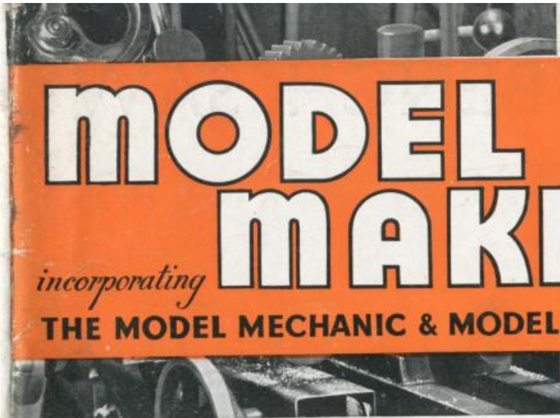
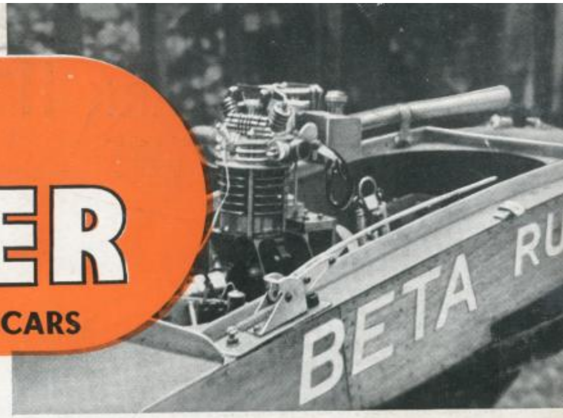
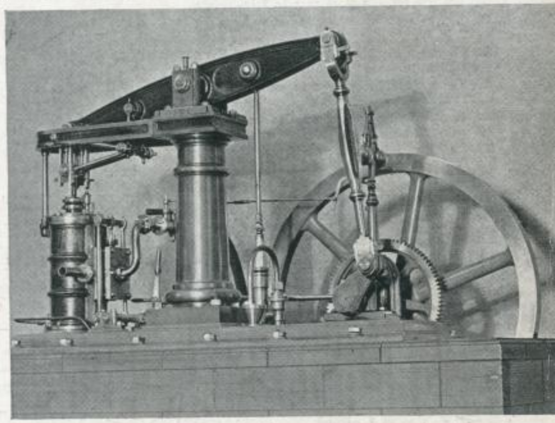
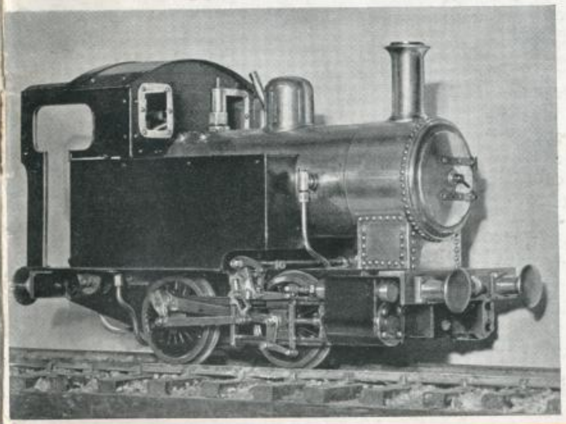
MODEL MAKER
incorporating THE MODEL MECHANIC & MODEL CARS









VOLUME 1 NUMBER 3 (New Series) FEBRUARY 1951

2/-

•new MARK II BENCH SAW

Introducing the vastly improved Mark II version of the popular Masco Bench saw—best of the old features retained, but note new points gained from world-wide use by purchasers.

1. Solid, strongly ribbed base to avoid distortion.
2. Improved rise, fall and tilting adjustments with strengthened fixing lug. Cutting zero to 1⅜in.
3. Table strongly ribbed underneath and 2½in. longer than Mark I model (now 11in. long).
4. Diecast Protractor Quadrant Angle Guide.
5. Circular woodcutting saw 6in. diameter (8 teeth pitch) of 20 s.w.g. steel to prevent flexing.
6. Adjustable fence, always parallel to blade. Positive locking from zero to 2¼in.
7. Large area phosphor bronze bearings for spindle.
8. High quality steel spindle ground to .001in. limits.
9. Three stout fixing lugs to ensure firm bench mounting.
10. Packed in returnable wooden box to obviate risk of transit damage.
11. Requires ¼ to ⅓ h.p. motor running at 1,400/3,000 r.p.m. Or treadle if 4in. saw substituted.
12. Easy terms available.

£6.6.0

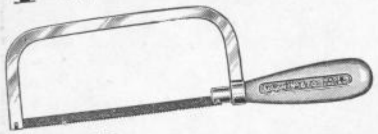
POST FREE DELIVERY

• EASY PAYMENT TERMS: 25/- Deposit with order and six monthly payments of 17/6. No references or guarantors required.

WHAT USERS SAY: "... a very compact job ..." "... a cabinetmaker ... will do ... a lot of work normally ... have to do by hand ..." "... the saw a great help ... will rebate grooves, cut tenons ..." "... will save a lot of time ..." "... equal to any of its size ... recommend to any keen modelmaker."

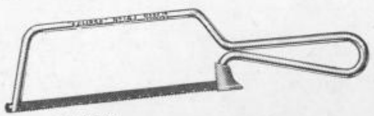
MODEL ACCESSORIES SUPPLY CO. (Dept. MM3) THE AERODROME, BILLINGTON ROAD STANBRIDGE, Nr. LEIGHTON BUZZARD

TWO HANDY SAWS for the tool kit...



ECLIPSE
No. 670 SAW FRAME

A neat, plated frame of the highest quality. The comfortable die-cast handle and strong bow ensure perfect balance and permit easy and accurate sawing. The pinned ends of the blades fit flush, one into the slotted bow and the other into the slotted tension screw, and so ensure complete protection.



ECLIPSE
No. 14J SAW FRAME

A neat, strong and handy saw of incomparable value with innumerable uses. It will cut metal, bone, wood, fibre and plastics and is especially suitable for light sawing work of every kind. It is supplied in a bright, plated finish, with blue rubber finger guard and complete with blade.

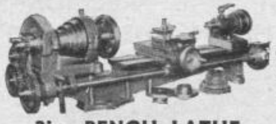
BOTH FRAMES USE 6″ JUNIOR SAW BLADES

EH 1960 Eclipse **TOOLS of QUALITY**

MADE BY JAMES NEILL & CO. (SHEFFIELD) LTD.
OBTAINABLE IMMEDIATELY FROM YOUR USUAL SUPPLIERS

SIX "JAGROSE" AIDS TO PRECISION MODEL MAKING

Surfacing. Screwcutting. Set-over Tail Stock.



Hollow Mandrel. Complete with set of Screw-cutting Gears.

3in. BENCH LATHE

A limited number only available! Cannot be repeated.

Carriage **£24 : 10 : 0** Extra

Or on E.P. Terms: £5.12.6 Deposit. Seven monthly payments of 63/7

3⅝″ model £49.10.0 (Faceplate 25/- extra). £12.7.6 deposit. Nine monthly payments of £4.19.0. Further particulars on application.

"JAGROSE" BENCH DRILL
Chuck to take up to ¼in. drill. Fully adjustable for height and swing.
57/6
Post 2/-.

"JAGROSE" BENCH GRINDER
with 4in. emery wheel.
10/6
Post 1/-.

Columbus Type Gauges	"JAGROSE" BENCH VICES 2½in.	3in.	3½in.	Hand Vices
15/9	17/6	21/6	29/6	2/11
Post 9d.	Post 1/-	1/3	1/6	Post.

JAMES GROSE LTD
379-381 EUSTON ROAD LONDON N.W.1 · EUS 5231

Make a better job of it! with the

HENLEY SOLON TRADE MARK **ELECTRIC SOLDERING IRONS**

5 models

CONSTANT HEAT

ALL THE HEAT IS IN THE BIT

PERFECT BALANCE FOR EASY HANDLING

ALL CONNECTIONS HOUSED AT END OF HANDLE AWAY FROM THE HEAT

CORD GRIP SECURES FLEXIBLE (prevents twist or pull being transmitted to internal wiring)

Write for Folder Y.10.

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

METAL for the MODEL MAKER

When you are planning to use

Brass, Copper, Bronze, Aluminium & Light Alloys

remember . . . you have a choice of 3,000 stock sizes of

ROD, BAR, TUBE, SHEET, STRIP WIRE, ANGLE, CHANNEL, TEE

at

H. ROLLET & Co Ltd

6 CHESHAM PLACE : LONDON, S.W.1

Phone: SLOane 3463

WORKS:

32/36 Rosebery Avenue LONDON, E.C.1

Kirkby Trading Estate LIVERPOOL

"No Quantity too Small"

ROWELL

MODEL RACING CARS

IF you are thinking of building a really fast 10 c.c. Racing Car this Spring so that you will be able to compete and share the joys of racing your own Car, we suggest that you write to us about your needs.

WE make a Racing Engine second to none and can also supply you with all the bits and pieces that are really necessary to handle the terrific power output of our Engine.

OUR prices too, are competitive, bearing in mind that our products are of a high precision nature. We would however, strongly advise would-be Car owners not to lose too much time in getting hold of their components if they wish a reasonable delivery period and prices at the present level.

A DIFFICULT period lies ahead of us all, and we are going to find it increasingly difficult to give the Service we would wish. Customers can be assured however, that we will do our utmost to supply all requirements in the least possible time.

IF you have not seen our book entitled **"MINIATURE RACE CARS—their design and construction"** why not send today for a copy. It costs only 2/- and is post paid. You will then be set on the right road to successful Car Racing.

ROWELL MOTORS LIMITED
93 VICTORIA ROAD, DUNDEE PHONE 4615

MODEL MAKER

ADVERTISER ORDER ENQUIRY

Please send me items below advertised in 'Model Maker' particulars of

I enclose remittance value ....

self-addressed envelope

To ....
(Name of advertiser)

....

....

From ....
(Name and address)

....

....

MODEL MAKER

ORDER FORM

To "Model Maker"
Allen House, NewarkeStreet, Leicester
I enclose remittance value 25/- for annual
13/- for six months
subscription to MODEL MAKER commencing with
..............................issue.

From Name..

Address..

....
BLOCK letters, please

NEWSAGENT RESERVATION FORM

To..
(Insert name of newsagent)

From..
(Insert own name)

Address..

....

Please reserve a copy of MODEL MAKER for me each month commencing with issue dated ....and continuing until cancelled.

MODEL MAKER PLANS SERVICE

All plans fully detailed and full size. ★ Castings available where indicated thus.

The Aerodrome : Billington Road : Stanbridge Nr. Leighton Buzzard : Beds. : Tel. Eaton Bray 246

Workshop Accessories, Engines, etc.

0.3 c.c. Compression Ignition Engine. The last word in tiny engines. Three times full size working drawings, size 28 x 20½ in. Price **5/-.**

★The Viking Launch Type Engine. Full size working drawings and full building instructions for this interestng and all too rarely published style of engine. Price **5/-.**

★Small Double Acting Oscillating Engine, for model boat propulsion. Bore 1/16 in., Stroke ⅜ in. Price **3/-**

★Motorised Self-acting Handshaper by L. H. Sparey. Adaption to mechanical operation of this useful tool. Drawing size 23 x 16½ ins. Price **3/6.**

Micrometer Boring Head. A valuable addition to the Sparey range of home-maće workshop accessories. Drawing size 18½ x 15 in. Price **2/-.**

Tailstock Turret Tool Holder. A multi use lathe accessory devised by L. H. Sparey that reduces working time to a minimum. For modelmakers and those who "make tools to make models." Full size working drawings, size 18½ x 20 in. Price **3/6.**

Collet Set. —worthwhile addition to any workshop. Full size working drawings, size 18½ x 14 in. Price **3/-.**

Four-way Toolpost. A simple lathe accessory that will appear to those who want a quickly made workshop aid. Full size working drawings, size 19 x 14 in. Price **1/6.**

Miniature Blowlamp. An indispensable "must" for the modelmaker's toolkit. Full size working drawings, size 18 x 13½ in. Price **1/6.**

Bench Saw and Lathe Saw Table. The original Sparey design as marketed by MASCO. Full step-by-step illustrated instruction leaflet with working drawing, size 38 x 28 in. Price **5/-.**

A Crocodile Truck for Drivers of Model Locomotives, by K. N. Harris. A 5 in. gauge truck for passenger-carrying model locomotives. Drawing size 28 x 20 ins. Price **3/6.**

Venetian Lamp. Elegant wrought iron hanging or porch lamp constructed without elaborate tools. Drawing size 32 x 26 ins. Price **3/6.**

Micrometer, accurate instrument that can be made for a few pence. Full size drawing **2/6.**

Coin Switch for Radio or Television Sets by viewer. Useful saving device on slot meter principle. Drawing size 26 x 18 ins. Price **2/-.**

Stationary Boiler & Horizontal Engine. Complete miniature steam plant fully detailed drawings of all parts. Drawing size 30 x 23 ins. Price **2/6.**

10 c.c. O.H.V. Engine. A powerful four-stroke petrol engine suitable for high-speed boat or race-car work. Full size working drawings, size 38 x 28 in. Price **5/-.**

★Change Wheel Dividing Head. By L. H. Sparey. Enables gear cutting, etc., to be carried out on the small lathe using the lathe change wheels. Drawing, size 28 x 21 in. Price **5/-.**

★5 c.c. Compression Ignition Engine. The most practical "diesel" in the country. Over a thousand have been built, often b ythe veriest tyros, from Editor L. H. Sparey"s design. Full size working drawings, size 28 x 18 in. Price **3/6.**

★0.8 c.c. Compression Ignition Engine. A small brother to the larger "Sparey" diesel, this newcomer to the range is ideal for a truly portable model aircraft or experiments with ultra small race-cars. Full size working drawings with details twice full size, size 22½ x 17½ in. Price **3/6.**

Fishing Reel with Ratchet Check. An attractive angler's accessory by L. H. Sparey, in ebonite and duralumin. Price **3/6.**

Simple Photographis Enlarger cheaply made without a lathe, that functions like a de luxe outfit. Price **3/-.**

Back Parting Toolholder for ML7 and similar lathes, neat, useful and easily made. Price **1/6.**

Special Change Wheel (50-1 internal reduction) for fine lathe feeds. Designed by "Aon". Price **2/-.**

45 c.c. 2-stroke Petrol Engine designed by L. H. Sparey. Suitable for lawn-mower, outboard engine, models, or workshop power. Price **8/-.**

Model Cars

Galeota Beginner's Model.—Overall length 18¾in., Overall width 3⅞in., Wheel base 11in., Track rear 8¾in., front 8in. Utilising engines of around 2.5 to 3.5 c.c. this model, capable of 25 m.p.h., is ideally suited to the beginner. Plan size, 30 x 30in. Price **7/6.**

M.G. Magnette.—G. H. Deason's version of the K3 supercharged Magnette. Aluminium tray-type chassis and aluminium and wood body. Scale appearance and reasonable speed in its class. Overall length 15in. Engines up to 3.5 c.c. Price **5/-.**

High-Speed Racing Austin.—A "cast-pan" chassis type semi-scale. Body built on "snip and solder" principle. Suitable for any 10 c.c. racing engine. Price **7/6.**

Austin Single Seater.—Simple friction-drive version of famous racing machine. Interesting beginner's model for engines up to 2.5 c.c. Price **2/6.**

Skirrow.—Scale model of popular British speedway car. Another mainly wood built beginner's model for engines up to 2.5 c.c. Price **2/6.**

Kitten.—G. H. Deason's original "kitchen-table special" that sold in hundreds as a kit, now available in plan form. Ply base, dural body, friction drive. Easy to build. Engines.75 to 2.5 c.c. Overall length 12¾in. Price **5/-.**

Jetmobile.—Jetex pewered semi-scale model of all wood construction—an excellent introduction to model car building. Price **1/6.**

★Dowson Lightweight.—Overall length 15¾in. Overall width 7¾in. Wheelbase 11in. Track 6¾in. Tyres 3¼in. For 5 c.c. engines. (Eight wheelcastings and base with axle fairings plus plan and instructions **25/-**). Plan only **5/-.**

"Standard Parts" Car Drawings

Each car in this series designed to make fullest possible use of prefabricated commercial parts, is drawn on two sheets, each measuring 30 x 20ins., and embodying side, front and rear elevations and all details required, and sells at the standard price of 10/6 for each car featured.

D Type E.R.A., 2-litre.—Overall length 17¾"; Overall width 6⅝"; Wheel base 11⅜"; Track 6"; Tyres 3¾" diameter. Independent coil springing; or alternative half-elliptic on rear wheels. Suitable for 5 c.c. engines.

Maserati Type 6c.—Overall length 18"; Overall width 7¾"; Wheel base 12¼"; Track 6⅜"; Rear clutch drive. Coil or leaf springing. Suitable for 5 c.c. engines.

M.G. Midget (based on T Type).—Overall length 16¾"; overall width 7"; Wheel base 11⅜"; Track 5⅞"; Tyres 3¾" diameter. Rubber or half-elliptic springing. Suitable for 5 c.c. engines.

Auto Union 1938 Grand Prix.—Overall length 17⅞"; Overall width 7"; Wheel base 11½"; Track 6¼"; Tyres 3¾" diameter. Underslung coil springing. F.W.D. with clutch or alternative layout for direct drive off the rear wheels. Suitable for 5 c.c. engines.

E. Type E.R.A. Grand Prix.—Overall length 18⅞"; Overall width 6⅝"; Wheel base 12⅜"; Track 6"; Tyres 3¾" diameter. Coil springing. Horizontally mounted engine driving by clutch through rear wheels. Suitable for 5 c.c. engines.

Gardner Record Car. — Overall length 19¾"; Overall width 6¾"; Wheel base 9⅝"; Track 4⅞"; Tyres 3" diameter. Horizontal engine mounting. Coil springing. Suitable for 5 c.c. engines.

The Buck 6-volt Starter.—Designed by one of the leading British experts, the Starter is a simply constructed accessory that has proven extremely handy. Utilising an ordinary car starter motor, this "gadget" makes for exceptionally easy starting of your model car engines. **Price 3/6.**

Prototype Plans—drawn from the original cars give scale outlines of famous marques, and are suitable for scale models utilising popular wheel sizes (mainly 3½in. dia.). Cars in the series are as follows:—4CLT/48 Maserati, 4½ litre G.P. Lago Talbot, Alfa Romeo (Monoposto P3), Bugatti (35B), E.R.A. (D Type), E.R.A. (E Type), Mercedes Benz (G.P. 1938), M.G. (Gardner Record Car), Auto Union (G.P. 1938), Maserati 6-cylinder, 1½-litre, Type 6C, 1½-litre Mercedes Benz, 1½-litre Delage, G.6 Amilcar, 350 h.p. Sunbeam, 120 XK Jaguar, Alta G.P., Alfa Romeo Type 158, S.S. 100, Connaught Comp. 2-str. B.R.M. Drawings, size 28½ x 21 in., are available at 2/6 post free.

Model Power and Sailing Craft

Coastal Sailing Barge "Will Everard"—½in. scale plans on five sheets for exhibition model—finest detailed drawings of their kind ever published. Per set **17/6.**

36in. Restricted Class Yacht "Lady Betty".—Full size plans of hull lines, etc., of this modern racing yacht. **7/6.**

24in. Stepless Hydroplane.—A freelance design based on the type of hydroplane popular in the Lake District. It is of easy construction, having no step, and is an ideal beginner's boat. On two sheets 40in. x 28in. and 40in. x 30in. Price **7/6.**

Walton Thames Air-Sea Rescue Launch—65ft. to ½in. to 1ft. scale (32½in. long). Spacious cabin accommodation, revolving gun-turret, rubber dinghy. Petrol engine up to 7.5 c.c., diesel 5 c.c., or other motive power. Three sheets each 40in. x 40in. Price **15/-.**

British Power Boat.—63ft. launch to ½in. to 1ft. scale (31½in. long). Suitable for any power as above. Rakish lines, clear swept deck. Good beginners boat. On three sheets each 40in. x 40in. Price **15/-.**

Vosper.—72ft. launch to ½in. to 1ft. scale (36in. long). This boat, being of light construction, is especially suited to rubber drive, giving a speed of about 4 knots. Fully detailed deck-ing, revolving gun-turret, etc. Three sheets each 40in. x 40in. Price **15/-.**

Thorneycroft.—63ft. launch to ½in. to 1ft. (31½in. long). Full-scale appearance and lifelike wake with bows well out of water. Revolving gun-turret, cabin, control room and twin dinghies. On three sheets, size 40in. x 40in. Price **15/-.**

28in. River Cruiser "Dubarry".—Perfect detailed scale replica of a Thames cruiser complete with deck fixtures. For Mills 1.3 c.c. Three sheets each 40in. x 30in. Price **15/-.**

Phantom II.—Miniature Racing Hydroplane for 5 c.c. engines by Norwegian designer Paul Sterud. Practical and well tested. Price **7/6.**

Chiquita.—24in. Cabin Cruiser of hard chine construction, suitable for electric, petrol or diesel drive. Drawing, 28in. x 22in. Price **7/6.**

Hydrojet.—One of the fascinating uses to which the new Jetex units can be put, is installation in a small hydroplane, the model being highly successful and capable of high speeds. Price **2/6.**

21in. Sailing Dinghy.—Scale model based on a 14ft. centre-board gaff-rigged, half-decked sailing dinghy. Centre-board lifts in scale fashion, full size clinker-built hull, properly clenched. Watertight compartments prevent capsizing. Two sheets each 40in. x 30in. Price **7/6.**

13in. Sailing Sharpie.—A scale model of a 13ft. Bermudan rigged three-quarter decked sailing sharpie. Having no centre-board is suited to shallow waters. On two sheets, size 40in. x 28in. Price **7/6.**

24in. Bermudan Sloop.—This 1in. to the foot model 4-ton (T.M.) centre-board hard chine cabin boat will appeal to enthusiasts. On two sheets, size 40in. x 32in., 40in. x 24in. Price **7/6.**

Elizabeth Regina.—Build a decorative Galleon from these fully detailed drawings. Designed by a specialist in this class of historical model, builders are assured of absolute authenticity. Price **2/6.**

YOUR PLANS BY POST! Any of these plans sent by return of post. For convenience of modelmakers who prefer unfolded drawings, orders will be sent rolled in stout cardboard tubes if requested when ordering: a further 1/- should be enclosed to cover cost of tube.

ILLUSTRATED LIST. A sixteen-page illustrated list is also available free of charge and will be sent on receipt of stamped addressed envelope, preferably size 9 x 6 ins.

KINDLY MENTION "MODEL MAKER" WHEN REPLYING TO ADVERTISEMENTS

A Full Comprehensive Service

FOR ALL MODEL MAKERS

We carry full stocks of all leading makes of kits

PECO . E.R.G. . STUART TURNER . SLATERS K.M.R. STOCKISTS . A complete stock of SMALL TOOLS suitable for modelling and large stocks of BALSA & PLYWOOD, ROD & SHEET METAL

Small Lathes

Power and Treadle Fret Machines in stock

We also have a constantly changing stock of Government surplus TOOLS at astonishingly low prices. It will pay you to give us a call.

SPECIAL OFFER: N.S.F. Verniers, brand new in polished mahogany cases, 6in., list price £8.10.0 - - £4.10.0

1½" high-speed Flutting Cutters, 2/- each

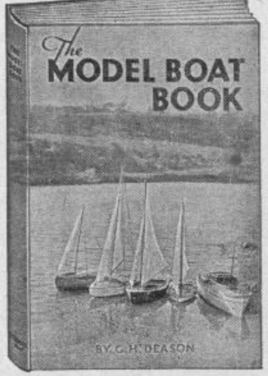
Full list sent with all orders

●

Precision Model Engineering Co.

61 Paradise Street, LIVERPOOL 1

Open SATURDAY *Phone: ROYAL 1174*



Provides a suitable groundwork for the not-so-expert and the nearly expert in the construction of all types of model boats. Stress is laid on such models as scale dinghies, sloops, sharpies, river cruisers, cabin cruisers and A.S.R.L.s. To non-working modellers the Tudor galleon Elizabeth Regina is offered. Methods of propulsion are covered in full. Full size plans of models described available from the publishers.

CONTENTS

Sailing Sharpie. Centre Board Dinghy. Bermudan Sloop. M-class Racing Yacht. Simple Electric Launch. Hydroplane. Hard Chine Cabin Cruiser. River Cruiser 'Dubarry'. Air-sea Rescue Launches. A Clockwork Driven British Power Boat. A Rubber Driven Vosper A.S.R.L. Two Power Driven A.S.R.L. Jetex Power Hydroplane. Decorative Galleon. Clockwork R.A.F. Tender. Model Steam Plants. Electric and Diesel Installations.

White art paper. 128 pages, size 8¾ x 5¾in. Over 100 illustrations in line and half-tone. Cloth and card cover, gold blocked title. Coloured dust cover.

PRICE **7/6**

(Or from the publishers 8/3 post free)

Drysdale Press Billington Rd., Stanbridge Near Leighton Buzzard

MODEL YOUR TRACK

Correctly modelled track, built to precision limits from guaranteed, branded, true-to-type components is your assurance of satisfactory trouble-free running.

The Peco Platelayer's Manual★ shows you how to plan the layout of your model railway, how to lay it down in trial form with specially cut and printed paper shapes (Peco Foundation Tapes and Point Plans) and, when the design is finally settled, how and where to lay each sleeper, chair and rail for precision running. The result is a properly laid and ballasted track which looks the real thing, and IS the real thing—in miniature.

Your trains will run faultlessly and you will exhibit your track work with pride if you use

PECO-INDIVIDULAY

True-to-type Components for the Home Constructor

★ The Peco Platelayer's Manual, post free 6/9

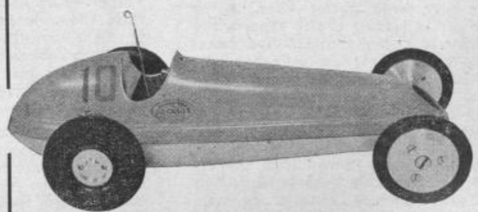
Catalogue post free 1/- from . . .

THE PRITCHARD PATENT PRODUCT CO. LTD.

Pecoway, Station Road, SEATON, Devon

JAO precision products

In model race car circles, the name of OLIVER is associated with good workmanship, fine materials, and high performance.



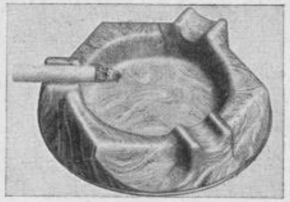
OLIVER "TIGER" TWO-FIVE COMPETITION RACE-CAR

Complete kit, less engine unit...	£3. 9.6
"Tiger" Standard unit and wheels	£7.10.0
"Tiger" Ball-bearing unit and wheels... ...	£8.18.6
Assembly, finish and test car. Extra	£2.10.0

All parts available separately, post free. Send postcard for "lists and drawings please" to Manufacturers:

J. A. OLIVER (Engineering)

136 Radford Road, NOTTINGHAM, England



FOR THE MODEL MAKER

"KARLENITE"

Entirely new Artificial Stone for casting Bookends, Ash Trays, Wall Vases, Statuettes, Plaques, etc. Karlenite sets granite-hard with a scintillating crystalline structure which very closely resembles Marble or Alabaster. It is enormously strong, highly resistant to heat, and impervious to water. Literally any type of natural veining can be simulated in any combination of colours, and a wide range of "Veining Pigments" is available for this purpose.

"ELASTOMOULD"

By means of the "Elastomould" technique you can easily produce permanent flexible mould for repetition casting, Bookends, Wall Plaques, Statuettes, Ornaments, etc., in quantities of thousands. "Elastomould" is a synthetic rubber substance prepared in convenient liquid form. The method of use is incredibly simple, and moulds can be taken from any type of pattern including Wood, Metal, Plaster, Stone, Glass Earthenware, Ivory, etc. "Elastomould" will faithfully reproduce even the most minute details of ornamentation and surface texture. It is equally suitable for casting articles in Cement, Plaster or Karlenite.

EXTRACTS FROM LETTERS RECENTLY RECEIVED:—

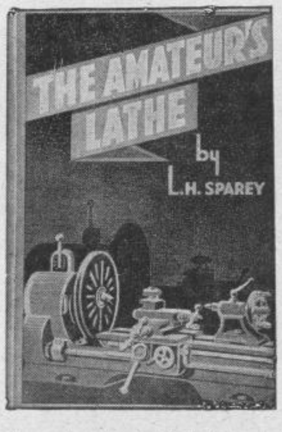
" . . . Having sampled your product Karlenite, I am pleased to say that it is the finest material I have ever used, and suits my purpose admirably well."

" . . . I have now had an opportunity of trying your "Elastomould" and find it very suitable for the type of mould we require. The main feature that impresses me is that while extremely elastic, it is far more rigid than the hot melt compounds I have tried before."

Start your own Business. Send 1/- for full details of this easy, fascinating and profitable hobby.

Dept. MM4 KARLENA ART STONE COMPANY

55 DEANSGATE ARCADE, DEANSGATE, MANCHESTER 3



Three colour dust jacket, cloth bound, title gold blocked on spine. Size 8¾ x 5½ in. white art paper. Over 200 half-tones and line illustrations. 232 pages. From Booksellers and Model Shops (or direct, including insurance and packing, price **12/6**.

20,000 READERS CAN'T BE WRONG!

★ TWENTY THOUSAND copies of this book have been printed!!! Several thousand copies have been sold by the leading manufacturers of small lathes in this country. What finer recommendation could there be for such a book as this?

★ Never before, in the history of model engineering, has there been written such a comprehensive book on the subject of work for the amateur's lathe. You will save the cost of this book within a few weeks of its purchase!

★ Mr. Sparey has had over 30 years' experience of workshop and journalistic practice, and it is this unique combination which has enabled him to write what is easily a best seller amongst current engineering literature in this class.

★ Figures count—and tell the whole story! There have already been two reprints of this title. Sales are world wide and steadily increasing. Twenty thousand copies means twenty thousand engineers who, at the relatively nominal expenditure of 12/6, have provided themselves with the most up-to-date and comprehensive handbook available on small lathes.

★ You cannot afford to be without *your copy* . . . now is the time to place your order . . .

The DRYSDALE PRESS

THE AERODROME, BILLINGTON ROAD STANBRIDGE, Nr. LEIGHTON BUZZARD

MODEL MAKER
incorporating THE MODEL MECHANIC & MODEL CARS

THE MONTHLY JOURNAL FOR ALL MODEL MAKERS

Managing Editor :
D. A. RUSSELL, M.I.Mech.E.

Co-Editors :
G. H. DEASON
D. J. LAIDLAW-DICKSON

Assistant Editor :
G. A. CULL

Published monthly on the 1st of the month. Subscription Rates - 25/- per annum prepaid, or 13/- for 6 months prepaid.

Editorial and Advertisement Offices :
THE AERODROME, BILLINGTON ROAD
STANBRIDGE, Nr. LEIGHTON BUZZARD, Beds.
Telephone : EATON BRAY 246.

Contents

VOLUME I No. 3 (New Series) FEBRUARY, 1951

THE EVER EXPANDING CIRCLE

IN presenting this, our third number of *Model Maker* to a critical public, we are conscious of some small feeling of satisfaction in having widened our range of interests by the promised inclusion of more on miniature railways, by the introduction of model tramways, and such unusual features as a model fishing village and even a model of Pharoah's daughter!

We expect our readers to press the claims of those modelling aspects which appeal most to them personally, but we have bene amazed by the volume of correspondence received from model yatching enthusiasts who would welcome more space devoted to their hobby. This hobby has expanded far more rapidly in the post-war years than has the literature devoted to it, and, is particularly fortunate in enjoying the wholehearted support of a number of local authorities, such as at Brighton and Fleetwood, to name but two, where yatching basins have been placed at the disposal of clubs.

Our columns will always be open for authoritative articles on model yatching subjects, in proportion to the relative interest of our readership as we have assured our correspondents. In this issue the popular Braine steering gear is discussed, and in another article load waterline calculations are considered. The first step towards building up a virile model yatch section must come from our readers in the shape of contributions, illustrated we trust, with really good photographs. But equally with the development of an editorial content must come advertising support. We have already extended a hand of welcome to our advertisers, now we address our remarks particularly to those marketing items of interest to the model yacht movement—makers of sails, retailers of accessories, manufacturers of constructional kits. We will back you—will you back us with information on your products for our reviews, with advertisements in due season to satisfy the demand we have created?

Let us hope that with our next number our would-be model yachting supporters will find those welcome signs to encourage them to believe we are truly with them. But first let some of the more expert amongst them down tools for a few evenings on their summer projects to put pen and pencil to paper to provide us with the sort of articles they would like to read.

ON THE COVER . . .

Another cross-section of our interests. Top right: Typical racing hydroplane power installation; in the centre exhibition beauties — a tank loco and a beam engine; at the bottom coastal sailing barge "Will Everard" and Clark Gable in his Offenhauser, subject of a new model building contest.

Mony a Mickle Makes a Mike

WHEN I took up model engineering after being demobbed, tools and equipment were very scarce and prices were prohibitive. However, I managed to obtain a lathe of sorts, several hand tools and a hand bench drill. From then on I was soon lost in a world of "thous", centre heights, feeds, speeds and clearances, but something was missing. The need for fine measurement during turning operations indicated that a micrometer should be the very next addition to my tool kit. There were none to be bought in the shops, and the ones offered secondhand often in poor condition were more than I could afford.

Looking through some old engineering magazines, I came across a sectioned drawing of a micrometer, and the idea was born. "Why not make one"? The following notes are a resume of the methods used in making, the only money actually spent on the project being sixpence.

Not having a micrometer from which to take measurements, I had to visualise one and when making working drawings had to scale them accordingly. These completed, I raided the junk box and found a suitable piece of mild steel from which the frame was sawn and filed to shape (Fig. 1). All the parts excepting the spindle were made from pieces of mild steel found in the junk box.

The Anvil Bearing and Locknut Housing

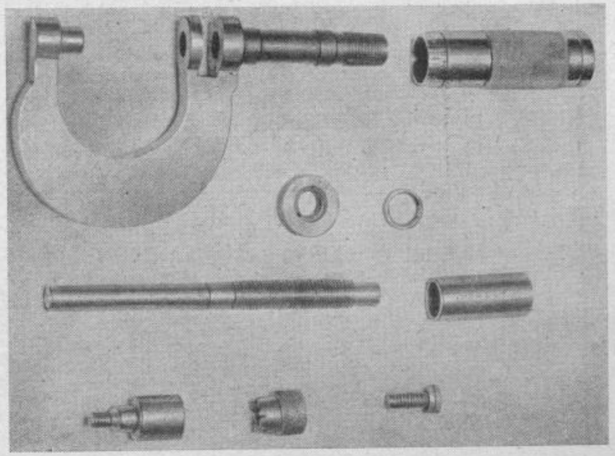
A short piece of mild steel was turned to $\frac{5}{8}$ in. dia., drilled and reamed a $\frac{1}{4}$ in., then opened out to $\frac{5}{16}$ in. to a depth of $\frac{5}{16}$in. and parted off to $\frac{19}{32}$ in. in length. (A. Fig. 1). A second piece was turned to $\frac{3}{8}$ in. dia., pilot drilled $\frac{1}{8}$ in., and the hole opened out with an old $\frac{1}{4}$ in. drill the lands of which had been carefully slip-stoned down, the resultant hole being approximately one thou. undersize and a nice press fit for the anvil. (B. Fig. 1). This was parted off $\frac{1}{4}$ in. long. A 6 in. piece of $\frac{1}{4}$ in. rod was put in the three jaw chuck and with the lathe running at top speed, one end was reduced by applying emery cloth folded over a flat file, until the anvil bearing was a very light push fit. The locknut housing was slipped on the opposite end, and the two pieces were presented to the frame to enable the seatings to be filed until a snug fit was obtained.

Spindle

This was the only purchase made in constructing the "mike" being a piece of silver steel $\frac{5}{16}$ in. in dia. This was set up in the four jaw chuck with $2\frac{5}{16}$ in. inside the chuck. When running perfectly true, with $3\frac{1}{4}$ in. projecting, it was turned to a dia. of $\frac{19}{64}$ in., and the $\frac{7}{32}$ in. dia. by $\frac{1}{4}$ in. long was turned up to the chuck. Change wheels were set up and the remaining portion was screw-cut 40 threads per inch. No definite depth of cut was worked, the screw cutting continued till the threads came to a nice clean point, note being taken of the index readings to enable the root diameter and drill size to be calculated for drilling the spindle-nut at a later stage. The readings indicated that $\frac{17}{64}$ in. drill would be needed. The next operation was to cut off $1\frac{1}{4}$ in. of the threaded portion, which was put on one side till it was needed to make the tap for threading the spindle-nut.

The piece still in the lathe was faced, centre drilled and the tailstock brought up for support, and the end turned to a $\frac{1}{4}$ in. dia., for a length of $\frac{1}{2}$ in. thus leaving $1\frac{1}{4}$ in. of thread. A number 25 drill was put in the tailstock chuck, and the end drilled and tapped 2 B.A. to a depth of $\frac{7}{16}$ in. The tap was replaced with a slocombe drill having a $\frac{1}{4}$ in. dia. body and was fed into the work until the 60° tapered hole was cleaned out. (B. Fig. 9).

The work was then reversed in the chuck, using a thin piece of copper sheet to protect the threads, set to run true, centred, and the tailstock brought up for support, and turned to a $\frac{1}{4}$ in. dia. I found that a sharp parting off tool gave a very good finish. The whole job was pushed back in the chuck leaving $\frac{1}{4}$ in. protruding. With a very sharp parting tool set to exactly centre height, $\frac{7}{16}$ in. was carefully parted off using bags of coolant. This piece is the anvil, and the remaining length is $1\frac{13}{16}$ in. called for in the drawing. Machining on the spindle was now complete and all that remained to complete the job was to cut the three equidistant slots in the coned end. (C. Fig. 9). All work on the spindle called for very light cuts and fine feeds, any heavy handedness would have resulted in disaster.



Left : The completed parts ready for assembly.

Above right : Micrometer assembled—approximately two-thirds fullsize.

The Tap

The piece of $1\frac{1}{4}$ in. x $\frac{19}{32}$ in. x 40 t.p.i. was put in the chuck and a half inch turned to $\frac{1}{4}$ in. dia., to provide the shank, then put in a machine vice, packed to the correct height on the boring table and the flutes cut. A fly-cutter was ground to shape using another tap as a template, then mounted in a boring bar between centres.

Three flutes were cut and the embryo tap fastened in the three jaw chuck by the plain portion, and emery paper on a flat file was used to give the tap a slight lead. Hardening to a dark straw completed this job.

The Spindle-nut and Sleeve Bearing

This was turned to the dimensions given in Fig. 2. The coned end was turned by offsetting the tailstock and was screw-cut 40 t.p.i. at the same setting, after which it was put in the four jaw, set to run true and the whole drilled for tapping using a succession of drills increasing in size. The tapping was done with the tap in the tailstock chuck until about eight full threads were obtained, the tap withdrawn and replaced by a $\frac{19}{64}$ in. drill, the work reversed in the chuck and the hole cleaned out to a depth of $1\frac{1}{16}$ in. The tapping was completed in the vice and the three equidistant slots cut in the coned end.

Assembling Frame Anvil Bearing and Locknut Houting

This job needed about six pairs of hands but with much juggling, the anvil bearing and locknut housing still on the prepared $\frac{1}{4}$ in. rod were tied to the frame with soft iron wire, and the spindle nut and sleeve bearing pushed into its housing. (Z. Fig. 1 and 2). The three joints were silver soldered, and after quenching the anvil having been hardened right out was pressed home in the vice, and the spindle screwed into the nut till it contacted the anvil. Due to the alignment of the parts with the $\frac{1}{4}$ in. prepared rod and the careful parting off, the anvil and the spindle matched perfectly, no light being visible between the two parts. The spindle was removed and the slot for the locknut cut going down into the frame $\frac{1}{8}$ in. The method of locking the spindle is not the orthodox one, but is quite effective. In effect, the locking nut being drilled $\frac{1}{32}$ in. off centre, when turned bears against the bottom of the slot, and jambs the spindle via the fibre centre pieces.

The Sleeve

This was a straightforward turning and drilling job, the $3\frac{1}{8}$ in. dia. hole being a slight push fit on the $\frac{3}{8}$ in. shoulders on the spindle nut. A line was engraved along its axis with a pointed tool on its side in the tool post. This is the datum line, but the rest of the engraving was carried out at a later stage.

The Barrel

This part was turned and bored to the dimensions in Fig. 4, and the knurling carried out, the final machining being the bevel to receive the 25 divisions, done by swivelling the top slide, and the line engraved on the shoulder with a pointed tool. A 50-tooth wheel was mounted on the mandrel and a suitable indent fixed up. Alternate teeth were marked giving 25 divisions. A tool ground like a screwcutting tool with a very sharp point was placed on its side in the tool post. With the indent in the first tooth, the tool was fed forward till it just touched the small end of the bevel, and the cross slide set to zero. By means of the top slide handle the tool was moved towards the headstock until it reached the line engraved on the shoulder. This was repeated the tool being fed in each time by two thous., until the first line was engraved to a suitable depth, note being taken of the cross slide index. The movement of the top slide index was also noted and the mandrel moved round one more division, and the process repeated, but this time the tool was only allowed to move half the distance by the top slide reading. This operation was repeated and on the fifth time the tool was taken up to the shoulder line, and the whole series repeated until the 25 divisions were engraved. Burrs were removed by using a fine file and emery paper with the lathe revolving at top speed. The numbers were now stamped in increments of five beginning with 0.

Ratchet

The ratchet also serves as the means of securing the barrel to the spindle via the 2 BA screw on the base part, the coned shoulder fitting in and expanding the slotted cone on the end of the spindle. Straightforward machining completed this part, the only part needing comment is the hole which received the spring and pawl. (I chose a No. 42 drill, the reason being I had a broken one, the shank of which made the pawl.)

The upper part was drilled 3/16 in. clearance for the 2 B.A. screw (which was cut to length by trial and error) and counter bored to house the head. (Sectioned drawing Fig. 6). The ratchet was formed by cutting four slots right across at 45° to each other with a fine hacksaw, and filing the teeth to shape. The spring was made by winding one strand of Bowden inner cable round a No. 56 drill, the drill shank already referred to used as the pawl. Some experimenting had to be done before the right tension was found.

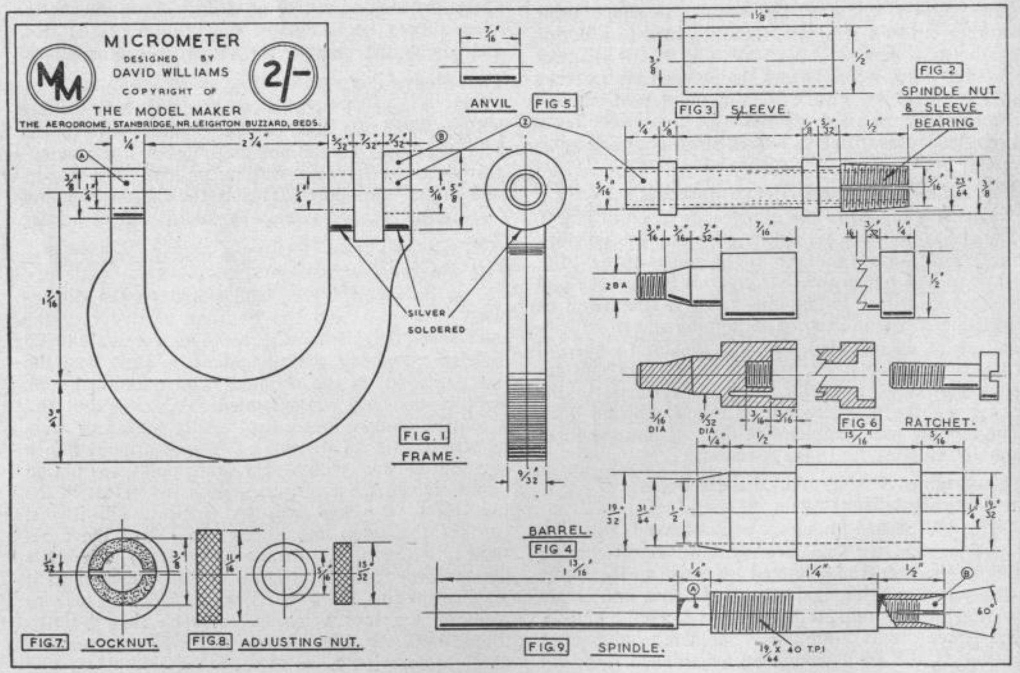
The Lock-nut and Adjusting-nut

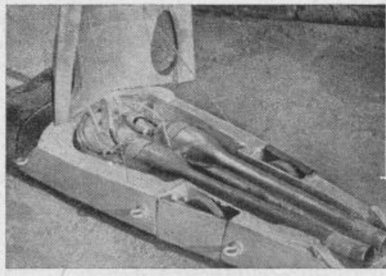
These were simple turning, drilling and knurling jobs. The hole in the lock-nut being drilled 1/32 in. off centre and then fitted with the fibre inset (Fig. 7) which was drilled 1/4 in. then cut across the centre. The adjusting-nut is tapped 40 t.p.i. to match the small end of the cone on the spindle-nut.

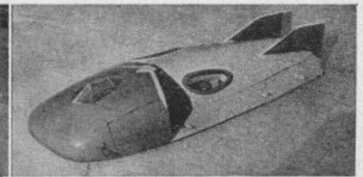
Trial Assembly and Finding the Zero Line on the Sleeve

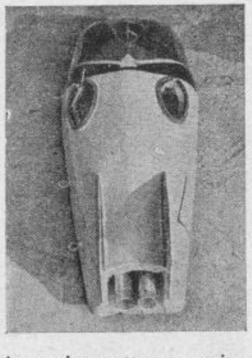
All parts were now complete and the job assembled. First the sleeve was pushed home on the shoulders on the spindle-nut, the engraved line in the position it would be in use. The adjusting-nut was screwed on one complete turn and the lock-nut slipped into its slot. The spindle was screwed home till both face of the anvil and spindle were touching as when used in measuring. At this point the spindle was clamped in the vice without any movement being allowed, and in such a manner as to ensure that no movement could take place whilst the barrel was pushed home with the zero mark matching the datum line on the sleeve. The base of the ratchet was screwed in tightly, followed by the upper part

(*Continued on page* 187)









Francis X. Gruber's latest pet, a twin Dynajet r.t.p. racer, seen (left) with the lid off, showing the jet units and heat-insulated interior, and (above and right) ready for action.

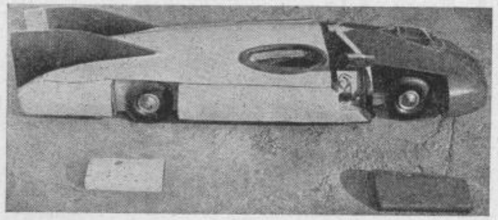
CAN YOU BEAT IT?

THE large jet powered model car is something of a Cinderella in this country, where no class is included for racing such projectiles, although the smaller types, burning propellant cartridges, are quite popular. In America, however, they like 'em big, as would appear from the following.

Some time ago there appeared in our pages a description of some experiments by Francis X. Gruber, of Albany, New York, with four large models powered by Dynajet units. When last we heard from him, his main difficulty lay in finding a suitable site on which to run his larger models, before the cops appeared, and he was concentrating on indoor jobs powered with Jetex motors. However, the call of the wild evidently got him again, and, having considerably shaken the neighbourhood with some of his motors in the past, he decided to do things in a *really* big way! Francis really *likes* jet motors. He must, for his latest effort houses not one, but two, and, as anyone who has experience of them will know, a full-blooded "Dynajet" is no nursery plaything!

"Red Nose Demon" is the new model's baptismal name, and its weight in fighting trim is all of 17 lb. The body is built of balsa and white pine, and measures 40 in. in length, 12 in. wide, and 10 in. high at the tail fins. The body is built to open at the rear for access to the jet unit, and for general adjustment. The tremendous heat generated by the Dynajets is insulated from the bodywork by lengths of 1/16 in. sheet asbestos, and the whole of the interior painted with four coats of heat-resisting silver paint. The wheels are 4 in. Heco Voigt racing pattern, running on 1/4 in. axles, and are accessible for lubrication and removal by detachable side panels. Originally each jet was supplied from its own 2½ oz. fuel tank, but 4½ oz. tanks have since been substituted, as the consumption was anything but modest.

"Red Nose Demon" with wheel covers detached and showing the starting plug sockets.



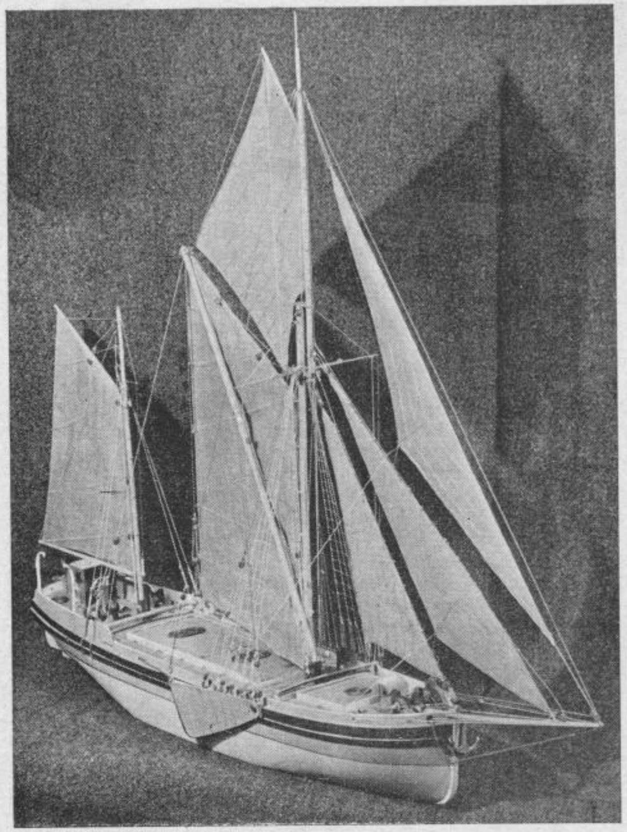
Electrical and air connections are made through plugs in the side of the car, facing the outside of the track, so arranged that they can quickly be pulled free once the motors are started up. These plugs are concealed by a hinged flap for running. Large air inlets are cut in the decking above the jet heads, and two air vent tubes from the fuel tanks project near the nose. Four massive eye-bolts are fitted, reinforced by a full length steel strap inside the body, to take twin bridles, and we should say they can't be too hefty! Four 60 lb. steel cables are used for tethering.

The big day arrived when the monster was to be loosed on the unsuspecting inhabitants of Albany, using a 70 ft. circle on an abandoned used car lot, which fortunately had the smooth surface required by a ½ in. ground clearance!

The first run was "slow", a mere 90 m.p.h., accompanied by much banging and popping, hardly sufficient to incommode the portable pylon, which was weighted with large lead blocks for the occasion. On the second attempt, 125 m.p.h. came up fairly easily, the vehicle still behaving like a land-based job. A spot of wheel lubrication, and next time this fearsome contrivance was seen to be travelling mainly on one wheel and occasionally on none, at 160 m.p.h. Things must have loosened up nicely by this time, for the fourth and last run resulted in a series of circuits at a speed calculated to be 176 m.p.h.! How this prodigous velocity was timed we do not know, since its intrepid creator states quite frankly that the car was just a roaring blur by this time, and he was beginning to doubt the wisdom of stepping things up much higher! Wheels used, if any, on this run, were the outside pair. An attempt to reach 200 m.p.h. was foiled by the timely discovery that one of the supporting arms of the pylon had fractured. However, our correspondent is all set to go again, and next time promises action pictures!

The Coastal Sailing Barge "Will Everard"

PT. V. RUNNING RIGGING AND BENDING OF SAILS : : BY BERNARD REEVE, M.S.N.R.



The Running Rigging

THIS comprises all halyards, sheets, brails and other gear used in the management of the sails. Much of this will be clear from the details in Sheet 4, such as the enlarged details at the head of the sprit, and the reeving of the special main sheet block to mention only two items. Some modifications have been made from the prototype to suit the needs of a model. So please study sheet 4 in conjunction with the general arrangement drawing on sheet 5 when reading these instructions in order to familiarise yourself with the general layout.

Jib Topsail "A"

This is "set flying" i.e. not hanked to the topmost forestay. A single block is shackled to the head of the sail, and another block attached to the topmast hounds. The halyards are rove through these blocks (Part 12) passed down the mast and belayed to a cleat on the mast.

Topsail Sheet (Part 20)

This sheet is double. It is attached to the clew of the sail (see Fig. 1 for parts of sail), one part passing on the starboard side of the jib, the other on the port side. They then lead through a bullseye (Fig. 2) lashed to No. 2 shroud 5 ft. 6 in. up from the deck (Fig. 3).

Jib "B"

This is hanked to the jib stay (Part 2) with 15 hanks. These hanks are "U" shaped metal rings sewn to the luff of the sail through which the stay passes to allow the sail to be raised and lowered. The tack is made fast to a fixed ring on the bowsprit. The head is fitted with a single block, another block is shackled to the lower end of the topmast just below the mast cap and the halyards (Part 13) are rove through these two blocks, pass down the mast and are belayed to a cleat on the mast case.

Jib Sheet (Part 21)

This is also double and is shackled to the clew of the sail. One part goes over the forestay to port, and the other part to starboard. The running part belays to cleats inside the bulwarks.

FIG 2 BULLSEYE

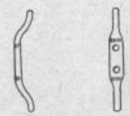


FIG 3 SHROUD CLEAT

Foresail "C"

This is hanked to the forestay (Part 3) by 11 hanks. The tack is shackled to an eye on the upper stay-fall block. A single block is shackled to the head and a further block shackled to the ironworks of the yoke. The halyards are rove through these blocks: the standing part being made fast just below the hounds and the running part made fast to a cleat on the mast.

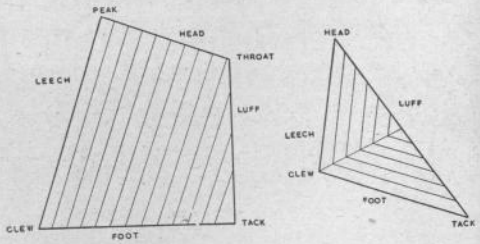


FIG 1 PARTS OF A SAIL

Foresail Sheet (Part 22)

A modification to the detail shown at 22 on Sheet 5 is required. The sheet is peculiar to barge rigs and consists of a wire tye encircling the fore horse. One end is shackled to a clew cringle, the other end terminates in another cringle. This is lashed to a further clew cringle with a lanyard. Fig. 4 shows the arrangement of the sheet and traveller which should make the setting up together with the bowline made fast to No. 1 shroud either to port or starboard according to the set of the sail.

Topsail "E"

The sail is attached to the topmast by eight mast hoops (see Fig. 5). The head is lashed to an oval head stick. This head stick has a halyard attached, which passes through a single block (Part 13) attached to the hounds of the pole mast, down the mast and ends in a cringle. A single block is shackled to this cringle. The halyard purchase is attached to the bottom of this block, is rove through a lower block secured to the chain of the muzzle up through the upper block and belayed to a cleat on the mast (see "Detail on foreside of the mast case" on sheet 4).

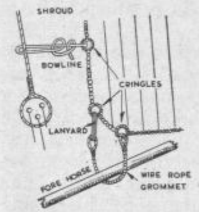


FIG 4 FORESAIL TRAVELLER

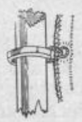


FIG 5 SECURING SAIL TO MAST HOOP

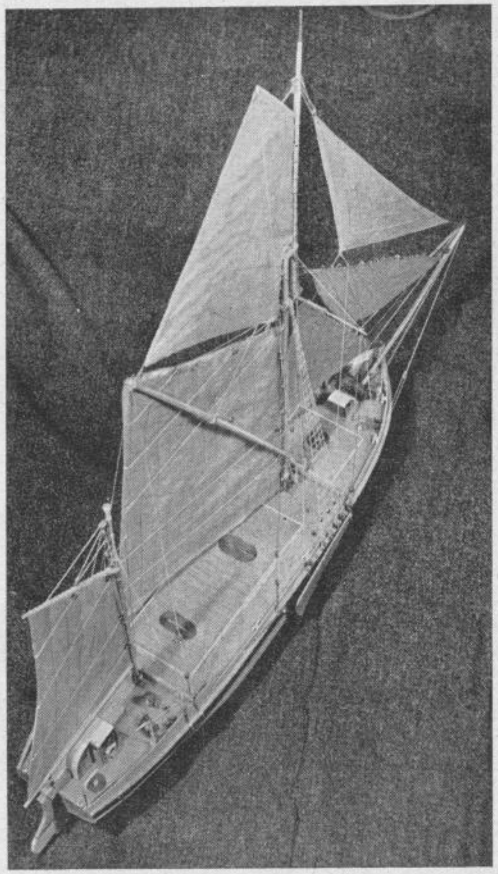
Topsail Sheet (Part 16)

This consists of a short length of chain shackled to the clew. This chain, with a length of wire attached passes through a single iron block attached to the head of the sprit. From this block the wire sheet passes along the sprit ending in a single block. The whip purchase standing part is made fast around the stanliff, up through the block at the end of the wire sheet down through a block shackled to the chain of the stanliff and belays to a cleat on the starboard side of the sprit. The tack is made fast to a belaying pin on the mast case.

Mainsail "D"

This sail is attached to the mast by means of a jack-stay and shackles. The jackstay consists of a thin cycle spoke, about 18 gauge and of rustless metal. This is passed through a series of very small screw eyes attached to the mast. To keep the jack-stay in place turn the ends at right angles, file to a point and press into the mast, but do this after you have threaded it through the screw-eyes, which in turn are screwed into the mast before threading the jackstay. This may seem rather superfluous advice, but it is surprising how small items such as this are apt to be missed when absorbed in a particular job.

Reference to the detail "Method of Fixing Mainsail to Mast" on Sheet 4 will show how the sail is attached to the jack-stay by means of shackles of 'U' shaped wire passing through cringles in the luff of the sail. These cringles, as has already been men-



Description	Key No. on Plan	Size & Type on Prototype	Size & Type on Model	Remarks
TOPMAST FORESTAY	1	2" F.S. Wire	24 g. S. Wire	
JIB STAY	2	2" F.S. Wire	24 g. S. Wire	
FORE STAY	3	4" G.I. Wire	18 g. S. Wire	6' 6" loop
TOPMAST BACK STAY	4	2" F.S. Wire	24 g. S. Wire	
SHROUDS & RATLINES	5	3" G.I. Wire	24 g. S. Wire	
PENDANT & RUNNER	6	2" F.S. Wire	24 g. S. Wire	Single iron block
RUNNER BACKSTAY	7	2" F.S. Wire	24 g. S. Wire	
VANGS	8	2" G.I. Wire	24 g. S. Wire	
VANG TACKLE	—	2½" M. Rope	No. 2 S. Silk	
SPRIT UPHAUL	9	3½ G.I. Wire	18 g. S. Wire	
CROSS TREE UPHAUL &	10			
DOWNHAUL	10a	2½" M. Rope	No. 2 S. Silk	
TOPMAST UPHAUL	11	1½" F.S. Wire	24 g. S. Wire	
JIB TOPSAIL HALYARDS	12	3" M. Rope	No. 3½ S. Silk	
JIB HALYARDS	13	3" M. Rope	No. 3½ S. Silk	
FORESAIL HALYARDS	14	3" M. Rope	No. 3½ S. Silk	
TOPSAIL CLEWLINE	15	3" M. Rope	No. 3½ S. Silk	
TOPSAIL SHEET	16	5/16 Chain & 12" F.S. Wire	24 g. S. Wire & Chain	Wire shackled to chain
TOPSAIL HALYARDS	17	3" M. Rope	No. 3½ S. Silk	
JIB TOPSAIL DOWNHAUL	18	3" M. Rope	No. 3½ S. Silk	
STAY FALL TACKLE	19	2½" F.S. Wire	24 g. S. Wire	
JIB TOPSAIL SHEET	20	2½" F.S. Wire	24 g. S. Wire	
JIB SHEET	21	3" M. Rope	No. 3½ S. Silk	
FORESAIL SHEET	22	3" M. Rope	No. 3½ S. Silk	
		5/16 Chain	Chain &	Wire shackled to chain
BOBSTAY	23	2" G.I. Wire	24 g. S. Wire	
BOWSPRIT SHROUDS	24	12" F.S. Wire	24 g. S. Wire	
MAIN SHEET	25	3" M. Rope	No. 3½ S. Silk	
OUTER PEAKS	26	3" M. Rope	No. 3½ S. Silk	
INNER PEAKS	27	3" M. Rope	No. 3½ S. Silk	
MAIN BRAILS	28	1½" F.S. Wire	24 g. S. Wire	
MIDDLE BRAILS	29	3" M. Rope	No. 3½ S. Silk	
LOWER BRAILS	30	3" M. Rope	No. 3½ S. Silk	
MIZZEN BACKSTAY	31	1½" G.I. Wire	24 g. S. Silk	
MIZZEN SHROUDS	32	3" M. Rope	No. 3½ S. Silk	
MIZZEN PEAK HALYARDS	33	3" M. Rope	No. 3½ S. Silk	
MIZZEN THROAT HALYARDS	34	3" M. Rope	No. 3½ S. Silk	
MIZZEN TOPPING LIFT	35	3" M. Rope	No. 3½ S. Silk	
MIZZEN PEAKS	36	3" M. Rope	No. 3½ S. Silk	
MIZZEN MAIN BRAILS	37	2½" M. Rope	No. 2 S. Silk	
MIZZEN MIDDLE BRAILS	38	2½" M. Rope	No. 2 S. Silk	
MIZZEN LOWER BRAILS	39	2" M. Rope	No. 1 S. Silk	
MIZZEN SHEET BRAILS	40	3" M. Rope	No. 3½ S. Silk	
REEF CRINGLES	41		Crochet Silk	
REEF POINTS	42		No. 0 S. Silk	
ROPES COILED ON MAIN HATCH				
TOWLINE	60 fthms.	7" Bass	7' 6" Water-cord	
MOORING ROPE	60 fthms.	7" Bass	7' 6" Water-cord	
WARP (2)	50 fthms.	Each 5" M.	6' 3" Water-cord	
BOLT-ROPES ON SAILS				
MAIN SAIL: Head Rope		2½" F.S. Wire	24 g. S. Wire	
Foot Rope		1½" M. Rope	No. 1 S. Silk	
Luff Rope		3" M. Rope	No. 3½ S. Silk	
Leach Rope		3½" M. Rope	No. 4 S. Silk	
FORESAIL: Bolt Rope	C	2½" M. Rope	No. 2 S. Silk	
Lee & Foot Rope		2" M. Rope	No. 1 S. Silk	
TOPSAIL: Bolt Rope	A	2¾" M. Rope	No. 3 S. Silk	
Lee & Foot Rope		2½" M. Rope	No. 1 S. Silk	
JIB TOPSAIL: Bolt Rope	B	2½" M. Rope	No. 2 S. Silk	
Lee & Foot Rope		2" M. Rope	No. 1 S. Silk	
MIZZEN: Head Rope		2¾" M. Rope	No. 3 S. Silk	
Foot Rope		2½" M. Rope	No. 1 S. Silk	
Luff Rope		2¼" M. Rope	No. 1 S. Silk	
Leach Rope		2½" M. Rope	No. 1 S. Silk	

KEY F.S.=Flexible Steel Wire Rope. G.I.=Galvanised Iron Wire Rope. M.=Manilla Rope. S. Wire=Stranded Phosphor Bronze Wire. S. Silk=Surgical Silk.

tioned, are pierced holes worked round with a button hole stitch. The ladies will be only too pleased to do all your sail work for you and do not need me to tell them how to set about the job.

At the head of the sail is a rope grommet or becket into which the end of the sprit fits (Sheet 4 "Detail at Head of Spreet or Sprit"). There are eight cringles in the leach of the sail, five for the brails (Parts 26, 27, 28 and 29) two reef cringles and a clew cringle. The thread of the sail is lashed to the hounds (Sheet 4) and the tack to the mast foot.

The Sprit (or Spreet)

This heavy oregon pine spar supports the main sail and is held in position by means of an iron band at its foot shackled to a "muzzle" or iron collar around the butt of the mast with heavy iron links. (Sheet 4). Around the middle of the spreet

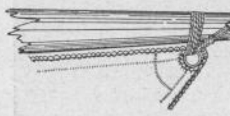


FIG 6 SECURING A SAIL TO THE BOOM END

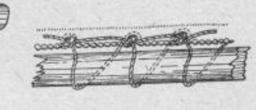


FIG 7 LACING A SAIL TO A BOOM.

is an iron band to which is shackled the sprit up-haul (Part 9) consisting of a wire passing through a block on the after side of the mast down to a block shackled to one of the links of the muzzle. The purchase is rove through this block down through a block at the foot of the mast case and belayed to a cleat on the mast.

The Brails

The main sail is furled by means of brails which draw the sail up to the mast in much the same way as a theatre curtain is "brailed-up". These consist of: Part 26 the outer peaks, Part 27 the inner peaks, Part 28 the main brails—these are double, one brail on each side of the sail united after passing through the block Part 29. The middle brails and finally Part 30 the lower brails.

All lead through their respective blocks two in the head of the sail, one at the throat (for throat fixing refer to Sheet 4) and two attached to luff or jack-stay shackles on the middle and lower part of the mast. All brails unite and are brought to the brail winches for hauling.

Owing to their length the middle and lower brails pass through "lizards" ((iron rings) sewn to the sail midway between the leach and the luff—shown as circles on the mainsail (Sheet 4).

Reef Points

There are two rows of reef points consisting of $\frac{3}{4}$ in. lengths of fine white thread passed through the sail on both sides and knotted in position.

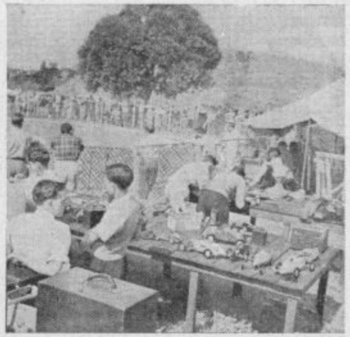
Vangs

These are wire tackles shackled to side eyes on the sprit collar on port and starboard sides. They terminate in a double block. The purchase consists of a double block attached to a short length of chain shackled to an eye plate on the ship's side and the tackle reeves through the lower block, up through the upper block, down again through the lower block, up and through the upper block and thence through a small single block on the horse securing iron and belays to a cleat inside the rail. This is repeated on the opposite side. This sounds rather complicated, but reference to Sheet 4 "Details of Mainsheet and Vang Tackle" will clarify these instructions. This drawing will also make quite clear the reeving of the main sheet and I do not think I need add anything further by way of instruction.

Mizzen "F"

This sail, like the topsail is attached to the mast by means of seven mast hoops or bands. The peak is lashed to the outer end of the gaff (Fig. 6) and the heaed of the sail is laced to the gaff as shown in Fig. 7. The throat is lashed to a ring attached to the under side of the gaff jaws. The foot of the sail is loose i.e. not laced to the boom, but is lashed to the outer boom iron as Fig. 6 and also to the goose-neck eye at the inner end.

(*Continued on page* 187)



(Left) W. Carlton starting his home built spur job. (Centre) Jack Rowles with his home built "Proto spur" with Marbro engine and (Right) a scene in the pits at the Victoria Miniature R.C.C.'s club track at Como Park, Melbourne.

AUSTRALIAN CHAMPIONSHIPS, 1950

THAT keen Australian enthusiast Eric H. Price has sent us the results and pictures of the Championship meeting held on November 11th, 1950, at Como Park, Melbourne, reproduced on this page. Although it seems that the American engines and cars still have a strong following, there are signs that home constructed models are on the up-grade in Australia, and it is notable that the new "Mite" class, comparable to our 2.5 c.c. class, is rapidly gaining in popularity. The McCoy 19 engines dominate this class at the moment, but British commercial engines are beginning to appear, and it would be interesting to see how our fastest British 2.5 c.c. jobs would fare against them. Incidentally, although a "Mite" sized track was provided for the "tiddlers", only one competitor used it, the remainder preferring the 70 ft. circuit! The normal cable used was of .049 in. piano wire, the Mite's running on a .020 in. line. Most of these cars were glo-plug ignited.

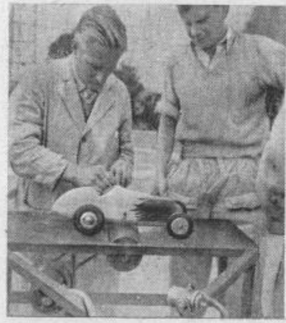
Three records fell during the meeting, and it is believed that Eric Price's 101 m.p.h. is also an Australian record for home constructed models.

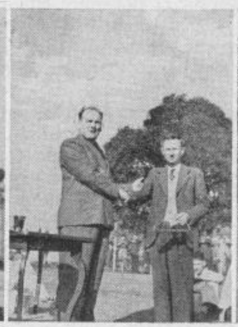
AUSTRALIAN CHAMPIONSHIPS, 1950

PROTO	
C. W. Ballem (Arrow—Dooling)	116.13*
E. H. Price (Challenger—ILG Dooling)	114.29
J. Flynn (Arrow—Dooling) run by C. Ballem ...	112.5
C. W. Ballem (Arrow—Dooling)	109.09
W. McKinnon (NSW) (Arrow—Dooling) run by C. Ballem	106.67
L. Marget (Own—Dooling)	105.11
E. H. Price (Own—Own)	101.41
J. L. McDonald (Dooling F—Meteor)	94.74
M. Hunter (Own—Dooling)	91.72
P. Dawson (Own—Own)	87.80
SPUR	
C. W. Ballem (Borden—Dooling)	111.63*
C. W. Ballem (McCoy—Dooling)	107.45
Mrs. Whight (Whight—McCoy) run by D. Rowan	91.14
W. Dagenhardt (Own—McCoy)	83.72
S. Yeats (Own—Hornet)	80.40
T. Connell (McCoy Hotrod—McCoy)	78.10
PROTO SPUR	
M. Hunter (Own—Own)	90.00*
K. Degenhardt (Own—Marbro)	71.06
MITE	
C. W. Ballem (McCoy—McCoy 19)	69.56
C. Lindberg (McCoy—McCoy 19)...	64.00
J. McDonald (McCoy—McCoy 19)	61.53
W. Gladwin (McCoy—McCoy 19)...	59.75
J. Flynn (McCoy—McCoy 19)	53.53
N. Blease (McCoy—McCoy)	49.31
W. Vickers (Own—Mills)	41.98
M. Hunter (Own—E.D.)	31.85

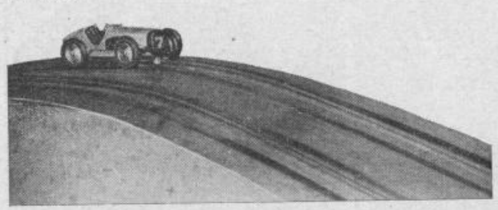
*** New records claimed.**

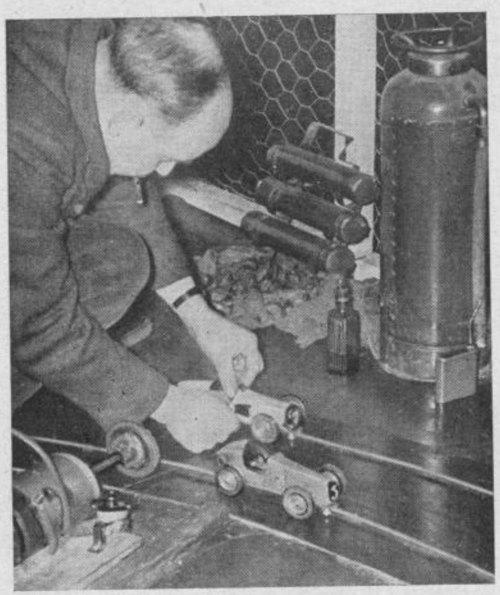
(Left) C. W. Ballem, well known Australian enthusiast, who with his able helper P. Larsen, ran no fewer than eight cars, and won every event in which he entered. (Left centre) J. Cousin with his home built Dooling engined Special (Right centre) E. H. Price, our correspondent, receives the "Home built" Trophy from Padre Elliot, president of the Association of Model Societies, and (right) is seen with his Challenger Dooling, which raised the existing record to 114.29 m.p.h., later beaten by C. W. Ballem's Dooling Arrow.





NEARER TO ROAD RACING





SINCE the first model car was built and run, everyone interested in the hobby has wished for some really satisfactory method of staging races in which model could compete against model in circumstances akin to those in which their big Grand Prix counterparts duel on the famous road circuits. In the early days of rubber and clockwork, straight races and hill climbs were organised with a considerable measure of success. With the advent of the more lethal power model, the cable track had to serve, and although we may recognise its shortcomings, we must be grateful for the excellent sport and the valuable testing ground it has provided. When early experiments were made with small banked rail tracks, we felt that here was a definite step in the right direction, and watched with interest for the next development.

With this in mind the writer was, to say the least of it, intrigued to receive an invitation to Bournemouth to witness the next step forward, which represents much hard work and imaginative experiment by Henri Baigent, well known to readers of *Model Cars* and *Model Maker*, as the creator of many beautiful scale racing models, and author of the present series of articles on the making of wire wheels and tyres.

The first track of the new type has survived six weeks of continuous daily testing at the big Bournemouth stores of J. J. Allen Ltd., who have staged an ambitious model display in conjunction with their Christmas Fair, in collaboration with Lt.-Col. Bowden of B.M. Models Ltd.

Apart from experimental sections, H. C. Baigent had not previously laid and operated a track, but no trouble of any sort was experienced with the first circuit.

This new track has a number of marked advantages over the earlier rail tracks. Firstly, it permits a course to be laid out in any plan, embracing left and right-hand turns, gradients and straights. Secondly, the cars, although guided by their individual rails, have much more freedom of movement, permitting lifelike tail-slides and snaking in and after the bends, which are unbanked as in real road racing.

Thirdly, and perhaps the most important factor, the cost of building and laying such a track, even in three or four rail form, is considerably less than anything we have seen in the past.

It has long been appreciated by those who have given the matter some thought that quite low speeds would be acceptable in this form of racing provided that the competitive element was present, and the tracks of such a size as to give the *illusion* of high speed. In fact on small tracks, high speeds tend to look ridiculous and unreal. With this in mind, the cars running on the Baigent track were powered with 0.75 c.c. Mills diesels, driving one rear wheel direct through a special clutch, and having a plug-in extension from the crankcase carrying the opposite wheel.

The engine is mounted horizontally, one crankcase lug being removed entirely, and brackets of strip steel made to secure the other lug and the cylinder head to the flat dural base. The clutches are similar to that ingenious little device used on the original Baigent-Austin, described some years ago in *Model Cars*, having no loose or "moving" parts. They are, in fact, made from one piece of bar, as shown, and work most reliably.

The front axles are affixed to plates, pivoted centrally ,and having two pairs of guide pulleys of duralumin running on plain bearings, ahead of and behind the axle itself. At the rear of the car a single pair of guide pulleys is carried on a loosely swinging plate which allows the rear end of the car the freedom of movement referred to earlier.

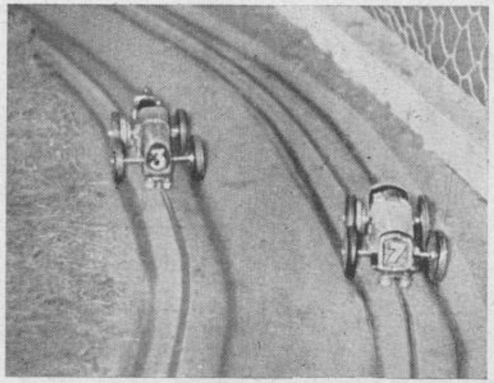
The rail is simply $\frac{1}{4}$ in. o.d. brass tube, secured to a compressed wall-board base by screws and short distance-pieces at intervals, whilst the lengths of tube are butt-jointed by inserting short lengths of rod or dowel. At the starting point the rail is notched to facilitate the fitting of the guide rollers. A small portable electric starter is used on the cars when in place on the rails, the clutches enabling them to be "warmed up" on the starting line and released at will.

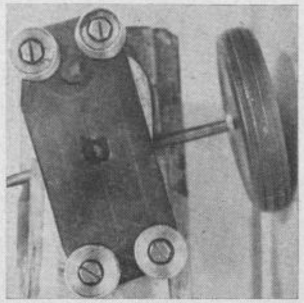
From this it will be gathered that the construction of the cars and track calls for far less expense and is less exacting in its demands for machining facilities than previous types, yet the performance, realism and reliability are impressive to a degree, and the possibilities which it opens up are most fascinating.

As our host pointed out, it should be quite feasible to lay such a track on asphalt out of doors, at an estimated cost of about a shilling a foot for a four car way, the rails being spaced 6 in. apart for cars of this size. For indoor use, wall board seems to be very suitable as a base, and the sections are quite simple to erect and design. Rail can be of steel, brass, dural or aluminium, in tube or rod.

When an outdoor course is contemplated, no levelling of the site is required, as the more natural gradient is introduced the more interesting the racing becomes! Asphalt remains reasonably flexible, when laid in a depth of two or three inches and will follow the contour of the shallow "cut" it is laid in without cracking, due to slight subsidences. The rails would in this case be secured to wooden pegs set at intervals in the surface, these being set *after* the rail lengths have been laid out and bent to follow the required curves and contours. By this means the pegs can be correctly positioned, one being required on either side of each joint in addition to others at intervals along each length of rail. It then remains to drill the rail through a simple drilling jig, and fix with countersunk wood screws.

In the case of the track operated at Messrs. J. J. Allens, no reverse curves were possible, owing to limited space, and the presence of a circular boat-tank and a cable track inside it, upon which Messrs. Wilmott Mansour staged demonstrations of "Jetex" land, sea and air models very convincingly. The rail track was roughly square in plan, and incorporated a climb and a drop in one of the straights.



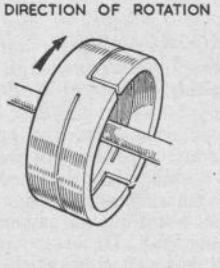


(Above) The two 0.75 c.c. models take a curve in close company. Note the swinging tails and tyre marks on the track. (Right) A close-up of the front axle plate with its guide pulleys.

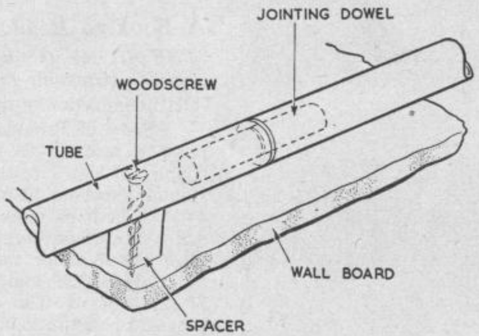
Model Maker Photos

(OPPOSITE PAGE) One of the cars zooming up to the crest of the "hill" and (below) H. C. Baigent, designer-builder of the track, prepares the cars for a "massed start"!

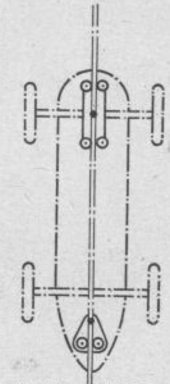
It seems likely that this track will be the forerunner of many more such projects, probably of a more ambitious nature, and it is not unlikely that before 1951 is out we shall see some real Grand Prix racing in miniature, which will add vastly to the appeal of the hobby. For this we certainly owe Henri C. Baigent our warm thanks, for he is pointing the way to better and brighter racing!



BAIGENT ONE PIECE CLUTCH



RAIL FIXING



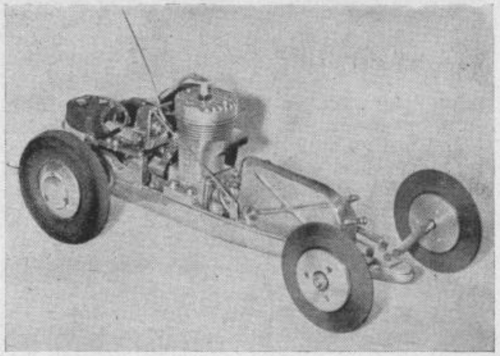
GUIDE WHEEL LAYOUT

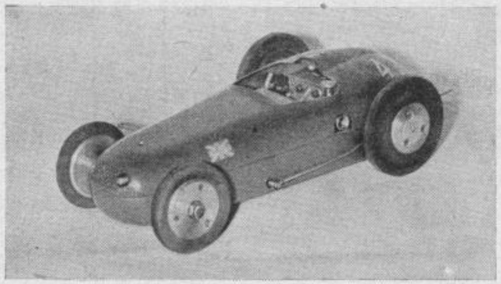
Hastings Trophy 1950

THE annual competition for the Hastings Trophy was run off this year by the Meteor Club on their indoor track at Rists Wires and Cables Ltd., at Newcastle-under-Lyme. This affair is a team event, and attracted three "away" clubs, Edmonton, Surrey, and Worcester, a state of affairs which was remedied in part by the home club, who fielded three teams. It is only fair to add that the weather was hardly conducive to long distance travel, being a nice English mixture of snow and fog. The Southerners were rewarded for their enterprise in braving the Staffordshire winter, however, when the Edmonton Club won the Trophy by a narrow margin, the result hanging in the balance between them and the Meteor Club until a final run by Alec Snelling settled the matter.

Each team consisted of a 10 c.c., 5 c.c., and 2.5 c.c. car, the latter running first. Competition was intense, F. G. Buck's opening run with "Wee 2" being accomplished at 70.8 m.p.h. for the quarter-mile, hotly followed by John Parker's Parker Oliver with 69.7 m.p.h. Alec Snelling's 2.5 car was third at 61.6.

(Above) A group of Meteor Club members at the "Hastings" meeting. (Below) "Topsy's" closest competitor was this Rowell "Sabre", built by Gerry Buck from a standard kit, which clocked 102.8 m.p.h. Lower pictures show S. R. Robinson's promising all-home built 5 c.c. model.





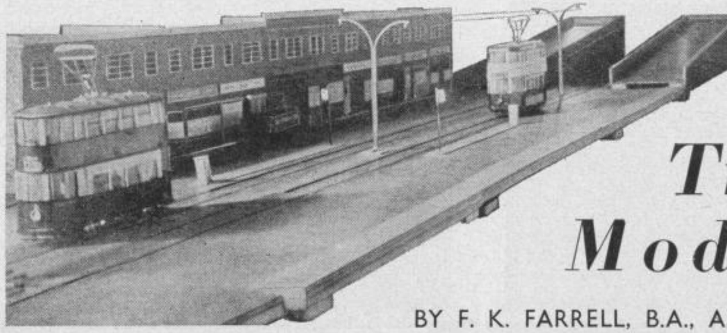
The 5 c.c. section was enlivened by Cyril Catchpole's Dooling B.R.M. which romped away with his class at 89.1 m.p.h., Alec Snelling coming second at 84.1 m.p.h., C. Craig of Meteor "B" third. S. Robinson of the Meteor "A" team managed a nice 69.2 m.p.h. with his all-home-brewed model, on which much midnight oil had been burnt to enable it to run.

The 10 c.c. class produced "Topsy" as the Meteor "A" car, and she lived up to her reputation by clocking 104.5 m.p.h., which proved fastest of the day. Second place went to Gerry Buck again, this time representing Meteor "C" team, and running the Rowell "Sabre" which distinguished itself at the Open Meeting, and which clocked an almost identical speed of 102.8 m.p.h. Harry Howlett's Mercedes was third, at 92.8 m.p.h. This latter car is now building up to big things, and nearly managed 100 m.p.h. on a later run. We are indebted to Harry Howlett for the report of the meeting.

A Book to Read

"THE STORY OF BROOKLANDS" Vol. III. W. Boddy (Grenville Press, 12/6).

THE completion of the third volume of W. Boddy's "Story of Brooklands" brought this fascinating piece of research to conclusion. From the opening chapter of Vol. I to the last appendices of the final volume the standard of accuracy is maintained, and, what is perhaps more remarkable, the account remains lively and entirely absorbing to anyone who cares about motor racing. Vol. III deals with the period 1933-1939, and is thus well within the memory of most of us. The many illustrations of historic ence and pleasure to enthusiasts and will, it is hoped, inspire more model builders to consider historic types as subjects for their craft.



Trams & Tramway Modelling

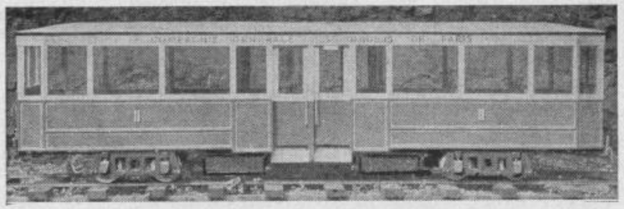
BY F. K. FARRELL, B.A., A.M.I.E.E. & F. W. HUNT

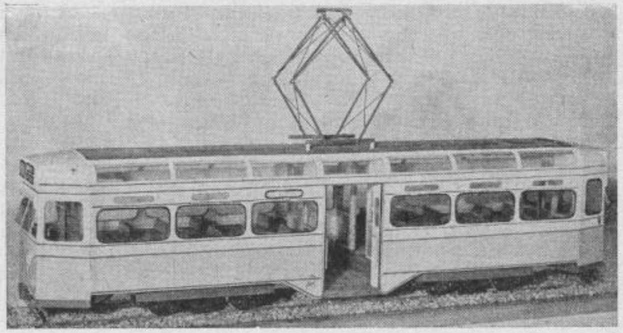
EVEN if tramways were an obsolete mode of transport there would still be great interest in building model trams, as accurate records still exist of many diverse types of which only a few have yet been the subjects of models. The existence of such models would be of great value to the future historian, for, no matter how many trams exist 30 years hence, they will bear little resemblance to the trams which are, or recently were, such a familiar sight in every large town.

A brief review of the history of the tram will give some idea of the wide range of subjects awaiting the modeller's attention. First introduced in New York in 1833, and in Paris in 1855, trams were first seen in England in 1861, when Train laid experimental lines at London and Birkenhead; these did not survive owing to the use of rails projecting above the road surface. From 1870 onwards, a steadily increasing number of tramway systems came into being each successive year. At first all were horse drawn, and horse traction, which survived in London till 1915 and at Pwllheli, North Wales, till 1927, is still employed by the Corporation of Douglas, Isle of Man, as a tourist attraction.

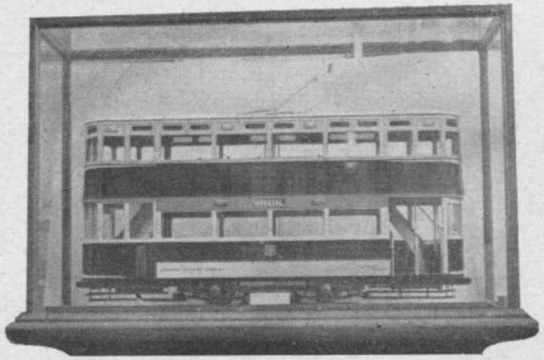
Soon, small steam engines were used in many towns but the last steam tram in Great Britain ceased operation at Wolverton in 1926, though there are still some in Holland. Later compressed air trams were tried at Croydon, and gas trams survived at Neath till 1925. Edinburgh had an extensive system of cable hauled trams until 1920, and other towns employed this system for hilly routes, of which there is a flourishing survivor, the Great Orme Railway at Llandudno. Petrol trams once ran at Morecambe, and at Rye till 1939; modern diesel "autorails" operate a network of interurban tramways in Belgium. Birmingham once had battery electric trams. The Portrush and Giant's Causeway Tramway opened in 1883, collecting current from a live rail, but was later converted for overhead collection. In 1884 Blackpool introduced the conduit system, in which a collector, passing through a narrow slot in the road makes contact with underground conductor rails; whilst Blackpool has long since converted its system to overhead collection, the conduit system persists in London. Wolverhampton employed the surface contact system, in which studs in the roadway became alive as the car passed over them, till 1923.

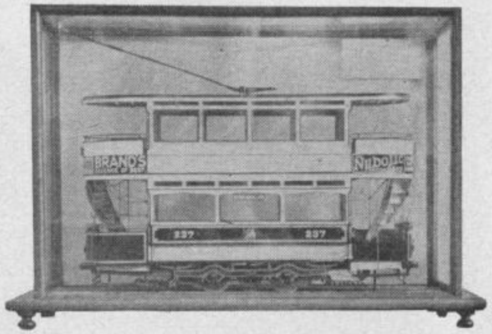
Most British trams have been double deckers. The earliest had open top decks and no covers over the driving platforms. Later the upper deck was extended to form canopies over the platforms, which were sometimes enclosed by glass screens. Later, a





Heading picture: A model tramway layout by the L.R.T.L., which has been a familiar sight at many model exhibitions. Right: Model of modern tram operating in Paris, and below: one-twentyfourth scale model of Glasgow tram by Mr. R. R. Clarke of that city.





wide variety of types of top covered cars were built, exploiting every conceivable combination of canopies and screens on either, neither or both decks.

Single deck cars with open platforms ran on the Kingsway subway route till 1929 whilst single deck cars with enclosed platforms still run at Gateshead, Grimsby and Llandudno as well as at Blackpool, where they are mostly streamlined. Llandudno has some completely open single deck cars fitted with cross bench seats, known as "toast racks", whilst the Manx Electric Railway has similar cars fitted with roofs, but open sides, and Blackpool has a more modern version with centre gangway and side panels to waist level but no roof.

Mechanically the three main types in this country are the 4-wheeled single truck car, a modern version of which is now in production for Sheffield, the "maximum traction" bogie car, common in London and Birmingham, which has two trucks each carrying one motor driving one pair of wheels, the other pair usually being smaller, and the four motor bogie car, of which modern types are in service at Blackpool, Glasgow, and Aberdeen. On the continent, there are modern six-wheeled cars at Ghent and Amsterdam.

Between 1929 and 1934 an entirely new design of car was developed in the U.S.A. known as the P.C.C. after the President's Conference Committee, a committee of the Conference of Presidents of Street Car companies, by whom research was initiated. The P.C.C. car has automatic acceleration by which a speed of 42 m.p.h. can be attained smoothly in 15 seconds from starting, and has resilient wheels containing a rubber sandwich which eliminates noise almost entirely. Since 1934, 5,000 cars of this type have been built for the large cities of the U.S.A. and Canada. Many large continental cities have developed modern cars along similar lines. With very few exceptions, mainly in France, all large cities on the continent are retaining and modernizing their tramways. Belgium has a vast network of interurban tramways linking all parts of the country, and there is a similar network in Germany.

Even in Great Britain, despite the prejudice against trams which has led to their replacement in many towns, modern trams very similar to the American P.C.C. have been developed for Blackpool Corporation, which has 25 now on order, whilst modern trams have also been built since 1945 for Glasgow, Edinburgh, Aberdeen, Sheffield and Leeds.

The advantage of trams is their high capacity and consequent ability to move crowds without queues, their use of home produced electricity and steel, instead of imported oil and rubber, their reliability in fog, frost and snow, the absence of vibration so that passengers can read without eyestrain, and absence of noxious fumes.

A model tramway system can be built in quite a small space owing to the extremely sharp curves which model trams can traverse. For the owner of a model railway, a model tramway worked on the automatic electric principle would form an interesting scenic piece, far more attractive than model buses which can only collect dust.

However, a model tramway system can be of great interest in itself, with all sorts of intriguing possibilities which could be modelled, such as narrow gauge systems, the London conduit system, high speed interurban lines and subways.

Unfortunately there is as yet no proper grooved model tramrail on the market in this country, though it is believed to be available in America and will doubtless become available here also if the demand increases. At present a useful method of building "0" gauge street tramway track is to use 7 mm. fine scale flat bottom rail spiked directly to the baseboard, the roadway then being filled in with a very soft sheet wood such as balsa or obechi. A fefinement of this method would be to solder the rail to thin tinplate sleepers and then solder on a continuous check rail of brass or nickel silver strip. Coarse wheel standards make the flangeway on street track far too wide for realism, so that fine scale standards as laid down by B.R.M.S.B. are much to be preferred.

There is a certain amount of fascination about a model which collects its current from an overhead wire. Fortunately Mr. R. Meadowcroft, Calderglen, Keighley Rd., Colne, Lancs., has been extremely lavish in providing this item and can supply overhead standards, cars, frogs, etc., in both 4 mm. and 7 mm. scales. The accepted dimensions for the height of the trolley wire above rail level is 6 in. for '0' gauge and 3½ in. for '00' gauge. The pantograph or bow system of current collection dispenses with all need for cars or frogs on the overhead, the trolley wire being soldered directly to the span wires. It must be realised however, that overhead for these systems must be very accurately constructed; the trolley wire must not diverge more than 10 mm. from the centre of the track in '0' gauge, or 6 mm. in '00' gauge. If the model is of the conduit system, as used in London and Washington, there is no need for overhead, a third rail between the running rails sufficing. This system is particularly useful for portable layouts.

Turning to the vehicles themselves, a survey of the vast and as yet unexpected field open to modellers has been made in the earlier part of this article. As to construction, the bodywork might be of all metal construction or a composite structure of wood and card. The latter method lends itself to fine detail but it is not nearly so durable as metal. Numerous motors suitable for model trams are now obtainable, of which the Romford is recommended for 4 mm. scale cars and the Adamset or Frog for 7 mm. scale models. Finally it would be as well to mention that suitable wheels and gears for tramcar models are available from Colne Models, who are believed to be the only firm in this country to specialise in tramway models.

Those who would like further information about tramways should write to the Light Railway Transport League, 245 Cricklewood Broadway, London, N.W.2, which caters for all who are interested in tramways and tram modelling, advocates the retention and modernisation of all suitable tramways and publishes a monthly magazine *The Modern Tramway*.

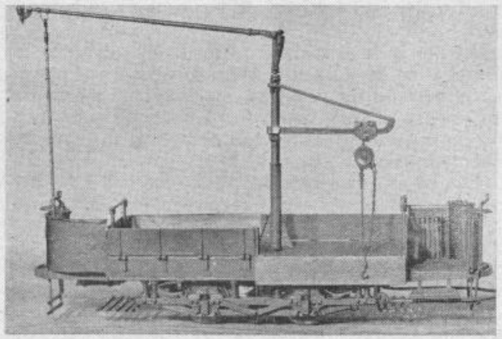
Another group, The Tramway and Light Railway Society, of 29 Queen's Drive, London, N.4, specialises in the construction of model trams for 3½ in. gauge, and their members have supplied some of the illustrations to this article.

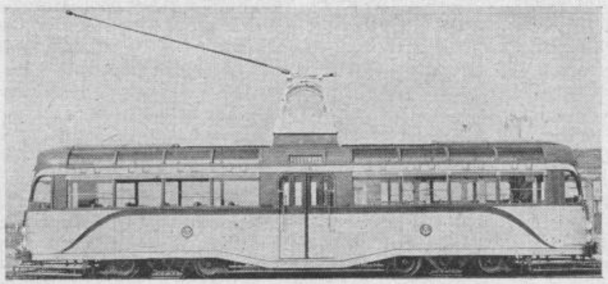
Opposite page, top left: One-twelfth scale model of typical Sunderland tram built by Sunderland Corporation Tramways. Top right: Another twelfth scale model of a Bradford tram built by Frank Hartley.

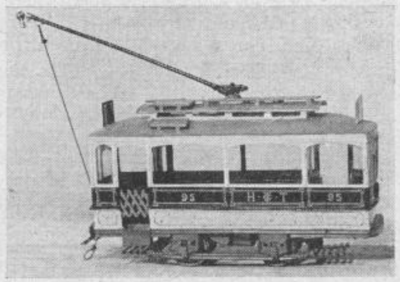
On this page, above: Modern Aberdeen Corporation tram built in 1949. Below: Permanent Way Car model from Halifax Corporation Tramways. Scale ⅜ in. to the foot, 1¼ in. gauge, powered by Frog electric motor, by worm drive. Built by A. J. Brooke of Elland.

Bottom left: Latest Blackpool tram equipped with resilient wheels and automatic accelerator.

Bottom right: Another model by A. J. Brooke in '0' gauge of a Halifax Corporation tram.







Load Water Line Calculations

BY A. M. COLBRIDGE

This article is the first of a short series on model boat design. What have been considered somewhat technical aspects are covered in a simple and practical manner that can readily be applied by the would-be designer. The next article will cover model speedboat hull design.

THE position of the water line, or rather the attitude of the model to the water line, is a very important factor in all boat design. The attitude of the boat relative to the water line determines to a very large exent its behaviour or stability when in motion. This applies equally well to a sailing yacht, a semi-scale power boat or a racing model. Best performance can only be realised with correct load water line position. A hull, in fact, is normally designed around the load water line and if made to operate at some other attitude will suffer a loss of efficiency and also, in all probability, a loss of stability. Where performance is of major importance, L.W.L. position can be critical.

In power boat work it is generally advisable to trim by the stern slightly, with a small positive movement between the centre of buoyancy and the centre of gravity rotating the nose or bows up some two or three degrees. In the case of a hydroplane reaching top speed the planing forces developed on the forebody will then probably rotate the hull a further two degrees or so with a corresponding increase in trim-by-stern.

It is, of course, possible to adjust the load water line of the completed model by shifting the components and thus altering the centre of gravity. Moving the centre of gravity aft will increase the trim-by-stern attitude. Moving it forward will decrease the trim-by-stern attitude or introduce a trim-by-nose attitude, or even a neutral attitude where the centre of gravity and centre of buoyancy come on the same vertical line. This is known as neutral trim.

Most modellers do, in fact, adopt this practical method of balancing the model out along the design load water line, although it is not always convenient or desirable to shift components about. Hence an appreciation of the method whereby the load water line can be determined in the design stage by reference to the plan is a useful attribute of the model boat designer.

First it is necessary to have a working knowledge of the method of laying out hull lines. The hull lines

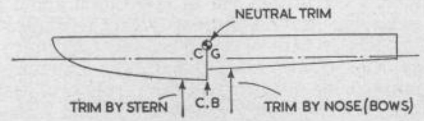


FIG. 1

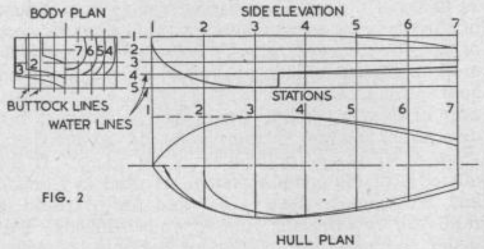


FIG. 2

are, roughly speaking, the plan view and side elevation of the hull. The body plan is a series of superimposed cross sections of the hull at various stations. A simple example is drawn out in Fig. 2. Both the side elevation and body plan are divided into vertical stations by a number of horizontal lines known as *water lines*, these being quite distinct from the load water line which is the subject of our investigation. These water lines are used to obtain the faired lines of the hull in plan view. The offset of each body line or section outline at that station with reference to the appropriate water lines gives corresponding offsets from the centre line in plan view of the hull at that station. The result is that the plan view is drawn as a series of separate slices or layers representing the actual plan shape of the hull at each 'layer' or water line reference station.

Finally there are the buttock lines which are vertical lines drawn on the body plan and are simply further reference lines which can be used as an additional check on the accuracy of the sections plotted on the body plan. They are transferred to the side elevation or profile drawing, all three views, side elevation, plan view and body plan then checking out around these two sets of reference lines.

For determination of the *load water line* a side elevation (profile) drawing and a body plan is necessary (Fig. 3). Both are drawn out with a convenient number of equi-spaced stations. With straight hull lines the number of stations can be kept to a minimum. With curved lines closer spaced stations have to be taken for accuracy. The actual position of the centre of gravity must also be known, if the load water line is to be calculated, or this position fixed as the design position and subsequent work adjusted accordingly. If, on the other hand, and this generally has the more practical application, the load water line is to be fixed at the design stage, the calculation is used to resolve the design position of the centre of

gravity of the finished model. For the purposes of example we shall adopt the latter method.

The required load water line is drawn in the side elevation with reference to the trim required. This line will cut the hull at two points, A and B. All parts of the hull coming below this line will represent submerged hull volume and we are really finding the position of the centre of buoyancy of this submerged volume and locating the centre of gravity of the complete boat vertically above it to trim.

Point A, or the point where the load water line cuts the hull, is called neutral. Taking the next hull station the depth of immersion is measured off the side elevation and transferred to the body plan and a horizontal line drawn across the body plan at this point. Where this cuts the appropriate section at that station the section concerned is divided into submerged and emerged or above water area. The submerged area must be calculated and marked off as a corresponding station ordinate below the load water line on the side elevation drawing. The scale is largely a matter of convenience—one inch equals one square inch, or any scale which gives a convenient diagram size.

The same procedure is repeated for each station along the hull. The corresponding load water line position at each station is first determined from the side elevation drawing, transferred to the body plan and the submerged area of the section at that station calculated. This area is plotted as an ordinate below the load water line on the side elevation drawing to the same scale as before. The result will be an envelope or curved area drawn below the load water line representing the displaced areas of the body sections from A to B. This envelope is actually called the curve or areas.

It is now necessary to find the centre of gravity of this curve of areas, which can be done by calculation—either by moments or by applying Simpson's Rule—or by a simple practical method. The latter is probably the easiest except where the curve of areas is simply proportioned and lends itself to ready calculation. The practical method is simply to trace a pattern of the curve of areas on to card, cut out and find the centre of gravity of the cut-out envelope by balancing across a ruler in two positions approximately at right angles and marking the intersection point, or suspending from two different points and marking the intersection of a plumb bob (Fig. 4).

Once the centre of gravity of the curve of areas has been determined in this fashion it can be marked on the original side elevation drawing. The centre of gravity of the completed boat must then lie on a line passing through the centre of gravity of the curve or areas at right angles to the load water line (Fig. 5).

The other method, whereby the load water line is calculated for a given model with a given centre of gravity position is essentially similar. To start with it is necessary to first draw on the *estimated* load water line and then proceed to find the curve of areas and its centre exactly as before. A line perpendicular to the load water line is then drawn through the centre of the curve of areas (Fig. 6). If this line passes through the centre of gravity position then your original estimate of load water line was correct. If not, the load water line must be re-drawn in a slightly different position and the calculations re-made. Which way to adjust the load water line will be obvious from the relative positions of the correct C.G. datum line and the actual C.G. position. It will be appreciated that with the possibility of having to make three or four sets of calculations before estimating the correct load water line this method is more tedious and less satisfactory than the original one described which is used to *determine* the C.G. position relative to a *design* load water line.

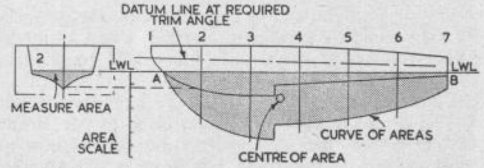


FIG. 3

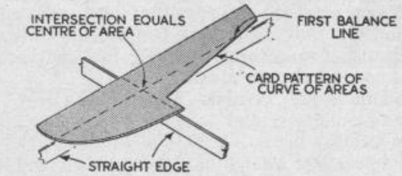


FIG. 4

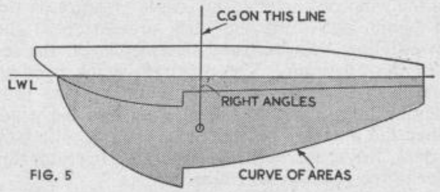


FIG. 5

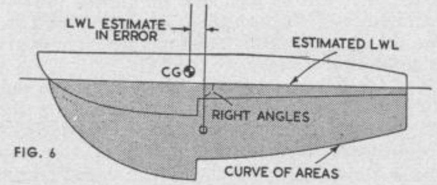
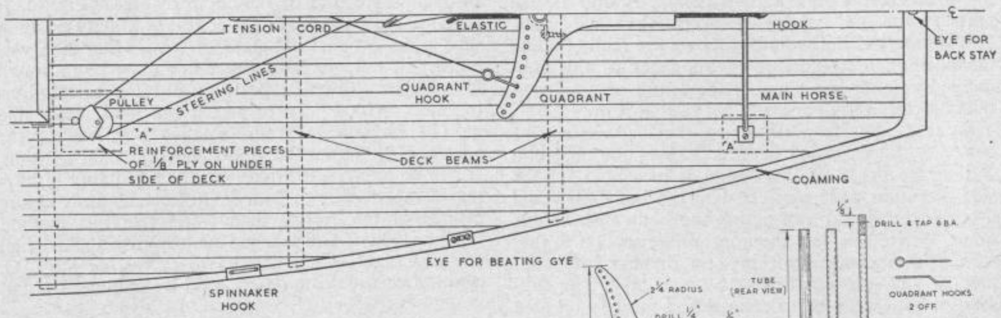


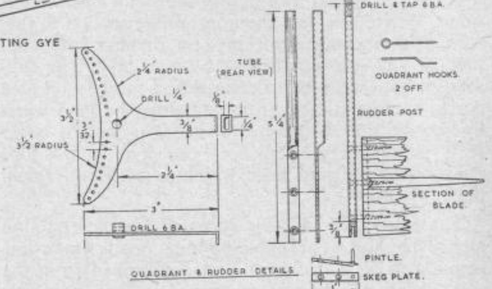
FIG. 6

The Braine Automatic Steering Gear & how to use it

"LADY BETTY" 36 in. RESTRICTED CLASS YACHT

PART V. BY "SHIPWRIGHT"





BEFORE the advent of the automatic steering gear the model yachtsman carried a pocketful of swing rudders of varying weights which he changed to suit the prevailing wind. Under these conditions the steering of a model was a very haphazard affair.

The Braine Steering Gear, conceived by Mr. Braine of the M.Y.A., has changed all that and is now almost universally used. A few years ago a Swedish model yachtsman invented a pivoted vane steering gear which has a growing following. It consists of a light vane attached to the rudder head actuated by the wind, the movement being controlled by rather a complicated arrangement of links, too complicated for the novice to worry about.

The Braine gear consists of a quadrant (Fig. 14), a pair of pulleys (Fig. 13) and two quadrant hooks for the steering lines. Fig. 23 shows a plan view of the complete gear when fitted. Note the crossed lines which is an essential feature of the device.

The principle of the gear is as follows:—

As the wind on the mainsail exerts pressure on the main boom (to which the lines are attached) the windward line, being crossed over, pulls on the lee arm of the quadrant. The quadrant being fixed to the rudder head pulls over the rudder blade thus preventing the yacht from running up into the wind.

When the model is put about on the opposite tack the slack lee sheet becomes taut and operates the rudder in the opposite direction.

The quadrant has a series of holes drilled along the arm which enables the leverage to be altered by inserting the quadrant hooks in different holes.

From this it will be seen that the farther towards the extremities of the arm the hooks are placed the greater the leverage and, therefore, the greater the angle of the rudder blade.

It is of the utmost importance to see that the rudder be free, but not slack, in its tube, and for this reason the heel is fitted on a pintle bearing. A rubber centreing cord is fitted, which is adjustable as to tension, to ensure that the rudder always returns to its central position, which it cannot do if any friction or binding is present.

Only practice will enable the novice to use the gear to its best advantage, but the following hints will help him to grasp the main principles.

If the model keeps off wind when it falls light the elastic adjustment is too slack. If, under the same conditions the model turns into the wind, the elastic is too tight.

When the wind freshens and she keeps off the wind, less leverage on the quadrant is required so move the hooks nearer to the centre. If the reverse, more leverage must be applied by moving the hooks towards the end of the quadrant arms.

When the exact settings have been found they will be correct for all time, so make notes of the various settings under different conditions. If you can enlist the services of an experienced fellow yachtsman so much the better.

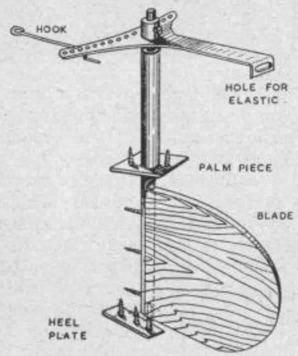
It is well to remember that all adjustments should be slight, or progressive, until the correct setting has been found. Do not be discouraged by the erratic performance of your model at first, such as the keel out of line, any tendency to poor steering performance is probably due to your inexperience.

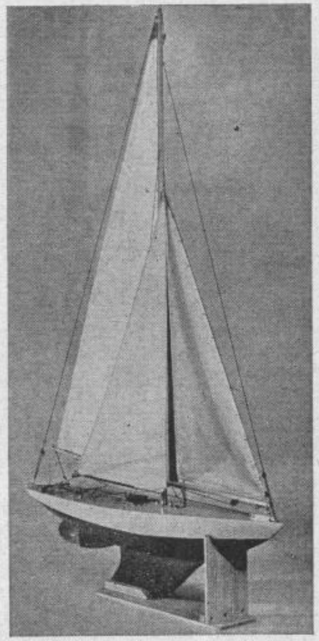
There is only one condition under which the Braine gear is not used. That is beating, or sailing into the wind. A well built model will, under these conditions, steer by the trim of the sails.

When beating slack off the steering lines and attach the beating sheet to the main horse.

FIG. 13. DECK PULLEY & DECK PLATE.

FIG. 14. QUADRANT & RUDDER ASSEMBLY





Above : The completed "Lady Betty" Yacht. Left : A typical 6-metre showing the Braine steering gear in operation.

Although not strictly connected with the Braine gear there is a device which is part of the steering apparatus of a model yacht. This is known as the beating gye. This enables a model to go about, or change course, after reaching a pre-determined position when making alternate short and long legs up the course.

It consists of an adjustable cord with elastic tensioning (Fig. 24). One end is attached to the outboard end of the main boom, the other end to an eye on the gunwale on the weather quarter.

To operate, adjust the elastic so that it is fully stretched when the sail pulls on the beating sheet.

The gye then gradually exerts pressure on the main boom until the boom swings over and the model goes about on the opposite tack, holding that tack until she reaches the shore on the next leg where she is put about once more by hand.

If this action takes place too quickly the elastic tension is too tight. Should she fail to go about before reaching the shore the elastic is too slack to exert the necessary pressure on the boom.

Here again practice is necessary for its successful operation, but it is one which will often win a close race when operated by an experienced skipper.

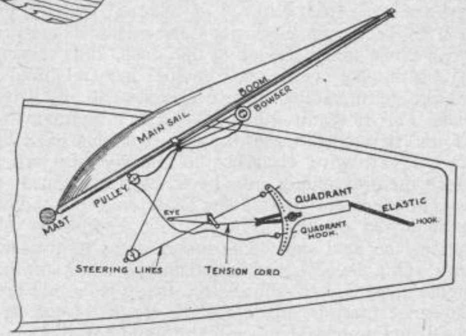


FIG. 23. PLAN OF BRAINE STEERING GEAR. (DIAGRAM ONLY.)

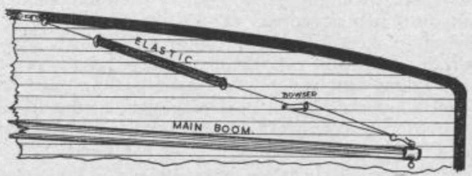
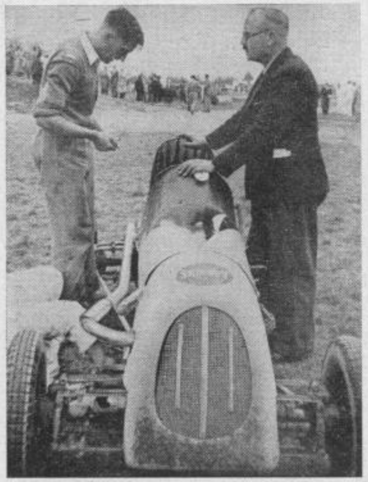
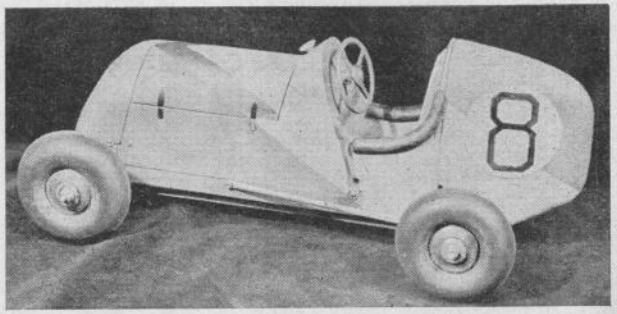


FIG. 24. THE BEATING GYE.



BUILDING A SIMPLE
SKIRROW-MIDGET

By MAURICE J. BRETT

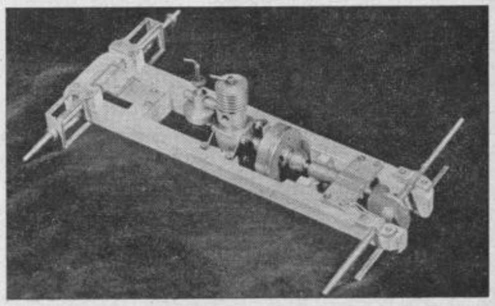


THIS interesting and rather topical little car was designed as a competition model some years ago by the Frenchman, G. Martin. While no longer perhaps in the competition class, it does rank as an ideal model for the younger and less skilled enthusiast, at the same time having quite a lively performance. Of extremely simple construction, it is all wood, part balsa, part hardwood, with such metal parts as are necessary, being easily obtained in near finished form.

The chassis is constructed of hardwood, pine or spruce being ideal for this purpose. The side members are made from $\frac{3}{8}$ in. x $\frac{1}{2}$ in. material, with a $\frac{3}{8}$ in. x $\frac{3}{16}$ in. rebate on the lower outer edges. There are three cross members, all $\frac{3}{8}$ in. deep, but varying in width, the rear one having a semi-circular cut-out $\frac{5}{16}$ in. radius, to give clearance to the drive shaft. This is readily apparent in the accompanying photos. Before assembly, the side members must be cut away to give clearance to the flywheel, after which the cross-pieces may be screwed and glued to the side members and corners chamfered to a radius as indicated on the drawing. This completes the chassis, the next step being to instal the motor and drive shaft. Actual installation and position of the engine depends, of course, on the type used, but allowance must be made for the length of the flywheel and universal assembly. Some form of universal coupling (there are several suitable types on the market) on the drive shaft is desirable though not absolutely essential. The drive shaft is $\frac{3}{16}$ in. dia. silver steel rod, tapped both ends, and the rubber driving wheel can be made from an old shoe heel rubber cut roughly to shape and finished in either a lathe or hand drill. The drawing of the drive-shaft bearing is self-explanatory, and when this has been made, the whole unit may be assembled.

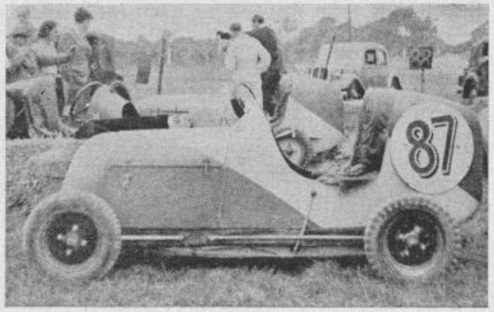
The rear axle is $\frac{3}{16}$ in. dia. silver steel, threaded at each end, the end diameter of the axle depending on the type of wheel used. In the case of the model illustrated, Z.N. Airwheels were used. The friction disc may be turned from brass or steel, or a bossed gear wheel may be obtained, such as Meccano, Trix, Juneero, etc., in which case the central hole may have to be bored out to take the axle, and the gear teeth filed off. If a gear wheel is to be used ensure that you obtain a plain disc type without lightening holes in it, otherwise the rubber driving wheel will be quickly torn to pieces. The friction disc is mounted on the axle, followed by a ball thrust bearing, and a 20 s.w.g. hairpin spring, one end of which is secured by one of the screws holding the adjacent axle bearing to the chassis. The chassis side members will need to be recessed to take the axle bearings and axle, care being taken to ensure that the centre line of the axle corresponds with that of the drive shaft. The axle, complete with friction disc, spring and axle bearings may now be fitted to the chassis.

In this view the simple chassis and suspension is shown to advantage. The rear dummy suspension is shown uncompleted.

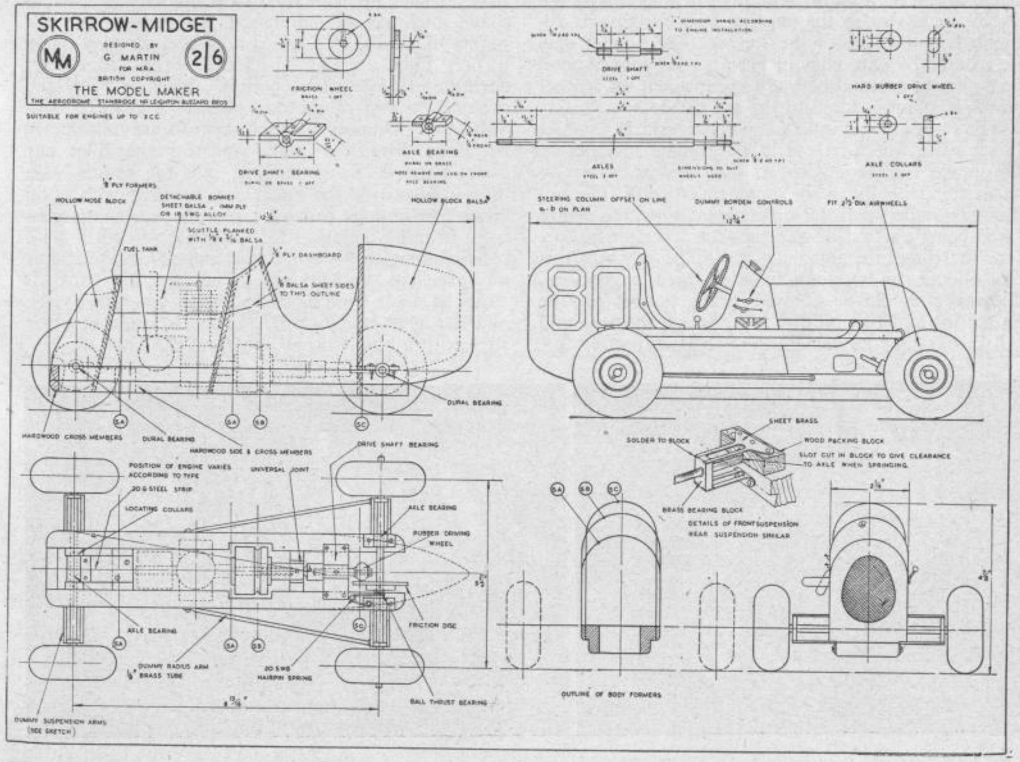


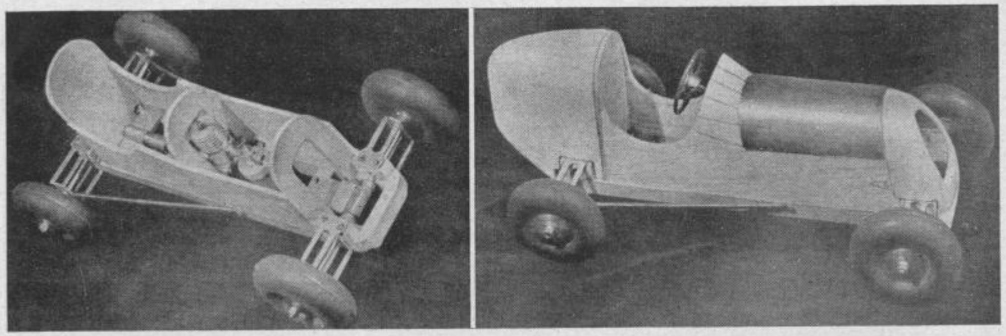
Springing is incorporated in the mounting of the front axle by means of a 20 s.w.g. steel strip. This is screwed at one end to the second cross member, the other end having the single axle bearing screwed to it. The front axle has the same dimensions as the rear and is located by two collars, one at each side of the bearing. The chassis members must be recessed to give clearance for the axle, as at the rear. The dummy suspension is the same front and back, details of which may be seen on the drawing. The wood packing blocks at the front must be cut away to allow for the movement of the axle when it is springing. The rear blocks may be secured by the same screws as those used for holding down the axle bearings or the blocks may be taken right across the bearings and screwed direct to the chassis. Dummy radius arms should now be fitted, one end being soldered to the brass outer bearing block of the dummy suspension, the other end being screwed to the chassis. Care must be taken here to ensure that there is no friction at the outer bearing blocks caused by the radius arms being too long or short, in fact it would be best to have a $\frac{1}{4}$ in. dia. hole in the blocks to ensure ample clearance for the axles.

With the chassis finished the bodywork may be added. Three $\frac{1}{8}$ in. ply formers are cut to shape as on the drawing and glued to the chassis, note the cutouts on the middle and rear formers to give clearance to the engine and to the hairspring and friction disc. The sides of the body are cut from $\frac{1}{8}$ in. sheet balsa and fixed to the formers, and the dashboard of $\frac{1}{8}$ in. ply is then fitted in place. When all this has set,



The heading pictures show, left, the full size car taken at Brayfield Stadium last year, while on the right is the finished model. Above is another view taken at Brayfield. Note the colour scheme !



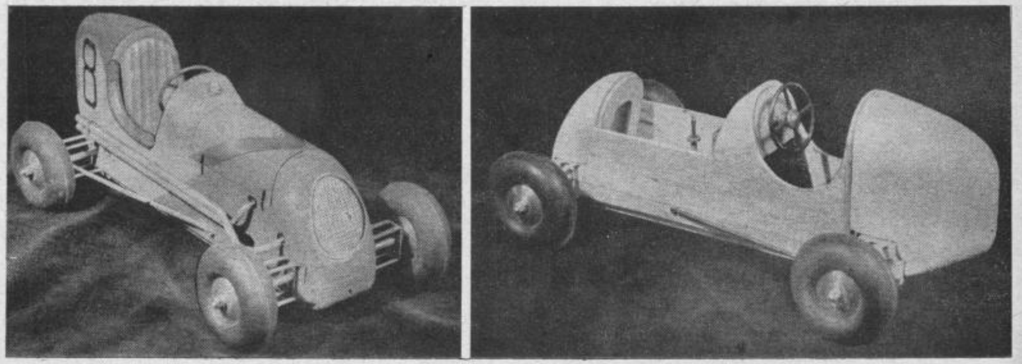


Top left: First stages in body construction showing $\frac{1}{8}$in. ply formers and $\frac{1}{8}$in. sheet balsa sides in place. Right: Top and bottom show the body-work completed with aluminium bonnet on and off. Bottom left is the finished model. Note the arrangement of the dummy exhausts.

the scuttle can be proceeded with, this being planked with $\frac{1}{8}$ in. x $\frac{3}{16}$ in. strip, tapered to the front and bevelled at the edges so that all the strips fit closely together. The bonnet may be made of either sheet balsa or 1 mm. ply steamed to shape, or 18 s.w.g. aluminium which can easily be bent to shape. The bonnet is located at the front end by its sitting on top of the former and butting against the noseblock, while at the rear end a piece of $\frac{1}{8}$ in. sheet balsa cut $\frac{1}{16}$ in. undersize to the existing body section is cemented to the face of the former. The bonnet may be secured by wire clips or even a wide rubber band passed right around the body to represent the leather straps sometimes fitted to the full-sized car.

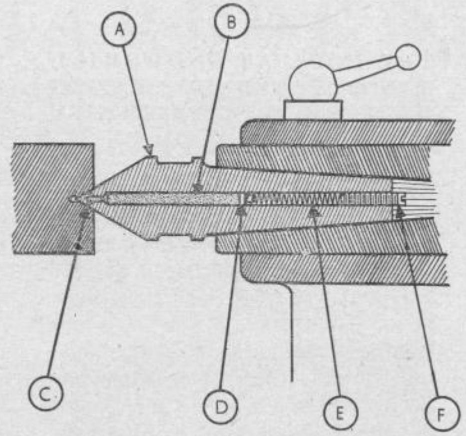
The nose and air intake cowl is shaped from solid block balsa hollowed out in the middle to form an air intake for the engine. It will be found best to carve this with the grain running vertically. The tail block is made up from three laminations, the centre layer being cut out as indicated on the drawing before the three are glued together. The grain in this case should run horizontally on all three laminations. Clearance should be allowed at the bottom for the hairspring and friction disc, after which the nose and tail blocks may be cemented to their respective formers. Final shaping may now be carried out and preparations made for the finish. Sanding sealer makes a good grain filler and two or three coats of this well rubbed down should suffice. The colour schemes are many and various, but a common one is illustrated on the model.

All that now remains is to add the detail such as exhaust pipes, steering wheel, etc. The steering wheel may be made up from brass strip and wire or a ready-made one may be purchased. That shown on the model illustrated is a Meccano wheel screwed on to a bolt fitted to the dashboard. Strips of rubber sheathing from electric conduit cable may be placed around the rim of the cockpit and a shaped balsa seat fitted. Dummy Bowden controls are represented by brass wire and nails, and for the filler cap a countersunk screw inserted into the scuttle with discs soldered to the head may be used with good effect. The dummy exhaust pipes can be bent up from brass or alloy tubing or for those not so skilled $\frac{1}{4}$ in. plastic tubing with wood dowel stiffener inside makes an excellent substitute. The steering box is easily be made from block balsa and $\frac{1}{8}$ in. dia. dowel, and the hand brake on the offside is made of brass strip with a blob of solder to form the knob.



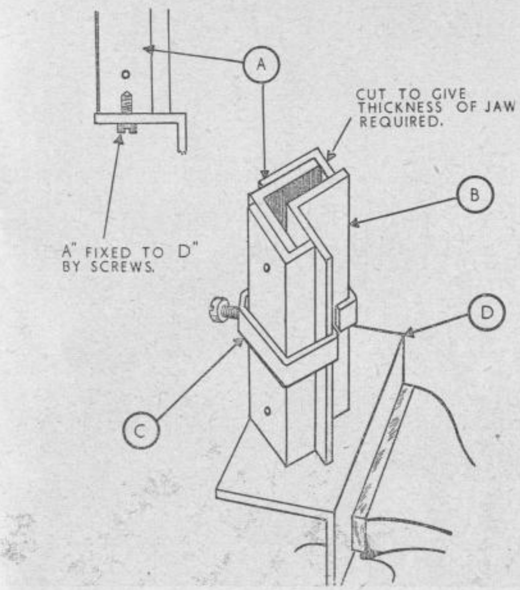
A SELF OILING LATHE CENTRE

WHEN turning a long job in the lathe between centres it is sometimes possible to work at the vice while the cut is proceeding and being thus absorbed the lathe is forgotten until a loud squeak warns us that the back centre has run dry and needs oiling. This is more prevalent when turning hard or heavy materials or when the work is revolving at high speed. The author has had several centres spoiled in this way and to remove the risk made the self oiling centre shown in the sketch. A is a standard type of lathe centre but before it is hardened it has a hole B drilled from the taper as at C. The back end of B is tapped and fitted with screw F. This screw contains within the hole the spring E and the pad D. In operation the hole is charged with heavy oil or grease and the spring and pad compressed in against it and kept in place by the screw F. The pressure of the spring should be just sufficient to force the oil or grease to ooze out at the taper. It has been found that lubrication is constant when in use with oil or grease and one charge lasts a long time. When not in use very little lubricant is lost if the spring is soft and properly adjusted. Holes of $\frac{1}{32}$in. diameter drilled in the taper are ample for good lubrication and if they become stopped up they can be cleared by charging the centre full and forcing them clear by the screw. The author considers this type of lathe centre to be an efficient and useful addition to the lathe equipment.



VICE CLAM MOULD

IT frequently happens that when we need the protection of vice clams they are found to be worn out or so badly out of shape as to be useless for the job in hand. A new set is needed and these are in most cases bent up from sheet lead, brass, copper, zinc or other suitable material. But all these metals are usually thin with the result the life of the clams are short and new ones are continually being made. The author made the simple mould shown in the sketch to mould up the type required from lead or aluminium. This produces a good square clam and is quicker in the long run than to keep on making the bent plate kind. As will be seen the mould is constructed from angle steel and requires very little work to produce an efficient mould. Four pieces of the angle are cut slightly wider than the vice jaws and the ends are squared up true with the sides. Three of these are riveted together as shown at A to form two sides of the shape. Note that two of the pieces are cut to give the thickness of the clams required. The author has found that $\frac{3}{16}$in. is a useful thickness. Part B closes the mould shape and is held tight against A by the steel clamp C. In making this clamp use metal thick enough to take a good thread. The completed mould is now mounted on to larger piece of angle D and is secured to by screws as shown. A will take a thread large enough if the drilling and tapping is done carefully. See that the two seat together closely as any gap will cause a loss of metal when pouring. In use the mould is held in the vice by the side of D as shown and the metal poured in at the top. Allow time for each pour to cool before separating the mould. The author has found that a metal known as plumbers' metal is better than lead. This contains a percentage of tin and is somewhat harder. Aluminium can also be used and for some work will be preferable.



A MODEL CORNISH HARBOUR

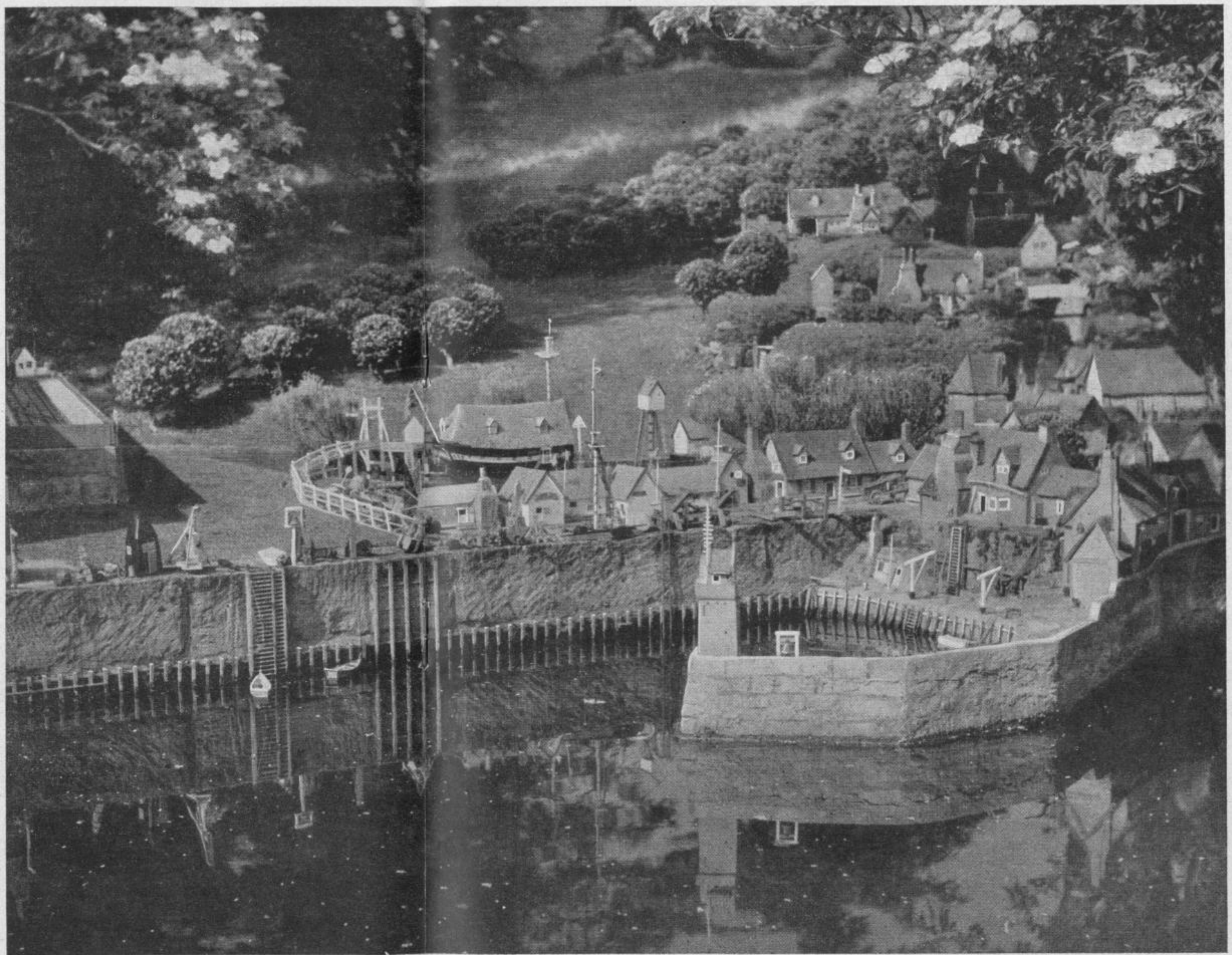
THE POOL AT SNOWSHILL MANOR OWNED BY CHARLES WADE, ESQ., ILLUSTRATION BY DR. STEPHEN COFFIN

Scenic models are seldom constructed to stand the rigours of the English climate—indeed much of the material in common use would hardly survive a typical wet week-end ! How much more noteworthy is this elegant treatment of a garden pool at Snowshill Manor—where fine detail and fidelity to scale has been maintained in spite of the need for weatherproof and durable materials.

In the middle distance dwarf trees maintain the illusion of reality, and it is not until the blossoms and boughs of normal flowering shrubs that frame the upper corners are noticed that we can be confident that this is in truth but a village in miniature.

Look as we may we are still finding new details in this delightful model. It was some time before we noticed the railway station platform, signal box and rails on the left above the harbour wall. Then, just in the middle of the scene, approached by a white railed sloping gangway that goes over a stream, is the stern half of an old ship, thatched over for habitation. Note too, the warning bell on the jetty, the cart in the village street, one can go on discovering such things indefinitely . . .

Work in the garden cannot but please even the most ardent of modelmakers with a project such as this in hand, and we would congratulate Mr. Charles Wade whose lovely pleasaunce this model graces on his departure from the traditional lily pond.



A Plaster Moulded Model of Pharoah's Daughter

AN UNUSUAL MODEL OF A TWELFTH DYNASTY PRINCESS

BY RAYMOND MORSE

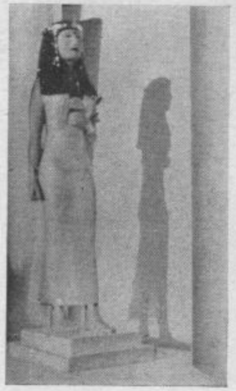
BEING for many years a keen student of early Egyptian history, I decided a short time ago, to produce a little statuette of the twelfth Dynasty Egyptian Princess Sit-Hathor-Yunet, who lived between 1890 and 1840 B.C. or little short of 4,000 years ago!

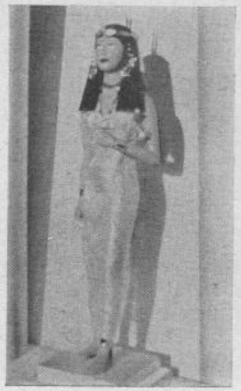
My reason for choosing this particular princess for modelling purposes was due to the fact that durin grecent years her actual ornaments were found by archaeologists at El-Lahun. I have been able, therefore, to construct this model adorned with exact miniatures of her actual jewellery, and so obtain quite an accurate picture of how this lady of such ancient times really looked.

During the twelfth Dynasty in the reign of Sen Wosret II, father of Sit-Hathor-Yunet, the skill of the ancient craftsmen reached a very high level, many of the jewels and ornaments of this period being particularly accurate in workmanship and artistic in appearance.

To modern eyes the massive wig will no doubt appear somewhat strange and heavy. They were in fact quite light for the wearer as well as providing an excellent shield for head and neck from the fierce sun.

Many of the men of these times also wore wigs some just as elaborate as those of their counterparts. These ancient wigs were composed of hair or sheep's wool, often plaited or dyed. A few samples which have survived down the ages may be seen today in our museums. Men usually had shaven heads under their wigs, women usually plaited hair or interwoven with the wig for a more natural appearance. Sometimes these wigs were kept in special little cabinets when not in use.





Most of us have read in our Bibles of the fine linen of ancient Egypt. Weaving was developed at a very early age and fabrics from coarse to extremely superfine texture were produced. Some garments were dyed in reds, blues and greens, but white was generally worn by both sexes. Many and pleasing were the designs of these early costumes, some were elaborately pleated, others had gold or silver thread worked in with the material, whilst lace and embroidery work were known and used in these far off days long before the Greek and Roman civilisations flourished, when our own forefathers in England in their woad covered bodies, lived their primitive hunting lives and when such remote Biblical figures as Jacob and Joseph were alive.

And now for a description of the model itself. First of all I built a birch dowel skeleton and mounted same on a square plywood plinth. The figure itself is 15½in. high, plinth 5in. square. The legs of the skeleton frame were securely screwed to the ¼in. thick base of the plinth which was a great aid during the modelling. The correct positioning of the legs to ensure the posture required is most important. Man readers may have noted the particularly dignified attitudes of most Egyptian figures, so a little care on this point is well worth while.

Using plasticine I next covered the entire skeleton with a layer all over, pressing well on to the wood. The face is, without doubt the most difficult and exacting part of the whole job, at least, so I found. I advise, therefore, should any reader wish to embark on a similar model, to model the head and face first, and complete it if you like. If you are satisfied, well continue with the rest of the work, and you will not find it too difficult provided you have an eye for line and proportion as well as a large slice of that modeller's virtue—patience.

From the plasticine pattern which I enamelled to give a hard surface, I made a set of nine moulds in plaster of paris, making all the sections fit inside a ply box with a few dowels arranged to locate them when pouring. It is, of course, most important to see that all sections of the mould can be readily removed from the pattern without keying.

Having completed the moulds and box I next well oiled the sections, using petroleum jelly for the larger surfaces and light machine oil for the finer parts such as face and hands.

After well lubricating all sections as well as the joints between them, I formed a rough wire skeleton which I suspended in the assembled mould prior to pouring the liquid plaster. I found that the ankles being thin require the additional wire stiffening, otherwise the brittle plaster would soon fracture at this point. For casting I stood the mould upside down, and after sealing the box joints in case any plaster should run out, I mixed equal parts of plaster to water, poured in just like filling a jug until the plinth (at the top) was just full. Next morning I removed the cast carefully from the mould, scraped away the flash and set aside to dry out thoroughly. If any slight alterations are needed or any little holes filled in which have been left by air bubbles, it is easier to do it before plaster has properly dried out when it can be pared quite readily with a sharp knife or balsa cutter.

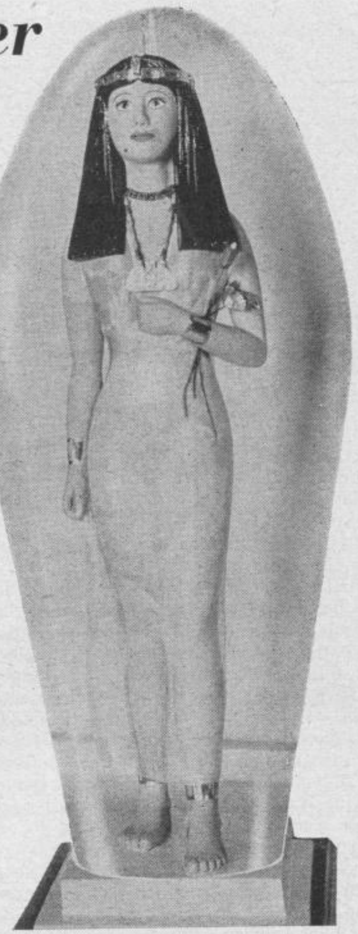
All the plaster finishing being completed, I left my model in a warm room for three weeks before attempting to paint, to thoroughly dry out, as paint will only give trouble or peel off if this point is not followed. I suggest leaving a model in the window to get the sun or near a stove or radiator. When quite dry the plaster should be hard and chalky in texture, inclined to crumble when cut.

It is well worth while taking care over the finish, as it is upon this that a model of this sort is judged. Whilst my model was in the drying stage I was kept busy fashioning the various ornaments. The diadem is composed of aluminium strip covered with gold chocolate foil, also the bracelets, anklets and pectoral. Lotus flowers are easily made from thin paper, wire and plastic wood.

Having made these parts, also the gown from light Japanese silk, the casting was ready for final finishing with sandpaper and painting. For this I used good quality artists oil paint mixed to the required shade and thinned down with a little pure turpentine, also artists quality. I found this ideal for all matt parts such as skin. For glossy parts such as eyes, fingers and toe nails I used lacquers. The eyelashes on my model are made of fine copper wire from a discarded wireless coil, a very delicate job. Quite a good effect can be obtained by the use of Indian ink applied with a fine brush or mapping pen. Eyebrows may also be represented by Indian ink, and should any reader wish to extend his skill as a make-up artist he may even border the eyes with a fine green line to imitate the malachite used in those times. When my model was complete I made a glass case to keep out the dust. This is 5¼in. square at the base and 17 ins. high. Personally I prefer the look of a model in the open without a case, but the original fresh appearance is soon lost with the dust unless the whole figure is highly glazed.

A few final words of advice to beginners in this class of art may help them to avoid the more obvious pitfalls:—

Always well lubricate moulds before pouring.

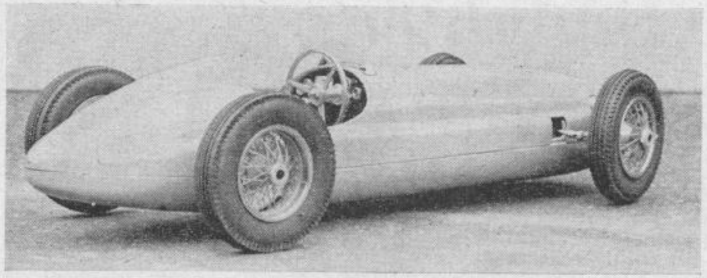


Above and on the left : Sit-Hathor Yunet in typical ceremonial dress of the Twelfth Dynasty, complete with authentic model jewellery. The smaller pictures were posed against an "Egyptian" background of cartridge paper columns.

Always pour your plaster at one go, otherwise if you stop, then continue later, a fault will occur in the casting. Shake mould box slightly after pouring to remove trapped air bubbles and ensure flow of plaster to all corners.

Always mix plaster to a smooth creamy consistency with no lumps. Try to obtain genuine plaster of paris, as so many of the trade makes do not shrink sufficiently to allow the models to be withdrawn from the mould.

Always clean sections of the mould well after use. With care you will be able to use them many times as I have done.



Make your own TYRES & WHEELS

Part III

By H. C. Baigent

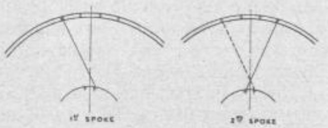
This B.R.M. model is a neat example of the satisfying touch lent by authentic wheels and tyres to racing models.

LET us assume you have now got your rims and holes drilled, and your spokes cut according to your requirements, and you are ready to commence spoking. I think it would be advisable here to just run through the bits and pieces you should have in front of you.

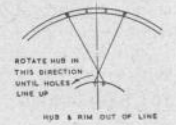
Rims, hubs, two sizes of spokes, assembly jig, reamer, bending block, pair of strong tweezers, solder, soldering iron, some sort of flame heat, such as a methylated lamp, and a small quantity of cold water in an open top container for cooling purposes. Now then, away we go.

First cut a small thin strip of solder and push it into the circular cavity at the back of the hub. Do not put too much in. I use a thin sheet solder that you can buy in what appears to be tubular form, but it is actually only folded over; this I open out and cut strips off. In the 2¼ wheels I use a strip approx. $\frac{1}{16}$ in. wide and just long enough to make one ring. Now place hub on jig, which should be a fairly tight fit to ensure that it does not move during the spoking. If you find it is a little loose, a simple way of making it fit is to place three small pieces of thin paper equally spaced round the jig before pushing the rim on, then tear off surplus. Of course, if rims and jig have been made correctly this should not be necessary, but mistakes are easy to make and there is no reason why a rim should be rejected for the sake of a couple of thou.

Start spoking with the rear row, bend only just that much of the spoke that goes on the hub, then select any one hole in the rim and ream it to take the direction to the corresponding hole in the hub. Now ream the fourth hole from that one inclusive in the opposite direction, and place the two spokes in position. You may find that the spokes do not look right, such as this



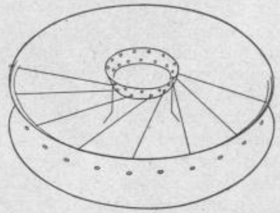
If this is so, release centre screw and turn hub till they become centralised.



Now at this stage it pays to put two spokes in the front row on the opposite side and this will show you if the two rows are going to line up; you might find they don't, and although it will only be very slight, remember that it is the front ones that want to be right, as they are the most obvious when the wheel is finished. So get your front ones right, and if the back ones are very slightly out it won't matter.

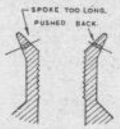
You now finish the back row and sweat in the centre by holding the jig complete over a flame, and when hot drop some Baker's fluid round the hub, and it will be found that the solder you have placed in the cavity will come through and run all round the spokes. (Only fix hub spokes at this stage—all the ends in the rim are fixed last.) Now slip the whole in cold water. This normalises the Baker's fluid and stops it corroding the jig, which as you see must be dural or the whole thing will become soldered solid.

Now you are ready for the front row. The sequence is the same as for the rear, but the bend is not quite so sharp as the spoke is longer, and the holes have to be reamed sideways and upwards as the spokes lean both sideways and outwards. It is found best to spoke the underneath ones first, that is the lowest of the staggered holes in the hub.



This save a lot of trouble trying to get spokes in under others.

When all the front spokes are in you are ready to fix ends, etc., and finish off.



Start fixing the centre ends in the hub first, for which you will need the soldering iron. First push back the ends of the spokes in the hub till they only just protrude through the metal of the hub, otherwise they will foul the hub caps.

Right: A set of hubs drilled and ready for spoking. Note the staggered holes. Extreme right: The finished wheel after plating showing the form of the "well-base" rim.

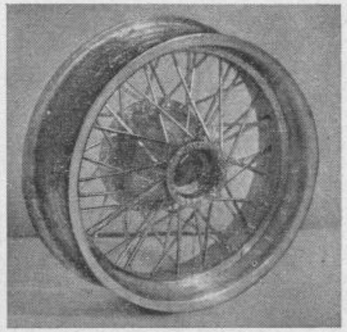


Photo by H. C. Baigent.

Now solder by holding the iron the spoke ends and slowly revolve the wheel, and keep the iron there until the solder runs right through to the other side, fixing spokes both sides very firmly.

Now file off any surplus spoke ends that protrude through the rim, then solder round the two rows together. I find it's best to preheat the whole over a flame and introduce flux when hot, then when you run round with the iron the solder runs easily and goes through the rim and makes a very solid job.

Now dip the whole again and remove from the jig, and you have a finished wheel which should be dead true and a pleasure to look at.

It is now ready for plating. I have had quite a lot of bother getting these small wheels plated satisfactorily, and have fitted up a small nickel bath which gives very satisfying results, and I shall be following this article with full details of construction and working of a small plating bath.

Please send any queries regarding the wheels or tyres that you may have to me direct, and if you include a s.a.e. I will answer by return of post. In fact I am interested to hear from *anyone* having a smack at this, so get cracking and let's see some spokes on the tracks next season.

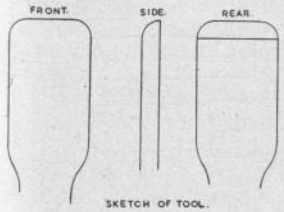
THOSE LOUVRES AGAIN!

SOME time ago we published an article by Arthur Weaver, who revealed the secrets of making those perfect scale louvres which are the envy and despair of so many model car builders. This method involved the use of a lathe, and certainly the results were beyond criticism.

Another reader, T. H. Bishop, of Lozells, Birmingham, has sent details of a somewhat simpler method of tackling the job. We cannot claim that the work produced by this method is so accurate as the one previously described, but it may well appeal to the less skilled builder who has no lathe, and particularly to those who are working on small models in that somewhat intractable medium, tinplate. Just what can be done with tinplate, by the way, was demonstrated by our correspondent some months ago, when his neat little electric racing model was described and illustrated in *Model Cars*.

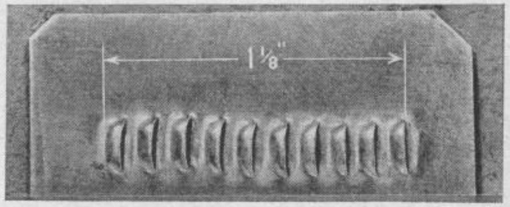
The tools required in this case are one or two old French files, and a sheet of lead. If the latter commodity is not available, it will not be difficult to find some lead scrap, melt it down and run it into a tin lid, to form a sheet not less than ⅛ in. thick. The old files are shaped up by hand to the appropriate size and form of the louvres required ,and according to our correspondent will not require to be hardened. The sketches show clearly the general shape of the punch, which can be varied somewhat as required. The panel upon which the louvres are to be formed is carefully marked off by scribing, and laid on the lead sheet. A smart tap with a hammer will then both form and shear the tinplate. Care must be taken to keep the successive cuts both parallel, in line and evenly spaced, as nothing looks worse than irregular incisions. This method can, of course, be used for either male or female louvres, but it should be applied only to flat sheet. Whether the resultant panel could be persuaded to take a curve is doubtful, but the method is in any case intended only for the simpler type of model.

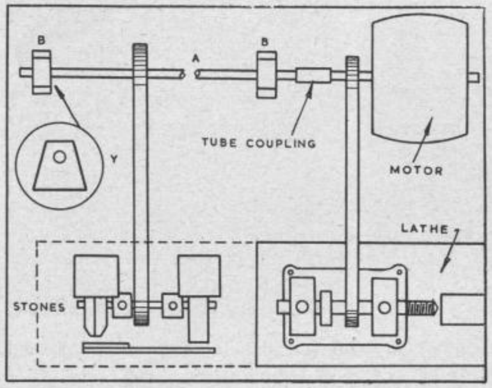
The specimen of work sent in by T. H. Bishop is illustrated here, approximately full size, and the louvres are exactly as punched out, without any subsequent dressing with a file.



Model Maker photo.

Left: The simple punch made from a broken file, and right, a "larger than life" photo of a sample sheet of tinplate after punching. The louvres are quite clean but the spacing and alignment are irregular.





GRINDSTONES DRIVEN BY LATHE MOTOR

AN INTERESTING LATHE ATTACHMENT THAT CAN BE ADAPTED TO MANY USES

BY H. A. ROBINSON, B.Eng.

THE two illustrations give details of a device designed and constructed by an amateur lathe worker. It is to make possible a ready-to-hand and easily coupled pair of grinding stones, the use of which are legion in the small workshop—as all craftsmen will know.

An electric motor of about $\frac{1}{3}$ h.p. drives the lathe in question, this being situated behind and to one side of the main axis, as shown, a belt being used for the transmission of power.

The main aims when rigging up the device were to have the stones located more or less on the same axial line as the lathe and on the same level; also, and this was most important, to have them independently driven although the power was to come from the lathe motor.

To effect all this therefore a shaft (a)—see diagram showing general layout—was mounted on the two bearings (b), 16 in. apart, and in alignment with the lathe motor axis. Its diameter being the same as the pulley extension from the motor.

A short length of tubing was then obtained and taken out until it just fitted nicely over the shaft and extension. It was next prepared, as Fig. A of the second diagram, by the taking out of the two corresponding slots (d), 1 in. in length, and the cutting of the two channels (e), also 1 in. long.

Both the new length of shafting and the motor extension were now bored and the two pins (g) and (h) driven through as Fig. B, their relative positions to the ends of the sections being as indicated. The pins extend about $\frac{3}{16}$ in. from the shafting on both sides.

When assembled (the assembly being effected by taking out the pin (g) and replacing after the tube has been slipped into position) the action of the arrangement is that when the tube is pulled to the left the extra shaft is quite unattached, and remains stationary when the motor is running. Pulled to the right, however, the pin on the motor extension engages with the channel (e) so solidly coupling the two parts—the extra shafting now rotating with the motor. The pin (g) merely slides along the slot (d) still giving a positive connection.

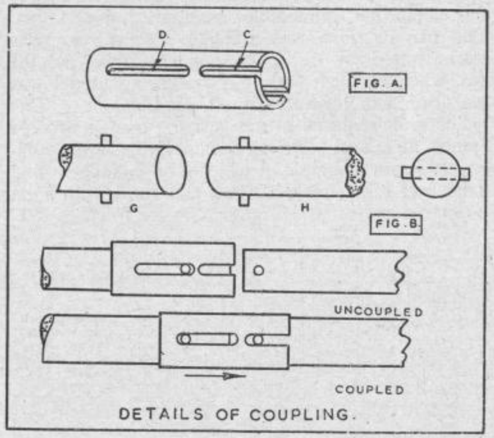
The stones 4 in. and $4\frac{1}{2}$ in. were commercially obtained and are mounted as one unit complete with guards, standards and bearings. The one is for flat grinding and has a square outer surface $\frac{3}{4}$ in. wide, while the other is bevelled towards its outer rim and is for "hollow" grinding.

Power is transmitted by the belt (y), the ratio of the pulleys being 2 to 1, the pulley on the shaft being 6 in. in diameter and that on the stones 3 in.

In practice all that is necessary to switch over from turning to grinding is to "throw" the lathe belt (x) and move the connecting tube across. The motor then drives the stones alone, the lathe standing idle.

The bearings (b) are simple blocks of wood bored and bushed at the correct level with tight-fitting lengths of brass tubing, while the full length of the extra shafting is 20 in. and the axis of the shafting and that of the stones 14 in. apart. Later it is intended to introduce an oiling cup to the bearings, but at present outside application of lubricant suffices. For easy manipulation the switch controlling the motor is set on the main horizontal member of the lathe between the lathe and the stones.

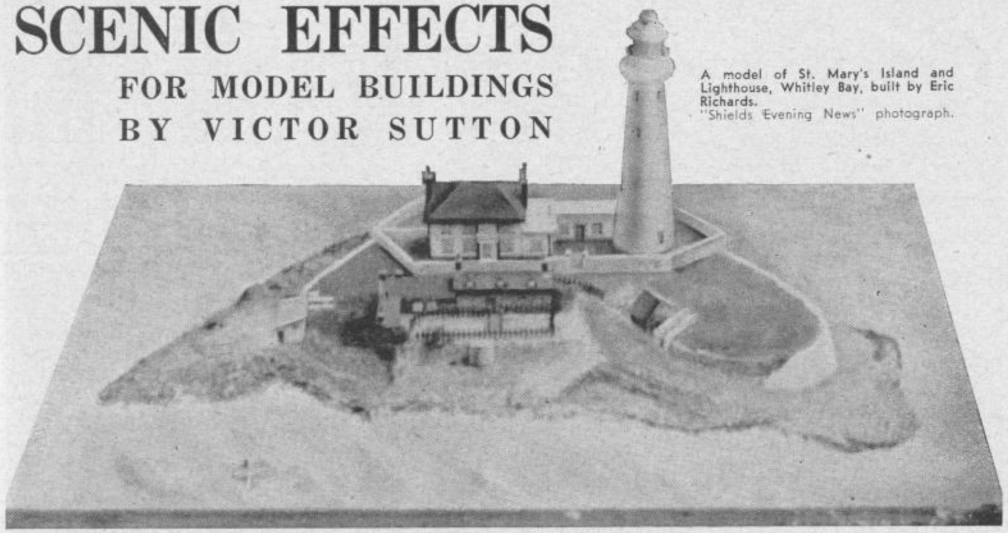
The pulleys used on this arrangement have all been turned on the lathe and the belting is strip leather.



SCENIC EFFECTS

FOR MODEL BUILDINGS

BY VICTOR SUTTON



A model of St. Mary's Island and Lighthouse, Whitley Bay, built by Eric Richards. "Shields Evening News" photograph.

IN the building of many models we so seldom see any scenic effects which, after all, make such craftsmanship more interesting and realistic. Just a model house, bungalow or ordinary building, can create far greater interest if set in some appropriate surroundings. In an exhibition, and against other models it would most certainly be rated as a prize winner.

The addition of this improvement gives much pleasure to the worker because he only has to try, with the barest materials, to make the effects look real.

Most houses and buildings have a path. There are many types. Crazy paving is now sold in well detailed sheets at the model shops. On the other hand some thick grey paint will do equally well if put on with a stiff short brush and dabbed on, not brushed on. Markings can be made with a thin, sharp stick. Do not leave jagged edges sticking up. A little sand, or pumice powder in the paint will also help. Most paints of the "flat" type will do. Under no circumstances have the path with a shining surface. Cement, whiting, and the ordinary wall paint can be used in path making. Experiment on a piece of cardboard first before doing the actual model.

If ambitious you can do the path with card strips, but this takes time, but is the most perfect. Cardboard can be indented to design and painted afterwards.

Whatever you decide to use for path or roadway bear in mind that all such things have unusual markings, tyre marks, where the rain continually runs off, and so on. It is only by very close study that you will find this out. It takes time, but it will look right in the end.

Some model makers paint the groundwork to the shade required and then thinly layer it with fine sand and thin gum. This deepens the tone and prevents gaps showing.

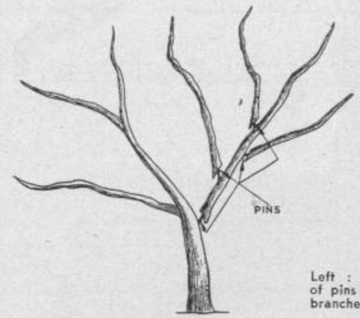
Monotony of tone can be avoided by shading as you go along.

Flower beds are best made in "Pyruma" modelling clay, and painted to suit the model, or one can get very effective layouts with plasticine which is now available in many colours. Dabs of bright enamels can represent flowers if put on with a pointed brush and the paint kept very thick. Rice, sago and other such small items can be used for climbing plants, etc.

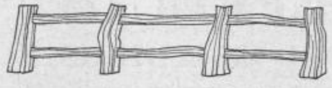
We often see some crude effects at waterways in the way of ponds and streams. The best idea needs a little planning, but is far more successful. Get an oddment of light green cathedral glass and fix in a box with a shallow depth. Paint the box part light blue graduated to almost white on the edges. For deeper water you would use a deeper green paint. Model your banks in plastic wood and add a few stiff cuttings of green paper for reeds.

The making of trees and shrubs is quite an art on its own, but it can be mastered.

Small shrubs and trees can be trimmed to shape from loofah or fine sponge if you can get it. Choose most carefully the sticks to make the branches or trunks. It is sometimes difficult to get the right shape, and so I have shown in my sketch a system I use to add a few more interesting branches. Here again, realism can be achieved if you imitate brightly coloured blossoms with rice and sago, but see that these things are not out of proportion. In this way collect some pictures or photographs, and follow the easy flowing lines of the trees. Avoid, stocky, stiff looking



Left : Shows the use of pins in building up branches of trees.



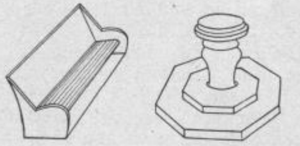
Above : Rustic post and rail fence. On the right : Random walling made from brick fragments.

models at all times.

You can make trees by tearing loofah out with a pair of tweezers. Put some in a saucer and fluff it out, and then dip into some green dye to get the correct shade. Add the bits to the tree with a strong adhesive like "Durafix". In such operations it is well to have a small wet rag to wipe the fingers.

Grass can also be shown by getting some flock paper. This has a stiff backing, but if you damp it it will become more pliable.

Just a few odd items of unusual interest in the miniature garden will always enhance the value of the model. Why not a wooden garden seat or a miniature sundial sheltered by some shrubs? This idea conjures up quite a pleasant picture of life in the garden. Then we have all the known types of bird houses, and all are interesting to make.



Garden seat and ornamental sundial that would enhance appearance of many model village layouts.

A little rockwork is another pastime in model making. Most odd bits of brick will crumble down with a hammer. There are several shades, red brick, brown brick, yellow brick, and quite a few others. Small stones can be embodied in plasticine, and the resulting powder stored in a tin for exterior decoration. Chalk, limestone, sandstone, all have special interests in different areas.

Odd scraps of wood will always do for fences, but the uprights need to be fitted firmly. In show work and display, your fence will always come down. Fit the uprights with pins from underneath as shown in the small sketch. Design the fence on rustic lines. Paint in poster shade and streak up in black Indian ink. Note the lining on the piece of fence shown. Underline the bars with dull green paint or brown. You will find a good use here for ordinary spills.

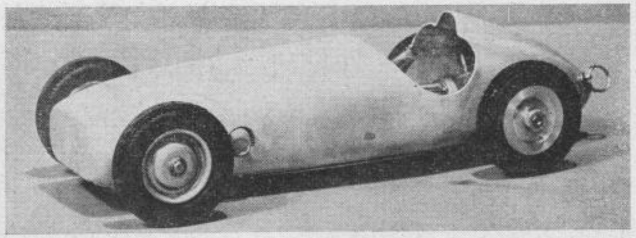
You can make an iron fence from Bristol board but it would not be considered artistic and best avoided unless in real connection with a commerce or utility building. Even in fences alone one could write many pages. They are all different and this applies to walls and surrounds.

It is my intention to write a series of articles on model buildings, and I am so keen to get my readers to appreciate the great interest in this work. Many interesting trips are arranged in my part of the globe by the Council for the Preservation of Rural England. Old buildings are visited and most enjoyable outings are had, and I understand valuable instruction on construction is obtained.

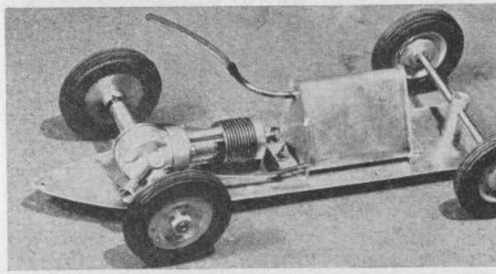
Model buildings would be considered one of those branches of our craft which would always fill in for the occasion when we may have to work on the kitchen table. I am all in favour of having two branches of model making going at the same time, but you must have a firm conviction that you will finish both jobs and not leave one unfinished. Two or even three models can be a very great stimulant, and I have found it very often prevents me from getting fed-up with model making.

Many readers will have their own ideas on making some scenic effects, but this article should give a good clue as to what to look for and what to use. You cannot go far wrong if you try to make it "look right", and so often that means using the same material as on the real thing, but in a different way.

B.R.M. KIT MODEL



The B.R.M. as supplied in part finished form. The grille, dashboard, screen and details remain to be fitted, but the car is ready to run. (Below) The chassis is of flat plate type, the front axle is adjustable, and a generous tank capacity is provided.



ALTHOUGH the majority of club enthusiasts and regular competitors in model racing either start or graduate to building their own models, there is a steady demand for kits of parts and ready-made components, from beginners and the less well equipped or less highly skilled workers, and also from those whose spare time or inclination limits them to racing only, rather than working from scratch.

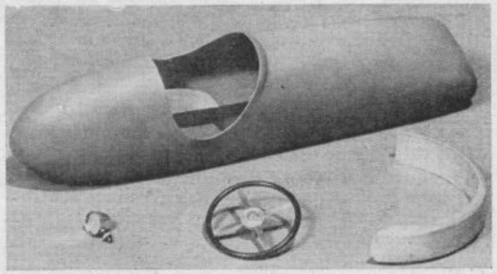
The latest complete kit submitted for our inspection is the 2.5 c.c. B.R.M., supplied by G. V. Walshaw, of Post Office Stores, Lytchett Minster, Dorset, and is intended for those who wish to carry out detail finishing and painting for themselves, in order to possess a practical competition model.

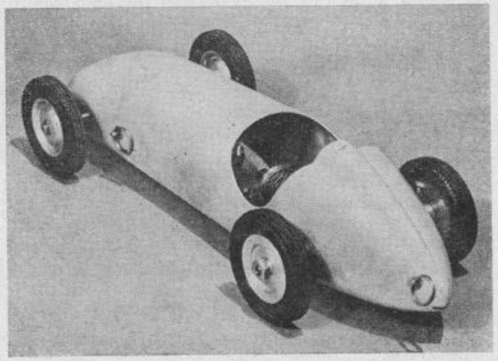
The B.R.M. is powered by a 2.5 c.c. diesel motor of Henri Baigent's manufacture, with disc rotary inlet valve and direct drive on both rear wheels. In the kit described, all major drilling and fitting is carried out, and the remaining work consists of piercing out the radiator grille, making up the grille itself and fitting the instrument panel, screen and such other cockpit details as the builder desires, and final painting. The resulting model should be an excellent replica, capable of a satisfying performance in its class.

During the time the car has been in our hands, wintry conditions have made full track tests impossible, but a brief run with the model on an improvised track assured us of its easy starting and excellent power output combined with a well chosen gear ratio. The price of the full assembled kit, known as No. 3, is £12. Kit No. 1 selling at £10, includes body and base tray, power unit with four wheels and tyres, front axle, tank and fittings, and No. 2 is similar to this, but with drilling and fitting carried out, and costs £11.

(Below) A Ferrari body, designed to fit a chassis similar to the B.R.M., and three other items of equipment, mirror, steering wheel and a section of aluminium mudguarding for model sports cars. Lower picture shows the B.R.M.'s neat and simple lines.

Intended for a model of basically similar type, a well made Ferrari type body was also submitted, together with some interesting scale accessories. These include an excellently finished $2\frac{1}{8}$ in. dia. four-spoked steering wheel with black plastic rim suitable for large models (which can also be had with three spokes and with white plastic rim) at 7/6, a neat rear view mirror, sections of close-fitting M.G. Type wings, and lengths of well finished louvres, 1 in. overall width. All these are fittings which are much in demand by those who like to see a well detailed model, and should prove really helpful to harassed builders.

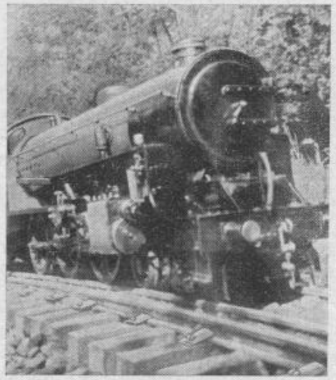


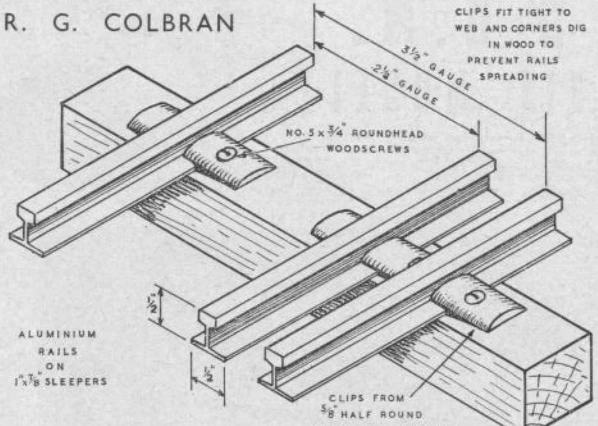


MODEL MAKER

OUTDOOR TRACKS

FURTHER COMMENTS BY R. G. COLBRAN





ALUMINIUM RAILS ON 1"x⅞" SLEEPERS

I WAS interested in "Puffing Billy's" recent article on Tracks, as I have had some experience with outdoor tracks, and can add a few comments.

For my first track, built before the war, I used ½ in. x ½ in. x ⅛ in. steel tees which were obtained very cheaply in those days. Tees were preferred to angles on account of a more realistic appearance. These rails were fixed to wood sleepers by round-head screws every 8 in., and with metal clips every 2 ft. Longitudinals were 4 in. x 2 in. timbers supported every 8 ft. by A-frames constructed of 1 in. x 1 in. x ⅛ in. steel angles.

This track, which is still in service, has had about 10 years' in the open, and is now showing signs of decay. Longitudinals and sleepers are rotting in places and the trestles have corroded away at ground level.

I have three objections to the iron rails—the running surface is only ⅛ in. wide, and engines are inclined to slip; secondly in wet weather they soon acquire a coating of rust, and when the rails get wet a brown rusty mud is flung up by the wheels on to the motion of the locos, and the underside of the rolling stock; finally on curves the rusty rails cause considerable flange friction. Otherwise they have given good service.

Brass rails have not been tried, but brass is affected by the atmosphere in smoky districts. I believe the zinc in it is attacked by the sulphur in the air. Two instances confirm this. I made some brass clips to hold sheets of glass together for "cloches" in the garden, and after a winter's exposure the clips had all broken and the metal had no strength left. Again, a friend in London had an "0" gauge railway laid with brass rails in a conservatory. After a few years the rails crumbled to pieces.

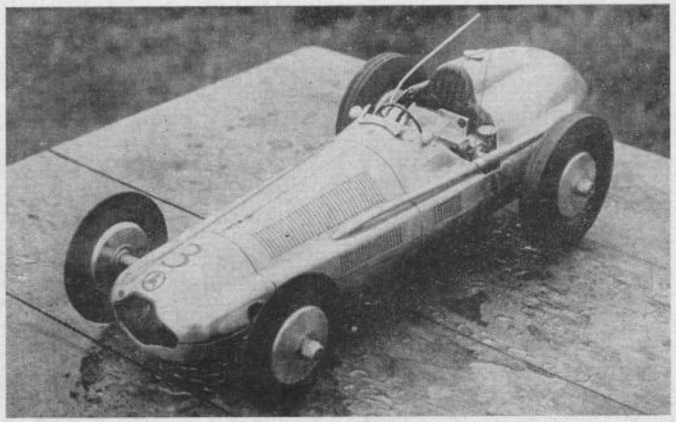
Aluminium-alloy rails have been used for an extension to my line, and have been quite satisfactory so far. It is expensive, although cheaper than brass, and looks very effective. The rails are secured by aluminium clips (cut from ⅝ in. half-round beading) screwed at 8 in. centres to every fourth sleeper. I prefer this method to plain screws or spikes as the latter do not maintain the rails to gauge so well, particularly if the sleepers are of soft wood. This part of my line is a 27 ft. radius curve on a gradient of 1 in 100. No fishplates are used, the joints being arranged on a sleeper. This is a mistake, as considerable creep takes place, a failing with full-size flat bottom track, by the way, for which many remedies have been tried out.

The clips are fixed with wood screws—I have tried both steel and brass for the purpose. Steel screws rust of course, and consequently are difficult to remove for repairs or alterations. Brass may suffer from the atmosphere as above, and furthermore there is an electrolytic action between brass and aluminium in the presence of moisture, and I have found it equally difficult to remove brass screws. Both stainless steel and aluminium-alloy wood screws are listed by manufacturers, but I have not tried them.

One other thing about alloy rails, when I first laid my curve I found rapid wear was taking place, a sprinkling of bright filings was dropping on to the sleepers. This was traced to the passenger trolley which had square edges to the wheel flanges. The wheels were hurriedly treated by well rounding the flanges, and no wear has since been noticed.

Although I have little opportunity of running a loco, the track gets plenty of hard use, our own and other children take great delight in riding on or pushing the long-suffering passenger trolley.

I quite agree that a concrete sub-structure forms a sound basis, and I intend to use it when my present line needs rebuilding. It must be borne in mind, however, that to be durable concrete must be very well made, and there is a lot more in it than just mixing sand, cement and water . . . but that is another story.



A MAN AND HIS MODELS

HARRY HOWLETT

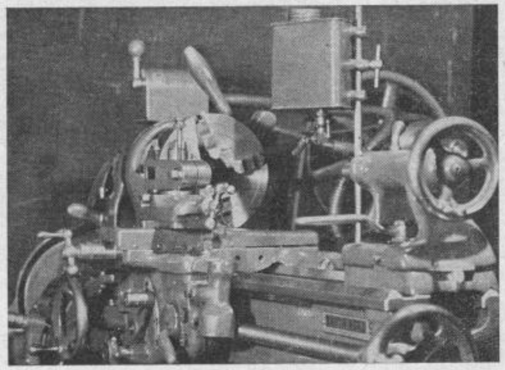
THEY do fling themselves into things heart and soul up Staffordshire way! To most model car folk that part of the globe spells Gerry Buck, but those who know the Meteor Club will confirm that they don't come much keener than Harry Howlett, who took over the Hon. Secretaryship of that august body from Gerry, and has made a "reet do" of it.

There's nothing of the dilettante about Harry, If his enthusiasm prompts him to take up a hobby he goes for it 100 per cent, and he wastes time up no by-lanes! He started in on model engineering at 16, fired by a 4 in. Drummond lathe presented by Papa. (How that must recur in countless biographies of model engineers!) The subsequent saving to buy new tools is easier to write about than to do. First engine was built at 19, a 30 c.c. 4-stroke, for the inevitable boat, but as far back as '38 the model car bug did its deadly work, and out came the 30 c.c. job, an angle iron chassis was slapped together. (I feel sure H.H. will write to say he never slapped anything in his life!) and an ashtray tyred wheel was put at each corner. Transmission? A ⅜ in. round leather belt, driving one-to-one on the back axle! I told you he does nothing by halves! Progressive take-up of the drive was achieved by slipping the belt on at full stick, whereat the back tyres came off and circled the room via the ceiling. Copper binding wire put paid to that, however, but history does not relate where this delectable machine was run. Alas, it did not survive to grace the Meteor Museum.

A Westbury Kestrel followed, and simultaneously our hero commenced a one-man foundry, using a gas fired furnace made from an old oil drum and a couple of hair driers to provide the blast. Then—big moment—at 21 the Drummond was sold and a South Bend lathe purchased, which still further fed the flames of enthusiasm. About this time a close association with Gerry Buck led to serious model car building, which the war rudely interrupted. Harry found himself in Canada amongst the other spots, and prudently bought a model car complete with Cyclone engine (the Meteor Club regard this as a forgivable youthful frolic and never mention it now). The delinquent himself says now that he only "experimented" with it. He then "experimented" with a silver head McCoy, for which he built the well-known Howlett Mercedes No. 1, Type G.P.38. The brethren worked upon him earnestly however, and after several powerful sessions with F.G.B., Eric and Alec Snellings, and others, he put away childish things with a half-stifled sigh, and began to build his own engines with the best of them. The present Howlett Mercedes was the outcome of this, and its completion coincided with an invitation to join the select band which journeyed to Sweden to revive memories of

(*Continued on page* 186)

(Above left) : Harry Howlett, Hon. Sec. of the Meteor M.R.C., with his Mercedes Benz Mark II, also shown in greater detail on the right. True to "Meteor" tradition, the home-built engine is being progressively developed to the 100 m.p.h. class. (Below) A nice 21st birthday present, Harry's South Bend Lathe.



A Novice Takes up Model Engineering

LIGHTHEARTED EXPERIENCES OF A NEWCOMER

BY H. SENOGLES

SOME of my friends say that I am quite mad! A busy practising accountant, who is tied up with meetings and committees three and four nights a week, has lately become a grandfather, is in the wrong side of fifty, has never had anything to do with metals or mechanics, and this is the man who had now taken up model engineering! True, brother true, but what a kick I am getting out of it all.

Before the war, I had some very enjoyable years of ship modelling, and, from the blue prints of an American periodical, turned out several 20 inch models such as the U.S. frigate "Constitution", a Viking ship and a Barbary Coast felucca, but all my work was in wood, and I was frightened stiff of metal. When the war came, I was halfway through a coast-guard vessel, and I regret to say that it is not finished yet. Shortage of staff, increasing work in the office, the Home Guard, and afterwards the local Council, all combined to bring modelling to a complete halt. I had quite a useful kit of woodworking tools, kept in various odd drawers and places, and I had a hankering to acquire a wood turning lathe when opportunity arose.

Just six months ago, Jack, a local garage mechanic, told me he was about to sell his Portass 3 in. lathe, as he was going in for something heavier, and would I be interested in a deal? I thought and I pondered and I counted the cost. It was not just a case of buying a lathe, but it would mean requisitioning a back bedroom as a workshop, bringing in power, furnishing it with a proper bench, a worktable, sundry storage cabinets and acquiring a kit of tools, instruments and accessories. I bought some Percival Marshall textbooks and later Sparey's grand book, and reckoned up that is would cost £60 for a decent start. All this on a gamble that the venture would be a success!

"What are you going to make" asked my wife. "Oh, models and things", said I. "What kind of models?" Now that was quite an awkward question to ask a man who hadn't the vaguest idea of what lay in front of him. "Well—it won't be locos, for that is far too complicated, the job takes too long, and there isn't a track anywhere that it could be tried upon. It won't be motor boats, because there aren't any ponds near. It is going to be steam engines for a start, anyhow". And that was that!

Whilst I was waiting for the fixing up of the workshop and for the lathe to be delivered, I studied books and waded through a pile of old model engineering magazines that Jack had lent me, when I caught sight of the drawings of an old beam engine. "Lovely", said I, and out came my drawing board and squared paper to get it down full size. It did not take long to realise that I would have to learn my trade before I tackled a job like that and that I must look round for something more within my reach.

At last, the lathe was installed, and I made my first attempts with Jack as my tutor. Mr. Sparey had shown in his book the drawings of a tailstock dieholder, and described it as "an ideal exercise in turning for the beginner". Since I had just bought a set of 0 - 10 B.A. taps and dies, that was quite enough for me, and off I started, upon my dieholder. Great was my pride when Jack pronounced the finished accessory as a satisfactory job. What next? I still had not found my first model, so I set to work upon a collet set, as described by Mr. Sparey, feeling that I might as well make something for the other end of the lathe. When Jack found out what I was doing, he pulled rather a face, and pointed out the fine limits necessary for collets, and the shop price of these sets. Be that as it may they came out very well, but I was in great trouble when it came to making the sawcuts with a small hand saw. For cutting the thread to fit my mandrel, I sent it away to have it done professionally, but I was very proud at being able to set up my lathe for my very first attempt at screwcutting the nose and its cap, and of doing the job successfully.

In July I sent up my subscription for *The Model Mechanic* and received the June and July issues, and there was my first model to be—Mr. McGrath's stationary steam engine and boiler, so off I wrote for the drawings. No longer would my wife be able to say "When are you going to make something", and as a small boy I wanted to possess such a model, without having been able to acquire one. Here was my chance at last, and I heeded not the remark that it was a grand-daughter that I had, not a grandson. I could not see how I was going to tackle the cylinder and steam-chest end of the model and I did not understand the construction of the boiler, though Jack was in no difficulty at all, of course. Bits and pieces of material were acquired and work was started on the engine, I had no drilling machine as yet and so I was turning out my parts one by one, and storing them in an old chocolate box in readiness for the drilling and for fitting up the engine. The drawing did not say how the slide bars were to be set up at the correct height above the bed, and I was quite pleased when I discovered for myself the solution (and please do not say it is very elementary), of drilling through a $\frac{1}{16}$ in. rod, cutting off into lengths of $\frac{1}{4}$ in. and $\frac{3}{8}$ in. and having a brass rod screwed both ends through the bars, rods and base support.

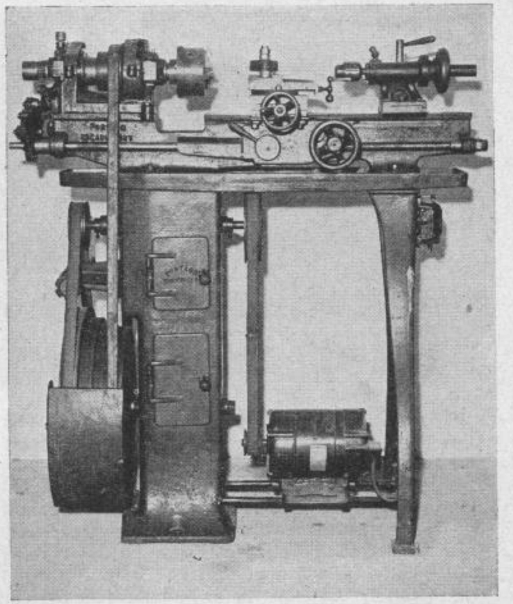
I was still wondering about the cylinder, and at last the time came to ask Jack how to go about it. He told me to turn a gunmetal cylinder of 1 in. diameter. Then get a bigger piece and bore a 1 in. hole, in the lathe. Then saw out the support for the steam chest, as shown by the drawings, which would sit nicely on the cylinder. This done, he would silver solder the two together for me, when it would be ready for boring truly for the piston, and for drilling the steam passages, etc. Like everything else, it is simple when you know how.

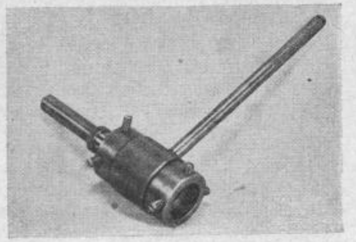
Where have I got to now? There is still the whole of the steam chest and the connections up to the eccentric strap to make and then the model should be ready for assembling together. I had reckoned that on my limited time and my inexperience, it would take me until Christmas to complete, and it looks as if this timing is near the mark.

What about the boiler, you may ask. I may as well say that there have been lots of arguments about this. I am sure that Jack will not mind my saying that he is "anti-meths" and is prejudiced in favour of a coal fired boiler. He reckons that a spirit fired boiler does not give a long enough run of steam, and that I would not be able to run two or three models at the same time from this plant. He showed me drawings for a coal burning boiler that would give all the steam I would ever want, but when I studied these drawings, I came to the opinion that this vertical boiler, over 12 in. high overall, would absolutely dwarf everything else. The actual boiler itself is 4 in. dia. x 4 in. high. How would it be if I scale it down to 3 in. dia. to 3 in. high, with everything else in proportion? It was rather surprising to find calculation that after taking into account the boiler tubes and central flue, the qauntity of water would be cut down to nearly a third of the original. As I do not yet know enough to take sides, I have taken rather an easy way out, for I have ordered a boiler, advertised at 30/-, to run this engine for me, and perhaps I will see the light later as to what kind and size of boiler to build that will supply enough steam to run say three models at the same time for half an hour at least.

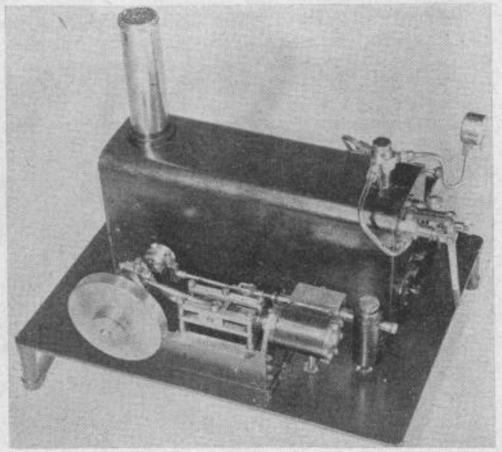
What I want to find now are the detailed drawings of a coal-fired stationary horizontal boiler, showing exactly how it is all set up and with the details of the various fittings that belong to it, but while it must be able to supply ample steam to run two or three models, it must not be so large as to dwarf them.

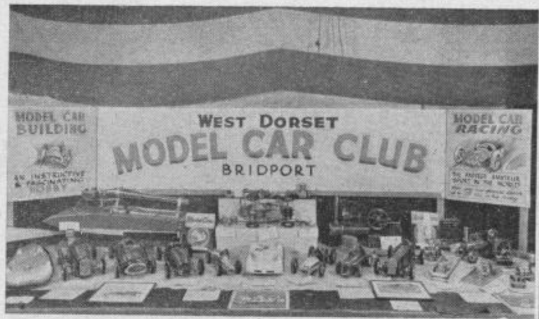
It is a most fascinating hobby — this model engineering.





Above: Portass 3½ in. lathe on stand—our contributor's is somewhat smaller and lacks the stand. Right: Home-made tailstock die-holder, reversible to take 1 in. and 13/16 in. round dies. Below: Mr. McGrath's steam engine and boiler now engaging our novice's attention.





Photos by Herbert

RECENT CLUB EVENTS

BRIDPORT

That West County group of enthusiasts, the West Dorset M.C.C. have been absorbed into the Bridport and West Dorset Model Car and Engineering Club, and celebrated the amalgamation with a successful Exhibition held in conjunction with the Weymouth and Dorchester model clubs at Weymouth recently.

Six thousand people, including holiday-making model enthusiasts saw the show. Bridport section was naturally the focus of attention for model car fanciers, and an interesting array of cars was on view. These included a scale Mercedes with 10 c.c. Gerald Smith engine, a 2.5 c.c. and 5 c.c. Cooper, and a 1.3 c.c. Mills Special, two M. and E. kit models, and two cars under construction. James Batten, the moving spirit of the model car section, was showing his well known Gordano scale job, and the old chain drive Hallam Special, first long distance record holder in the country. Finally, the stand included a replica of John Cobb's Railton Mobil Special and an experimental chassis.

The West Dorset club provide excellent publicity for their activities with a fine display of models. (Right) James Batten explains a chassis to the Mayor of Weymouth and the President of the Weymouth Society.

Mrs. Batten, of 1 Bullen's Mead, North Allington, Bridport, is the club's Hon. Secretary, and she tells us that the club is increasing its membership satisfactorily, but is somewhat hampered by lack of a full-sized track. Model car enthusiasts in Dorset and the surrounding district will be welcomed, and any suggestion for a suitable track site should be sent to Mrs. Batten.

LIVERPOOL

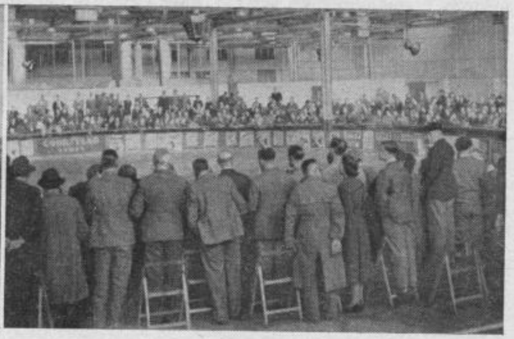
A new and progressive model car racing group has appeared in Liverpool, under the aegis of the English Electric and Napier Model Engineering Club, whose headquarters are at East Lancashire Road, Liverpool 10.

We recently met J. Hart, Hon. Sec. of the car section who gave an encouraging report of the club's growth, and has since sent us concrete evidence of its enterprise in the pictures of their recent meeting reproduced on this page. No fewer than 50 entries of excellent quality were received, and 1,500 spectators were accommodated in the company's works canteen.

J. R. Parker was the club's "godfather" and founder member, and has greatly encouraged the group

Continued on page 191

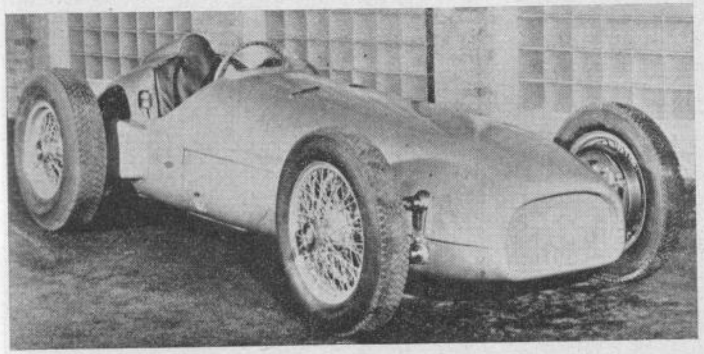
A group of English Electric and Napier M.E.C. members with the club car referred to. J. Hart, Hon. Secretary, is on the left in the front row, and J. R. Parker of the Meteor Club is second from left in the back row (Right) A view of the meeting in the canteen, showing some of the 1,500 spectators and the poster-lined track.



PROTOTYPE PARADE No. 27 by G. H. DEASON

B.R.M.

by permission of BRITISH RACING RESEARCH TRUST



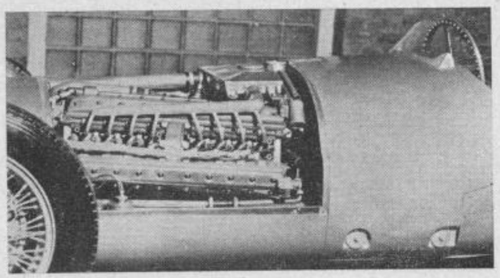
(Left) The B.R.M. in its original form. Note the absence of rear-view mirrors, louvres and bonnet straps.
(Below) The most advanced engine ever seen in G.P. racing. Note the array of water take-off pipes and the remote header tank.

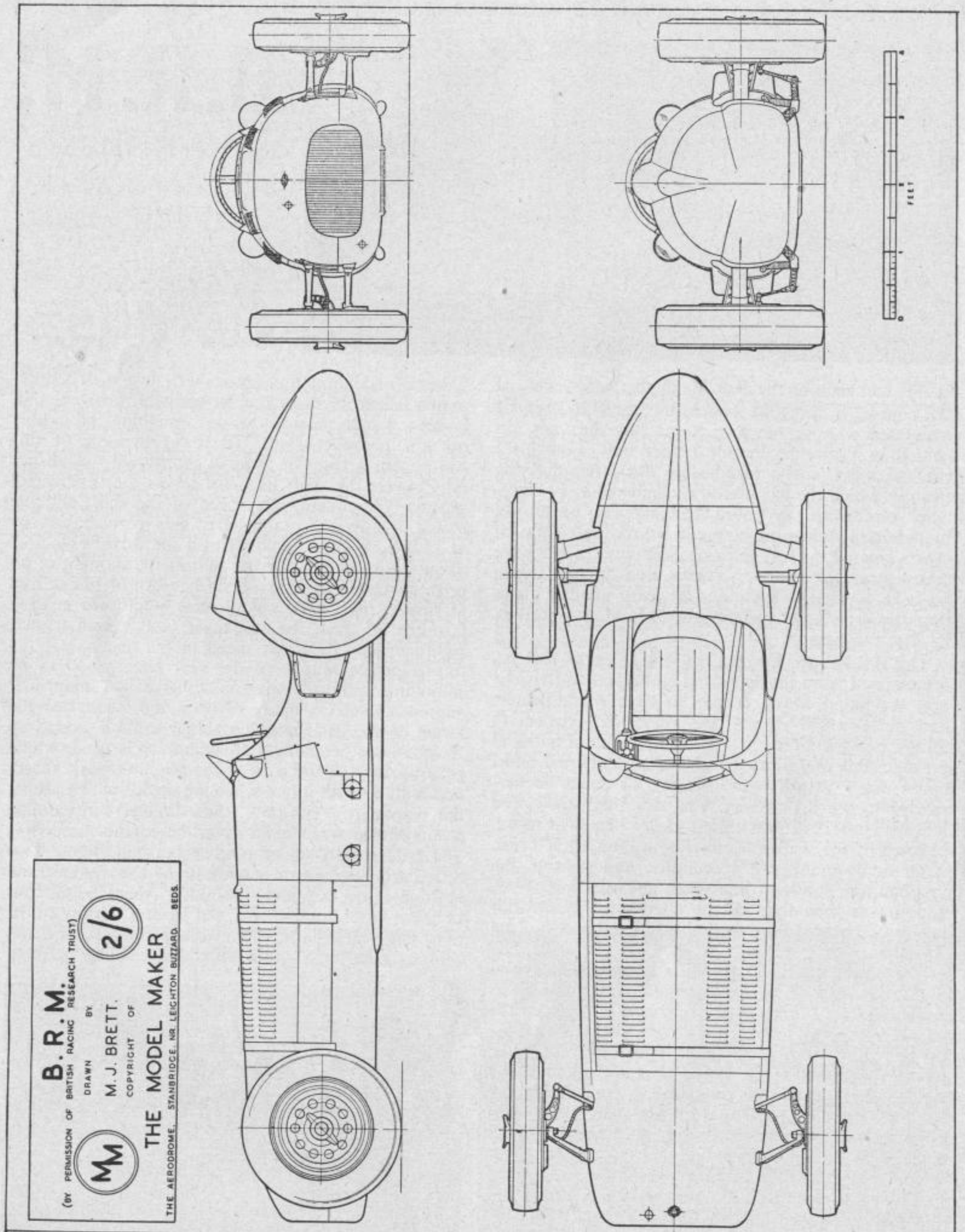
THE inclusion of the B.R.M. in this series was, of course, a foregone conclusion, and it may be wondered why so fabulous a machine has not appeared in Prototype Parade before now. For this I confess myself to be responsible, for I felt that the form in which the car was first displayed at Folkingham Aerodrome was more than likely to be subject to detail modification before the promised team of racers entered the fray in force. So many readers have called for a description, however, that the matter can be held over no longer, and at least we can claim that the drawing represents the B.R.M. as raced in its first full season.

The B.R.M. was an idea in 1939. Like the E.R.A., it emanated from that practical enthusiast and visionary, Raymond Mays. It was to be a world-beater; and since world-beaters are very, very expensive things, besides adding greatly to the lustre of national prestige, this one must plainly be a communal effort by as many British manufacturers as could be persuaded to see it that way. The war intervened, and it wasn't till 1947 that things really began to move, directed by the British Motor Racing Research Trust. After many months of speculation and rumour, the first car was shown to the Press in December, 1949, and it was seen that all the attributes of a world-beater *had* indeed been assembled into that 8 ft. 2 in. wheelbase.

The power unit is a magnificent conception, based on the idea that if lots of bits must go up and down and round very often in a given time to produce the necessary energy to beat the world, the bits that go up and down should be small, light and numerous, whilst the bits that go round should be stout and rigid. Hence the sixteen tiny pistons, each displacing 93 c.c., totalling 1,488 c.c. And since it takes a great deal of precious energy to push the wind aside with an unyielding body at high speed, low overall height and frontal are served by setting the two banks of cylinders at a very wide angle (actually 135 deg.) and gearing two separate crankshafts together, a device which simultaneously improves balance and simplifies crankshaft design. Then remains the problem of the driver, who, being of old-fashioned pattern, must sit on something, preferably not the propeller shaft. To lower the line of this component a train of gears is interposed, which not only lowers the shaft line, but serves the very useful purpose of reducing the speed of the shaft and the clutch. Whilst the crankshafts may revolve happily at 12,000 r.p.m., it is doubtful if the driver's state of mind would be equally tranquil at the thought of an open propeller shaft revolving beneath or beside him at similar revs. ! The two-to-one step-down gearing is taken off from the crankcase, and a similar gear train steps up the shaft speed to the rear axle.

The power output of the new engine had to be something quite phenomenal to give it a chance of supremacy, and a figure of over 400 b.h.p. was the target of the designers. To achieve this a geared-up Rolls Royce centrifugal supercharger is used, which runs up to 40,000 r.p.m. at the engine's peak speed, and is fitted with a free-wheeling device which allows the vanes to "run-on", thus taking considerable strain off the mechanism when the engine speed rises and falls rapidly under road-racing conditions. Two S.U. carburetters are set ahead of the engine, and ignition is by coil and distributor, there being four of these latter components, fed from a battery in the tail. The crankshafts run in ten plain bearings, the four camshafts in roller bearings. Cooling is by a



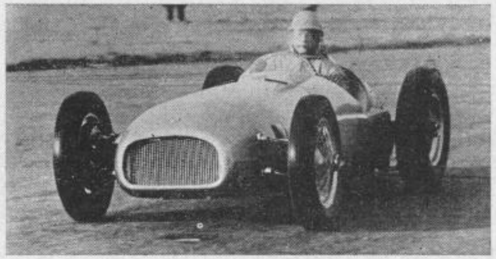


pressurised radiator block set low down in the nose of the car, with a remote header-tank above and behind the engine. The engine is set at an angle, the drive-line running rearwards towards the near side.

The chassis is fabricated, the members being boxed by sheet steel welded to tubes set one above the other. Trailing arm independent front suspension is used, damped by oleo-pneumatic struts, which are set ahead of the front cross-member and operated by forward extended arms from the upper links. The rear end is similar to the G.P. Mercedes Benz, the gearbox-cum-differential being fixed to the frame, and the drive being taken outboard by universally jointed half-shafts, a de Dion tube and radius arms locating the wheels. Once again oleo-pneumatic struts take the road shocks.

The steering column passes centrally over the engine, and operates through a universal joint to the steering box on the near side, from which divided track rods pass rearwards to the steering arms. Fourteen inch brake drums enclose the Lockheed three-leading-shoe mechanism, which is served by dual fluid pipes. Two fuel tanks are fitted, one of saddle type over the driver's knees, and the other conventionally mounted in the tail. These tanks are joined by large-bore pipes which pass on either side of the cockpit, as in the 3-litre Mercedes Benz. The oil tank for the dry sump lubrication system is on the off side of the engine.

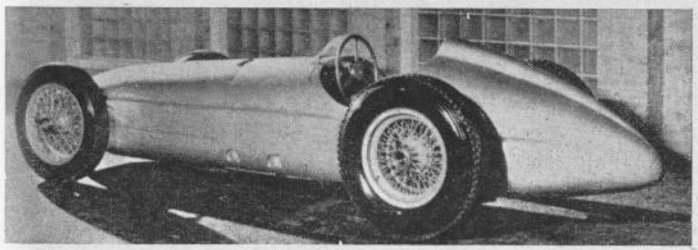
So much for the main mechanical details, a full description of which would fill a book. The model makers' interest is mainly in external appearance, and we have already seen a number of versions (and variations!) on club tracks during 1950. The general appearance of the car is plain, to severity, and beautifully proportioned. The snub nose with its strictly vertical line runs quickly into a very low bonnet with parallel sides and not-very-pronounced side bulges. This line is broken by the fairings over the radius arms, and pierced at the front with openings for the suspension arms and track-rods. The cockpit is wide and commodious for so small a car, and the deeply upholstered driving seat is specially designed to locate the driver snugly, having arm rests and padded "wings" for his shoulders. A low head fairing in no way supports the driver's head, but is simply what its name implies. The tail is graceful, with a sharply falling profile and a round blunt extremity.



The five-speed gearbox is controlled by a normal short lever working in an open gate on the right of the driver, a hand brake lever lies almost horizontally beside it, and a 17 in. three-spoked steering wheel is fitted. The facia board of the first car contained a large array of instruments, but later cars are likely to carry a simplified set.

Bodywork is finished in an attractive shade of light green, similar to that used in the early "Works" E.R.A.s. Wheels are silver, and all visible components are brightly polished steel. The B.R.M. badge, a four-pointed star in concentric circles, is carried on the nose of the car. In the case of B.R.M. No. 1 no louvres were used, with the exception of the pairs on the scuttle for cockpit ventilation, but engine cover louvres appeared later in the season for the Barcelona G.P. The windshield is of curved "Perspex", and circular faired rear-view mirrors are fitted on either side of the scuttle.

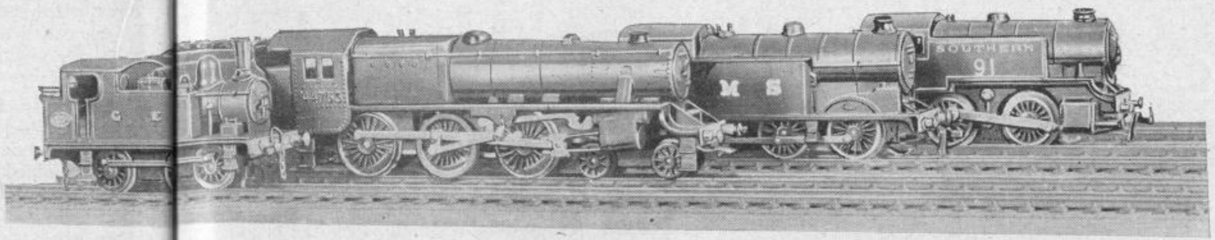
An almost incredible amount of "guff" has been written about the B.R.M.'s public appearances during 1950, much of which has been grossly unfair to a new racing car in its first season, and most of which would never have appeared but for the tremendous amount of publicity the project has received. I have no wish to hurl myself into the mêlee of amateur and professional scribes who seek to explain the reasons for its failure or the remedies for its troubles, but shall be quite content to await its 1951 appearance in the belief that, given the time, such a magnificently conceived motor car must eventually overcome its difficulties and give a true account of itself. In the meantime I recall with delight the stirring war-song, rather reminiscent of a high speed circular saw blade doing a nice clean job, and may that war-song spell the discomforture of its foreign rivals before a changing formula or another World War spoil its chances for ever.



(Above) First view of the B.R.M. in action in December, 1949, at Folkington, with Raymond Mays at the wheel. (Left) A view which shows to perfection the beautiful lines and low overall height of the car. The large-section rear tyres are very reminiscent of the pre-War G.P. Mercedes.

On the Right Track

A REGULAR FEATURE OF INTEREST TO ALL 00 GAUGE FANS BY R. WATKINS-PITCHFORD



Heading picture shows from left to right an 0-6-0 scale loco by F. Roche, a Graham Farish 4-6-0, a Hornby Dublo 0-6-2T and a Trix 0-4-0T. Illustration from our contributor's book "Peco Platelayer's Manual."

The Case for 00 Gauge

THE newcomer to the model railway hobby does not as a rule get very far before coming up against the question of scales and gauges and unless he can get some experienced member of his club to explain these matters clearly—and impartially!—the whole subject is apt to appear somewhat mystifying and frightening. So we may as well attempt to lay this particular ghost right at the outset.

Most readers of *Model Maker* will be well aware that the gauge of a railway track is measured between the opposing faces of the rails. The standard gauge in this country is 4 ft. 8½ in. and its metrical equivalent of 1.435 m. is also employed in many countries abroad. For convenience the odd 8½ inches are omitted—or rather taken for granted—in railway parlance and the gauge is referred to shortly as "the four-foot way" to distinguish it from "the six-foot way" separating adjacent roads. Still more readers will understand what is meant by saying that a model is made to a scale of so many inches (or millimetres) to the foot.

And it would appear at first sight that in laying down a miniature railway all one needs to do is to decide upon a convenient modelling scale and then reproduce the prototype in every respect—including track gauge—to that scale.

Unfortunately it is not quite as simple as that.

A complete railway system including track, locos, rolling stock, buildings, and accessories, comprises hundreds of different items. If, therefore, we choose a modelling scale of our own that is not a "stock line" on the market, we shall have to make every item of equipment, including rails and wheels, ourselves and this would take a lifetime of spare time before we could get down to operating a railway even of modest dimensions.

For the great majority, even amongst those whose chief interest lies in the actual making of models, the reward of labour is to achieve a "railway in being" whereon miniature trains move under power in satisfying and convincing surroundings.

The wise course then is to select a modelling scale that offers a wide choice of ready-made components, thus leaving the railway man free to make or to buy according to his time, his purse and his inclination. There are, of course, many standard or stock modelling scales for which commercially manufactured parts in greater or less numbers are available, and these scales range from 4 inches down to 2 m.m. to the foot.

But for the indoor model railway, with which the present series of articles is concerned, the 7 mm. scale is the largest that will be considered. This scale is deservedly popular not only because of the wide selection of components offered by the market, but also because it permits super detail modelling "down to the last rivet" to be incorporated—and seen!

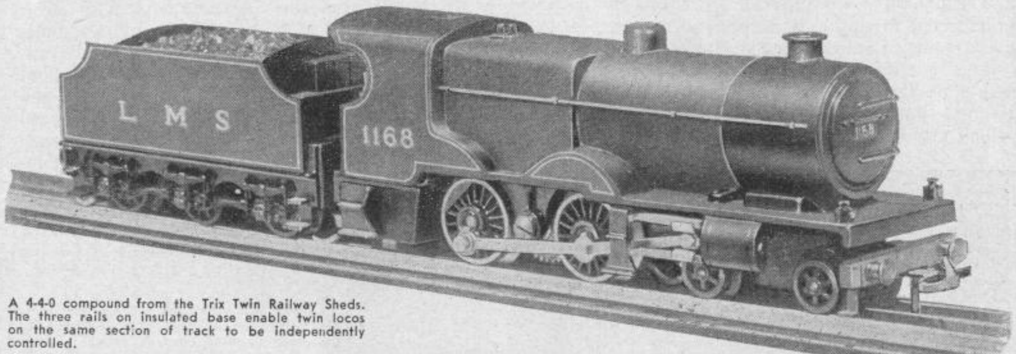
However, when it is appreciated that in this scale a train of four coaches with a tank loco will occupy well over six feet of track (and platform space) it will be seen that a room of sizeable dimensions is needed before a working layout can be put down. Since this all important factor of space for the railway must, necessarily, govern the size of our layout, it is common to find that constructors choose one of the smaller modelling scales whereby such space as they may have available can be put to its fullest use.

If we halve the 7 mm. scale we come to 3½ mm. and this is a scale that is regularly used among modellers. However, while we have gained very considerably in the amount of track we can lay down in our space, we have, by choosing the 3½ mm. scale in preference to the 7 mm., escaped one difficulty only to encounter another. Modelling in 3½ mm. scale is, we may expect to find, delicate work, particularly when it comes to outside valve gear on a loco, or when we try faithfully to scale down a part which is only half-inch stuff on the prototype! Much of our fine detail work will be invisible without a magnifying glass and, if we attempt the short cut of buying rather than making these "fiddling" parts, we may well find that the particular parts we need are not made commercially in this scale.

So again we decide reluctantly that the 3½ mm. scale is not for us as beginners and we again survey the market to see what it has to offer. It is then we discover that a scale which is particularly popular is that of 4 mm. to the foot. At first sight it does not seem that this extra ½ mm. to the foot will help us much, but a glance at Fig. 1 will show that the difference is quite appreciable. We have just that bit more "breathing space" that is so acceptable where fine work is concerned.

But when we look at Fig. 1 (b) again more attentively we notice a peculiar thing. The loco seems to overhang its metals on either side more than it should—in other words it does not seem to be suited to the gauge of the metals. Indeed on getting out our dividers we find that the gauge in 3½ mm. scale is identical with that of the 4 mm. gauge—both show 16.5 mm. between running rail faces. A little calculation makes us protest that while the 3½ mm. equivalent of 4 ft. 8½ in. is somewhere near 16.5 mm., the 4 mm. equivalent should be nearer 19 m.m.

Protest upheld! But in this, as in so many things in life, it is a matter of compromise. If we elect to



A 4-4-0 compound from the Trix Twin Railway Sheds. The three rails on insulated base enable twin locos on the same section of track to be independently controlled.

Graham Farish's new Battle of Britain locomotive, a most successful streamliner in green and yellow livery. It is also available in blue and white livery (Merchant Navy).

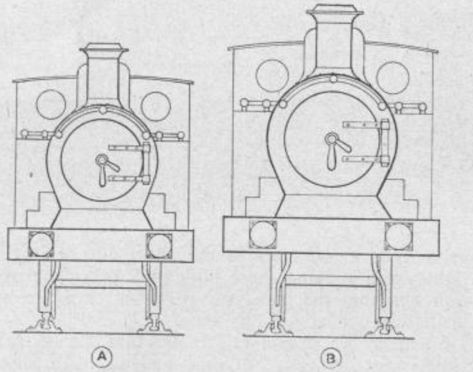


Fig. 1. Head-on view of loco.

(A) Showing gauge in approximately correct proportion to scale, i.e. 16.5 m.m. 3½ m.m.

(B) Same loco enlarged to 4 m.m. scale but STILL standing on 16.5 m.m. track.

work in 4 mm. scale and then—in the interests of scale fidelity—use a 19 mm. gauge (as they do in U.S.A.) or an 18 mm. gauge (known as EM over here) we must be prepared to find that those extra few millimetres on the gauge do make an appreciable difference to the ruling radius or minimum curvature we can use. So we have gained in making the railway more true to life and we have, in a given space, had to use a smaller layout because the wide curves just won't go in.

And so the model railway "Trade", whose help can be so invaluable in these matters, materialised and settled on this combination of a 16.5 mm. gauge and a 4 mm. modelling scale, rather after the manner of bees swarming round their queen. They decided that, all things considered, this particular scale and gauge combination was the most practical both in manufacture, in retailing and in private modelling and operation. And they called it "00" gauge. It is upon the "00" gauge railway, in spite of its inconsistencies of scale-gauge ratio, that we propose to lay special emphasis in these notes and this for the following reasons:—

1. the 16.5 mm. track permits of fairly sharp radius curves, thus enabling a satisfying amount of track work to be put down in a small area.
2. the 4 mm. scale does permit the modeller to make equipment for himself without demanding an excessively delicate touch.
3. in "00" gauge there is hardly a single item of railway equipment that cannot be purchased ready made. Some manufacturers specialise in this to the exclusion of all other gauges.
4. there are at least three big firms making complete "train sets" in this gauge. Many items of equipment made by them are suitable for inclusion even in advanced "scale" railways.

The Economics of the Game

It will be seen that each of these four features has a marked influence upon the keeping down of costs. The fact that many big manufacturing firms have considered it worth while to cater for the needs of "00" gauge by installing methods of mass production, has a bearing on market prices which needs no labouring here. In these days of plastics and pressure die-castings an amount of fine detail can be reproduced in locomotives, coaching stock and wagons that could only have been secured a few years back by engaging the services of the super detail model maker and paying for such services accordingly.

But it is not only in this more obvious direction that the "00" gauge railway scores in economy. The great saving is in the space required for the layout.

If our layout is to contain a reversing loop or an inverted "figure of 8" or any other device by which the train is to be brought back to its original starting place without reversing the loco, then the width of baseboard required will be somewhat more than twice the minimum radius of curvature permissible. This means, for example, that whereas in "00" gauge we could secure satisfactory main line running and lay down a complete oval or circle (or any derivative thereof) on a baseboard 6 ft. wide—i.e. using curves of 2 ft. 6 in. to 2 ft. 8 in. radius—we should in "0" gauge require for equivalent results 13 ft. of width.

It is often said that a given layout in "0" gauge requires four times the baseboard area of its equivalent in "00" gauge and, although this is not strictly true, it is sufficiently accurate to imply that the cost of the "0" gauge baseboard with all its framework and under-pinning will, in these days of timber shortage, present a very formidable figure in relation to the running facilities that could be enjoyed in the same space by using "00" gauge.

However, the subject of baseboards and the layouts that can be put down on them is one that we must leave over for another chat. Our subject for the moment is scales and gauges and we have attempted to show that those who are on the threshold of this absorbing hobby have everything to gain by electing to work in "00" gauge.

What's Gone Before *Part III*

Concluded by G. H. DEASON

1950 started as something of a critical year for the model car movement as a whole. Although on paper, and to judge from the Model Car Association's records of affiliation, more clubs and individuals were interesting themselves in the hobby than ever before, there was a definite feeling in some quarters at the beginning of the season that all was not right with things, and that unless steps were taken to restore the original enthusiasm, model car racing was heading for a decline.

Not unnaturally, different clubs and individuals had their own remedies in mind, and the fact that by the end of the season things were moving as briskly as before was proof that in the main these remedies had been at least locally effective.

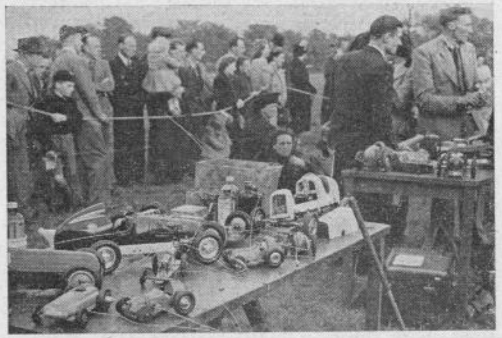
Each individual club and group has its own characteristics, likes and dislikes, and they have been very largely free to operate as their members wished. Thus the clubs which contain a large proportion of novices have largely ignored the big national competitions and speed championships and have organised the type of event in which everyone could join without being made to feel a "rabbit"! The scale minded groups, which so often form round one or two keen builders of this class of model, did the same, and the "build it yourself or be damned" boys closed their ranks and excluded the bought product in all or part of their programmes.

In the open speed competitions the British and Open classes eased the situation somewhat, but this did not provide a completely satisfying answer, as the "man in the street" is still disinclined to bother his head about the niceties of these definitions.

However, thanks largely to a spirit of sportsmanship and live-and-let-live, the season was a generally successful one, with the promise of considerably widening interests in the forthcoming year to attract plenty of newcomers, and lure back to the fold some of those whose interests had waned for lack of suitable encouragement.

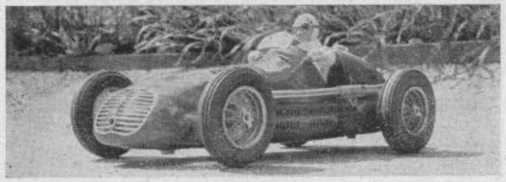
Reverting from generalities to events, the Pioneer Club launched out into 1950 with its A.G.M. at which a majority vote cast the die in favour of home construction and design, which in fact had been a guiding principle of the club from its inception, though not perhaps so clearly stipulated. At the same time this conservative body officially recognised the existence of the under 2.5 c.c. model, which had up till that time been banned on the Pioneer track.

At the Model Car Association's A.G.M. at Derby, a lengthy agenda included the future of international competitions, the choice of national representatives and the thorny problem of financing these glamorous expeditions, and the fact emerged that unless some

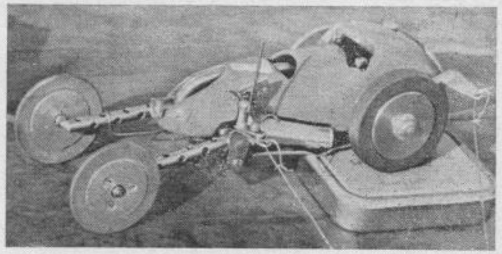


A corner of the pits at the postponed Chiltern Charity held at Whitsun, with a brood of "Woolworth Specials" amongst the bigger stuff in the foreground.

Cyril Field receiving the Sutton Trophy from G. W. Arthur Brand, for the best workmanship in an under 5 c.c. model. The car in question is the O.H.V. Alfa Romeo 158.



They come in all shapes! (Above) A scale type, H. C. Baigent's 2.5 c.c. Maserati, complete with overalled driver, and (below) R. G. Dixon's "Sparky", which competed in the 1950 M.G. Trophy at Easter.






(Above left to right) A glimpse of the Model Car Association's Speed Championship at Worcester, the North London M.E.S. rail-track opening at Barnet; that hard trier W. S. Warne pushing off a 5 c.c. B.R.M. at Eaton Bray, and Ken Smith pushing off his streamline "Frog" at Dundee.

(Below) F. G. Buck deep in thought at the Worcester Speed Championship Finals.

means could be found to subsidise the chosen teams, they must of necessity consist of those who could afford the luxury of foreign travel rather than those who were necessarily best qualified for inclusion. This state of affairs has its parallel with that of many other sports, and up to the moment no remedy is possible, other than an increasingly healthy financial situation.

The M.C.A. at this meeting also approved the division of the 10 c.c. class into British and Open categories, but wisely left the matter as a domestic issue where individual club competitions were concerned.

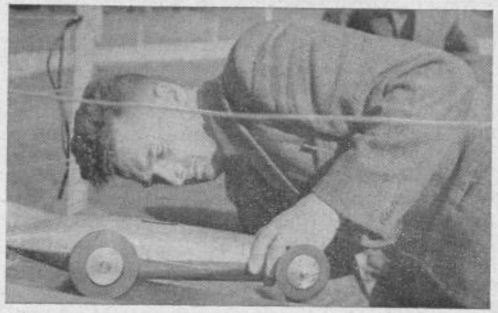
The real outdoor season commenced in earnest in April, and the B.M.C.C.'s M.G. meeting was to be followed by the Chiltern M.C.C.'s first Open Day of the year at Woodside. Great interest was added to the former meeting by the development during the winter months of a number of positively microscopic racers, mostly built round or rather into, Woolworth and Marks & Spencers' plastic toy cars, which were known to have achieved astonishing speeds, when propelled by engines of about 1 c.c. To this was added the fact that both flying and standing starts were called for. In point of fact a 2.5 c.c. car, overcame its handicap and collected the trophy, J. S. Oliver's remarkable "Busy" emerging the winner from B. W. Harris's 2.5 c.c. "Yellow F". "Busy", then the experimental prototype of the now well known "Tigers", improved on last year's winning speed by 8.8 m.p.h. clocking 63.82 m.p.h. for the flying quarter, and 52.72 m.p.h. for the standing quarter. The Woolworth brigade collected two "class" wins, R. A. Hinks' 1.5 c.c. version managing 48.39 m.p.h. and J. Emerton's 1 c.c. car 33.09 m.p.h.

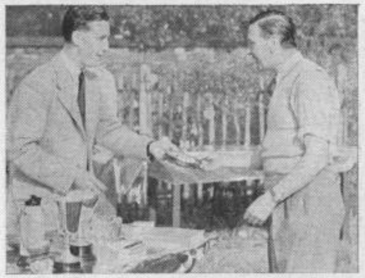
The following day, Easter Monday, will long be remembered by all who were hoping to do a spot of holiday racing, as being a sample of what last season could do if it tried, and frequently did! Pouring rain made racing impossible in most parts of the country and an excellently organised Chiltern meeting was regretfully abandoned.

Racing in the West County was getting well under way by this time, both Bristol and Plymouth being well established, and on the Eastern side Scunthorpe and Cleethorpes were making strides with track construction. On the debit side, Surrey were at that time without a home, and Edmonton's scheme had been turned down by the Parks Committee, upon whom their hopes had been pinned for some time. Both, happily, have now found solutions to their problems, and are busy re-establishing themselves.

The usual spate of speed models gathered at Whitsun for the Austin Trophy, and no fewer than nine models exceeded 100 m.p.h., fastest being Gerry Buck's surprise entry of an extremely flamboyant McCoy engined job, known as the C. & C. Special, which did two consecutive runs at 115.39 m.p.h. Dooling engines occupied seven of the next eight places, S. Honey's Special and Eric Snelling's B.R.M. being the first home-built cars, 11th and 12th respectively. At this meeting Eric Snelling's streamlined 5 c.c. job shook a number of the 10 c.c. runners with a quarter mile at 84.9 m.p.h.

The Chiltern Club fared better with the weather than at Easter, when they staged their postponed charity meeting the day following the "Austin". An entry of 50 took part in a consistency competition,





(Left) Cyril Catchpole receives the Rolls Royce Trophy at Derby. (Centre) Jack Green with his record breaking 5 c.c. model at Sunderland, and (right) "fastest lady of the year", Mrs. I. W. Moore, receiving her 5 c.c. award at Derby.

won by Cyril Catchpole's Dooling, with two runs at over 105 m.p.h. and a difference of 0.02 m.p.h. Eric Snelling's Streamliner was second with a difference of 0.39 m.p.h., proving that speed *can* be blended with reliability!

About this time the North London M.E.S. staged the opening of their miniature rail track for cars of under 1 c.c., and the Pioneer Club's Proficiency Trial was won by George Thornton's pretty looking 2.5 c.c. Talbot. Bolton's Open Day saw Gerry Buck's C. & C. Special scoop the pool, which the winner handed over to the fastest home-built job, and G. E. Jackson, M.C.A. Secretary, ran second with a Dooling.

Bradford, Sunderland and Dundee also staged excellently attended meetings, the latter club running the Scottish Speed Championship for a very handsome cup, won by F. G. Buck with "Topsy". Derby received 55 entries for their Open Day, Cyril Catchpole's Dooling and Gerry Buck's "Topsy" dividing the 10 c.c. classes at 115.53 m.p.h. and 109.75 m.p.h. respectively, whilst Mrs. I. W. Moore shook the 5 c.c. class with 87.63 m.p.h. with the then new experimental car. Cyril Catchpole's run, incidentally, equalled Gerry Buck's existing Open record, set up previously on the Derby track. Eric Snelling netted the 2.5 c.c. prize with 66.96 m.p.h.; altogether a cracking day's racing.

Amongst a perfect spate of midsummer meetings, W. P. Jones again won the Russel "scale" event, and Cyril Field the Sutton Trophy for the finest workmanship in the 5 c.c. class. Surrey Pioneer and Edmonton clubs, being without outdoor tracks, gathered at Eaton Bray from time to time, and the latter club put on an ambitious demonstration throughout Ford Service Week at Hubert Dees of South Croydon.

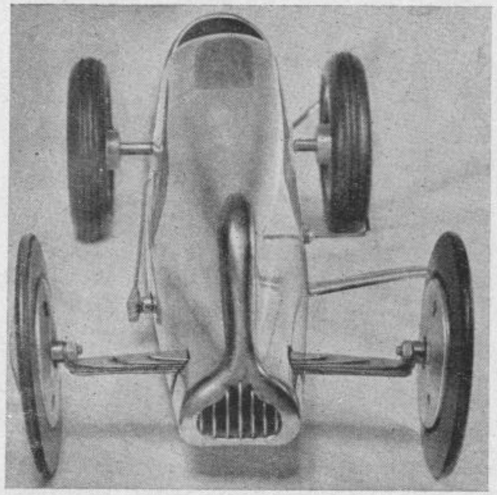
One of the most notable affairs of the year was undoubtedly the Cleethorpes opening, where a general holiday spirit didn't prevent records falling spectacularly. The opening run by Peter Hugo's Dooling set a new 10 c.c. Open figure at 118.42 m.p.h. for the ¼ mile, and Mrs. Moore's 5 c.c. Dooling engined model recorded 96.25 m.p.h. for the same distance, which gave every reason for jubilation in the newly-formed Dooling Enthusiasts' Club!

Finally to round off the busiest season so far, the M.C.A. Elimination Tests were run off simultaneously at Dundee, Bolton, Harrogate, Derby, and Eaton Bray, and speeds continued to soar despite the bad weather conditions. E. V. Snelling's 2.5 c.c. entry clocked 72.57 m.p.h. J. I. Green, of Sunderland, managed 88.25 m.p.h. at Harrogate, and Bert Winter's Dooling pulled out 113 m.p.h. at Eaton Bray.

The finals at Worcester a fortnight later resulted in a win for that hard trier Péter Hugo at 116.27 m.p.h., the runners-up being Gerry Buck and Ernie Jackson in the 10 c.c. class, Mrs. Moore beat Cyril Catchpole by less than 1 m.p.h. to take the 5 c.c. honours at 93.55 m.p.h., and Gerry Buck pipped Eric Snelling and John Parker in the "Tiddler" class with a speed of 71.65 m.p.h. from his Elfin engined "Wee 2".

Thus ended a busy season, successful despite the somewhat gloomy forecasts of the prophets. Speeds certainly rose to a pitch obtainable by only the select band of expert tuners, but so it is with all other competitive pastimes, and organisers assuredly learnt much in the matter of arranging alternative attractions for the lesser lights, a lesson which should show dividends in 1951. Coupled with the interesting developments we may expect with miniature rail racing and the inclusion of a 1.5 c.c. class by the M.C.A., we can look forward to an interesting and progressive 1951.

One of the North East's keenest racing men, Jack Cook (without jacket) is chairman of the Sunderland club, and has travelled over 2,000 miles in 1950 to compete in the season's meetings.



An ETA Engined Speed Model

BY A. H. FOXTON

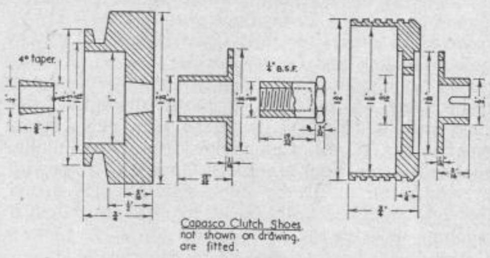
CONSIDERABLE time was spent staring into last winter's flickering embers visualising a reasonably fast 5 c.c. car built round the E.T.A. G.P. engine and having a body of such a shape that, to quote John Bolster, it would "make a small hole in the wind" with the minimum amount of drag. The body outline ultimately decided upon, which in some respects resembles an American 10 c.c., entails very little work, the bulk of the shaping being carried out with a hardwood forming tool, the use of which will be described later.

Having prepared chassis and body outline plans from engine and bevel assembly dimensions, work commenced on the chassis, which consists of two 5/32 in. duralumin side members 2 in. apart at the engine bearers and parallel as far as the rear axle bearings but tapering forward of the power unit to a 1⅛ in. duralumin bracing block, on which is clamped the front spring. Further bracing is provided by the dural plate harness tethering brackets, which are bolted between the side members also by the assembly which houses the two bevel pinion shaft ballraces.

The front spring, which started life as a 12 in. steel rule, consists of a main leaf, on which are mounted the front wheels, with three subsidiary leaves above and a buffer leaf below.

Knife edged front tyres, 3¼ in. dia., were turned from ¼ in. Goodyear shoe soling material. The easiest way of doing this was to bore the 1⅝ in. dia. hole in a 4 in. square of the rubber material, which was screwed by the four corners to a block of wood secured to the face plate. After chiselling to approx. 3½ in. dia. the tyre was pressed over a tight fitting mandrel and turned to the T-section with a ⅛ in. firmer chisel. Although this smelly process was carried out at a high speed on an M.L.8 wood worker's lathe I have since turned similar material quite successfully on the slower M.L.7. The front wheels were completed by clamping both the tyre and ¾ in. x ¼ in. ballrace securely between duralumin inner and outer wheel halves. The lack of resilience in these tyres is made up by the soft front spring.

— Flywheel and Clutch Details —

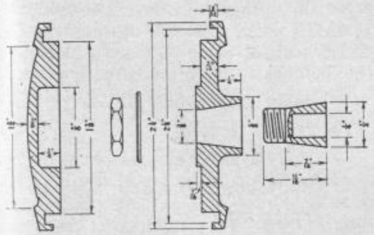


Rear wheels, consisting of inner and outer duralumin halves clamping 1066 3½ in. air cord tyres are secured to the ¼ in. silver steel rear axle by means of split draw-in collets. At the moment the drive is through a three-shoe centrifugal clutch and 1.75 : 1 bevel assembly, but a more robust rear axle and bevel set is under construction to withstand the strains of the direct coupling when required.

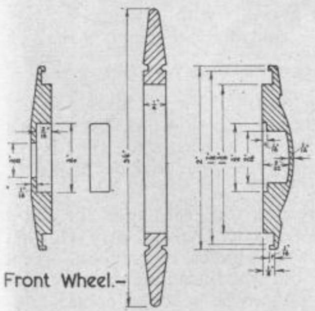
The "L" type fuel tank is fitted with an air scoop on the near side and a deflector on the other to assist in cooling the cylinder head. The chassis nose bracing block is drilled to allow a passage of air from the smallish intake to the carb. and cylinder head.

The fuel cut-off valve presented numerous difficulties caused by lack of space, but an on and off spring loaded cock, proved to be the most efficient.

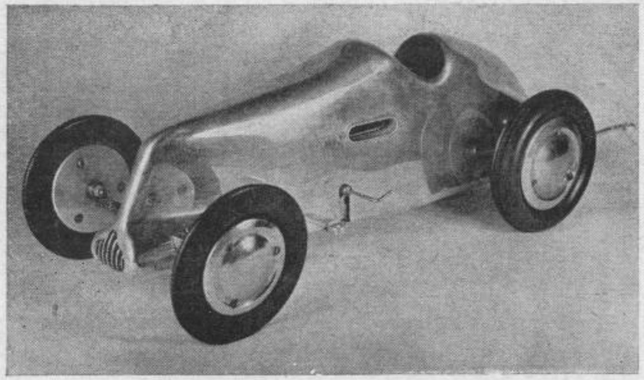
Most of the bodywork follows the usual practice, namely two halves formed over a hard wood block finally welded together. However, the method of making the body shell, the shape of which was designed to involve a minimum amount of drawing in and forming, may appeal to the modeller who steers clear of beaten metal work. Most of the shaping was done with a boxwood forming tool held just above the point where the material makes contact with the pattern. By applying the hammer or mallet blows to this tool, which should be held over at an angle to the material in order to spread the pressure by sliding slightly over the surface, all the hollowing and most of the drawing in processes were carried out without the slightest trace of hammer marks or blemishes. It is important that superfluous material is cut away as soon as possible when drawing in, so as to minimise

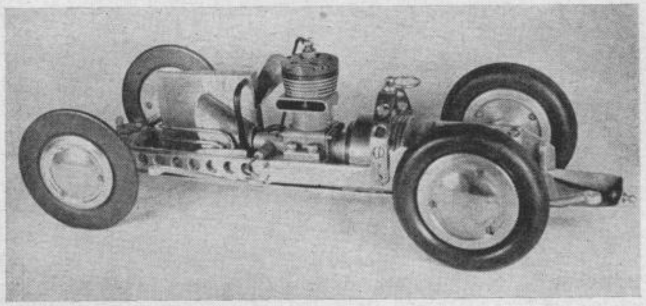


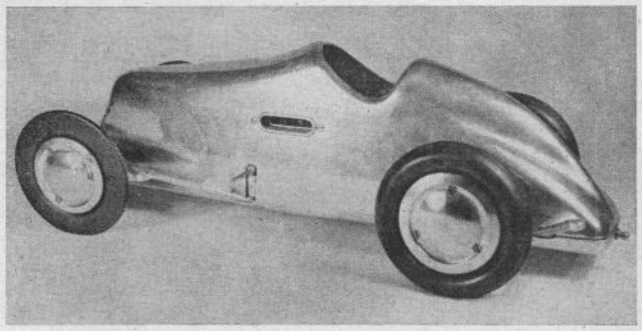
— Rear Wheel-half & Collet Details. —



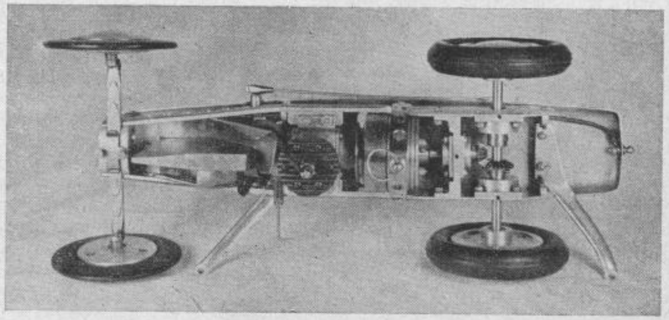
- Front Wheel. -



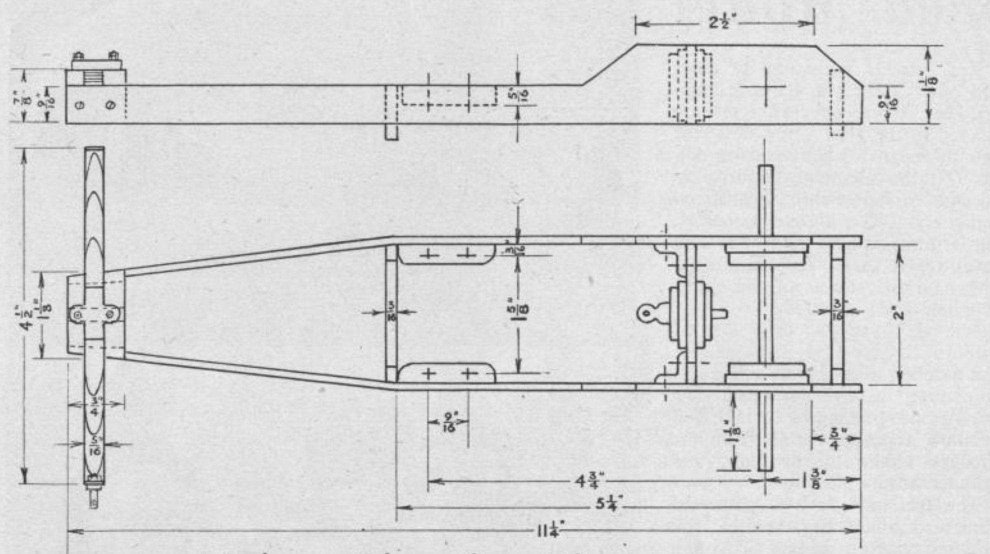




(Above) The Eta Special presents a somewhat startling appearance when viewed from the front, but the form is certainly efficient. Note the laminated transverse spring, and the small cooling aperture, which is assisted by an interior scoop and deflector.

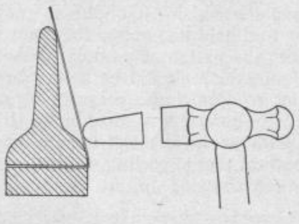


(Right) Plan view of the chassis, in which the best possible use has been made of available space, by designing the chassis round the engine and transmission. The cooling deflector can be clearly seen.

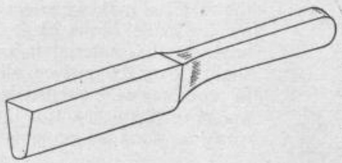


—Major Chassis Dimensions—

the risk of creases forming, and that it is annealed frequently to prevent cracking. Final drawing in around the air intake and front was done with a small mallet. After welding together the two halves and trimming the openings a simple grille built up from scrap was fitted. The body is secured to the chassis by a quick release clip mounted centrally over the clutch, which engages with a stainless steel bridge fitted across the cockpit opening. The under tray, made up from 20 s.w.g. material, has an opening opposite the flywheel for using an electric starter and is screwed to the chassis bracing members.



Position & Angle of Forming Tool.



— Boxwood Forming Tool.—

Main dimensions are:—

Overall length	14½ in.
Body width (max.) ...	2½ in.
Body height (max.) ...	4¾ in.
Track-front	5¼ in.
Track-rear	4¾ in.
Wheel base	9½ in.
Weight with flywheel and clutch assembly	3 lb. 8 oz.

A MAN AND HIS MODELS : HARRY HOWLETT

(*continued from page* 171)

what real food tasted like, and to run their model cars against those of their Nordic hosts. The Merc. was a little new, and did not give of its best, but Henry H. returned to his native shores filled with Smörgas and fired with fresh enthusiasm, which led to the building of an entirely new engine. 1950 saw this new 10 c.c. plot really churning out the requisite degree of "wham", and the Mercedes is now bordering on the 100 mark; no mean feat when the "home brewed" label can be stuck proudly on the front! Apart from the big stuff, a 2.5 c.c. Oliver was acquired, which was diced up as shown in last month's *Model Maker*, and he fills in what spare time is left with much hard work for the Meteor M.R.C.C.

If and when, dear reader, you visit one of the club's meetings at Newcastle-under-Lyme, Harry Howlett will be the bloke who whizzes by you on urgent Secretarial business, but who finds time to pause long enough to say how pleased he is you've come!

MONY A MICKLE MAKES A MIKE

(*Continued from page* 140)

which was secured by the 2 BA screw. The assembled 'mike' was removed from the vice and tested by opening and closing by use of the ratchet only. All being in order, the 'mike' was closed again and ensuring that the zero on the sleeve and the datum line coincided, a line was scribed on the sleeve using the tapered end of the barrel as a rule. This is the zero line to be used as the starting point when the sleeve was engraved. The 'mike' was taken apart and the sleeve pushed on a true running mandrel in the three jaw.

Engraving the Sleeve

The lathe leadscrew having eight threads per inch, a 50-tooth gear wheel was mounted thereon, each tenth tooth being clearly marked. A suitable indent was set up, and when the wheel was turned one-fifth of a revolution, i.e., ten teeth, the saddle moved 1/40th of an inch. The sleeve was set with the datum line opposite the engraving tool, which was the same one used for engraving the barrel, and the cross slide fed in until the tool point just touched the work, and the cross slide index set to zero. Two chalk marks were made on the periphery of the chuck and a pointer fixed to register with these marks as the mandrel was turned. By these means the long and short lines were cut to the correct length each time. After ensuring that all was in order and the clasp nut was engaged, the first was engraved, using the upper chalk mark as a guide. Feeding in the tool one-thousandth at each cut the first line was cut five-thousandths deep, exactly on the line previously scribed. The leadscrew was turned one-fifth of a revolution, and the second line was engraved using the lower chalk mark as a guide, and the operation repeated for the three short lines.

At the fifth line the upper chalk mark was used as a guide, then the whole series of operations repeated till all 40 divisions were completed. A fine file and emery removed all burrs, and the sleeve was removed to the vice for stamping the numbers over each long line.

One little job and the 'mike' was completed, i.e., a piece of springy brass ⅛ in. wide and 1 in. long was bent slightly upwards and placed between the two shoulders on the spindle nut. The sleeve was pushed over this and was quite firmly held in position.

The micrometer was reassembled with the datum line and zero again matching and it was ready for testing. This was done by using test pieces of a known diameter, and it was found to be very accurate, and has since given excellent service.

One point should be mentioned, the dimensions of this 'mike' are rather on the big side and could be considerably reduced in several parts, i.e., the width and depth of the frame, diameter of the sleeve and barrel and the length of the spindle, which of course would automatically follow the reduction of the frame sizes.

THE COASTAL SAILING BARGE "WILL EVERARD"

(*Continued from page* 144)

Peak Halyards (Part 33)

These are made fast to the gaff near its outer end and from there pass through a single block under the mast truck, down to another single block attached to the middle band on the gaff up to a further single block attached to the mast and the fall belays to a cleat on the mast case.

Throat Halyards (Part 34)

Consists of a pair of double blocks the upper one is attached to a "crane" on the afterside of the mast and the lower one to an eye on the upper side of the gaff jaws. The reeving of these blocks can be followed easily from the details on Sheet 5. The fall belays to a cleat on the mast case.

Topping Lift (Part 35)

The standing part is secured to the boom end up through a single block at the mast head and down the mast to belay on a cleat on the mast case.

Brails (Parts 36, 37, 38, and 39)

These are single except No. 38 which is double. All pass through blocks attached to the head and throat of sail and to the mast hoops. They "marry" i.e. are spliced together, after reaching the lower brail block and are belayed to the fourth cleat on the mast case.

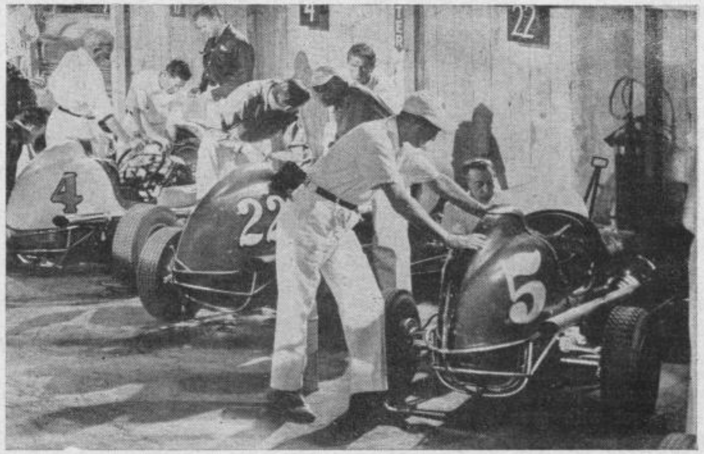
Sheet (Part 40)

This part consists of an upper double block attached to an iron band near the end of the boom and a single block attached to a ring bolt on the steering gear box. One end of the sheet is spliced around the single block, it is then rove through the double block down through the single block, back again through the double block and the fall led along the boom to belay around a cleat on the under side of the boom.

Reef Points (Part 42)

There are seven reef points of thin white thread knotted on both sides of the sail. Reefs are pulled down by means of a line known as an "earing" attached to a reef cringle (Part 41) worked in the leach of the sail as shown. This reef earing is belayed loosely around the boom end until it is required to pull down the folds of the sail to enable the reef points to be tied under the boom.

As this is an exhibition model all running rigging should be coiled down, tied loosely with cotton at one or two points on the coil and the whole given a coating of weak gum to fix the coils which are then looped over their respective belaying pins. Mooring ropes should be closely coiled in a circle and fixed to the hatch carling boards with adhesive. I find the best way to do this is to coil them by starting at the centre, turning them under two fingers on a flat surface, then brush the top of the coil with gum.



Free Isle of Man Holiday & Other Prizes for Modelmakers

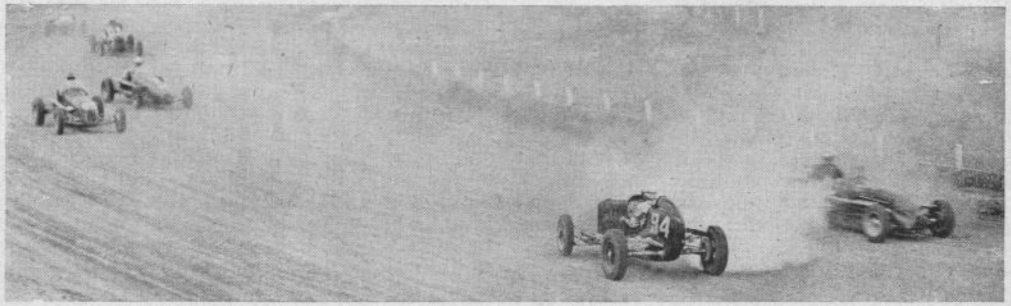
Illustrations are from the M.G.M. picture "To Please a Lady" to be released in mid-February, and show a midget car pit scene and one of the thrills of "big time" racing.

MID-FEBRUARY will see the release of one of those all-too-rare motor racing films, this time a Metro-Goldwyn-Mayer Production co-starring Clark Gable and Barbara Stanwyck entitled "To Please a Lady". The action starts on an American midget car speedway which enjoys a following in the United States greater even than our own interest in dirt track motor-cycle racing, and should not be considered as at all like the several efforts to popularise cinder car racing that have attracted only a moderate interest in this country. Like everything else popularity has made development possible, high stake money attracts top-notch drivers and in turn makes for more popularity still.

Many of the crowd scenes have been shot at actual meetings and give some idea of the wildly enthusiastic following the sport enjoys. The racing enthusiast will also enjoy the climax of the film where our hero races on the famous Indianapolis track. For the most part we must rest content with occasional news reel shots of the annual 500 mile event, but here we are treated to a more liberal portion. Seekers after reality will be glad to know that no double is employed for these racing sequences, Clark Gable himself actually takes the wheel and puts up a worthy show—his coach being no less than the sometime American champion Billy Rosen. Since Gable's personal motoring is enjoyed for the most part in a Jaguar XK120 these dicing speeds can really have come as no great change.

By arrangement with M.G.M. we shall be publishing in our March issue drawings and building instructions for a 1 c.c. engined Offenhauser speedway car with clutch drive, which we are now working on. This car will form the subject of a nationwide model building contest, with local prizes arranged by the two thousand cinemas at which the film is due to appear and national finals, at a venue to be decided, where cars will be required to qualify on the track. In the local eliminating events appearance points only will count. Ultimate winners will be the guests of M.G.M. for a week's holiday in the Isle of Man to coincide with race week.

It is hoped model car enthusiasts and club men will extend a helping hand to cinema managers wishing to stage demonstrations locally—many cinema car parks are reasonably surfaced and would make excellent temporary tracks.



SCRAP-BOX by "Tailstock"

Models and James Watt

". . . numerous patents . . ."

WE all know the story of how James Watt was inspired to direct his attentions to the power of steam by watching the bouncing lid of a kettle boiling on the kitchen hob, and most of us are aware that, like most other fables, it has not even a slight foundation of truth. This pleasant little story not only distorts the facts about Watt himself, but leads to the inference that he was the first discoverer of the steam engine, when, in point of fact, steam engines were fairly common things years before Watt was born in 1736. Savery's pumping engine was patented in 1699 and, six years after, Newcomen patented the atmospheric steam engine, which remained the predominating type for almost 100 years.

It was, in fact, a model of Newcomen's engine that first attracted Watt to the subject, and the first of his numerous patents dealt with an improvement to the condensing arrangements of the atmospheric engine. The invention was an extremely sound one, and greatly improved the engines of the day, for it accomplished the apparently impossible task of condensing the steam in the cylinder by cooling, while keeping the cylinder itself hot.

Those familiar with the principle on which atmospheric engines work, will agree that it is a most ingenious one, as it allows a working pressure of about 14½ lb. to the sq. in., using a boiler pressure of only 3 or 4 lb. Those unfamiliar with the principle will find it most interesting.

The arrangement consists of a large, open-topped cylinder, having a moving piston and piston rod. The end of the rod is connected—usually by a chain—to one end of a pivoted beam, to the other end of which is attached either the plunger of a pump (in pumping engines) or a connecting rod, crankshaft and flywheel, in the usual manner of beam engines.

Steam at low pressure, about 3 to 4 lb. per sq. in., is admitted into the cylinder—by means of a hand-operated cock in the early engines—so that the piston is forced upwards. At the top of the stroke the steam is shut off, and cold water is injected into the cylinder through another cock. This has the effect of condensing the steam into water, and creating a partial vacuum beneath the piston, which is then forced downwards by the pressure of the atmosphere, thus providing the power stroke.

". . . partial vacuum . . ."

By this method the engine made about six or seven strokes a minute, and was inefficient and wasteful of steam by reason of the fact that the cylinder became cool as the steam was condensed. A great deal of the incoming steam was used in heating up the cylinder to prevent premature condensation. Watt's contribution was the addition of a separate condensing cylinder, or chamber, connected to the power cylinder by a pipe. Steam was forced into both these cylinders, but the cooling water was injected only into the condensing chamber. Thus, the vacuum was created in this, and the steam was drawn from the working cylinder into the condenser. In this way, the whole working was speeded up, and a great saving in fuel was made.

Early Experimental Models

James Watt was born at Greenock, and was apprenticed, at the age of sixteen, to a mathematical instrument maker. It would seem that this business differed greatly from what we now understand by the term, as it comprised land surveying, making and repairing clocks, all kinds of musical instruments, fishing tackle, and cutlery. In the year 1757 he was appointed mathematical instrument maker to the University of Glasgow where he lived and worked.

". . . apparatus for dissolving bones . . ."

According to Watt himself, his attention was first directed to the subject of steam engines by a young student of the University in 1759, and a few months later he made some experiments on the force of steam, with a sort of model steam engine. For a boiler he used a "Papin's digester"—an apparatus for dissolving bones under high pressure—to which he connected a cock which admitted steam to a syringe about one third of an inch in diameter, fitted with another cock to admit air. He thus constructed what was, in effect, an atmospheric steam engine for, by operation of the cocks alternately, the plunger of the syringe was made to move in and out. It was found that under the pressure of the steam the plunger raised a considerable weight (15 lb.) with which it was loaded. Although the cocks were operated by hand, Watt observed that it was easy to see how this could be done by the machine itself, and he contemplated making a model engine working on a high pressure system. He abandoned the idea from fear of the danger of bursting the boiler, and the difficulty in making steam-tight joints. This latter seems a very insufficient reason, as there could be no possible difficulty in this direction.

" . . . was thus led . . . "

Mr. Watt's own accounts, however, cannot always be relied upon for accuracy, and nothing was heard of his connection with the steam engine until 1763, in which year he had occasion to repair a model of Newcomen's engine, belonging to the University. On completion of the repairs, Mr. Watt found that although the cylinder was only 2 in. in diameter, and of 6 in. stroke, it was scarcely workable with a boiler of 9 in. diameter. He was thus led to the invention of the condensing chamber, and subsequently to a pump for extracting the air and condensing water from it.

During these model experiments Watt made valuable discoveries relating to the generation and condensing of steam, which have been considered to be as valuable as anything which he ever did.

An Unanswered Question

At this time, a clergyman, Mr. Gainsborough, of Henley-on-Thames—brother of the famous painter—was also pursuing experiments with steam engines, which seem to have been along the lines of those of James Watt, and he also constructed a model engine embodying the very same principle of condensing in a separate chamber. This model was so successful that it aroused the interest of the Cornish pumping engineers, who came to inspect it, and reported favourably upon it. This naturally brought on some competition between Watt and Gainsborough, who asserted that the invention had been communicated to Watt by the folly of a mutual acquaintance who was fully informed of what Mr. Gainsborough had in hand.

At this date it is impossible to decide the merits of their respective claims, and authorities have from time to time differed in their opinions, but Mr. Watt's later habit of patenting and claiming the ideas of others as his own would give some credence to Gainsborough's statements.

A Strange Personality

The character of James Watt seems to have been a most curious one. That he was possessed of undoubted genius is beyond question, yet there is clear evidence that he adopted an obstructionist policy towards any inventive progress that was not his own. He was in frequent litigation with other inventors, and his method seems to have been to register vague and all-embracing patent specifications—how some of them ever passed the Patents Office is a mystery—so that he might claim priority of idea when some other inventor had worked out the details. And, what is more to the point, he usually got away with it.

" . . . a mystery . . . "

In this manner he did, for instance, succeed in setting aside Matthew Murrey's patent for the slide-valve—one of the greatest of all steam inventions—because certain combinations of Murrey's engine bore a trifling resemblance to an engine which was professed to be described in an obscure patent of 1768 (which really explained nothing).

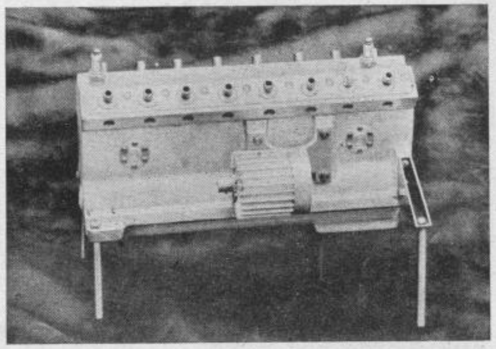
It was evidently Mr. Watt's intention to obtain a monopoly on the steam engine, and we find almost every possible application claimed in his patent specifications; thus, the high-pressure engine, the application of oils, fats, resinous bodies, etc., etc., regulators out of number, governors, cranks, many rotary engines, together with steam carriages, and a whole host of modifications. The Patents Office demands that a specification should be such than anyone, without any special skill or knowledge of the subject, should be able to construct a machine according to the intentions of the patentee, and few of Mr. Watt's specifications would conform to this rule. How anyone—even Watt himself—could have fitted one of the huge and ponderous atmospheric engines to a steam carriage is beyond comprehension.

"...special skill..."

Looked at from our times, the great pity of all this is that it was entirely unnecessary; the genius of Watt outstripped all his competitors, and had little need for the continual bolstering of the law. Posterity has, however, gone one better than Mr. Watt himself, and has ascribed to him not only the invention of the steam engine in all its forms, but the honour of being the first man to even appreciate the possibilities of steam.

DOPE & CASTOR

By JERRY CANN



IT do make you think, don't it! I mean the picture on the right. The Ed. returned from Bournemouth babbling happily of twin-cam blown eight-cylinder jobs screaming round double S-bends, and forthwith tore out on to the Sportsdrome to see if he could find enough room to build a quarter-scale Donington Park. The cost of enough dwarf trees to make Holly Wood rather shook him, but he's still hopeful, and we don't discourage him in those moods! Actually the embryo eight in line has nothing to do with rail tracks but is a commissioned job that Henri Baigent is doing for a Manchester customer—16 c.c., and an Alfa Romeo to match! Whew! The engine will be something of a *tour de force* on completion. Castings were all done in the Baigent workshop, the head has inserted valve seats, and the blower is a sliding vane job with fibre "paddles".

Are you still listening, boys? The crankshaft is a one-piece job, with split big ends, and the camshafts work direct on the valves, which carry hardened thimbles on the stems. Camshafts gearing is at the front, not in the middle of the block as in the original, but have a heart, you can't expect *everything*! Incidentally, talking of multi-cylinders, older readers who recall the 5 c.c. three-cylinder in line motor built by H.C.B. some years ago may be interested to know that this is the basis of his new radio controlled car.

With much tramping of hobnailed boots the "heavy gang" has now completed the removal of the Clanger Dept. to *Model Maker* from *Model Cars*. The opening ceremony is being performed by Peter Hugo, who takes a shrewd crack at the Ed. (sorry co-Ed.!) for labelling Herbie White's "Arrow" a "Pacemaker" last month. Passed to you, Cann!

Calling all Club Secretaries! A "Lecture by Proxy" on the art and craft of model car racing as she is practised in the U.S.A. has been prepared by Howard W. Frank of New York, and dates can be booked from Ian W. Moore, of 2 Bridge Street, Derby. The subject matter covered in detail will include track construction, U.S.A. racing rules, cars and component parts, engine modification for higher performance, fuels, tuning methods, racing operations, personalities, etc.

The sixty-odd photographs and drawings are presented in standard 2 in. x 2 in. glass mounted slides, and clubs will be required to provide a suitable projector (blower cooled if possible) and a large viewing screen. Since each slide will have an accompanying text, each club should select a "narrator" (the bloke who does the spiel ,to you!), who will take the place of the absent Howard Frank.

Addressed in spidery writing on a part-used and much travelled O.H.M.S. envelope, a letter arrived at the office the other day, and was discovered to be from the Old Character from Stoke-on-Trent, who had seen his likeness on page 127 last month and didn't like what he saw. The Old Character was much incensed that advantage had been taken of his innocence by one of these 'ere newspaper fellers without his knowing that he was giving a message to the great British Public. Moreover the caption of his picture in particular seemed to have got in his back hair, and we were warned that any further nonsense about Old Bucks, Old Blocks, Chips or other derogatory terms would be dealt with by the Old Character's solicitors. Hey, Gramps! Take it easy!

RECENT CLUB EVENTS

LIVERPOOL

(*Continued from page* 174)

in its initial stages. An interesting activity has been the building of a club car, by communal effort, which has provided excellent experience for new members. This is an idea we can warmly recommend to other clubs.

At the recent meeting a special prize of a Goblet was presented by Gerry Buck to the first home constructor in the competition who had not up to then won any kind of award. This prize went to M. Thoroughgood with his 1.7 c.c. model.

The results of the meeting are given below.

10 c.c. Open	
P. Hugo (Derby)	116.73
F. G. Buck (Meteor)	110.83
10 c.c. British	
H. S. Howlett (Meteor)	92.78
J. W. Riding (Bolton)	90.45
E.E.C. Club Entry (Liverpool)	81.08
5 c.c. Open	
Mrs. I. W. Moore (Derby)	94.50
5 c.c. British	
N. Haslam (Bolton)	76.00
W. B. Etherington (Hooton)	71.70
B. Kershaw (Bolton)	68.70
2.5 c.c.	
F. G. Buck (Meteor)	68.70
J. S. Oliver (Nottingham)	67.80
J. A. Oliver (Nottingham)	63.80

Race Car Fans . . .

SPEED!!

Make up the

Westbury Atom 6 c.c.
Ensign 10 c.c. and
Cadet 5 c.c.

and get the results

ALL CASTINGS, prints, plugs, rings and equipment and any special castings you may need from :—

The HEADINGLEY MOTOR & ENGINEERING CO. LTD.

8 OTLEY ROAD, LEEDS. Phone 52627-8.

Handy TOOL or SPARE PARTS CABINET

12 Drawer Metal Cabinet, 11 ins. high, 7⅜ins. wide, 6ins. deep. Weight 8 lbs. Contains 12 drawers, size 5⅜ in. x 3¼ in. x 1⅞ in. deep. Sprayed green, with plated drawer knobs. Ideal for small tools, clock parts, garden seeds, fishing accessories, collectors' specimens, and a hundred and one other uses. Satisfaction guaranteed or cash refunded.

15/- Carriage Paid

RALPH SMITH'S MECHANICAL MART
31/49 SHAKESPEARE STREET, SOUTHPORT

AEROMODELLER — the national monthly that covers the world of aeromodelling!

One of the only hobbies that combines interesting constructional work indoors with ample opportunity for healthy outdoor exercise—flying the models made during the winter evenings! AEROMODELLER is full of the latest designs for all classes of flying model aircraft, including gliders, petrol, diesel, and glow-plug engined machines, control line stunt and speed models, together with reports of world-wide meetings, club and international events, for expert or beginner. AEROMODELLER features regular articles on the fascinating new developments of RADIO-CONTROL of equal interest to ALL model makers!!

NO DIFFICULTY should be found in buying your copy from any good bookshop or model store—but if you do not see one about, send 2/- to the publishers for a copy of the current 68-page issue.

AEROMODELLER DEPT. MM.3
BILLINGTON ROAD, STANBRIDGE, Nr. LEIGHTON BUZZARD, BEDS.

At Last!

It is possible for modellers to enjoy the thrill of watching their creations perform like "the real thing" as they transmit instructions by radio-control. No licence is required to operate your receiver and transmitter provided you keep within the waveband allotted by the P.O. Airplane, boat, yacht, and car, can be controlled.

Read all about it in the . . .

only book on the subject!

G. HONNEST-REDLICH, the author, is a recognised authority both in this country and abroad.

Profusely illustrated with half-tone pictures and line drawings, circuit diagrams, etc. 128 pages, size 8¾ x 5½in., cloth and card bound, gilt-blocked title.

By post 9/3. PRICE **8/6**

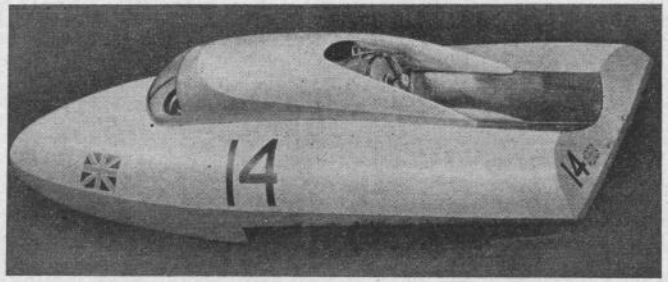
A HARBOROUGH PUBLICATION
Dept. RCM.3, THE AERODROME
BILLINGTON RD., STANBRIDGE, Nr. LEIGHTON BUZZARD, Beds.

HYDROJET

17in. long Hydroplane. Streamlined speed kit complete (less Jetex motor) and ready to build. All parts printed on balsa and ply sheet, finished brass rudder. All paints, cements, etc. Full illustrated instructions and full-size plan. Will run free or on towline for circular speed runs. Reduced from 17/6.

NOW **10/6**

Direct from manufacturers.

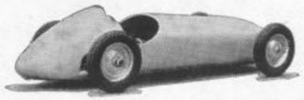


MASCO, Dept. MM3, The Aerodrome, Billington Road, Stanbridge, nr. Leighton Buzzard

This Model is built on the lines of the

B · R · M

Reviewed in this issue, see page 169



One piece hand beaten aluminium body and tray with four disc wheels and tyres, powered by 2.5 c.c. diesel back axle unit. PUSH START.
POWER UNIT and Tyres specially designed and made for this car by H. C. Baigent. Kit contains the basic essentials to build a real scale masterpiece with competition performance.

KIT No. 1. Body and tray, power unit with 4 wheels and tyres, front axle, tank and fittings. Not drilled or fitted. Full building instructions £10. 0. 0

KIT No. 2. Drilled and fitted but not assembled. £11. 0. 0

KIT No. 3. Fully assembled £12. 0. 0

ACCESSORIES FOR 10 c.c. CARS. Silvered rear view mirrors ⅝in. dia., 7/6 pair. 3 or 4 spoke plastic rimmed steering wheels 2in. dia. with stub column, 7/6 each. 1in. wide aluminium louvred strip, 6d. per inch.

G. V. WALSHAW *Models & Model Equipment* **P.O. STORES LYTCHETT MINSTER, DORSET**

CLASSIFIED ADVERTISEMENTS

PRIVATE: Minimum 18 words 3s. and 2d. per word for each subsequent word.

TRADE: Minimum 18 words 6s. and 4d. per word for each subsequent word.

Box numbers are permissible—to count as 6 words when costing the advertisement.

COPY should be sent to the Classified Advertisement Dept. "The Model Maker", Billington Road, Stanbridge, Beds.

SHIPS in Bottles. Instruction (3,000 words, 28 diagrams), and unfinished hull, masts, yards, 3/11. Gardner, 23 Wallbutton Road, Brockley, S.E.4.

NORTH East Engine Depot, Victoria Street, Goole. Engine part exchange. We hold the largest stock in the trade.

FOR SALE: 18 *Model Cars*, 36 *Model Car News*, 25/- the lot; good condition. Baker, 5 Haydn Road, Sherwood, Nottingham.

HORNBY — Dublo Tank Locomotives, 55/-. Large stocks. Twin-Trix, Graham Farish, Hornby trains, Transformers reduced — Trix 14v. 22/6, Dublo 12v., 25/-, Hornby 20v. 25/-. Hattons, 136 Smithdown Road, Liverpool 15.

BRAND new McCoy 10 c.c. Redhead, £10/10/-, including electrical components, flywheel and spares; engine unused. G. Lacroix, Hill Bungalow, Halesworth, Suffolk.

Insurance is essential to every Modeller

NGM

Benefit from the protection afforded by the Guild's THIRD - PARTY INSURANCE POLICY which is underwritten by Lloyds. Can you take the risk of having a claim made against you for injury to a third party, possibly running into many thousands of pounds? Obviously not, and it is plain common sense to take advantage of the Guild's service, through which any claims up to £5,000 can be met, all for a ridiculously small annual premium. Models of all types are covered and attractive transfers and badges are available.

Send 2½d. stamp for full particulars to :

Third Party Cover for Rubber Models, Sailplanes & Gliders 9d.

Third Party Cover for models powered with internal combustion / diesel engines 2/6

Third Party Cover for models powered by Rocket, Jet, Steam, etc. 5/-

Enrolment for total loss of models by o.o.s. Rubber and Glider 2/-

Rocket powered 4/-

ALLEN HOUSE : NEWARKE STREET : LEICESTER

Conditions of Sale . . .

This periodical is sold subject to the following conditions:—That it shall not, without the written consent of the publishers, be lent, resold, hired-out, or otherwise disposed of by way of Trade except at the full retail price of 2/- and that it shall not be lent, resold, hired-out, or otherwise disposed of in mutilated condition or in any unauthorised cover by way of Trade; or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

Overseas Subscriptions . . .

Annual Subscriptions for MODEL MAKER can be accepted from any country in the world.

Subscribers should send the sterling equivalent of 25/- by INTERNATIONAL MONEY ORDER to "MODEL MAKER", Subscription Dept., Allen House, Newarke Street, Leicester, England.

All advertisement enquiries to . . .

THE AERODROME, BILLINGTON ROAD, STANBRIDGE
Nr. LEIGHTON BUZZARD - - - - BEDFORDSHIRE
Telephone : EATON BRAY 246

Subscriptions in United States to . . .

GULL MODEL AIRPLANE CO.,
10 EAST OVERLEA AVENUE, BALTIMORE, 6.M.D.

Made and printed in Great Britain by Bletchley Printers Ltd., Bletchley, Bucks, for the Proprietors and Publishers, Model Aeronautical Press Ltd., The Aerodrome, Billington Road, Stanbridge, nr. Leighton Buzzard, Beds. Trade Distributors: Horace Marshall & Son Ltd., Temple House, Tallis Street, London, E.C.4—C 1601. Sole Agent for Australasia: G. Mason, 4 Princes Walk, Melbourne. Registered at the G.P.O. for transmission by Canadian Magazine Post.