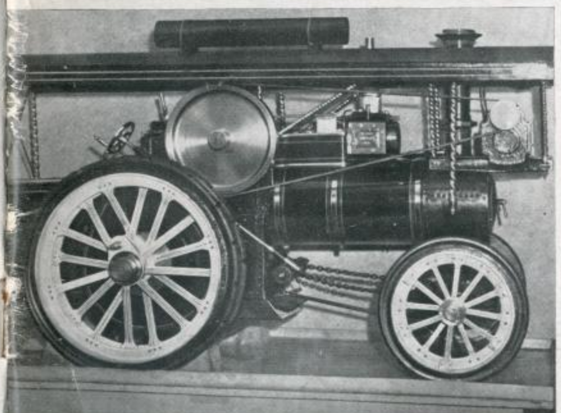
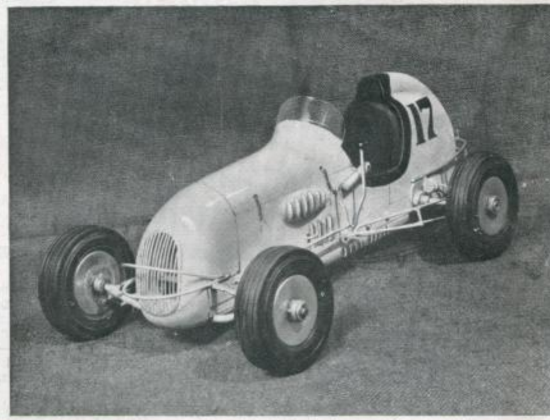
MODEL MAKER

incorporating **THE MODEL MECHANIC & MODEL CARS**





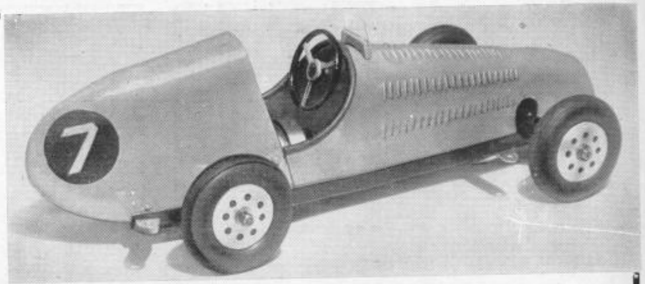
VOLUME 1 **NUMBER 4 (New Series)** **MARCH 1951**

IN THIS ISSUE: Offenhauser Speedway Car Building Competition : Miniature Inn Signs : Building without Bricks : Speedboat Hull Design : A Radio Controlled Model Yacht : Choosing a Site for Your 00 Track : Miniature Railway Shunting & Couplings : A Marshall Traction Engine : Hints on Lathe Centres : Print Glazer & Drier : A Self-contained Epidiascope : Vane, Self-tacking Steering Gear : Rudiments of Model Yacht Sailing : Home Case Hardening : Rhiando Trimax Prototype Car Model Cars from Italy : Redwing Special Model Car : Readers' Letters : Engine Test : Features

2/-

"HALF PINT"

THE CAR FOR YOUR E. D. BEE



OBTAINABLE ONLY FROM SOLE MANUFACTURERS:

J. S. WREFORD LTD.

PRICE **47/6** Carriage paid

Send 1d. stamp for literature.

MGM OFFENHAUSER

The Wreford Clutch is specified in this design—(see Parts List opposite). Can also be supplied bored to fit Mills .75 c.c. and Allbon 1.49 c.c. Please state your requirements.

HALF PINT SPARE PARTS LIST

2¾ in. Diameter Wheels (Set of four)	12	6
Flywheel clutch units (E.D.-Bee)	17	6
Axle gear box	17	6
Set of 4 wheels (with bushes and discs)	6	0
Stub axles (per pair)	5	0
Chassis plate	4	0
Steering wheel		6
Body aluminium cut to shape	3	6
Exhaust pipe	1	6
Bridle	1	0
Bevel Gears	5	6
Postage on any of above items		4

J. S. WREFORD LTD., 25 North St., Romford, Essex

WHEN IT DEPENDS ON ...

'POWER'

WEIGHT X SIZE

SPECIFY VENNER

THE LIGHTWEIGHT ACCUMULATOR

... WITH THE WINNING RATIO

THIS IS ACTUAL SIZE

Venner Accumulators might have been specially designed for model makers. Whether your forte is aircraft, power boats or racing cars you cannot afford to ignore their outstanding qualities. Approximately **one third the weight** and **half the size** of other accumulators of similar capacity. Shockproof — unspillable — operate in any position — withstand overloading — can be left charged, semi-charged or discharged without harm.

* *Not at present available for domestic radio*

For details of all types write for leaflet VA.006/MM

VENNER ACCUMULATORS LTD.

KINGSTON BY-PASS, NEW MALDEN, SURREY. MALden 2442 (6 lines)

Sole London distributors: DAVID & SOLF LTD., 176 FLEET ST., E.C.4. Tel.: CENtral 4579

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

A. J. REEVES & CO.

FOBCO "STAR" 0-½in. motorised drilling machines. 4 speeds, fully tilting table can be located at 90 degrees each way. 3-phase **£27/2/6.** Single phase **£28/17/6.** Deposit £7/4/6 and 12 monthly payments of 41/1. Carriage paid. Illustrated literature gladly sent.

WOLF CUB ¼in. Home Constructor electric drills, **99/6** carriage paid. Send for illustrated leaflet on this useful little tool.

CHAMPION No. 2. 0-⅜in. drilling machines, **£13/15/-** carriage paid.

SELECTA 4½in. double ended portable grinders **£7/5/-** carriage paid.

WOLF TG6. 6in. bench grinders, single phase **£13/15/-.** Three phase **£14/15/-,** carriage paid.

BURNERD LATHE CHUCKS 4in. S.C. 3-jaw G.S. **£6/2/9.** 6in. 4-jaw Ind. **97/4.**

MYFORD and HALIFAX lathes and accessories. Illustrated literature gladly sent.

A 6d. stamp will bring you a copy of our comprehensive illustrated catalogue, with details of 38 "L.B.S.C." designed small steam locomotives.

416 MOSELEY ROAD, BIRMINGHAM, 12

Grams: "Reevesco Birmingham" Phone: CALthorpe 2554

"THE CHOICE OF EXPERIENCE"

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**

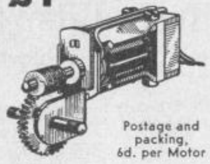
"No Quantity too Small"

THE

ZENITH X.3 MOTOR UNIT

... Only £1

ERG and GEM unite in wholehearted recommendation of this unit as the finest value for money in 00 motive power.



Postage and packing, 6d. per Motor

SPECIFICATION:

Alnico Magnet, 3-pole armature, flat copper commutator, wound for 12 v. D.C. with an approximate consumption of 0.35 amps. Complete with gearbox sideframes and 40-1 constant mesh worm drive, with the worm wheel already fitted on ⅛in. axle knurled each end (suitable for S-R wheels); modellers wishing to use Romford or any other ⅛ in. axle can replace the knurled axle by pressing it out and substituting the required type. The gearbox sideframes, apart from ensuring perfect mesh, make the unit ideal for a fully sprung chassis and in the case of a non-sprung chassis or non-sprung driven axle, this type of motor eliminates the need for securing screws and special seating.

ERG (Bournemouth) LTD.

529 ROUMELIA LANE, BOSCOMBE, BOURNEMOUTH

(*Boscombe* 33431)

Deal with your local ERG Stockist wherever possible, but if unable to obtain your requirements locally you are of course welcome to order direct from us.

MODEL MAKER PLANS SERVICE

OUR 1951 CATALOGUE is now at the Printers and will shortly be available for distribution. It contains a fully descriptive list of the many fullsize working drawings in our wide range, including workshop accessories, miniature engines, scale model sailing craft, decorative ship models, model power boats and air/sea rescue launches, a wide range of model cars to meet all degrees of skill, and many miscellaneous items of interest to modelmakers. Every model or accessory is illustrated, described, priced and size of plan, details of any building instructions, etc., given. This 16-page list will be sent free of charge to readers enclosing stamped addressed envelope (preferably 9in. x 6in.) or label.

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

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.

We told you!

"Once again congratulations on all your products and may we see many more in the near future as I do not hesitate to say, Graham Farish 00-gauge Model Railway equipment is the finest on the market and unbeatable in any way. Thanking you for so much pleasure..."
F. J. A., Yorks.

HELLO, all you Modellers — we told you the new Prairie Tanker was a winner! Now you know — anyway the lucky ones who ordered early do — we're coping with the rush and executing orders in strict rotation but, sorry, we simply must limit each order to a maximum of two locos. It's great fun, this Prairie Tanker kit, and so easy — just a couple of hours pleasant and interesting work with a screwdriver and file and you're ready to run — no soldering, drilling or tapping, and full instructions and drawings clearly show the work step by step!

Designed directly from drawings kindly supplied by British Railways. And how it performs! The exclusive patent motor — the centrifugal clutch — the spur gear box — combine to give over 4½ ozs. drawbar pull on under one-third of an ampere. No other commercial model has even approached this performance because no other commercial model has the exclusive features of this tanker.

Examine the detailed features opposite — they create a new standard — quite different — and away ahead of all current model designs. ***Build it yourself — only then can you really claim to be a modeller — only so can you fully realise what a magnificent job it is.*** And remember new types, when produced, will as far as possible use the same standard parts—start right, send off to us today!

As from 15th March, 1951, approx., the Prairie Tanker will be available with alternative centre rail pick-up AT NO EXTRA CHARGE!

PRICES.

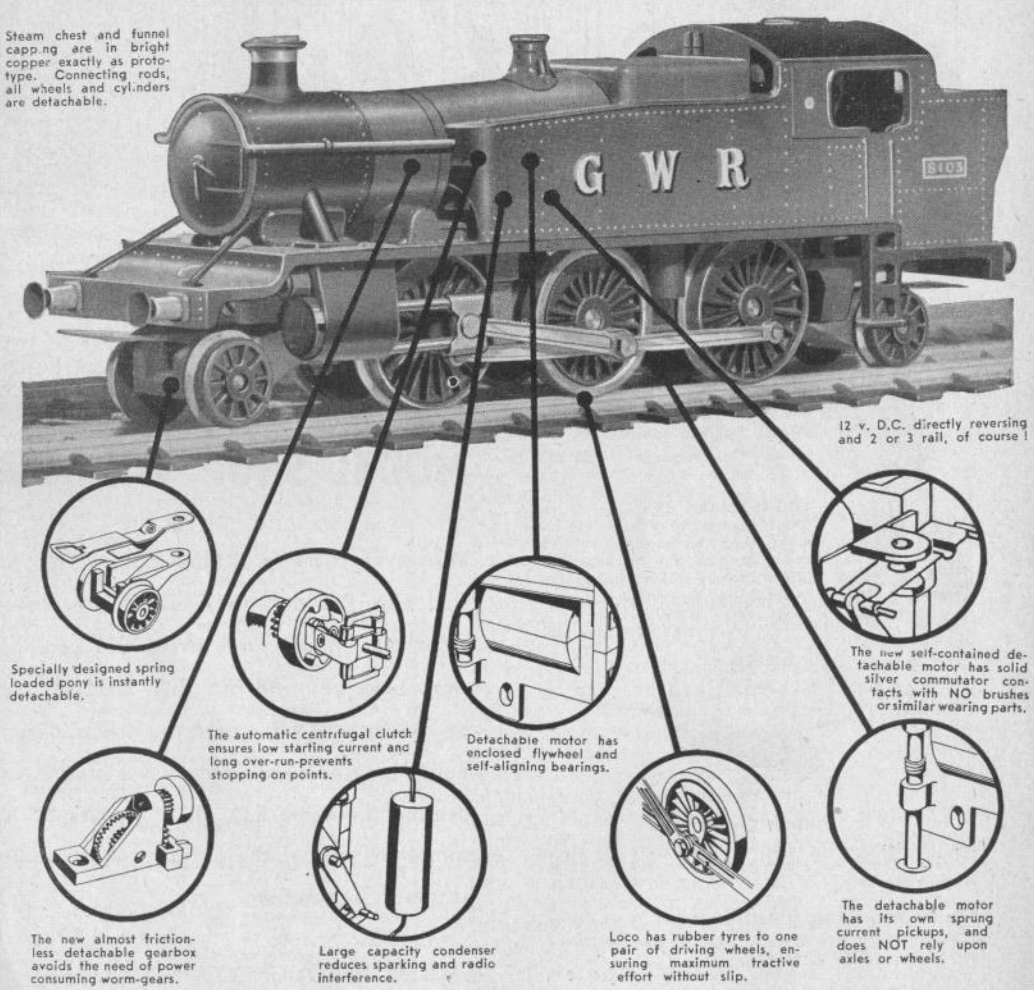
Complete Kit of Parts Unpainted	Complete Kit of Parts Body enamelled Black	Complete Kit of Parts Body Green and Black
79/6	**84/-**	**89/-**
Inc. P. Tax With British Railways Transfers.	Inc. P. Tax With British Railways Transfers.	Inc. P. Tax With G.W.R. Transfers.

Postage and Packing on all Kits 1/- extra

Owing to limited supplies, at present no more than two Locos can be supplied to any one order.

★ **This model has been selected for exhibition by the organisers of the Festival of Britain.**

The NEW "OO" GAUGE PRAIRIE TANKER LOCO



RUSH YOUR ORDER AND REMITTANCE DIRECT—NOW!

to the sole retail distributors:—

Cheques, Money Orders and Postal Orders should be made payable to FORMO PRODUCTS LTD. and crossed.

FORMO PRODUCTS LTD. (Dept. MM) MASONS HILL, BROMLEY

SPECIAL NOTICE: This model is obtainable *by post only* DIRECT from us.

DON'T DELAY!
All orders will be executed in strict rotation
POST ORDER TODAY!

KINDLY MENTION "MODEL MAKER" WHEN REPLYING TO ADVERTISEMENTS

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. 4 (New Series) MARCH, 1951

EDITORIAL MISCELLANY

MODEL yachting enthusiasts have answered our call for articles and comments in no uncertain manner, so that in this issue we are able to offer details of the vane steering gear and particulars of the only radio-controlled model yacht yet in operation in this country. South coast residents have hastened to point out that Hove and not Brighton should be given due credit for their model yachting basin—a correction we are very pleased to make. Our 00 gauge model railway articles have met with a good reception and will we trust go from strength to strength. In the search for an unusual model of the month, we feel our model inn sign article strikes an unconventional note. Examples of this particular craft have proved very welcome return gifts to American friends who have overwhelmed our contributor in the past with their traditional generosity.

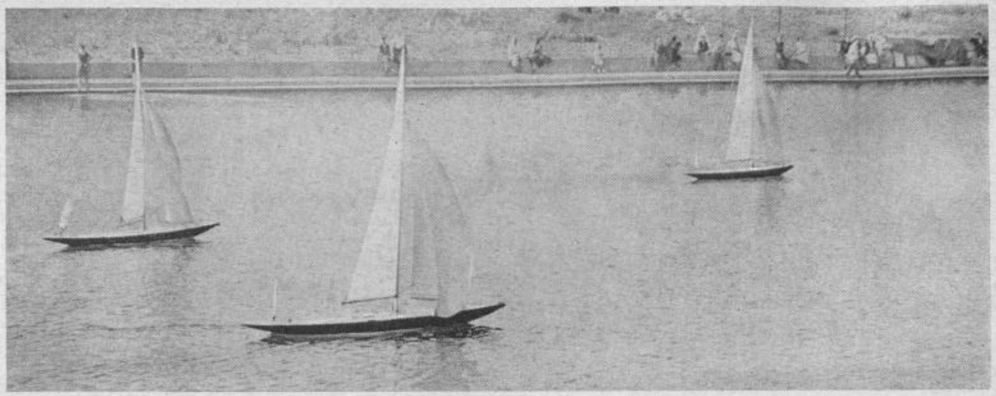
For your future entertainment, we are happy to announce a new series by our contributor Bernard Reeve which will cover the history and development of the leading model yacht classes; live steam enthusiasts will be glad to know that K. N. Harris will be continuing his Model Steam Locomotive Design articles and also be discussing that old favourite the steam car. In our own workshop we have been working hard on rolling stock for the *Model Maker* track, and will describe our first locomotive—a Royal Scot—next month. For the lathe worker we shall shortly be offering a really potent 5 c.c. miniature engine design, covered in detail over several issues.

It is not too early to consider the summer programme of outdoor model operators. In this connection we shall welcome advance information of model car meetings, regattas, passenger carrying tracks and the like, so that we can publish a monthly "What's On" feature, and in due course attend as many as possible of these meetings, with notebook and camera.

Those enthusiasts who prefer to make models and workshop accessories from established drawings may be interested to know that we have prepared a revised catalogue of our working drawings, which covers model sailing craft and powered boats, model cars for all degrees of building skill, a wide range of practical workshop accessories, and a number of miscellaneous items ranging from a series of engines from .3 c.c. upwards to ornamental porch lamps. In many cases castings are also available by arrangement with an associated company so that the would-be maker's task is considerably simplified.

ON THE COVER . . .

Top right: Ever popular passenger tracks — this time at the Brighton Exhibition. Centre left: Ambitious speedboat from Fleetwood. Centre right: Start of an A Class match again from Fleetwood. Bottom left: An exhibition quality model showman's engine. Bottom right: Contest car — the Offenhauser readers must make for their free holiday.



THE vane steering gear illustrated, was designed and constructed after a good deal of trial and error owing to the fact that it was found impossible to obtain plans in this country.

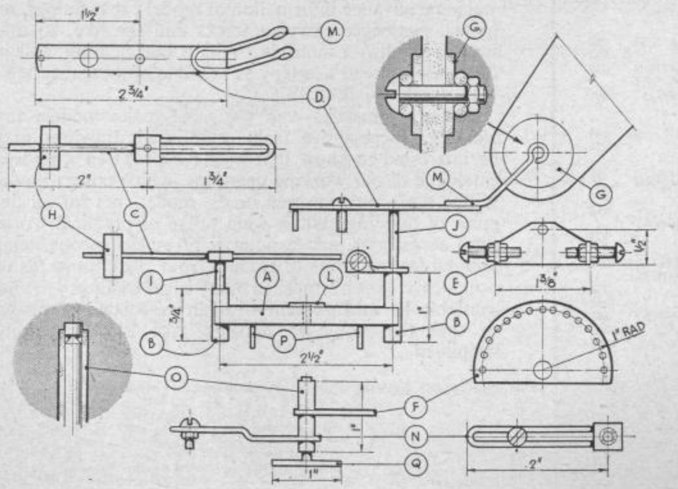
Although one or two vane gears were on the market, the price was considered to be prohibitive, and apart from the cost, there is a great deal of satisfaction to be obtained if one sees one's own design performing satisfactorily.

The whole gear is constructed of light brass and soft soldered. It has been used in very rough weather and all the joints have stood up to the strain. It is therefore not considered necessary to use silver solder.

The gear illustrated, has not been plated, because it was originally intended as an experimental design, but now that it has performed so well, it will no doubt, be chromium plated. Plating is well worth the extra cost, especially if the boat is to be used in salt water. It will be seen from the plans that the gear is very simple to construct, and no special tools of any kind are required.

The main frame consists of a piece of $\frac{1}{4}$ in. wide channel brass which forms a strong foundation. The channel is filed at each end to take the tube bearings, leaving the sides to overlap the tubes, and the whole is then soldered thus forming a very strong bearing at each end. It was considered necessary to overlap the tubes at each side as when the boat is self-tacking in a strong breeze there is a considerable amount of strain on the end bearings. The tube used for the bearings is of very light brass and was originally intended for aeromodelling.

The vane tiller consists of brass rod, doubled over and fitted with a 6 B.A. bolt and nut as a driving pin, which engages the rudder tiller. The vane arm is $\frac{1}{16}$ in. brass with a pin soldered at the end to engage the compensating arm, which is also made of



VANE SELF-TACKING STEERING GEAR
LIST OF PARTS

A.—Main Body (channel brass $\frac{1}{4}$in. square).
B.—End Bearings (brass tube to fit $\frac{1}{8}$in. rod).
C.—Compensation Arm (brass rod 1/16in. diam. threaded for weight—H).
D.—Vane Arm (brass strip 1/16in. strip $\frac{3}{8}$in. wide).
E.—Quadrant of 1/32in. brass with 6BA nut soldered each end to take 6BA bolts for adjusting length of tack).
F.—Main Quadrant (1/16in. brass drilled all round the edge 1/16in. holes).
G.—Aluminium Discs (2 off for supporting vane with 6BA bolt passing through).
H.—Lead Weight threaded for adjustment.
I.—Brass spindles for vane arm and compensating arm ($\frac{1}{8}$in. brass).
K.—Brass Pin 1/16in. diameter to engage compensating arm C when self-tacking.
L.—Brass Plate soldered on top of open channel and drilled to take tube O.
M.—Brass Rod 1/16in. diameter soldered to D and doubled to take vane.
N.—Vane Tiller of 1/16in. brass doubled and soldered to tube O. 6BA bolt and nut fitted in gap and movable.
O.—Main Vane Bearing of brass tube with short piece of $\frac{1}{8}$in. rod soldered in at its top. Main spindle of $\frac{1}{8}$in. brass fits in tube—top of spindle formed to a point to made needle bearing.
P.—Two 1/16in. Brass Pins to engage in holes in main quadrant F.
Q.—Main Base of $\frac{1}{8}$in. brass with main spindle threaded and soldered on.

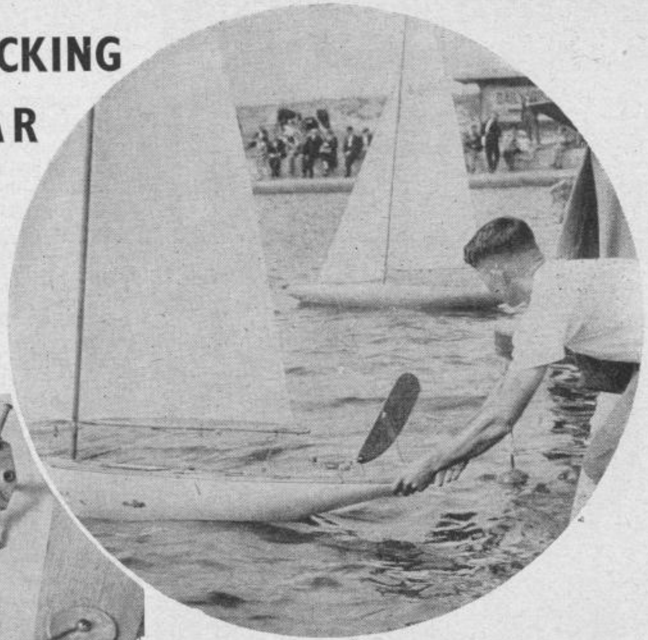
Vane SELF TACKING STEERING GEAR

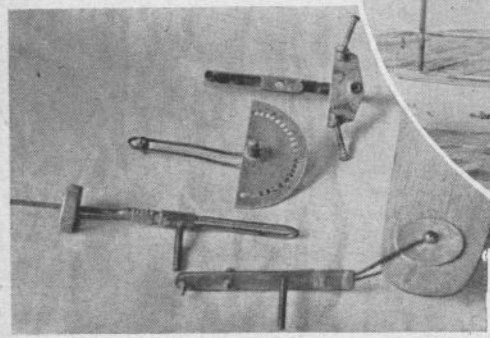
BY K. P. MORRIS

On the left: Vane equipped A Class Yachts running before the wind at Fleetwood, 1950.

On the right: Start of a race between vane equipped craft—again at Fleetwood, 1950.

Below: Steering Gear parts ready for assembly. Right centre: Gear fixed for heading. Bottom: Gear fixed for self-tacking.

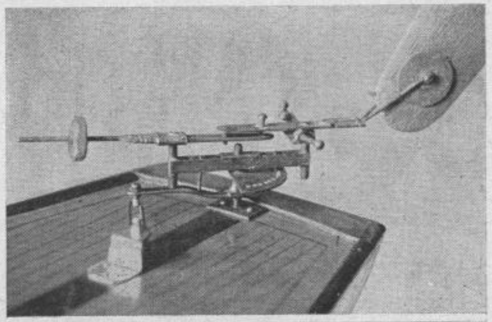


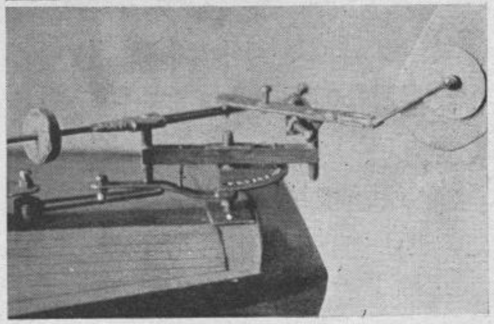


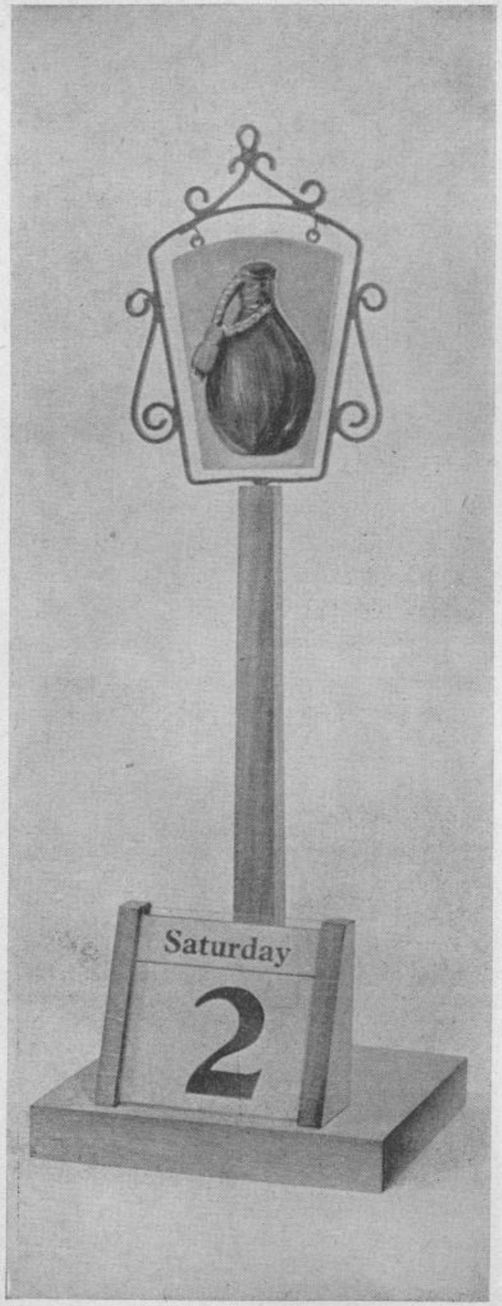
$\frac{1}{16}$ in. brass rod and doubled over like the vane tiller, and threaded to take the compensating weight. The vane arm is tapped 6 B.A. and fitted with a 6 B.A. bolt. When this bolt is unscrewed the vane "breaks", and is then in the self-tacking position.

For reaching and running, the two arms are brought into alignment, and the 6 B.A. bolt screwed down to retain them in that position. The small quadrant soldered to the top of the rear bearing tube, has its edges turned up and cut out to hold a 6 B.A. nut, the latter being soldered in each side. The bolts fitted in these nuts can be separately adjusted so that the distance of travel of the vane feather can be controlled when self-tacking. The boat can then be made to travel on a long or short tack as required, and then come about. The tiller arm has a sliding 6 B.A. bolt so that the pressure exerted on the tiller can be controlled. By sliding the bolt to the extreme end of the tiller the length of the vane tiller is increased, and the length of the rudder tiller correspondingly decreased. This has the effect of quick action, but needs more wind pressure. By sliding the bolt in the opposite direction the reverse effect is obtained, the vane action will be slower but more effective in light winds.

(*Continued on page* 245)







A. G. PALMER OFFERS

Inn Signs in Miniature

INN signs are one of the oldest forms of advertisement and derived from the fact that in olden days very few people could read, therefore a sign was used to depict the name of the Inn or Hostelry. This compares with the traditional use of the twisted pole for the barber or the mortar and pestle for the chemist. The art of signwriting dates back into antiquity and signboards were discovered in the ruins of Pompeii, some carved, some painted, some of wood, some of stone.

In this country signs were common over shops of all types until well into the 18th century, from the middle of that century they very gradually decreased in number until at the end of the 19th century only the pawnbrokers three golden balls were in common use apart from the signs at the inns. One can still occasionally see shop signs in the shape of a pair of spectacles at an opticians or a boot at a shoemakers, but these are rare.

England is still rich in unusual signs although it is to be deplored that nowadays some brewers are hanging plain signs bearing only their own names and the name of the inn concerned.

Many historical occasions have been the inspiration of inn names, generally the inn has been named after the main figure connected with the occasion, thus whilst there are a few "Trafalgar Inns" there are many more "Lord Nelsons". In the same way we have many "Duke of Wellington", "Drake Arms", "Earl Beatty" and similar inns. Other historic occasions are honoured by implication, the "Royal Oak" is a reminder of the famous hiding place of Charles II. "Nell Gwynne", "Shakespeare", "Robin Hood", and "Falstaff" are all inns that honour famous characters real or imaginary.

Perhaps the most unusual sign commemorating a real person is that of the "Ordinary Fellow" at Chatham. This sign shows a George V penny and the title is taken from the famous remark of that monarch at the time of his Silver Jubilee.

A very amusing sign at West Malling depicts St. Leonard who has many associations with that district, his head haloed by zooming aircraft presumably from the nearby R.A.F. Station, truly a "Startled Saint".

William Hogarth painted many inn signs the most satirical being "The Man With the Load of Mischief". This shows a very henpecked man bearing on his shoulders a shrewish wife who holds in one hand a glass of gin whilst the other holds a monkey.

W. S. Gilbert is immortalised by the "Three Mariners" at Hythe, this shows one rather elderly sailor who had been shipwrecked and, having eaten his shipmates, had become ". . . a cook and a captain bold and the mate of the *Nancy* brig".

"The Trusty Servant" at Minstead in the New Forest shows a composite figure with the feet of a deer for swiftness, and the hands of a craftsman, the snout of a pig not to be able to divulge his master's business, and the ears of a dog to hear his every command.

On the London to Basingstoke road is a "Bird in the Hand" sign, on one sign this shows the usual picture of a hand holding a hawk whilst the other shows a young "Gallant" with his arm around his "bird". In the same district is a "Victoria" inn which shows, instead of the venerable Queen, a Victoria carriage. Most of the many "Nags Head" inns show a bridled horse, but the one at St. Leonards shows a "nag" wearing a scold's bridle.

Sport is commemorated in many inn signs, perhaps the most famous being the "Cricketers" at Hambledon and Maidstone. The former shows top-hatted players of a bygone day, whilst the latter shows beflannelled captains at the toss. Other sports are commemorated by the various "Fish", "Anglers" and "Fox and Hounds" inns. The inn at Barley has its fox and hounds racing on a sign right across the street.

It will be seen that the study of inn signs can be very fascinating, and immense pleasure can be gained by the study of these "works of art", to say nothing of the product they advertise. It will cease to be an abstract fascination if one starts to make miniatures of the various signs. Miniatures can be carved from wood and then painted. Boxwood is the most satisfactory, but others which serve are Abura or Japanese Oak. The carving should be about $\frac{1}{8}$ in. in depth, and it is better to allow the central object to stand out in relief, all background being cut away and minor details painted on.

Wrought iron frames set off the carving to great advantage and look suitably authentic. This can be made with either steel or brass $\frac{1}{8}$ in. x $\frac{1}{16}$ in. It can be shaped and soldered quite easily. A small spike left from the centre of the lower edge allows the sign to be fitted into a wooden "post".

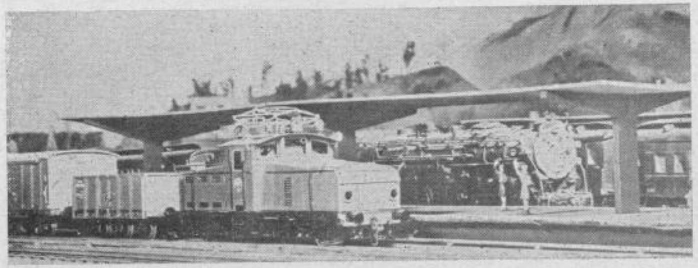
These little signs make delightful calendar stands, ashtrays, menu holders, etc., or can be used as decorations much the same as horse brasses.

Some signs which appeal to the individual may be too intricate to permit carving and these can be painted straight on to the wood, but it must be admitted that these are not so effective. The ideal size for these miniatures is not more than 3 in. square.

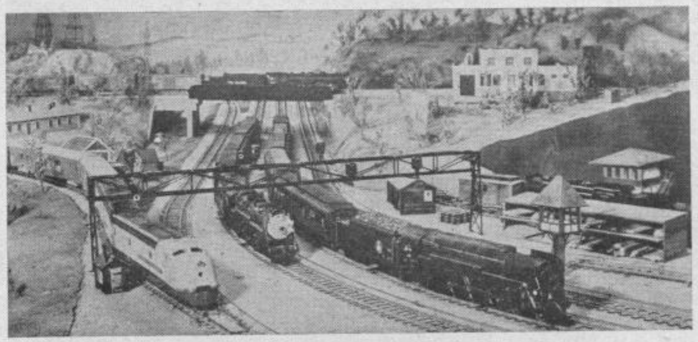
Readers who decide to start this very fascinating hobby will be well repaid. Perhaps if sufficient interest is shown by the general public, in our rich tradition of inn signs, the brewers and publicans will revert to the old style signs, and so preserve one of the really old characteristics of England.

On the Right Track

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

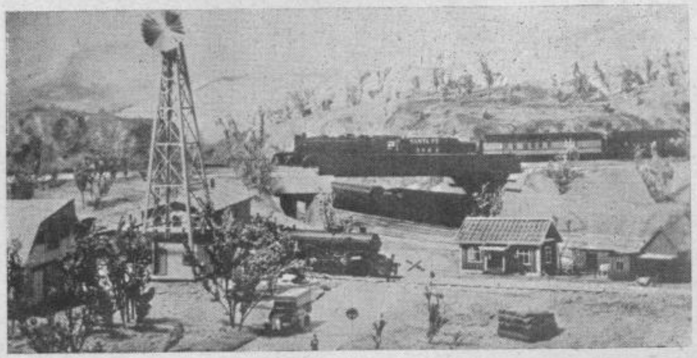


Electric goods and steam express trains at the main station on the elaborate layout installed by the local model railway club of Stockholm in an exhibition building of their famous Skansen Park Folk Museum.



Another view of the realistic Skansen layout, including an ultra-modern streamliner on the left. Note the oil derricks in the top left background, duly served by an appropriate tanker train.

The American influence on Scandinavian modelling is even more evident in this picture, showing "Santa Fe" on the tender of locomotive in middle distance. Lionel components have largely been used throughout the system. Compare these pictures with the typical British layout at Bournemouth published in our January number.



Finding a Site

IN our previous chat in this series we agreed that the beginner—to whom in the main these articles are addressed—would be well advised to select the 00 gauge of 16.5 mm. associated with its modelling scale of 4 mm. to the foot.

One of the advantages of this gauge, as we saw, is that it permits the use of reasonably sharp curves, and it is this factor of the ruling radius that exercises a very important influence over the layout of our railway just as it does in full size practice.

In the full size railway the aim of the engineer is the purely utility one of getting his passengers and goods from point A to point B by as direct and level a road as possible. Curves, grades, embankments, cuttings, bridges and tunnels, picturesque as these may be are avoided wherever possible, because they make for expense in laying the track, in maintaining it and in running the trains. But in a model railway we aim at making a picture—a picture that is intended to be looked at from a more or less fixed point of view. For this reason, although it might be possible for us to lay a perfectly flat and straight track between our terminal stations, we deliberately introduce curves and grades, because these enable us to show off the railway in a more convincing setting. Also, of course, a straight level track would, for most of us, limit the run to 20 ft. or less.

However, the moment we decide that we are going to make our track curve back on itself (as in the oval, Fig. 8, etc., layout), there arises the question of the width of baseboard necessary to permit such a return curve and this promptly introduces the question of the curve radius to which we must limit ourselves.

The question "Where shall I put the railway?" cannot be fully answered then except by first asking "What sort of a railway have you in mind?"

If you hope to represent a railway having a main line carrying scale coaches of full length and locos with long fixed wheel bases (six or more coupled wheels) and to run such trains at "express" speeds, you must start thinking in terms of at least 2 ft. 6 in. radius (as measured at track centre line). This means a baseboard of 5 ft. 6 in. for a single track and about 6 ft. for a double track. Of course the baseboard need only be of full width at the parts where the return curves occur.

On the other hand, if your wishes trend in the direction of a lazy little country line using small tank locos and short rolling stock running "one train a day on weekdays and none on Sundays", then your curves might come down to 2 ft. or even possibly to 1 ft. 6 in. radius, giving you a baseboard of 4 ft. 6 in. to 3 ft. 6 in. in width.

It should, of course, be appreciated that all the figures quoted already, represent curves far sharper than the equivalents found in full size practice. Some proprietary "table" railways employ track units of a fixed radius of curvature of less than 1 ft. 6 in., but such curves, although they enable narrower baseboards to be used, introduce certain limitations in the matter of overhang of long vehicles, station platforms on a curve, etc. The aim should always be to use the widest radius of curvature that the site will permit. This brings us again to the subject matter of this chat—that of deciding upon or finding a suitable site.

Since we are dealing with the 00 gauge railway, it follows that the site will be an indoor one. 00 gauge railways *can* be run out of doors, particularly if the stations are housed under cover in a greenhouse or shed and other weather-proofing precautions are taken. But trains in this diminutive gauge are apt to appear "lost" in out-of-door surroundings, where even the humble daisy assumes the proportions of a giant sunflower.

Indoors the scenic effects can be designed and arranged round and on the railway in such a manner as to preserve relative proportions and make the scene as a whole a convincing one. But the materials used for this scenic work must, necessarily, be delicate. Cardboard, thin plywood, and strip wood held together by glue will be the most commonly used materials, and buildings or scenic effects made of such materials do not take kindly to exposure to our delectable climate. In fact, dampness is by far the most deadly enemy of the miniature railway, and is to be avoided in the indoor layout no less than in the outdoor. The basement site is usually the one where damp is most to be feared, and unless precautions are taken, good running will be impossible.

Woodwork will swell and twist, sleepers, if of fibre, will expand and throw the track out of gauge and electric wiring will develop baffling faults.

On the other hand, the basement is usually free from the disadvantage of the loft amongst which we must reckon (a) liability to temperature extremes, (b) dust, (c) difficulty of getting materials to the site, (d) disturbance to the sleepers (human!) below.

It should also be borne in mind that the conversion of a house loft into a model railway site may require some sanction from housing authorities and effect the rateable value of the property.

All this sounds horribly negative and depressing. In practice it does not mean that basements and lofts are taboo as sites for model railways, but rather that the constructor will be wise to take full account of these lets and hindrances before he lays down his track. For the beginner there are quite enough problems connected with laying down a railway without asking for troubles that can be avoided by foresight.

And this brings us to what is probably the sound-

(*Continued on page* 254)

Control panel of the Skansen layout. In addition to full automatic control of the whole system, giving a twenty minute run to complete a simple circuit of all trains, it is possible from this switchboard to provide appropriate sounds, whistles, running over iron bridges, through tunnels, and indeed all the typical sound effects of a fullsize railway.

Model Speedboat Hull Design

PART I

BY A. M. COLBRIDGE

THE design layout and proportioning of a model hydroplane hull usually resolves itself into a series of "guesstimations" with the practical results obtained, apparently, often at variance with theory. It is difficult, in fact, to find any adequate sources of data for theoretical hull design which can be applied to model work so that design procedure is generally one of "rule of thumb". It does seem possible, however, that by examining the various aspects of the question more thoroughly there are a number of rules and similar considerations which might well be applied to model design layout.

One the main considerations is, of course, reduction in drag. A high speed hull—model or full size—is designed to plane or skim over the surface of the water rather than plough its way through it. Water resistance when planing is very much lower than "submerged" resistance to motion. Once satisfactory planing is achieved it then becomes necessary to stabilise the boat in this attitude.

In the planing attitude the resistance is largely frictional, although a certain amount of water displacement will still take place. But the point to bear in mind here is that frictional resistance is largely dependent on wetted area or the amount of hull in contact with the water. Once a hull design is evolved which will plane satisfactorily, therefore, further reduction in water resistance can only come from a reduction in wetted area.

This leads naturally to the size of hull required for any given boat. Many designers appear to select a hull size purely by experience, or possibly preference, with very little direct relationship to the main criterion for determining size—the overall weight.

Theoretically, at least, there is a definite minimum size of hull which is satisfactory for high speed operation, other design features then being proportioned accordingly. This is that the displacement of the complete hull, fully submerged, should be equal to three times the overall weight of the boat. This is not a purely theoretical rule. It is one which has been proven in practice and gives particularly good results in model float design for seaplane work, or full-scale floatplane design.

Stated in another way, this basic rule is: the hull should be no more than one-third fully submerged when fully loaded. Such a hull can be made to plane satisfactorily and, this being the minimum size of hull required, should then give the minimum "wetted area" and consequently minimum water resistance.

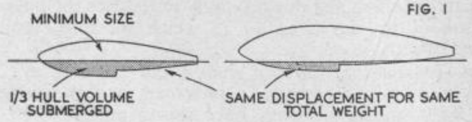


FIG. I

Other considerations being equal, e.g. the same degree of streamlining—air resistance should also be a minimum, although what proportion of the total resistance when running is attributable to air resistance is problematical.

In general, air resistance contributes a small proportion of the total resistance of a boat or surface vehicle below about 50 to 60 m.p.h., and is not particularly critical on slow flying model aircraft. As far as model speedboat design goes it seems satisfactory to neglect the air resistance of the hull entirely and simply adopt a reasonable degree of streamlining as regards the layout of the deck fittings, etc. The aerodynamic reaction of the fast-moving hull is another matter and may not be neglected so completely as this can well affect the *stability* of the hull when running.

Returning to our original question of hull size, this minimum size proportioned according to the total weight of the boat should give minimum resistance, other design factors being similar. Any increase in hull size would, from the point of view of performance, at least, seem unnecessary. A larger hull would only displace the same amount of water, but at the expense of greater wetted area. In effect this means that the larger hull of similar proportions would have greater freeboard and less draught at the expense of greater wetted area and running resistance (Fig. 1).

Knowing the total weight of the boat it is quite a simple matter to calculate the total volume of hull required: 1.8 cub. in. of water weighs roughly 1 oz. and therefore 3 x 1.8 = 5.4 cub. in. of hull volume is required for each ounce of total weight. Since it is very difficult to estimate total weight in the design stage with absolute accuracy a figure of 5.5 cu. in. per ounce of total weight is usually adopted as the minimum hull volume required, this allowing a small safety margin. Actual total weights almost invariably seem to work out slightly higher than estimated total weights. Of this total hull volume one third represents the submerged volume with the boat at rest, or the displacement. We can tabulate a list of minimum hull sizes accordingly.

Total Weight (lb.)	½	1	1½	2	2½	3	3½	4	5	6	7	8	9	10
Total Hull Volume (cu. in.)	49	88	132	176	220	264	308	352	440	528	616	704	792	880

Whether the designer will now wish to work right down to this minimum size or not is a matter of preference. Theoretically such a hull should give the lowest potential drag, for any given total weight. Any further reduction in drag can then only come from a further reduction in weight, when a still smaller hull can be used, and so on. The two—weight and total hull volume—are closely linked in this manner. This close relationship can also upset design relationships.

If, for example, the model eventually comes out overweight the submerged volume will be greater than one third of the total hull volume and some difficulty may be experienced in getting the hull to plane properly. In bad cases the model may not have enough power to pass the hump speed and change the running attitude of the hull from pure displacement to planing. As a consequence its speed will be low. Increasing the power could then have the desired result, although stability may then be affected. Of the two it would appear better to err on the side of too large rather than too small a hull.

Whatever methods are adopted to secure maximum performance from a hull these must never be obtained at the expense of stability. However "fast" the hull it will be quite unsuited for practical application if it is unstable and cannot maintain its correct running attitude. The higher the speed, in general, the greater the margin of stability required.

Lateral stability of stability in roll is not of such importance with tethered running as in free running since the cable or line itself usually has a certain stabilising effect, but in high speed running it is still one of the major design requirements since water is never perfectly still and lack of stability in roll can lead to instability in other directions.

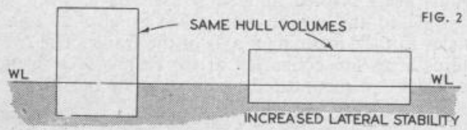


FIG. 2

The simplest way to increase resistance to, and recovery from, a roll is by increasing the beam (Fig. 2), but lateral stability itself is related to the weight of the complete boat, and the metacentric height as well as the type and design of the hull itself. So important has adequate lateral stability been found in practice that hull platform shapes are largely dictated by this need.

The relative positions of the centre of buoyancy and the centre of gravity determine whether or not the hull is stable (Fig 3). If the centre of gravity is below the centre of gravity then the arrangement is stable. If displaced in a roll there is a restoring moment set up about the centre of gravity which is *positive*, or tending to restore the hull to its original attitude. Where the centre of gravity is above the centre of buoyancy, however, any displacement in roll produces an *upsetting* moment about the centre of gravity tending to aggravate the roll. In the third case, where the centre of buoyancy and centre of

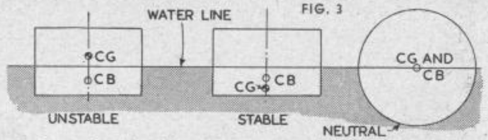


FIG. 3

gravity coincide, the arrangement is statically stable, but when displaced there is no restoring or aggravating moment established so that the hull or body will tend to remain in the displaced position.

Unfortunately these simple stability conditions are considerably modified when the hull is planing, but ample lateral stability achieved under "submerged" conditions is usually a satisfactory design factor for stability when planing. It is worthwhile, therefore, to investigate the effect of relative centre of gravity and centre of buoyancy positions. The distance between them is termed the metacentric height which will be measured along a vertical line with the hull in its normal attitude (Fig. 4). If now this hull is displaced in roll a new water line is established, and the centre of buoyance moves to a new position whilst the weight continues to act downwards through the centre of gravity.

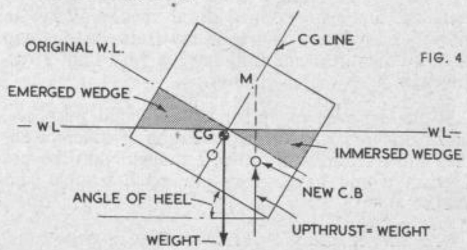


FIG. 4

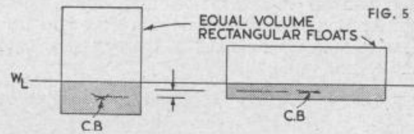
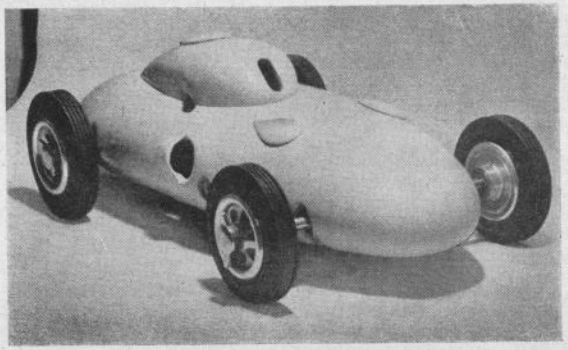


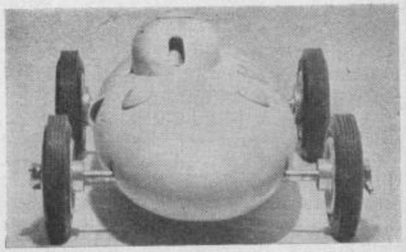
FIG. 5

The buoyancy force projected upwards cuts the C.G. line at some point M, the distance between C.G. and M. being known as the metacentric height. Lateral stability is achieved when M. is above the C.G. or the metacentric height is *positive*. If the metacentric height is negative or below the C.G., the hull is laterally unstable.

Fig. 5 then shows quite clearly how broadening the hull automatically raises the centre of buoyancy—a feature commonly adopted in hydroplane practice where a beam of at least one third of the length is generally about the minimum figure used. Such a layout is very desirable, for the layout of a racing model tends to give a rather high centre of gravity position. In fact, even with the conventional broad-beam wedge type hull the stability margin is often on the small side.

(To be continued)





An Unusual McCoy Powered Italian Design

BY GUSTAVO CLERICI

MY car was born from the necessity of making most parts with what means were at my disposal, that is a small bench lathe and a few tools, so I looked to a solution which would allow me to reach my purpose without sacrificing strength and efficiency. Structurally I've made use of a "watch maker" chassis (so-called because I've rigidly joined together two sides made from 6 mm. dural sheet, liberally lightened, and using bolted dural spaces). I can in this way completely dismantle my frame as one can see from pictures, and still have a very light structure, with a very high rigidity.

As the car was made for experimental purposes, particularly regarding the installation of different engines and transmission ratios, I thought that the use of gears would have given me much trouble and expense.

With this in mind I decided to use a belt transmission and an engine mount that would allow a certain amount of longitudinal displacement, to enable me to take up the slack of the belt after changing the engine pulley.

This system has proved very effective: I've been able to change the transmission ratio four times with no trouble.

The belt is a continuous ring of woven cotton impregnated with rubber, the only point worth mentioning is that pulleys should be turned with a certain amount of "hump", and that they should be flanged with 5 mm. flanges on the sides.

The changing of the engine pulley can be accomplished in less than 15 minutes. The use of a belt transmission has, to my point of view, another advantage of importance, even if the American tendency is opposite: it gives the possibility of incorporating a rear suspension system, which thing means a better adherence to the track.

In my case this has been done by the use of two radius arms pivoted about a cross axis as near as possible to the engine axis which is also at right angles to the longitudinal axis of the frame. The two radius arms are connected at the rear with a drum on which are mounted the two rear axle bearings.

The springing is through rubber bands held around the aforementioned drum. The rear pulley incorporates a centrifugal cone clutch, driven by the rotation of the rear wheels, somewhat like the one used by my friend Dr. Mancini on his MK 2 car. This clutch must be built with the utmost care, and is very sensitive, but it offers the advantage of very fine setting, done through variation of the centrifugal weights which are easily accessible, one can thus obtain a more or less prompt engagement in accordance with car weight, engine power, and transmission ratio. One thing is safe—that once the clutch is engaged it will not allow the least slip.

The car is equipped with four Pirelli tyres of new type, expressly built of very good rubber, and they behaved very nicely, being light and perfectly balanced.

The engine was a McCoy 60; on the 1 km. base the maximum speed was 113,700 km.p.h., with a ratio of 1:1.7 and 100 mm. wheels. The total weight is about 4 kilograms, and I'm now working to lighten the car and better the forward suspension.

Naturally the fuel tank has been the result of a careful study—it is very long and narrow, and placed about the axis of the carburetter funnel (the one shown in the picture has been discarded though it worked well up to 80 km.p.h. with a less powerful engine).

The bodywork is built up of strips of chestnut and birch glued together: it is rigidly connected to the frame by means of two bolts which carry in them the eyelets for hooking the bridle.

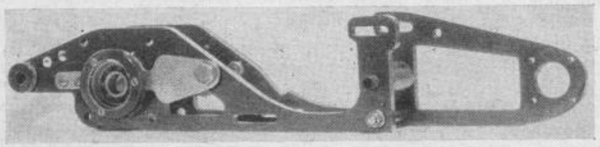
Photo by Paolo Costa

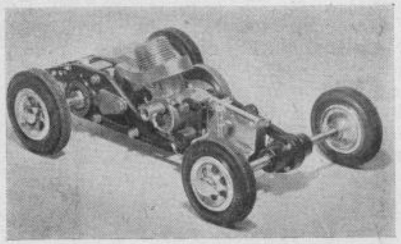
(Above) The author displays his interesting model, and the cup he won in the 10 c.c. class. (Right) His enthusiastic helper points triumphantly to the score board!

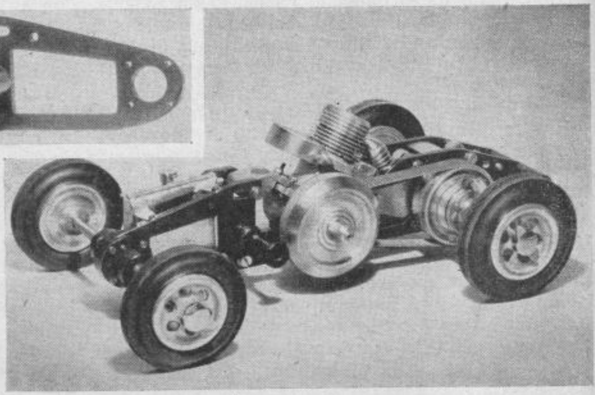
(OPPOSITE PAGE) Above and below are views of the complete car, and details of the ingenious chassis construction, the side plates being assembled on "watchmaking" principles. Note the flat belt drive.

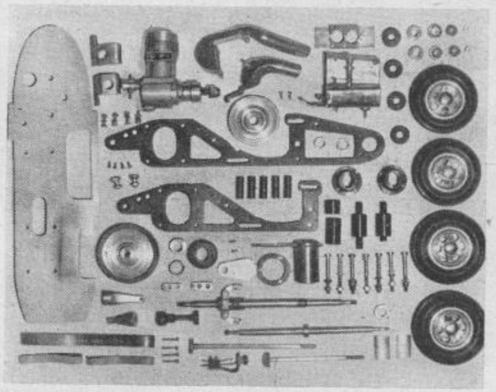
(Below) The author at his work-bench with a selection of American and home produced racers. The two centre cars are a Thimbledrome and a Dooling, the streamliner being the wood-en-bodied job described some months ago.

Photo by Paolo Costa









A Radio-Controlled "A" Class Model Yacht

BY GEORGE HONNEST-REDLICH

As one of the leading experts in the development of radio control for models in this country, and author of the only book on the subject in English, G.H.-R. has now bravely invaded the world of sail—though frankly admitting his ignorance of the finer points.

After the Fleetwood Regatta he demonstrated the yacht below on the pool, carrying out manoeuvres as requested by members of the crowd, and, finally, took part in a challenge match against an expert skipper sailing in the conventional manner. In this match his challenger beat him by a yard over two boards, making up over seven yards that he had lost on the up wind run by a really fast down wind recovery. Competent judges were of the opinion that, given craft of approximately equal speed, skippered by equally skilful yachtsmen, the radio controlled model would usually win. Of particular interest on this occasion was the enthusiasm of reputedly diehard oldtimers to try out this new slant on an established hobby. We certainly hope the author's plea for a "bit of competition" this summer will be answered.

G. Honnest-Redlich demonstrates his radio control equipment on dry land—a picture taken at one of the larger model exhibitions. ('Sport & General' Photo.)

RADIO control is fast becoming a very necessary addition, or even the *raison d'etre* of every working model which by virtue of motion when launched is out of touch with the hand which created it.

However, it is generally marked that the more mechanical a model is, the more the owner turns to radio control to give him power over his out-of-reach Frankenstein.

The modern model yachtsman, like his full-sized counterpart, has traditionally disdained electronic or mechanical aids, with the exception of the various types of "Braine" and other gear to counteract fickle winds.

It appeared to me that here especially a type of remote control which would be able to give a "personal" touch would be invaluable. For even a general straight course, the means of adjustment of trim of sail as well as rudder variation would require a new type of skill in model yachting. The obvious conclusion of complete control would in fact put the operator "on board" his model.

My original experiments were made with a commercial 36 in. sailing boat of normal design, in order to gain a little experience in this for me, new hobby. As only a "positional" rudder control was fitted, little was expected in exact manoeuvrability. However, the results were to me astonishing, and after a few weeks' practice I decided to equip an "A" class racing yacht with both a progressive rudder control as well as a means of adjusting the sail position. (I must here apologise for my lack of correct yachting terms. I am the type who likes to learn from my own experience and then later get the correct phraseology.

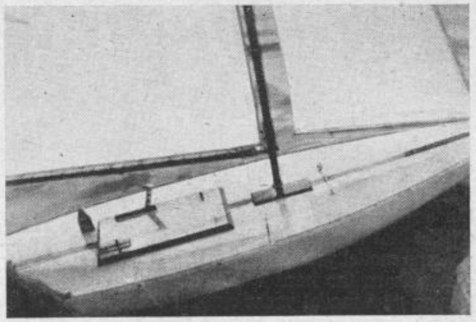
Before getting down to the constructional details, I studied the requirements. It was apparent that a progressive fractional "inching" of the rudder was more important than the necessity to achieve a sudden complete reversal of position. Therefore it was decided that the gearing of the rudder electric motor drive should be very low, giving the possibility of movements as small as 5 deg., and allowing about 3 secs. for a complete change of helm from full port to starboard.

The sail was the major problem. The wind pressure on an "A" class mainsail even in a medium wind is very considerable, and the motive power to haul it in had to come from a reasonably sized battery via an electric motor. In both motor and batteries, power equals weight and size, and I had no wish to add unwanted weight to my boat.

I therefore chose a motor driven chain of gears which incorporated an automatic switch of simple design, arranged so that short impulses from the transmitter would give three sail positions in sequence: close hauled, reaching, and running positions. Intermediate positions with this method were not obtainable.

The reason for this method was due to the fact that I intended to instal an existing radio receiver which had provision for only three "channels". One being used for rudder port, and one for starboard, left only one for the sail control. A four channel radio would allow the sail to be progressively altered without recourse to a fixed positional sequence method.

The installation was the next problem. A self-contained unit which could be lifted out of the hull solved both the accessibility and transport problem. The hatch was enlarged to take a watertight drop-in box of about 12 in. x 8 in. x 5 in. In this box the complete radio receiver, servo gear and all batteries were housed. Externally, through watertight slots protruded two levers for rudder and sail control. The former was connected to the helm with a stiff rod. The sheets were operated via a movement doubling block and tackle and could be hooked on to the second lever in holes at various heights in order to give the experimentally determined angle of sail required. In practice I found that I personally had more control over the yacht by mainsail control alone (in combination with the rudder of course), but provision was also made for connecting the jib to this lever at a lower hole position to give a smaller angular



Close-up of the totally enclosed radio-control box let into decking of the yacht. In spite of trials in appalling weather "the works" were never affected by water penetration, either on this yacht or on the smaller 36in. commercial model.

movement. A push-button on-off switch for the complete equipment also protruded from the box, and finally about 3 ft. of aerial wire which was run up along the mast.

In a full season's use in all weathers, the complete job has not suffered from the effects of water either salt or fresh, whereas the hull has had to be emptied several times after long runs. The separate watertight unit box is therefore definitely worthwhile.

The transmitter controls were the next problem. A telephone-type switch lever was chosen for the rudder control. This was self-centring when released, and a quick flick in either direction enabled me to "inch" the rudder easily. The sail positions were chosen by a push-button, and due to the self-switching system used for the sails, the button could be pressed quickly and then one could return to the rudder control without waiting for the sail to come to its final position first. This is very important, because I find that during complicated manoeuvres one tends to over-steer and over-correct. Unless one's hand is constantly on the rudder lever, the boat, for example after coming about, proceeds in a wavy line before settling on its new course.

You will see by this very rough general description that radio control applied to model yachting is not just another modern device aimed at making it easier but it actually requires a greater and new type of skill to operate. Herein, in my opinion, lies its very attraction.

And now I make my appeal. This, as far as I know, is the only yacht of its type equipped with comprehensive radio control. Its popularity will lie in its means for real competition of sailing skill. I cannot compete with myself. It is up to you to produce other radio control "A" class yachts or even "D" raters, so that either demonstrations or competitions can be held. From the moment the first few exist, the general interest will increase by leaps and bounds, and I prophesy that a new era of model yachting in both design and skill will be born.

The Rudiments of Model Yacht Sailing

SHIPWRIGHT GIVES SOME PONDSIDE ADVICE TO THE NOVICE SKIPPER

IN the short space at my disposal I can only touch upon the rudiments of model yacht sailing.

I hope, however, this short dissertation will enable the beginner to grasp the main principles and thus enable him to enjoy the fruits of his building efforts.

Some model yachtsmen achieve success right away, others learn the hard way. I strongly advocate the joining of a model yacht club, if there is one in the district, for it is here he will find willing help and advice which will soon enable him to become proficient enough to enter his model in club competitions.

BEATING.—In the first place it must be clearly understood that no yacht can sail into the wind's eye. The average well designed model will point as high as 4 points off the wind. As each point is equal to 11¼ deg. it will be seen that the nearest the bows can point to the wind is 45 degrees. This is known as beating and under these conditions the yacht sails by the trim of her sails only. The quadrant steering lines are slacked off and the beating sheet attached to the main horse.

The average beginner always makes the mistake of trying to point the model too high, i.e. sail closer to the wind than is possible by tightening the sheets too much. The result is that the yacht takes on an excessive heel and looses speed. Sail as upright as you can; always remembering to slack off the jib sheet slightly more than the main sheet.

Fig. 28 illustrates a typical example of a beat to windward showing the direction of the wind, the direction of the yacht's head and the trim of the sails.

A few moments experimental sailing will teach the novice far more than pages of explanatory matter.

REACHING.—When the wind is abeam, or a little forward or a little aft of it, the boat is said to be on a reach. The beating sheet is unhooked and the steering lines attached to quadrant. It will be seen that the sail pulls upon the weather sheet as the steering lines are crossed. Hook the weather line two or three holes from the centre of the quadrant and slack off the tension cord. Now point the bows in the direction you wish to sail and slack off the sheet by means of the bowser until the wind spills from the sails. Then haul in the sheet slightly and try her out.

Again, experience will be required before the best results are obtained, but if you can enlist the help of an old hand so much the better.

As the wind comes further abaft the beam so must the sheets be eased off until the jib fails to do its work owing to its being blanked by the main sail.

When this stage has been reached it is time to set the spinnaker, and this point of sailing is known as:—

RUNNING.—Until the wind hauls right aft the spinnaker should be set well forward, i.e. the boom pointing forward.

As the wind comes further aft ease the mainsail and haul the spinnaker aft. Finally, as the wind comes dead astern the mainsail is eased right off as square as possible, but not far enough to foul the shrouds and make the steering inoperative.

TUNING-UP.—No model yacht can be expected to put up her best performance the first time she is put into the water. The beginner is strongly advised to enlist the help of an experienced model yachtsman to assist in the process of tuning-up.

This process is a question of perfect balance between the sails and the position of the mast—hence the use of a mast slide to move the centre-of-effort in a fore and aft direction.

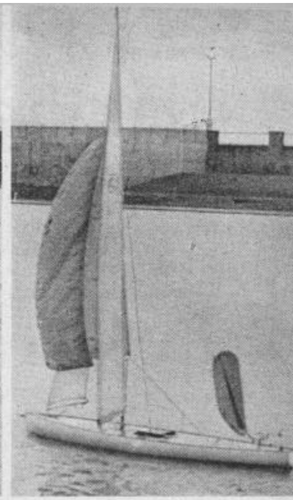
Let us assume that we are about to launch our boat on her trial trip. Her sails should have been stretched by a preliminary run without bothering about the finer points of sailing.

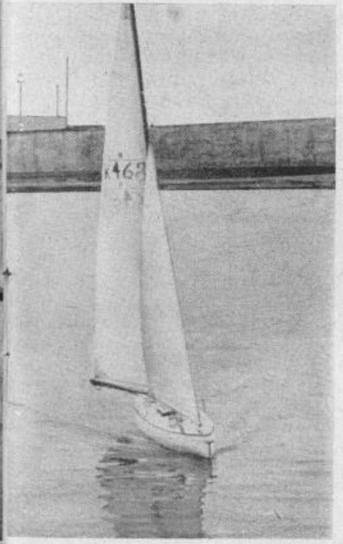
The test is to be sailing to windward, i.e. beating. Set course 4 points off the wind with the mainsail close hauled and the jib nearly so, but not too tight. Now watch!

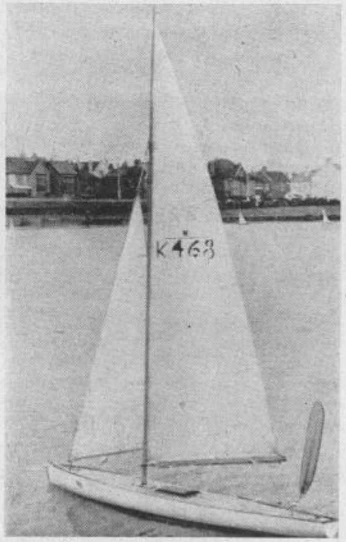
If she refuses to sail properly to windward or falls off the whole sail plain is too far forward. Move it aft by means of the slide and try again. She may now go into "irons", i.e. run up into the wind and stay there, perhaps moving backwards, with sails swinging. In this case move the mast forward.

When the correct position has once been found it will be correct for all time. Mast rake may also be necessary, but this is purely a matter of experiment.

When a model yacht has been correctly tuned up for windward work she will sail full-and-bye for as long as she is on that course, never slowing or altering course.

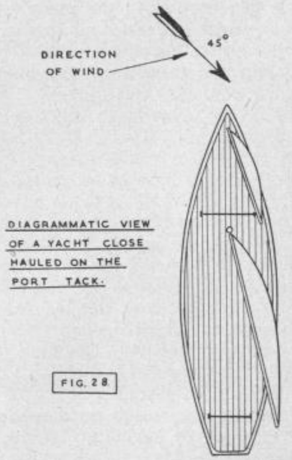






Top right pictures demonstrate "Running with spinnaker set". Below left first three pictures show "Beating into wind". Remaining two pictures below depict "Reaching".

These pictures were specially arranged for "Model Maker" and feature Mr. Arthur Mullett's champion Marblehead in action.



Making Model Buildings

PART II OF VICTOR SUTTON'S NEW SERIES

ALTHOUGH a most interesting part of model making, it is surprising how few keen model makers actually take it up. In many ways I think it has far more varied interests than any other branch and above all it need not be expensive. This article will deal with the many pitfalls of making model buildings, and should help many more readers to embark on a building or two even if only for an experiment.

Everybody has his own taste. He may not want to build the usual type of model railway buildings. He may think they are too set and rigid for his own idea which may be very definitely free-hand in every respect. He may have a flare for drawing, and if so he will be more than pleased with a try-out at buildings.

Why not choose a local building to model? You can either go along and draw it or pick up photographs and postcards of the subject. Ask permission to go into the grounds so that you can get further details. Like the artist, you will mostly find this liberty granted and the owner quite interested. Have you an old mill, now tumbled down in your locality? Here is a subject for the next exhibition and which will make you a top-line local model maker. Farm buildings, too, are interesting. Have you ever seen two farm buildings alike? I seldom do. Here is variety for you. Then we have the local woodyard with its store of timber in the background, and other oddments. Churches are always a popular model to be shown at any exhibition. Few will argue that this building does not allow scope for variety in model making. Generally speaking it calls for some very intensive study because in its treatment you cannot just run around to the model shop and buy some brick paper to plaster all over it. In most cases you will have to mix up some thick paint and shade this to suit the texture of the building. My previous article explained this fully.

We now come to the making of buildings for the railway and the layout. There are quite a few books on this, and a splendid range of plans. What I do say is that it pays to introduce a little individuality into this part to get a better effect. How often do we see a fine row of up-to-date shops at the side of the main line (and this at a well-known exhibition), but apparently nobody has ever moved into the shops because the windows are entirely vacant.

You can get over this by making a small cut-out background on which you can paint some articles. If you cannot paint, then look through a catalogue and you will probably find some display photographs which will help you.

So often we see a good model, but this appears to be spoilt by having no interior. For such a model you can paint a background on this card and set it inside before assembly.

If you intend to make a large layout or, in time intend to extend the existing one, do consider the question of size. Try and keep the baseboard to 2 ft. x 2 ft. This is larger than you think, but you may be faced with having to take it to a show, and one cannot always tip it sideways to get it in somebody's car. There is also the question of stress and strain when tilting. If the board gives then out will come some of the sides of the building for certain. It is a point worth remembering. All baseboards should have a screwed on (not nailed) quartering of 1 in. x 1 in. wood.

Before deciding on building the model make up your mind if you want to light it up or not. If you are going to, then adjust all the wiring points before you start.

To model buildings well you need quite a flare for drawing. This is not always possible. At the same time you will find the book "How to draw houses" by the Studio people most helpful. It costs somewhere about 3/- although it may have gone up a little lately.

Whatever you have decided to make you will be compelled to decide on scale. If you are making a single large model, such as a mill or a church, then there is little to worry about the scale. At the same time you may not want to try making lead figures as well, and therefore, it would be wise to find out what figures you can buy to go in with your model when finished as this does really make a better model. There can be bought quite a few figures which can be painted up, made by the well-known firm of "Brittains", and the height of these would be approx. 1¾ in., and this with the following information should help you all through. I built the whole of my model fire brigade (65 vehicles) based on the height of the lead toy fireman available in my younger days.

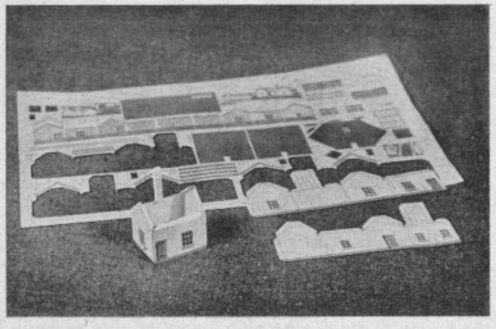
Whether building one model or a set-piece some of these measurements should help.

Pavement 6 ft., kerb stones 5 in., fire alarm 5 ft., telephone kiosk 7 ft., police box 8 ft., wood paving blocks 3 in. x 9 in., narrow road 10 ft., medium 40 ft., lamp standards normal 10 ft., some types 19 ft., directional signs town 10 ft., country 4 ft., Belisha beacons 7 ft. 6 in., safety island posts 4 ft., seats, roadside 6 ft., wide 2 ft. 6 in., hedges 5 ft., bridges, overhead 18 ft.

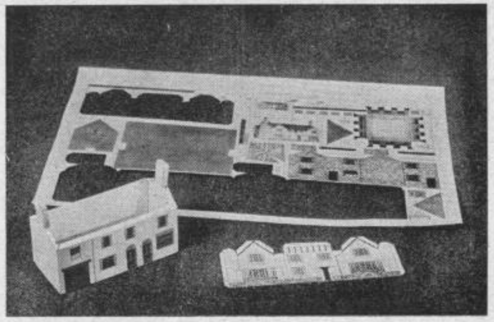
These scales will help you, if making a scenic model, town or country, to visualise your measurements.

My next article will deal with the various woods which are available for model buildings.

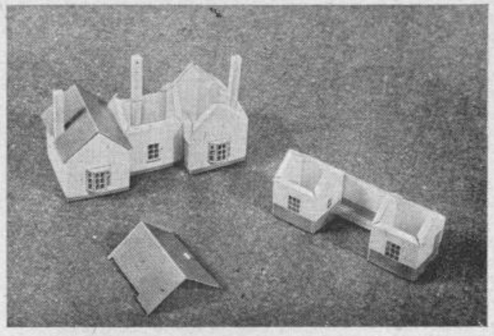
Building Without Bricks



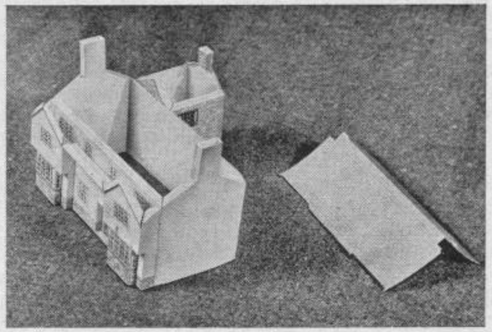
Webberley Ltd. are marketing a very nice line in printed card building construction sets, under the trade name of "Bilteezi" for 00 gauge model railways. Above is shown the "Country Station" sheet which is one of three sheets of the "Railway Buildings" set.



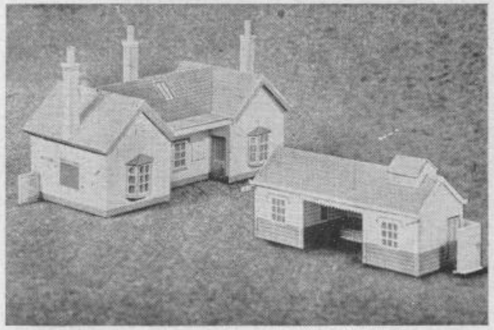
There are six sheets in the "Village" set, one of which is shown above. All sheets are colour printed on card, most of them having several alternative layouts, for instance, the "Public House" sheet shown can be built in three different versions.



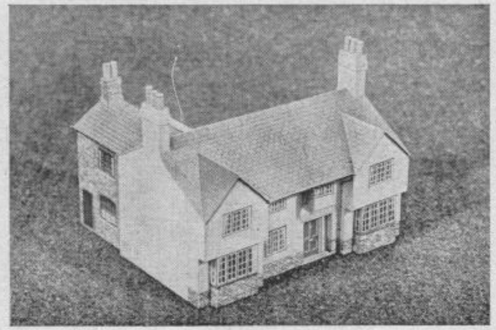
Construction is straightforward and instructions are printed on the sheets. The only tools required are a straightedge and a sharp knife or razor-blade. It is advisable not to cut with scissors as they tend to curl the edges of the card.



The top pictures show some of the parts cut out and assembled, and the middle pictures show further stages in the assembly. Note that the addition of an extra front turns the shopfronted building with garage (top) into a public house (middle).



Above is shown the completed station buildings; left, is the main portion with waiting rooms, offices, and the ticket collector's gate, etc.; and on the right is the ticket office, etc. Two or even three of these sheets may be used together to form a large station as each of the main structures may be made up as two or three separate buildings.



The public house is a very attractive little model, and was sufficiently lifelike to cause several staff mouths to water at sight of it. Other sheets in the same set include the church, garage, school, houses, etc., all beautifully and authentically coloured. A few evenings work on these little masterpieces will transform any 00 gauge layout.

MILAN GRAND PRIX : 1950

by Sig. Gustavo Clerici

Model car racing is finding plenty of followers in Italy, where all forms of motoring sport are sure of enthusiastic support. Some time ago we published an account of some interesting and unusual models sent by Sig. Clerici and as far back as April, 1949, Model Cars *gave details of the movement and illustrations of some fine models by Piero Casanova and others.*

The latest budget of news from Gustavo Clerici contains an account of the Milan Grand Prix, which is virtually the Italian Speed Championship. This event was held, most appropriately, in the works of Alfa Romeo, where to judge from the heading picture, first-class indoor racing facilities were laid on and a large number of spectators very comfortably housed.

It is of particular interest to follow the trend of the hobby in Italy, where they may be said to be in the same stage of development as was the British movement three or four years ago, and there seems to be ample scope for individual designs and any amount of variety in the layout of the cars. G.H.D.

THE Auto Model Sport Club Italiano (A.M.S.C.I.) organised the first Milan Grand Prix for Model Cars of the B and C classes; the event was sponsored by the Milan Automobile Club and by the Commissione Sportiva Automobilistica Italiana.

The race took place on the 29th October, 1950, in a spacious hall in the Alfa Romeo's buildings, the well-known and famous firm. The race was a great success from the technical and sporting point of view, and was incidentally the first held in Milan.

There were 38 entrants, and this is a sign that model cars are making a steady headway in Italy; many entries embodied very interesting details.

The race was held in three heats and for final qualification a point system was used similar to the A.M.R.C.A. one. The base was, for both the classes, 1 kilometre. Results are given separately.

As will be noticed, speeds were still modest, but we hope to better them soon, and to be able to meet our British friends.

By a happy coincidence my car won the C class event, and I welcome the opportunity of giving a brief description of it elsewhere in this issue to my friends of *Model Maker* hoping it will be of interest to them.

(Above left) A general view of the track and grandstand situated in the Alfa Romeo works at Milan, and (right) a familiar scene at the start. (Below, left and centre) Our correspondent Sig. Gustavo Clerici with his model, which is described on p. 210/211. Note the converted bicycle starter. (Below right) All models were carefully weighed in.

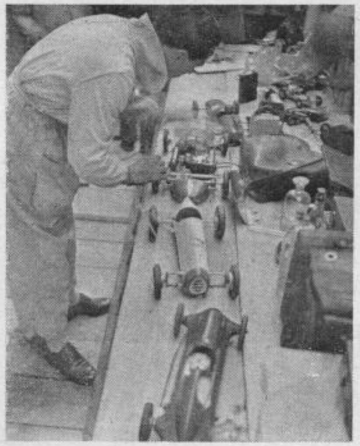
(Above left) The handsome trophies and prizes including a 10 c.c. engine, displayed beneath the Alfa Romeo flag. (Centre) Piero Casanova, whose interesting scale models we have described in the past, was winner of Class B with this very unusual looking car. (Right) Timekeepers with the electric timing equipment, and members of the race committee pose beneath the well-known Alfa emblem.

MILAN GRAND PRIX 1950 : RESULTS

	CLASS B — 5 c.c.	Motor	1st Run Km/h	2nd Run Km/h	3rd Run Km/h	Points
1	Casanova, Piero, Ancona	Testa Rossa ...	65.454	62.283	67.164	925
2	Conte, Franco, Torino	Dooling 29 ...	N.R.	70.175	72.874	800
3	Bordignon, Abramo, Milano...	Testa Rossa ...	60.402	60.913	62.717	563
4	Benaglio, Elia, Milano	Testa Rossa ...	61.538	57.507	50.130	442
5	Brianzoli, Achille, Milano	Testa Rossa ...	54.628	57.877	53.333	391
6	Benaglio, Battista, Milano	Testa Rossa ...	45.627	58.727	53.019	349
7	Giua and Ristori, Firenze	Torpedo 29 ...	N.R.	N.R.	69.902	300
8	Cirani, Giuseppe, Milano	McCoy 19 ...	N.R.	61.749	47.058	278
	CLASS C — 10 c.c.					
1	Clerici and Ferrari, Milano	McCoy 60 ...	102.857	113.207	113.207	1000
2	Penna, Lorenzo, Torino	Penna 10 ...	103.151	85.308	109.756	925
3	Castelbarco and Fanoli, Milano	Dooling 61 ...	N.R.	115.755	105.263	625
4	Carugati, Vitaliano, Milano	McCoy 60 ...	76.251	75.471	85.714	484
5	Vallinotto, Torino	Pantera 10 ...	63.716	79.470	79.120	391
6	Bindi, Mario, Ivrea	Pantera 10 ...	75.000	74.534	77.753	311
7	Pramaggiore, Mario, Torino...	Elia 10	49.247	79.295	66.914	251
8	Monani, Gildo, Mulazzano	McCoy 60 ...	N.R.	63.157	84.112	180
9	Mancini, ing Filippo, Ivrea	Osam GB.17 ...	39.151	54.711	51.948	123
10	Bonetto, Emilio, Milano	Osam GB.17 ...	52.785	N.R.	42.402	117
11	Clerici and Crucitti, Milano	Movo D.10 ...	N.R.	N.R.	60.606	40

(1 km.p.h. = 0.621 m.p.h.)

(Below left) Another well known Italian model builder, Dr. Mancini, works on a big 10 c.c. model in the pits. (Centre) Elia Bengalio with his Alfa Romeo 158, and Lorenzo Penna at the start with his car which has trailing arm I.F.S. and rear mounted engine. (Below right) Lorenzo Penna working in the pits on another of his cars.



A Self-Contained Epidiascope

FOR EXAMINING SMALL OBJECTS

BY H. A. ROBINSON, B.ENG.

MOST epidiascopes work on the "magic lantern" principle with the image projected on to a screen, but here is a *self-contained* epidiascope where the image appears on the top of a vertical body, the object being placed on the base-board below. The instrument is particularly useful to the amateur technician for examining small parts, and to the hobbyist for a similar close scrutiny of coins, etc.

Needed for the making of this novel instrument are several sheets of card, a simple lens (as say from an old camera), an electric bulb and holder, a small card or tin box, and a few pieces of wood.

First construct the body (3) Figures A and B. This is built of four sections of card, each about 1 ft. long and truncated as shown. The lower ends of the pieces are turned out and held by drawing-pins to the block (8). This block is a square of wood with a circular hole taken out of the centre just big enough to take the lens tube (5). The four sides of the body are held together by strips of gummed paper, but full rigidity is given by the frame (18).

The side pieces are secured to the frame by a series of small pins which go through the sides and into the edges of the frame (which should be of fairly thick card). Over the frame is now placed a sheet of ground-glass (fine) where it is secured by gummed paper all round. The glass is fitted frosted side down—the diagram making it clear how everything is put together. If properly made this cardboard body should be very solid, the parts being held rigid by the glass on top and the flaps, pinned to the base, at the bottom.

Now we put in the lens and lens tube. The tube is merely a rectangle of card rolled round the lens and glued, while the lens is held in position by two card strips glued on the inside of the tube which form "collars" (19). When finished the tube should just slip stiffly up and down the hole in the wood (8) and stay at any position by friction only. Good fitting is essential, and it is worth going to some trouble to obtain it.

Now make a few experiments with an electric torch to find out how far above the base the block (8) must be. Remember that the lens will be adjustable in the block, but find such a height that when a half-crown is put where the base will be the image just nicely fills the top ground glass when the lens is in the mid-position.

Having got the height, next cut the two supports (9) and prepare the base (1). The uprights should be of such a length that they can come from the base, touch, and be fastened to the block (8) and then touch the side of the body some little distance up. The base made, the uprights are let into the edges and secured by a single screw each. Screws are then run through to the edges of the block (8), thus fastening it at the correct height, and the upper ends are fixed with a wire "stitch" which goes through two holes in the wood and two in the card, the inner end being bent over. For all this fitting the ground-glass must be temporarily removed.

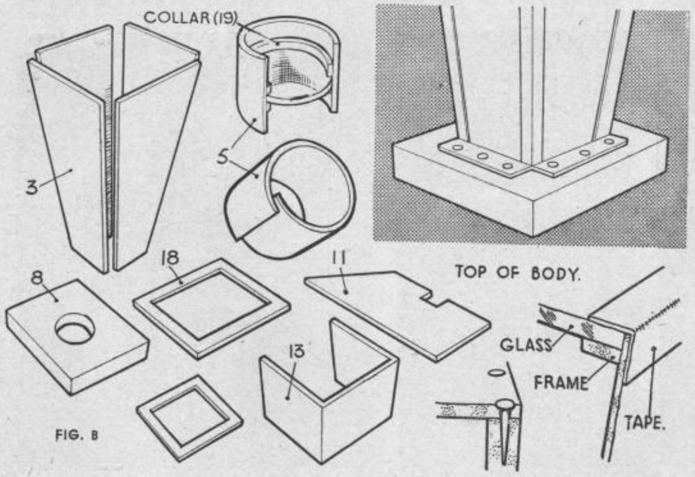


FIG. B

Now comes the lamp-house (2). This is a stiff card or tin box placed at an angle as shown, being held by the triangular block (10), and by resting on the near-side edge of the block (8). If desired, the ventilating cowl (16) can be put on top over a slot cut in the edge of the box. This helps to keep everything cooler, which is an advantage, as perhaps one may want at times to keep an object under inspection for some considerable period.

The electric bulb is fitted through a hole in the back, the socket being held by the shade collar with which these sockets are fitted.

Finally the light baffle cards (11) are fitted to the sides, also the removal piece (13). The side pieces are shaped as indicated, and are passed inside the uprights and just into the lamp-box, with the rectangles cut out of the top edge which just fits round the upright but allows the card to come on the outside of the block (8). In this position the cards hold well without glue or nails, but the lower ends can be turned in and glued or pinned, if desired.

The section (13) just slips inside the side pieces, and of course, is removable, so that objects can be laid on the base. The great point of the screening is that the *only* light to reach the eye must be from the ground-glass picture, otherwise the image will be dimmed.

All is now complete, and the perfect position for the lens should be found by placing something strongly defined on the base, say a card with some printing on it, and adjusting till a pin-sharp image comes on the glass.

As the image is made by *reflected* light only, as nearly the whole lens as possible should be used, as the more of the surface employed the more light that comes through and the brighter the image. If, however, the image on the ground glass is fuzzy round the sides, the area of the lens through which rays come must be made less, and this is done by slipping a disc of blacked card into the tube with a smaller hole punched out of the centre.

The smaller hole, it will be found, makes the picture sharp all over, but not so bright, exactly as in photography.

Finally, there is no need to paint the instrument on the outside, but the inside surfaces around the object, and the inside of the box (2) must be given a coat of white to get as much light as possible on to the item.

(A projecting-type epidiascope which makes use of the builder's own camera, and is suitable for club lectures will be described in a future issue.—EDITOR.)

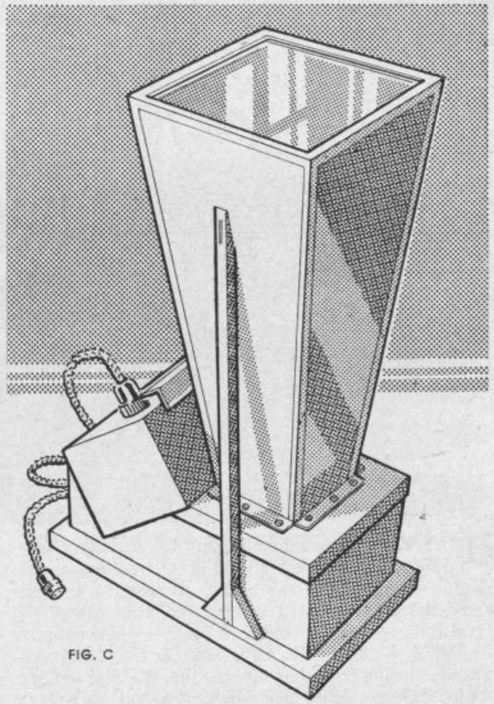


FIG. C

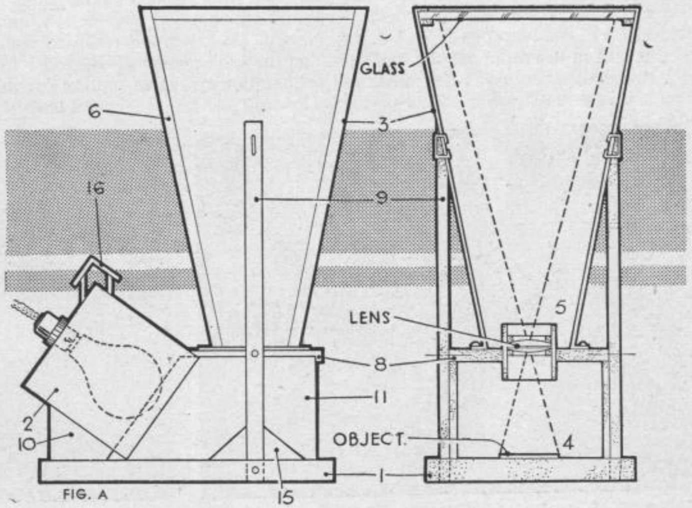


FIG. A

A Marshall Traction Engine

PHOTOGRAPHED & DESCRIBED BY L. J. OLDRIDGE

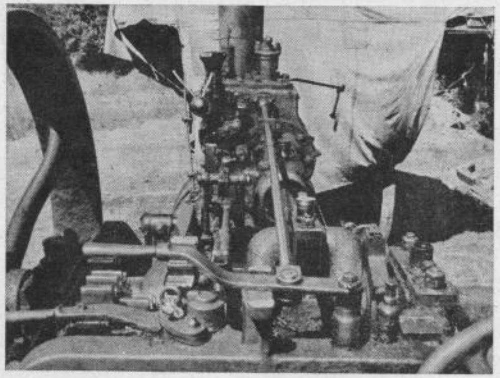
The fine old lady, single cylinder No. 23368 wears her years lightly in spite of over fifty years "on the job".

HAVING contracted that serious malady "tractionitis" I decided to build a traction engine model, but doubting my ability to tackle a complicated design I searched around for a simple prototype and eventually decided to build a single cylinder Marshall. Messrs. Marshall, Sons & Co. Ltd., produced, during the heyday of the traction engine, many fine examples of both compound and single cylinder engines, steam tractors and road rollers. I have spoken to many owners of these machines, all of whom speak very highly of them.

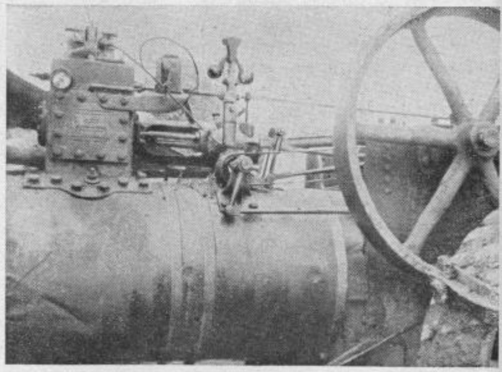
May I introduce you to the fine old lady, the single cylinder, No. 23368, general views of which are given in photographs Nos. 1 and 2. New in 1894 she is still in use although she has been "on the job" for over half a century. I first made her acquaintance on a sunny afternoon in a pleasant field in the heart of Devonshire. At the time she was driving a rack saw bench and sawing trunks of English oak into planks. At times the saw was completely buried in the wood, the radius of the saw being less than the diameter of the wood. As the governors opened the throttle she barked her contempt of the load, rocked from side to side, piston rod flashing, flywheel spinning and then, as the load came off, gently sat back on her haunches as if to catch her breath for the next effort. Add to all this — flying sawdust, the scream of the saw, and that indescribable but characteristic smell that all traction engines seem to exude and which I like to attribute to honest sweat, cannot you understand that I decided there and then that this was the engine I was going to model?

For the model mechanic looking for a simple prototype there is much to recommend this engine. The mere fact that she is a single cylinder simplifies the modelling considerably because, in addition to the work saved on the crankshaft, motion, cylinders, etc., much more room is left between the hornplates to get the motion, etc., all in. Believe me there is not much room to spare even on a full size compound engine, Burrells, for example, having to crank the valve motion for this very reason.

Unbalanced crankshaft forged and bent out of a solid steel bar.



Bearings for the weighbar supported by a bracket.



The Marshall is fitted with a trunk guide, which if machined at one setting saves all the subsequent lining-up troubles which guides of other types are likely to give (see photograph No. 3). The trunk guide is supported at the crankshaft end by a bracket which also forms the guide for the valve slide and stand for the governors, the latter being belt driven from the crankshaft. The bearings for the weighbar shaft are also carried on the same bracket (photograph No. 4).

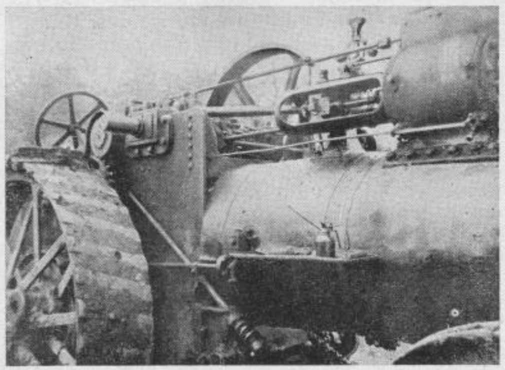
The crankshaft is forged and bent out of a solid steel bar, and is unbalanced (see photograph No. 5). On the left hand side of the crank are the eccentrics for the Stephenson link valve gear, and on the right hand side the eccentric which drives the water pump, the pump being fitted on the offside of the engine inside the hornplates extending back towards the tender.

The cylinder and steam valve chest are combined in one casting fitted with a renewable cylinder liner. The cylinder is 8½ in. dia., and the stroke is 12 in. The slide valve is constructed of bronze alloy and fitted with a steel valve spindle. Double safety valves of the Ramsbottam type are fitted, and also a mechanical oil pump for cylinder lubrication.

Characteristic of Marshall practice is the spoked flywheel 4 ft. 3 in. in diameter, which is dished to clear the rear wheel.

A two-speed, four-shaft engine, two fixed gearwheels are situated on the nearside of the crankshaft between the valve eccentrics and the hornplates. Between the two wheels is a boss which is utilised as a pulley for the belt drive to the governors. On the second shaft slides the gearwheels which engage with those on the crankshaft, the second shaft being of square section to prevent these wheels from turning on the shaft. Modern practice would demand splines for this purpose, but the wheels and shaft, which are the originals, show little sign of wear. In Marshall's catalogue the road speed of the engine is given as four and two m.p.h. on high and low speed respectively, and she is governed at 160 r.p.m. when belt driving.

Detail of the trunk guide — a good model feature.



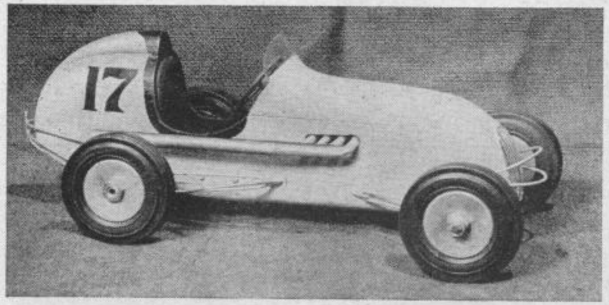
Another portrait of this fine prototype traction engine, showing her lines even more attractively.

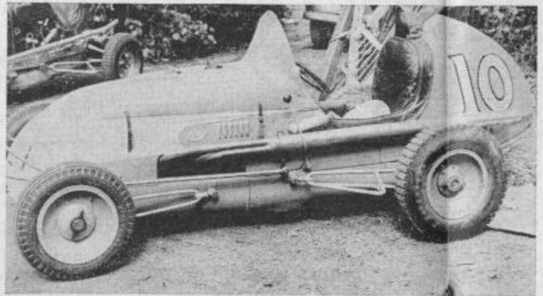
The drive is taken by gear wheels on the third shaft to the rear axle, the differential and all the gearing, except that between the hornplates, is on the off side of the engine. A brake drum with band brake is fitted to the near side wheel, and the brake is operated by a screw and handle on the same side. A winding drum carrying 50 yds. of flexible steel rope is fitted to the rear axle on the near side.

All controls are placed within easy reach of the driver, the steering wheel being on the off side, and reversing lever on the near side of the engine. The regulator is fitted horizontally and is pulled towards the driver to open.

The engine is unsprung. A bar extends from the front end of the firebox forward to the front axle to take the strain from the perch bracket. Both front and rear wheels are of orthodox construction, the rear wheels being 6 ft. in diameter and 18 in. wide. As is usual with Marshall engines a rectangular spud pan is fitted to the front axle. "Spuds", I might mention, for those who are not familiar with traction engines, are specially shaped pieces of angle iron which are fixed to the rear wheels to prevent them from slipping when the engine is working on soft ground. In photograph No. 2 these spuds will be seen hanging on the spud pan and in photographs Nos. 3 and 4 one spud will be seen in position on the wheel.

Clark Gable's "Offenhauser" Speedway Car



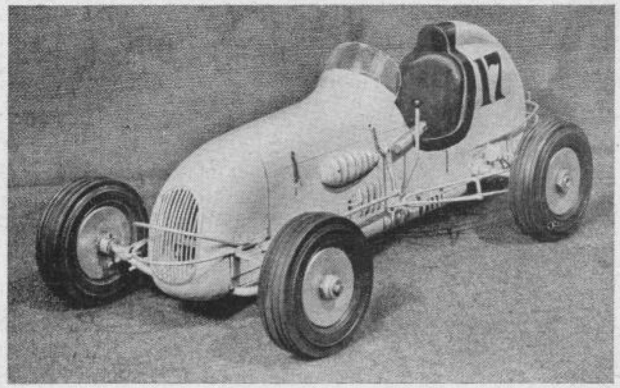


Designed and built by

MAURICE J. BRETT

This model forms the subject of a nationwide contest in connection with M.G.M.'s film "To Please a Lady." Local prizes will be arranged when it is shown at YOUR cinema, while in addition the best model entered in the contest will win its builder a WEEK'S FREE HOLIDAY IN THE ISLE OF MAN for Race Week.

Photos by courtesy of Spike Rhiando and "Model Maker"

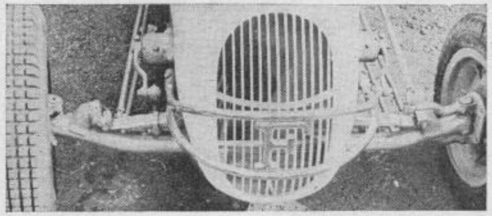


THIS model has been designed to fit in with several requirements which may appeal to a good many people, but naturally won't suit everyone.

One requirement was that it should be easy to build, even to someone who has never built a model car before. Another, that as many ready-made components as possible should be incorporated, and that these should not cost a fabulous sum, and also bearing in mind the fact that for the M.G.M. Contest, performance should be secondary to appearance, and a popular and inexpensive engine should be used. The result is an easily made, pleasing looking car, with a gentlemanly performance, costing somewhere in the region of 30/- to 35/- without the engine or clutch.

The chassis is of composite wood and metal construction comprised basically of two lengths of $\frac{1}{2}$in. sq. hardwood, to which are attached the metal strips for the rear axle bearings, etc., the $\frac{1}{4}$ in. ply engine bearer and the $\frac{1}{4}$ in. ply front axle mounting. The two $\frac{1}{2}$ in. x $\frac{1}{16}$ in. mild steel strips are first bent to shape and drilled to take the axle and cardan shaft bearings. The chassis side members are recessed to take the strips which fit one inside the other and which are bolted together by six 6 BA bolts. The $\frac{1}{4}$ in. ply engine bearer which is cut away in the middle to take the engine crankcase, is let into the side members and screwed and glued into position, while the front axle mount is screwed on to the underside of the chassis. The engine and flywheel assembly should now be installed, and if the E.D. Bee is used, it will be found necessary to carve away some more out of the chassis side members, to give clearance to the engine feet and the flywheel.

Top, left and right corners, are two views of the completed model, finished in yellow and black. Top centre shows a typical Curtiscraft racer (not an Offenhauser) differing only in respect of the top bonnet and exhaust system.
Below is shown the full-size front axle of a Ford V-8 engined Curtiscraft racer. The "Offy" is a Curtiscraft with an Offenhauser engine.



In the original model the new 'Wreford' clutch, flywheel and universal coupling which is designed especially for the Bee was used, and this fits in very conveniently, but, of course, if you wish to forego this luxury, direct drive may be used just as well.

The cardan shaft is $\frac{3}{16}$ in. dia. silver steel, as is the rear axle, and a pair of bevel gears giving 2:1 ratio are used. These gears may be obtained from 'Bonds' of Euston Road, or another firm specialising in these items, Messrs. C. C. Whitney & Co. Ltd., 1 Fairlop Road, Leytonstone, E.11.

The axle and cardan shaft bearings may consist of screwed bushes as on the original, or short lengths of $\frac{3}{16}$ in. dia. brass tubing soldered into the steel strips. Incidentally, screwed bushes are used in radio chassis and a visit to a shop which specialises in parts for the radio amateur will provide these items, and possibly other odds and ends which can be successfully misused for all sorts of things. If brass tubing is to be used for bearings, be careful to line them up accurately. This can be done by soldering with all the gears and shafts, etc., in place.

The 'Bee' is supplied with an integral fuel tank, but this is rather small for a model car, and it is advisable to fit a larger tank. The 'Juneero' tank can be used if it is shortened by cutting off one end to $2\frac{1}{4}$in. in length and re-soldering the end plate. The rear end of the tank is bolted on to a strip of brass which is screwed across the chassis while the front end is bolted to the front axle mounting.

The basic front axle assembly consists of a length of $\frac{3}{16}$in. dia. silver steel bent to shape and drilled in the middle to take two 6 BA bolts, and the dummy leaf spring which is similarly drilled.

The dummy spring consists of five layers of $\frac{3}{16}$in. wide strips of brass of varying length and is screwed to the chassis side members which are slotted to allow the spring to sit flush. The axle is then bolted through the $\frac{1}{4}$in. ply mount to the spring, and the ends of the spring are soldered to the axle with another piece of brass which is wrapped around the axle to form a bracket.

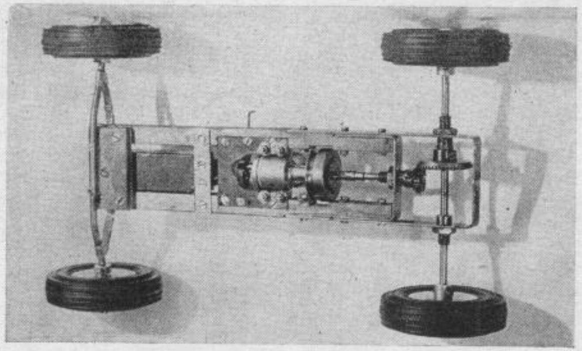
The wheels are 3in. dia. although actually the front wheels should be slightly smaller and narrower than the rear. Juneero wheels are excellent for this model as they have approximate correct proportions, though they are rather heavy and have somewhat clumsy bushes.

This last fault can be minimised by cutting the nuts in half and in the case of the front wheels, carefully cutting off the portion which contains the grub screws, leaving just a very narrow shoulder. The piece which has been cut off makes an excellent collar, and can be used to locate the front wheels on the axle. The rear wheels of course are fixed to the axle and rotate with it.

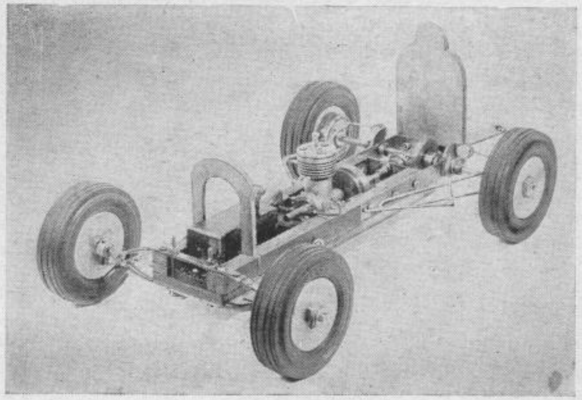
The first steps in building the body are to fit the $\frac{1}{8}$ in. ply formers F1 and F3. F1 is bolted, together with the $\frac{1}{2}$in. x $\frac{1}{16}$in. mild steel strip which forms the rear tether plate, to the steel chassis member, and F3 is slotted and glued into the wooden side members. Two pieces of $\frac{1}{8}$in. sheet balsa form the sides of the body and with F1A cemented in place, the front of the headrest fairing and tail cone is planked with $\frac{1}{8}$in. strip balsa.

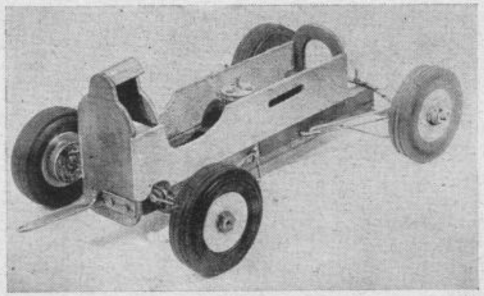
The tail cone and nose are built up from block balsa ($\frac{3}{4}$ in. laminations being a useful size) and then cemented to F1 and F3. An easy way of making the bonnet is to position the formers F2 and F3A on the body, and plank with strips of $\frac{5}{32}$in. soft balsa. When the cement has set, sand the planking to shape.

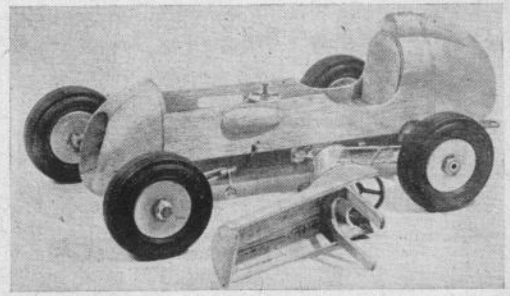
Centre: An under view of the chassis showing engine installation and general layout. The front axle and dummy suspension is shown in its bare essentials. Note the method used for mounting the engine; this may be varied by carrying the $\frac{1}{4}$in. ply bearer right across the wooden side members.



Below: This view shows the first stage in the body construction with formers F.1 and F.3 in place, and with some of the "gadgetry" fitted. Note the use of small tin-lids for the dummy rear brake drums.





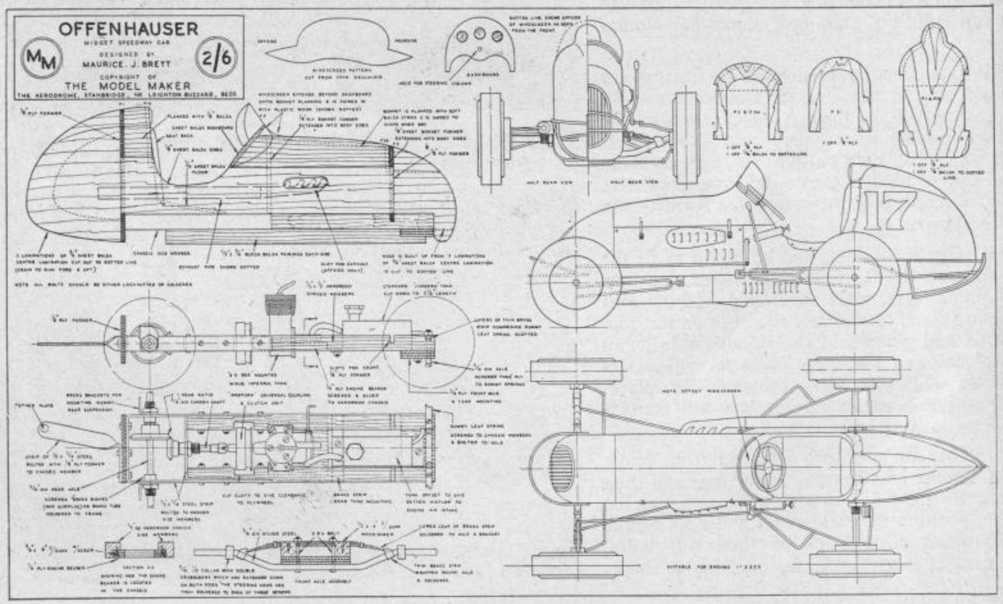


Left: With the body sides in place and the planking of the tail cone half-completed, the car begins to take shape. Note the mounting of the rear tether plate and battery terminals for the shock absorber housings. Right, the main bodywork and the construction of the bonnet.

trim off the cockpit, and cement the dashboard into place. The windscreen should then be fitted, and faired into the bonnet with plastic wood. The bonnet may be secured by a rubber band, the ends of which pass out through holes in the side, and loop over bent pins inserted in the body sides.

Finish on a model like this is all important, as it is this and external details which catch the eye first. Sanding sealer, which is manufactured by Titanine Ltd., forms an excellent surface on balsa, and makes a good base for any cellulose type finish. Most of the external details can be made from 14 or 16 s.w.g. piano or brass wire, e.g., bumper bars, drag link, track rod, shock absorber arms, handbrake lever and radius arms, etc. Louvres can be made from balsa, and likewise the bulge on the nearside of the bonnet. The brake drums on the rear wheels may be made out of screw caps or stoppers—those used on the model shown were off paint tins—terminals and caps from a grid bias battery are utilised for the shock absorber housings which are mounted on brass brackets fixed to the chassis. The oil pump and exhaust pipe can be made with wood dowel or metal tubing depending on the skill or preference of the builder. The finish of most of the external gadgetry on the full size cars was chromium plate, so if you make these pieces for your model in brass you could have them chromed, otherwise you will have to paint them with silver lacquer.

One fifth scale reproduction of full size working drawing available from MODEL MAKER PLANS SERVICE, Billington Road, Stanbridge, Nr. Leighton Buzzard, Beds, price 2/6 post free.



A MODEL IN THE AIR

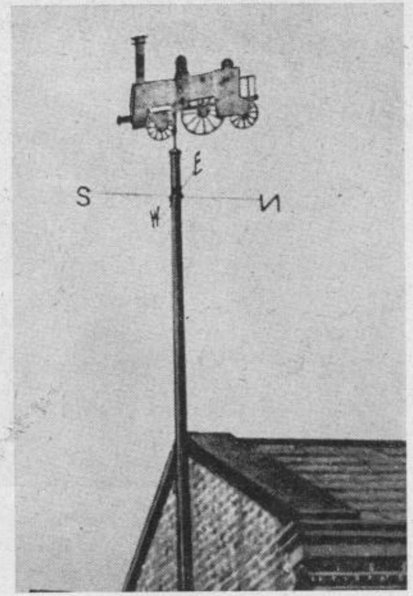
THE accompanying photograph shows a clever piece of craftwork which is now well over 100 years old—it is something of a railway curiosity.

Standing above the running sheds at the old Town Station, Birkenhead, the weathervane (for such it is) is a faithful reproduction of the first locomotive to bring a train into this Merseyside borough in the September of 1840. As well as being a perfect silhouette a study of the vane shows that it is slightly embossed, and a good amount of detail added by scribed lines.

Originally Town Station was the terminus of the new railway from Chester, but later a tunnel was bored through to the river bank and the present Woodside Station erected.

The engine depicted is a refinement of the Forrester 2-2-2, the tendered "single" that was extensively used on the Grand Trunk Railway between 1834 and 1845. This class also appeared on the Liverpool and Manchester Railway after 1834 as the "Swiftsure".

Set in position in 1841, the vane was the work of the first shop foreman at the sheds attached to the terminus, and only once during the century has it been down from its lofty perch. That was a few years ago when it was removed to be polished up and to be fitted with a ballbearing race.



A Fine Precision Lathe

THE lathe shown in the accompanying picture is a 2½ in. (actually 65 mm.) screwcutting Lorch instrument maker's lathe.

It is a real collector's specimen for though not new, and showing one or two signs of careless use, it is, generally speaking, in very fine condition indeed.

The bed has a raised "Vee" on the front shear on which the saddle takes its longitudinal guide, the inside edge of the back shear is "Vee" undercut and the tailstock locking device bears upon it. The tailstock barrel is graduated and the body is cut away with an index mark incised on the cut-away portion.

The barrel is screw fed and as is common practice with this type of lathe, it is not of the self ejecting centre type.

The back gear is housed under the cast iron cover immediately behind the headstock main bearing, the logshaft and its gears are immediately below the mandrel and are put in or out of mesh by the cross-handle seen just below the mandrel nose, the knob, bottom of front limb of headstock, locks the gear in or out.

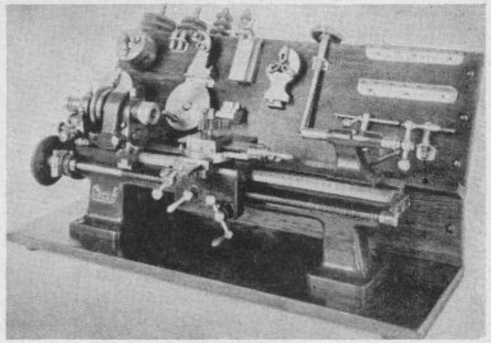
Tumbler reverse is incorporated on the rear limb of the headstock. The pulley has the rear face of the largest step divided into several rows of holes, the stop pointer is fixed to the front of the headstock and can be seen in the photograph standing up in front of the rear limb.

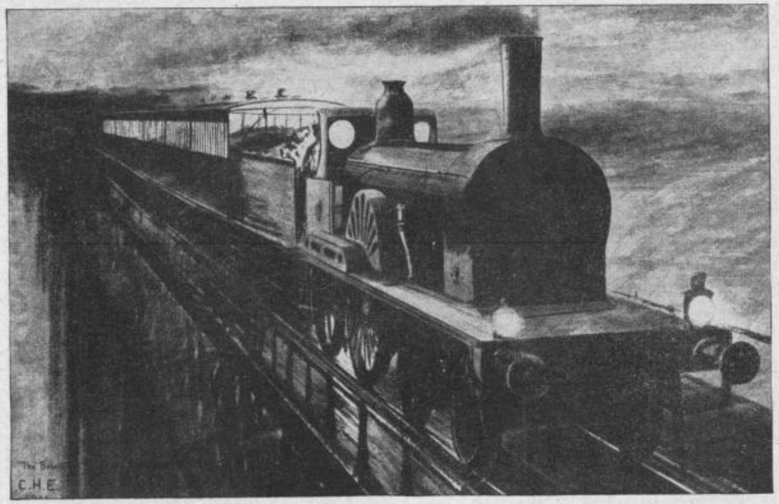
A brass nose protecting cap is fitted over the screwed end of the mandrel, which is hollow and arranged to take 10 mm. draw-in collets.

The half-nut on the saddle is fitted with spring trip gear, which can be set by means of an adjustable stop block to operate at any desired point. The block can be seen on the photograph on the front shear of the bed, just in front of the headstock.

As will be seen there is a good range of equipment including centres, driver plate, two three-jaw chucks, fixed and travelling steadies, hand rest, draw bar, etc.

The stand is of polished dark oak, with brass fittings, and is mounted on four rubber feet.





From Stephenson to Standardisation

L. H. SPAREY REVIEWS C. HAMILTON ELLIS'S NEW BOOK "FOUR MAIN LINES"

George Allen and Unwin Ltd.; Size 9½ in. by 6¼ in., 225 pages, index, 8 coloured plates and 70 half-tone illustrations; Cloth, 16/-.

LAST year we expressed the hope that the publication of a book on railways by Mr. C. Hamilton Ellis would become an annual event. Following the publication of *The Trains we Loved,* in 1948, and *Some Classic Locomotives,* in 1949, it was obvious that we had here a unique writer on railway history. *Four Main Lines* is probably the best of these three books, as the wider subject gives more scope for Mr. Ellis's particular genius.

The success of this writer undoubtedly lies in the fact that he is a master of anecdote, so that the reader may rely that he will find a page of facts and figures suddenly illuminated by some interesting sidelight, quaint story, or some vivid comment by the author. One does, in fact, find oneself looking forward to these brilliant flashes, and carefully following the technical data in the knowledge that it is a necessary build-up to some unexpected story or viewpoint.

A recital of the chapter headings would give little indication of the quality of the book, nor indicate how such things as Amelia Bloomer's attempted dress reform in the middle '80's, or Queen Elizabeth's unfortunate anagram on the old spelling of Folkestone, could have any bearing on railway history. These, and many other things, the reader will discover for himself; together with some unexpected information on the more personal amenities of early long-distance railway coaches, on pages 51 and 100. The account of the building of the Kilsby Tunnel is as exciting as anything in fiction, while the vivid account of the Tay Bridge disaster gives us a few pages of dramatic horror.

Apart from these literary aspects, the book is crammed with technical information on engines, trains, bridges and railway stations, ranging from the days of Stephenson to the trial run of the Silver Jubilee—during which, at 112 m.p.h., an L.M.S. goods train was overtaken, and appeared to be going backwards against its own wheels.

To Londoners, and indeed, to all travellers from the north also, the short chapter on Euston Station will perhaps be one of the most interesting. In this, Mr. Ellis has captured much of the spirit of London Town, "superb in its grime". As the first main line station into London, its developments have been many and varied, and the author gives much interesting information about its career—with, of course, the usual anecdotes, from the occasion on the opening day when the brakesman turned the brake handle the wrong way, and the first up train went through the buffers, to the moment in 1939 when the late Lord Stamp, sitting in the shareholders' room, turned a switch which closed a circuit and blasted out some 100,000 tons of limestone far away in the Caldon Low Quarries to provide raw material for the new Euston which was never built.

In reviewing a book of this sort one is almost forced into giving a series of excerpts; to do otherwise would be like trying to report a conversation without recording what was said. In fact, the word "conversation" is a particularly apt one to use in connection with Mr. Ellis's book. Reading it is like conversing with some particularly well-informed lover of railway trains and all that pertains to them, with the advantage that one has only to listen without answering back.

The book may be summarised as being an anecdotal history of the four main British railways, their engines, rolling stock, tunnels and bridges and stations, and of the men who designed and built them. In some instances, special chapters are devoted to certain aspects—such as the broad gauge days of the Great Western, and the development of the Atlantic and Pacific classes of locomotive.

The illustrations are worth a very special mention; in particular, the coloured plates reproduced from paintings by the author. We know of no other collection of coloured drawings of British locomotives, available to the public, to equal those to be found in Mr. Ellis's three volumes. All of them are excellent, but, because of its quaint interest, we would mention that of the *Royal Crampton* painted in the Royal Stuart tartan, and that of the Southern Railway Engine, *Canadian Pacific,* because of the impression of majesty and power which it portrays.

The seventy half-tone photographic illustrations of engines and railways ancient and modern are of outstanding interest to lovers of the railway and to students of its history.

A very worth-while book, admirably produced.

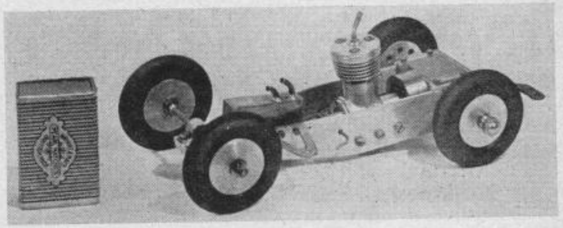
"The Brink". Wash drawing by the author depicting North British engine No. 224 with the mail train on the old Tay Bridge on the fateful December 28th, 1879.

Reproduction from an old coloured lithograph of the great cliff fall between Dawlish and Teignmouth, 1862; passengers transferring between two South Devon trains.

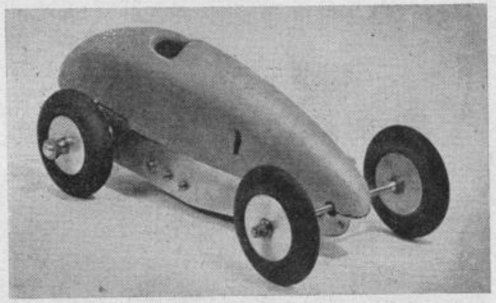
Press run of the Silver Jubilee train, L.N.E.R. in 1935, where the author was present. Some interesting details of this trip are given. The engine is the famous "Silver Link".

Model of a Model

Model Maker Photos.



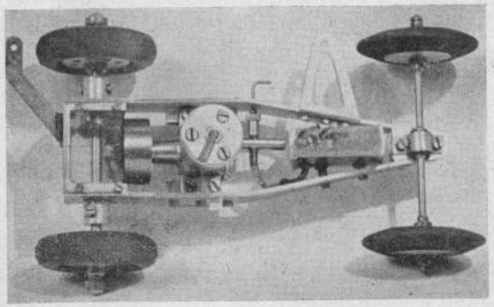
The three pictures shown here give an idea of the excellent workmanship which has gone into the sturdy little scaled-down replica of the Rowell Rapier High Speed model. The engine is an E.D. Bee. The temporary bodywork is constructed of papier mache, but an aluminium body is on the way.



IMITATION, we are told, is the sincerest form of flattery, and in this instance Rowell Motors Ltd. should feel duly gratified, for it was their well-known kit car, the 10 c.c. Rowell Rapier, which inspired R. G. Cameron, of Gatehouse of Fleet, Kirdcudbrightshire, to make a half-scale replica for his 11 year old son.

This project, our correspondent tells us, was commenced whilst he was awaiting delivery of a new Rowell "60" engine to instal in his own Rapier High Speed car, and was doubtless the result of importunate pleadings by young Master Cameron. Its construction took a few weeks of spare time, and the work was straightforward and without snags.

The first impression given by the little chassis is that of excellent workmanship, which will be seen in the accompanying illustrations. The deep side members are cut from 1/16 in. dural, and bored out at their rear ends to fit over the rear frame stretcher ballrace housings. The stretcher itself is cut out of the solid in hyduminium, and is fitted with 3/16 in. bore by 1/2 in. o.d. ballraces, and it is interesting to note that there are no less than 21 tapped 8 B.A. holes in the stretcher alone, and no fewer than 37 of this size in the complete car.



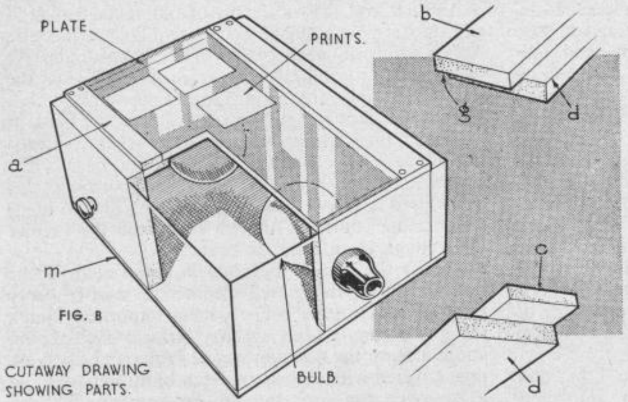
The engine mounting blocks are also of hyduminium, and are fixed to the chassis members by three 6 B.A. screws on either side. The nose piece between the tapering side frames is also of this metal, and is secured in place by 8 B.A. screws. Two 6 B.A. screws are used to secure a steel strap to the top of the nose block in which is clamped the rubber mounting block carrying the front axle.

The power unit is the familiar E.D. Bee, with the axis of its cylinder inclined slightly forward, and arranged to drive the rear axle through a similar close coupled bevel drive to that used in the Rapier. A pair of Messrs. Muffett's mitre bevels are used in the transmission, the boss of the driver gear being pressed into the 3/8 in. bore of the cast iron flywheel. The gear itself has had its bore enlarged to 1/4 in. to take the existing E.D. collar which is a taper fit on the crankshaft. The back of the flywheel is counter-bored to let in this collar in order to reduce overhang, and a thrust washer fitted between collar and crankcase. The driven bevel gear is pinned to the 3/16 in. dia. rear axle, and the "gearbox" completed by the addition of a "Perspex" cover above the gears.

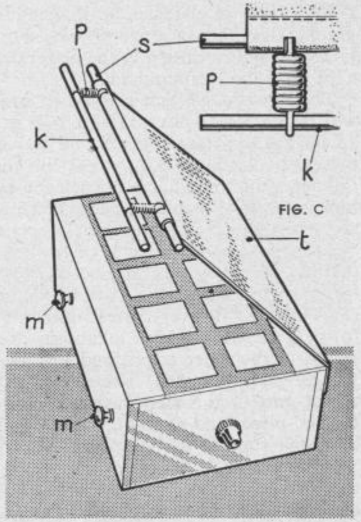
The wheels are 2 in. dia. Wreford products, as used in the "Half Pint" kits, and are ideal for the purpose. The axle ends are threaded for about 3/8 in. at each end and steel collars are screwed up these threads as far as they will go. Next the inner wheel discs are slipped on, followed by the solid rubber wheels, then the outer discs, and the whole assembly secured by knurled blind-ended nuts. Bearing collars are fitted on each side of the ballraces for the purpose of bevel adjustment, as in the full-sized Rapier. The front wheels were reduced to the fashionable knife edged section by mounting them on an axle in a watchmaker's lathe and shaving off the surplus tyre with a razor blade. The sheet brass fuel tank is patterned on the big job, and tether plates are of 1/32 in. steel. An aluminium body is on the way, but in the meantime a lifelike representation of the well known Rapier body has been fashioned of papier mache.

This baby weighs just over 3/4 lb., and its principal dimensions are as follows: Wheelbase 5 3/8 in., Track 3 1/4 in., Flywheel dia. 1 in., Overall length 8 1/2 in.

Print Glazer and Drier



CUTAWAY DRAWING SHOWING PARTS.



A GLAZER and drier for photographic prints is a very handy accessory for the amateur to have, and here are details of how a simple one can be constructed.

Unlike most of its kind the glazer described is mainly made of wood. The prints, however, are squeegeed on to the usual chromium or stainless steel plate which, of course, does the actual glazing.

As will be seen by the sketches, the general idea is of a box with electric bulbs burning inside to give the necessary heat, and with a plate holding the prints across the top, the latter being covered and held firmly by a canvas "apron".

Curiously, prints will never stick to either stainless steel or chromium—as they often will to glass—and either type of plate will serve the purpose. But stainless steel is better in the long run, as in time the chromium dressing is apt to get rubbed away, when prints certainly *will* stick. Stainless steel being the same material throughout never loses its surface—no matter how vigorously it is cleaned.

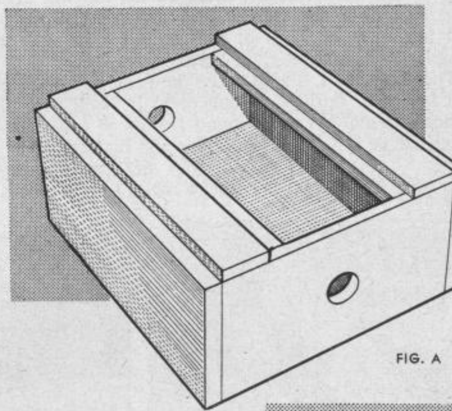


FIG. A

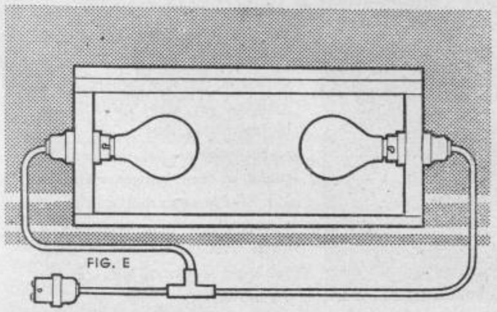


FIG. E

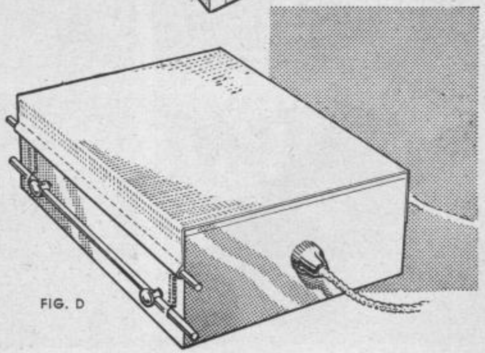


FIG. D

Both types of plate can be obtained through photographic dealers in a range of sizes. For amateur use, however, and for fitting in the glazer described, 10 in. x 15 in. is the size required.

The box is constructed from two end-pieces, 14 in. x 6 in., two side-pieces 15 in. x 6 in., and a base 15 in. x 15 in. (see Figs. A and B). Side- and end-pieces should be of ½ in. wood, but the base can be thinner. From the middle of each end-piece a circular hole is taken of such a diameter that it will just allow the inserting of a standard bulb socket (Fig. A).

The most important items of the box are the strips (a), Fig. B. These are shaped as (b) with the step (g) taken out across the ends, leaving the thin layer (c). This is to fit over the end-pieces. A second step (d) of ¼ in. wide is also taken out down the whole length of the inner edges, and just the depth of the glazing plate obtained. The aim is to get the horizontal part of this step flush with the top edges of the end-pieces and so form, with the ends, a complete all-round support for the plate.

In depth the strips (a) can be ¾ in. to 1 in., and they are held in position by screws going into their ends (through the ends of the box), and by a series of further screws through the upper lip of the sides.

If all has gone well a perfectly flush top will also have been obtained with the plate (when in position) and the upper surfaces of the pieces (a) forming a completely even area right across.

The "apron" t, Fig. C, can now be fitted. This is a length of fairly stout calico, 15 in. wide and of sufficient length to wrap round from side to side as indicated in Fig. D. At one side the material is attached to the wood by a series of screws going through a fold, but at the other a metal rod (s) passes through a tunnel of cloth formed by turning a short length back and stitching along the upper edge. The stitching should be particularly strong at the ends of the tunnel where a fair amount of strain comes.

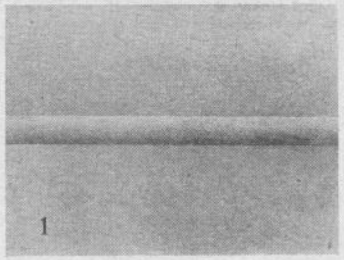
Another rod (k)—a length of old metal stair-rod will do—is now attached by the two coil springs (p). This second rod when pulled over catches under the two screws (m), things being arranged that when the rod is so caught, the springs are under tension, thus holding the canvas tightly stretched over the plate.

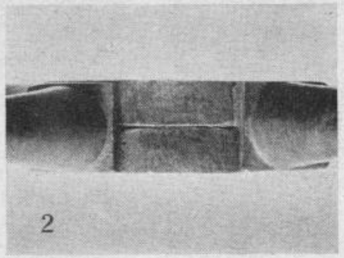
Finally, two ordinary electric light sockets are fitted into the holes in the sides (Fig. E) and wired together so that they can be run off one household plug. The bulbs used need not be of any great power, 50 or 60 watts being sufficient, though of course the greater the wattage, the greater the heat.

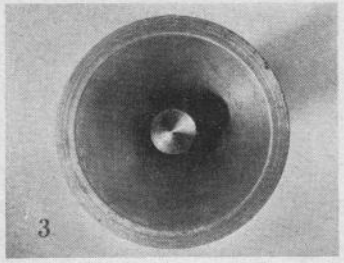
To use the glazer, the plate is removed from the box, and after being well cleaned to remove every trace of grease (this being a most important thing), the prints are placed on its surface, face down, straight from the washing water. Prints and plate are now covered with a sheet of clean blotting paper and a squeegee run over the top, or something like a ruler pulled from edge to edge—the whole idea being to get the prints into absolutely tight contact with the highly glossed metal. The prints being wet this tight contact is automatically secured as the water is squeegeed out, if the pressing action is even in its application.

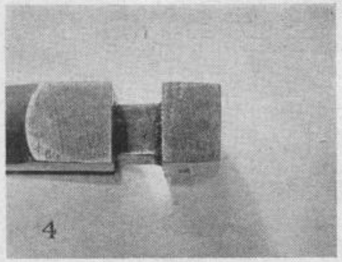
The plate with the prints is now replaced on the box and the apron pulled across. All being ready the lamps are switched on, and in a short time it will be found that the prints are quite dry and with an infinitely higher gloss than they would have had by natural drying.

Oddities

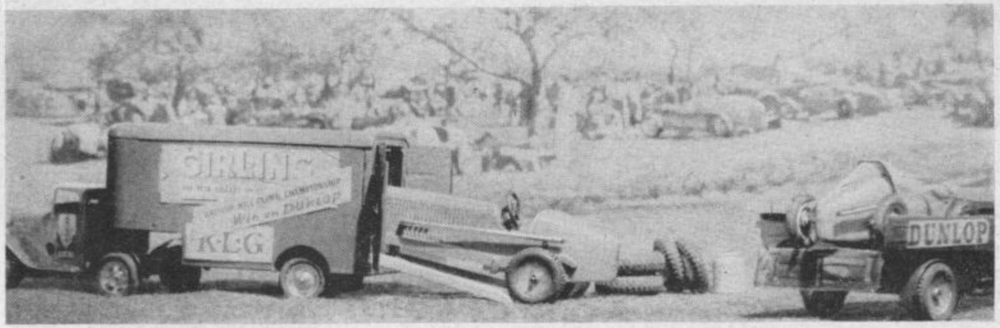








These numbered illustrations were all photographed in any ordinary model maker's workshop—and represent quite ordinary objects that are likely to be found there. Numbers 2 and 4 should represent no difficulty in identifying, but 1 and 3 are rather trickier. Solution will be found at the bottom of page 254. We hope to run "odd shot" pictures from time to time and invite readers to submit unusual angle workshop pictures for the series.



Some Models I Should Like to See . . . .

by W. BODDY — Editor of "Motor Sport"

AFTER the views I expressed in *Model Cars* some time ago about petrol models it might seem better if I laid low, but, on the other hand, there *are* other aspects of model car building that deserve emphasis. So, if your Editor will lend a willing ear and some of his valuable space, I will indulge in a few wild day-dreams that may inspire interest in new kinds of car models.

Day-dream number one concerns the various fascinating miniature electric motors that one encounters in the model shops. They have powered tiny r.t.p. racing cars, but I long to see them in their truly appropriate sphere, i.e. as the power plant of a scale-model electric car. Battery-driven broughams and buggies were popular in the early days of the "horseless-carriage" movement, and the more refined versions persisted for many years in the States, for short shopping expeditions and estate work. Search amongst the motoring tomes in your local library should produce data on which to base your model, its motor and battery located in the correct position and the body lines being correctly formed, and those skilled in fretwork able to have the time of their lives putting in doors, windows, etc. The model should be geared to run slowly and silently, as the prototypes did, but it should not be too elaborate or a larger motor, requiring mains-feed via a transformer, will be required to propel it. Although, if headlamps and interior lights would light up I could excuse a trailing cable; and think what an attraction such a model would be at any children's party. . . .

Since I have started by prating about electrically driven models I may as well go on, although I am aware that a friend of mine who is a sound practical model maker has a rooted objection to cars that have to be fed from an outside source of power, although he has no objection to "electickery" as such. And I am afraid that is exactly how I want to supply the juice to my proposed model. However, it has a rather special function to fulfil. I want, indeed, to build a quite big scale racing car, say the sort of car you used to see tearing round the edge of the banking at Brooklands before the war, and into it I want to put a really hefty motor, perhaps one taken from an electric screen wiper. Then I want to prepare every part of the car so that it will be as durable as I can possibly make it, and I want to set it to lap r.t.p. at a steady 30 m.p.h. for 24 hours on end, power cuts permitting. Stupid, I know, yet there is allure in the thought of a model car covering over 700 miles in one continuous run. It would be a mighty fine advertisement for whichever motor and other proprietary parts were used, and I present the idea free of charge to a Christmas toy shop, where the run could be properly staged, with a board telling how long the model had run and at what speed, and after it finished the doll driver who occupied the cockpit could be raffled for charity. . . .

Up to now these day-dreams seem to have been rather neurotic. Let's turn to others, even if some are merely childish. For instance, I always itch, but never have time, to create from a ready-made miniature racing car and a shop bought toy lorry the sort of long distance set up you see at any important motor race. You know—the travel-stained transport which has brought a famous racing car and its mechanics across Europe to the scene of the race, while the driver follows in the fast car of his choice. The miniature racing car would be half obscured under a tiny tarpaulin and typical items of racing gear, such as pit signals, fuel churns, jacks and cases of tools would be packed about it. The lorry or van would be given extra lamps to assist it on its exciting night runs with its precious cargo, and it would bear those fascinating symbols and lettering of the *equipé* to which it belongs—and which stir the hearts of all of us who regard motor racing as our favourite sport. Nor should I forget the unloading ramps, and foreign number plates should my lorry contain a Maserati or Bugatti. . . .

A more serious day-dream concerns the modelling of famous cars out of history, particularly the really early "horseless carriages", to any scale convenient but to the best of one's ability accurately depicting the outstanding features and mechanical details of the original. The Veteran Car Club paid a great tribute recently to the scale model which Major Browning has made of his own 1900 New Orleans, and emphasised the educational importance which such models will have in the future. . . .

More lightheartedly, I must say that I am completely in love with G. H. Deason's idea of model cyclecars, and would like to commend them in any form, just for the fun of trying to make a pet transmission system work, whether belt, chain, friction disc or a combination of them all; and it wouldn't matter a tinker's cuss whether the motive power was petrol, electric or clockwork. Models with things that work besides the "engine", such as clutch, gearbox, brakes and steering, contain their reward in the building and initial adjustment, even if they prove almost impractical to operate subsequently. Recalling some grand models in this category made by Derek Dent, a Brooklands driver, including a Frazer-Nash with working four-speed chain transmission and some of the very first scale wire wheels, and another of his models, an electrically propelled car with front drive, clutch, four-speed gearbox, steering, four-wheel brakes and again those realistic wire wheels, in a wheelbase of under 2 ft., I am surprised that more models of this kind are not constructed. . . .

. . . and some Editorial Comments by G. H. DEASON

The author of the foregoing article suggested that I might like to chip in with my own comments at this point, and so I would! He and I have discussed cars and car models for years, and now and then I have been enthused to the point of having a go at some highly unorthodox schemes; some of the results have survived, some haven't; nor, I hope have my comments when they have proved too wildly impractical!

Firstly, this electricity business. I *do* like the idea of a working electric brougham, even if my fretwork might need brushing up a bit! It could be quite a period-piece, with any amount of scope for body building in the grand manner, and none of your one-piece tin baths, or balsa bananas. But it must be admitted that "self-contained" electric vehicles, unless very light and simple, have rarely proved successful; at any rate my versions haven't. A vicious spiral sets in, and one needs heavier and heavier batteries to drive the more and more powerful motors to drag the heavier and heavier batteries, etc., etc., and so on infinitum. But it's a nice *idea*. . . . I'm sorry (and this is a *purely* personal view) but I don't really like the external source of power, except for exhibition and very small models, unless it can be supplied via an unobtrusive track scheme, such as Charles Woodland has been working on recently. Some years ago "just for fun" a colleague and I did build a fairly big electric r.t.p. car, powered with two of those potent "Viking" 12v. motors used to fly the r.t.p. model aircraft at the Dorland Hall Exhibitions. These motors would stand a shocking amount of overloading and abuse, and in fact I believe the ones used to drive the scale "Vampire" by means of a high speed fan in the fuselage used to be overrun at 36 volts for take-off purposes!

Our hybrid vehicle had a motor to each axle, was very lightly constructed, and on a 28 ft. indoor track used to exceed 50 m.p.h. at unmentionable voltage for short periods before flying apart, or frying the windings to a cinder. I don't fancy that after a 24 hour run in this "springless wonder" any doll driver would have fetched much in a raffle, however deserving the charity! On the other hand the idea of a big model of an old Brooklands Outer Circuit car is very appealing, and if I'm allowed to substitute an engine for an electric motor I might even build one, complete with long distance tanks, provided that my friend of *Motor Sport* will undertake to sit by the track-side with sandwiches and thermos, and count the laps. And let me say here and now that I will *not* supply scores of miniature hurricane lamps to go round the track, nor any model cows or other livestock to wander on to the track during the night hours!

Table-top photography, popular with the photographic types for years, is a fascinating art, which might well be applied to motor racing more than it is. It can be treated rather as caricature than art when applied to scenes including small models and human figures unless one is prepared to go to fantastic lengths to obtain realism and accuracy, for the camera has an unholy knack of picking out imperfections and inaccuracies. However, I've been tempted to try my 'prentice hand at this with the result illustrated. Here I should point out one of the snags overlooked by the author of "Part One". I assume that by "ready-made miniature racing cars" he refers to such models as "Scamold", or more ambitiously, the S.M.E.C. kit models. The first of these are a thought too big for even the "Super Minic" lorries, and the latter decidedly oversize. Even the Super Minic pantechnican, when pressed into service as transport for an old E.R.A., proved somewhat unaccommodating, so the owner was obliged to arrive at Prescott with his front axle dismantled! The smaller open lorry proved even more of a problem, but being obviously more of a "poor man's transport", eventually arrived at the hill loaded with a 500 Special (it looks rather like Gerald Spink's "Squanderbug", and took about an hour to concoct from balsa, wire and the back wheels of the Minic Transport! The latter sprouted the front wheels of the E.R.A.!) Well, even if the result isn't exactly *art*, you see what we mean, don't you!

The modelling of veteran types has been left largely to the experts and professional model makers, who have made magnificent jobs of them. I should be a

(*Continued on page* 237)

Win A Free Holiday in the Isle of Man & Luxury Air Transport by B.E.A.

Pit scene from "To Please a Lady" showing the Meyer-Drake-Offenhauser powered Don Lee Special, subject of the M.G.M. - Model Maker Contest.

THE centre pages of this issue contain building instructions and a reduced size plan of the Meyer-Drake-Offenhauser powered Don Lee Special driven by Clark Gable in his latest film "To Please a Lady", now generally released. By arrangement with Metro-Goldwyn-Mayer Pictures Ltd., this model is to be the subject of a model building contest, spread over the period of the general release—that is for the better part of a year.

Model makers are invited to make their own model of this car, following our own specially prepared plan, full size copies of which are obtainable from our office, price 2/6 post free. We have installed the popular E.D. Bee 1 c.c. engine, Wreford clutch specially produced for the engine, and fitted Juneero wheels. All these items are readily available from most model shops or from the makers direct in the case of the clutch.

Rules have been made as simple as possible—the model is interesting—the summer racing season is before us—so that we look forward to a really first class entry from all over the country.

M.G.M.-MODEL MAKER CONTEST RULES

1. Scope of Contest

Open to all model makers.

2. First Prize

One week's holiday in the Isle of Man during T.T. Racing. Winner will be flown there and back by British European Airways.

3. Venue of Finals

The final will be held at Eaton Bray Sportsdrome, Billington Road, Stanbridge, Nr. Leighton Buzzard.

4. General Rules

1. An All-British Prize will be presented by M.G.M. for best model of Clark Gable's Offenhauser built from the contest plan.
2. Local Prizes will be awarded as arranged by local Cinema Managers—winners going forward into the National Final.
3. Entry is FREE and open to all.
4. Entrants must build their models from the plans available from *Model Maker*.
5. The model is designed for a 1 c.c. diesel, but any other model engine may be fitted by entrant up to 5 c.c.
6. Local entrants will be judged on appearance and fidelity to scale only.
7. Finalists, which will embrace all local winners, will take part in a final contest to be held at Eaton Bray Sportsdrome on a date to be announced.
8. In the final, judging will be on the basis of 75% for appearance, and 25% for speed performance on a circular track over a distance of $\frac{1}{4}$ mile.
9. Entrants with larger engines than 1 c.c. will be handicapped on a basis of speed divided by two for a 5 c.c. engine, and pro rata for intermediate sizes.
10. Finalists unable to attend personally may appoint a proxy to run their model.
11. Judging will be by a panel comprising one member appointed by M.G.M., and one member appointed by *Model Maker*.
12. In the event of tie, better performance in speed section will take precedence.
13. The decision of the judges shall be final and legally binding.
14. No correspondence can be entered into, and the act of submitting an entry shall be interpreted as unqualified acceptance of the above rules and conditions.

5. Local Contests

1. Your finished model should be handed in to your local cinema immediately upon completion. Local closing date will be announced by the theatre.
2. The model remains your property absolutely and will be returned to you after local judging.
3. The Organisers reserve the right to display winning models for a period not exceeding fourteen days and will insure such models against damage, theft, etc., during any such display.

A Chart for Calculating the Magnitude of Centrifugal Force

BY "PROFESSOR"

Photo: Angus Photos

PIONEERS and old stagers of the model car racing movement are, of course, well aware of the effects of centrifugal forces both from the point of view of fuel feeds and the strain imposed on the tether line, fixing clips and bridle of model racing cars at high speeds.

This "awareness" was, in many cases, the result of experiences both hard and bitter, since, in the early days incidents resulting in either severe damage to, or even almost total destruction of, model racing cars were all too frequent in view of the much smaller band of enthusiasts then operating.

However sad these incidents proved to be to the individuals concerned, and no matter how much the remainder of the band sympathised with them, it cannot be said that the movement as a whole has not benefited from them, since one of the first actions following the founding of the Model Car Association was the testing of, and subsequent approval of standard tether lines.

This action ensured that, provided the attachment clips were as specified and the car bridles in themselves were sufficiently strong, model car racing could be enjoyed without incident in complete safety.

Enthusiasts who have joined the movement comparatively recently have, therefore, been participating in the sport during a period of what can be termed a lull in centrifugal force problems, other than as applied to fuel feed, so that perhaps a gentle reminder on the subject would not come amiss.

There is little doubt that the subject of tethering and weights of model racing cars will be reviewed in the near future in view of one or two recent incidents, together with the banning of the faster 10 c.c. cars at an open meeting held on a 42 ft. dia. track.

The above occurrences have caused much waggling of "guess sticks" in many circles to see exactly what factors of safety are in hand, not only for the 10 c.c. classes, but for all classes in general, and of course, the principal factor enforcing this revision is the rapid ascendency of speeds.

One of the chief characteristics of centrifugal force is the fact that whereas it is directly proportional to weight and inversely proportional to the tether radius, it is directly proportional also to the square of the speed. Thus, whereas doubling the weight doubles the centrifugal force and doubling the radius halves it, the act of doubling the speed increases the centrifugal force fourfold.

The formula for the calculation of centrifugal force, for the enlightenment of those who have not as yet seen it in print is:—

Centrifugal Force (pounds) $= \frac{W \times V^2}{g \quad r}$ 1

where w weight of car in pounds.
v velocity of car in feet per second.
g acceleration due to gravity in ft. per sec. per sec.
r tether radius in feet.

Now this is rather unwieldy, since velocities or speeds are usually expressed in miles per hour, but this difficulty can be surmounted if it is remembered that 60 m.p.h. is the equivalent of 88 ft. per second.

Furthermore the value of g is a constant (broadly speaking) and can be taken as 32 feet per second per second.

The formula can then be rewritten, cutting out the intermediate steps as:—

Centrifugal Force (pounds) $= 0.067 \frac{wv^2}{r}$

where v is expressed in miles per hour.
w is expressed in pounds.
r is expressed in feet.

It is however, remarkable that amongst model engineers and model makers as a whole there exists a marked reluctance to juggle with figures, and to avoid this operation the accompanying chart has been designed.

The tense of the above is not quite correct however, as the chart, or Nomogram, is in actual fact a relic of the early days, when it was designed to facilitate the drawing of graphs for varying weights speeds or tether radii as the case may be.

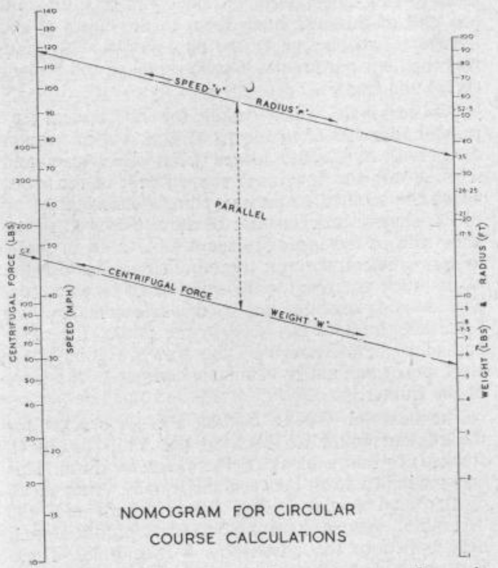
It is interesting to note that the figure at the top of the speed scale was not too optimistic in view of recent results.

The scales which are logarithmic were deliberately left open since it is easy to assess mid-points, and it will also be noted that the right hand scale is identical for both tether radius and weight though, of course, as it happens our radii are in the upper regions whilst the weights likely to be encountered are all within the lower portion.

The manner in which to make use of the chart is, it is hoped, self explanatory, but just in case of any doubts, here are a few brief notes.

In most cases it is fairly certain that the chart will be used for the determination of the magnitude of the centrifugal force for given conditions of speed, tether radius and weight, and such an example is illustrated on the actual nomogram for figures of 118 m.p.h., 35 ft., and 5½ pounds respectively.

Most readers will be familiar with nomograms in general, though those normally encountered are usually of the three vertical line type where the two known quantities are linked together on the outer scales, and the unknown read off the central scale at the point where this link intersects it.



NOMOGRAM FOR CIRCULAR COURSE CALCULATIONS

This type of nomogram however, caters for only three variables whereas that for centrifugal force must cater for four variables in all, and such conditions can perhaps best be met by what is known as a parallel line nomogram.

In the nomogram given, the link between speed and radius must always be parallel to the link between weight and centrifugal force, and therefore to solve the above problem 118 m.p.h. on the speed scale is linked with 35 feet on the radius scale, and a parallel link then made through the 5½ lb. mark on the weight scale cutting the centrifugal force scale at the appropriate value, namely just under 147 lb.

It is emphasised that it is unnecessary to draw a line on the chart for each or any link, in fact the chart can actually be used without performing the linkages in the following manner.

Taking the quoted example, a piece of paper is laid on the chart edge on to the right hand scale and two pencil marks scribed on it opposite the values 35 ft. and 5½ lb. The paper is then transferred to the left hand scale, again edges on, and slid up or down until the upper pencilled mark is alongside the 118 m.p.h. mark on the speed scale, the appropriate value for centrifugal force being read off alongside the lower pencilled mark.

The whole operation is therefore seen to be simple, and it will also be seen that if any three of the four variables are known, the fourth can readily be ascertained. The only word of warning necessary is to avoid confusion when reading the scales.

In model car racing practice it is of course usual to allow a factor of safety, the minimum of which should be of the order of 1:5 thus, the breaking strain of the line or associated fittings should always be at least one and a half times greater than the anticipated centrifugal force.

The lines at present approved by the M.C.A. are three in number, quoted at values of 180 lb., 3 cwts., and 5 cwts. respectively, the first two being used on the 70 ft. or larger diameter tracks, whereas the latter is used as the heavy line on tracks less than 70 ft. diameter.

These values are variously quoted as being minimum breakage and withstand, but it is the safest policy to regard them as being maximum permissible loadings and ignore the fact that the manufacturer will, in his own interests, have applied a suitable factor of safety.

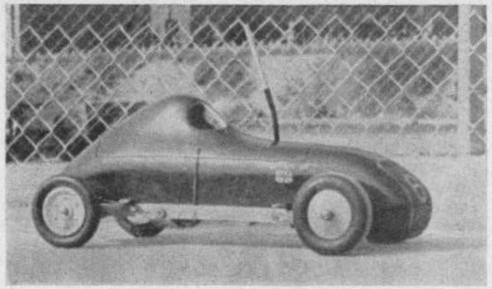
SOME MODELS I SHOULD LIKE TO SEE

(Continued from page 234)

veteran type myself long before I had completed one model to these standards, but I *do* commend the idea of less pretentious representations (I won't tread on any corns by saying "models") to form a collection from a given period, or a cavalcade of types over the years built on the lines of those effective R.A.F. vehicles described last month by Victor Sutton. These should be within the scope of almost any handy man, and even if not made to exhibition standards, they do what they set out to do, i.e. show clearly what the original looked like. For this reason I strongly approve of those American kits, the "Hudson Miniatures" series, which I described recently, and time is being sought to make a start on a Stutz "Bearcat" any minute now! On second thoughts perhaps I shouldn't claim that my models "show clearly what the originals looked like", for on completing the Hupmobile Runabout, I photographed it proudly and sent a copy to W.B. Back came a p.c. from that eminent vintage and veteran authority saying "I think the Flanders looks fine!" I was more than a little damped! After all, it *had* the name on the radiator!

The Redwing Special

BY JOHN T. LONG



THE building of this, my second attempt at model racing cars was planned with the following points in view: complete reliability; modest cost on the pocket; reasonable performance.

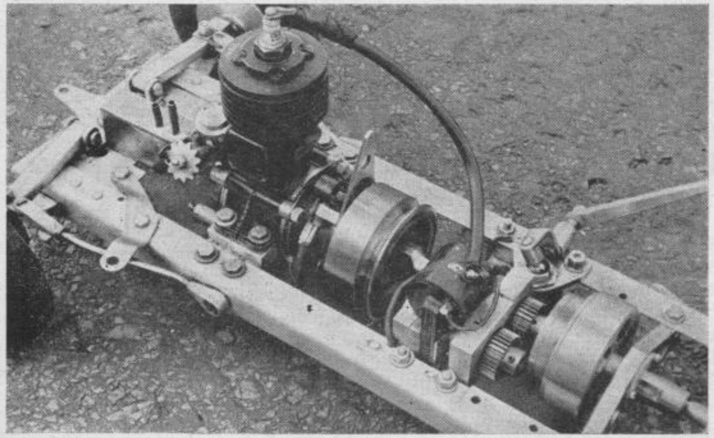
I decided to base the general layout on that excelent car of F. G. Buck's, the 2A. About the time I was making the drawings, etc., of the layout, I was lucky to purchase one of Gerald Smith's 7.5 c.c. "Redwing" engines, and after some test bench runs with this unit, I decided this was the ideal engine for my car. At the time of purchase these engines were far superior to any other British motor on the market, and I would like to express my appreciation of my particular unit which has never given any trouble, being an easy starter with extreme flexibility, accessibility of controls, and robustness, making it the ideal unit for the reliability part of my project.

After completing rough drawings, having decided on a front wheel drive, I commenced construction by obtaining a length of $\frac{5}{8}$ x $\frac{5}{8}$ x 18 g. duralumin angle for the main frames, which was cut into two 13 in. lengths, and a rummage through my dural scrap box produced a sheet of $\frac{1}{4}$ in. thick plate from which was cut a bracket to connect the front of the frames together. This crosspiece was shallow vee-shaped to clear the front bearing housing of the gearbox, and after being suitably drilled for lightness was secured to the frames by 4 B.A. countersunk screws. Next a piece of 18 g. sheet dural was cut $2\frac{5}{8}$ in. x $3\frac{3}{4}$ in., and one end of this was bent down to the depth of the frames as can be seen by the photograph. This plate was then cut out for the steering bracket and riveted across the frames.

The rear axle, which is split for independent suspension, consists of two arms of $\frac{3}{8}$ in. x $\frac{3}{8}$ in. section dural with stub axles turned from silver steel and screwed into the downward shaped ends of the arms, which are secured to the swivelling steering plate by two U-shaped brackets also of dural. Screwed to the underside of the arms are the 4 B.A. x $1\frac{3}{8}$ in. bolts to carry the coil springs; these bolts pass through the angle brackets riveted to the side frames on each side. The tie rods are attached to the axle arms by two dural couplings clearly seen in the photo, the other end of the rods, which by the way are $\frac{1}{8}$ in. silver steel, being secured by similar couplings to the sides of the frames.

The next job was to fashion a cross bracket for the engine mount, so back to the scrap box (well stocked) to find a block of $1\frac{7}{8}$ in. square dural. This was machined to fit between the frames. After much drilling and sawing (using that excellent tool the "Abrafile" saw) a light bracket was produced and duly bolted to the chassis by 4 B.A. bolts. These B.A. bolts, incidentally, are hexagon headed, cadmium plated, and were obtained from the local scrap merchant, being war-surplus material.

As I intended to fit a magneto to supply the sparks for the engine I purchased an M.I. unit type for building into my own housing. Having no rear drive on the engine I decided to instal this magneto to once side of the cardan shaft, reference to the photo once again clearly shows this. This layout necessitated an extra bearing bracket across the chassis frames to carry the centrifugal clutch assembly. This bracket was cut from the $\frac{1}{4}$ in. dural plate suitably lightened by drilling. Returning to the magneto housing, this was machined in the form of two L-shaped pieces bolted together with 4 B.A. screws to enclose the unit magneto, and containing a $\frac{1}{4}$ in. x $\frac{3}{4}$ in. and a $\frac{3}{16}$ in. x $\frac{1}{2}$ in. ballrace (also obtained from war surplus material). The rotor shaft was extended beyond the housing to carry one of the two bronze gears (obtained from ex-Government radar equipment) the other gear being secured to the main cardan shaft by means of a 4 B.A. allen grub screw, thus providing a means of setting the ignition timing using the contact breaker on the engine. Bolted to the side of the mag. housing is a further support bracket for the clutch housing carrying a $\frac{1}{4}$ in. x $\frac{3}{4}$ in. ballrace.

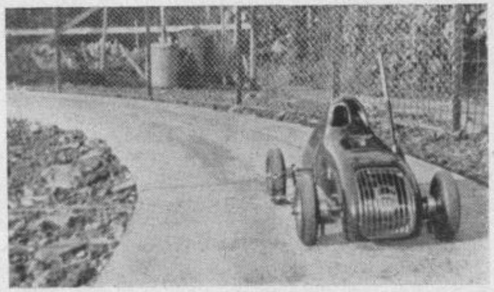


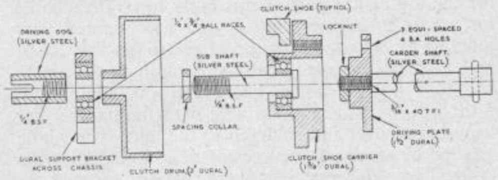
(Above) The author's completed car, showing the effective body treatment which overcomes the problem of engine height, and (left) a close-up view of the chassis. Construction is conventional, but the gearing of the miniature magneto from the propeller shaft is interesting.

The centrifugal clutch assembly is best explained by the "exploded" sketch. This unit has proved completely reliable and was originally fitted with brass shoes capped with a proprietary cork jointing material, these however, proved much too heavy, and consequently fierce in action, therefore were replaced with shoes of Tufnol, which were completely satisfactory, needing only light springs to give smooth acceleration. The components of the clutch unit comprise the cardan shaft and driving plate, shoe carrier plate with stub free running shaft, clutch drum, bearing bracket, and the hardened and tempered socket part of the ball and pin coupling.

The gearbox follows the usual pattern, being constructed mainly from solid dural and containing $2\frac{1}{4}$ in. x $\frac{3}{8}$ in. ballraces for the axle, and $2\frac{3}{16}$ in. x $\frac{1}{2}$ in. races in the front housing carrying the small pinion shaft. This gearbox is totally enclosed to enable it to be part-filled with oil. The crosspins in the ball-pin universal joints are of 12g. motor cycle spoke, a high tensile material, and prove an extremely suitable material for this job. The gears, of $1\frac{3}{4}$ to 1 ratio, were obtained from The Experimental and Model Co., of Coventry, and were secured to the shafts by pinning (cycle spoke) and soldering, which I have found the only safe and simple way of fixing. Mine have given no trouble up to the present. The axle itself was of $\frac{1}{4}$ in. silver steel and was screwed $\frac{1}{4}$ B.S.F. right and left hand at each end. Two $\frac{3}{32}$ in. keyways were milled at the ends to take the collets for the driving wheels. Next the outrigger bearings were machined

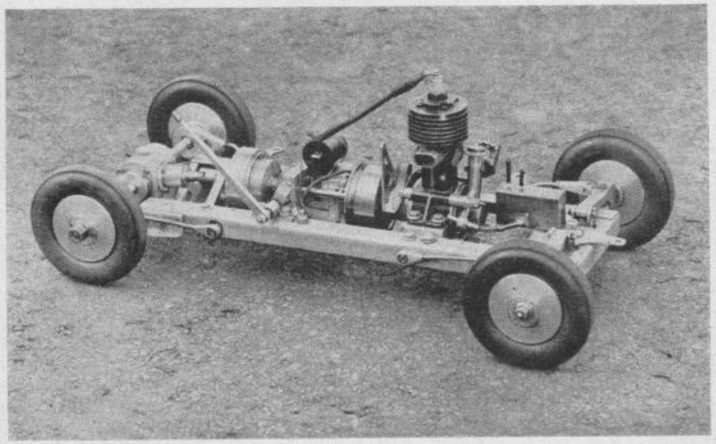
(Above) The front end of the model is well carried out, and should provide ample cooling. Below is a sketch of the efficient and robust three shoe clutch, which is unusual in being mounted remotely from the flywheel. (Right) A general view of the chassis showing the layout of components.





CLUTCH ASSEMBLY

from dural, and bored to take $\frac{1}{4}$ in. ballraces, tapped 4 B.A. on the underside to carry the bolt for the coil spring suspension; cover plates were turned to enclose the ballraces to keep out the dirt from the track. I had decided to use Z.N. wheels and on delivery these were found to be of excellent quality providing just the right finish for the chassis. The bushes supplied were slotted $\frac{3}{32}$ in. to engage with the keyway on the axle, thus giving a positive and trouble-free drive. The whole of the components of the front axle were assembled using $\frac{5}{16}$ in. o.d. dural tubing as spacers, enabling the whole to be locked as a unit by the $\frac{1}{4}$ in. B.S.F. right and left hand nuts. Two shaped 16g. angle brackets of dural were bolted to the front of the frames to carry the

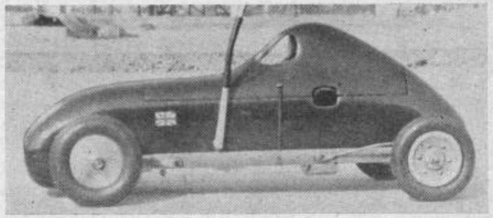


coil spring outrigger bearings from which extended the $\frac{1}{8}$ in. silver steel tie rods, which were in turn secured to the side members as shown in the photo.

The 16g. stainless steel tether brackets and the tumbler switch and arm which shorts the L.T. side of the magneto to the frame completing the chassis.

Turning my attention next to the bodywork, and taking into consideration my lack of experience of panel beating, I decided to use wood. Drawings were made of a simple, totally enclosed streamline type of body which was produced bread and butter principle from mahogany. After pre-cutting each section, the whole was glued together and carved hollowed to give an average thickness of about $\frac{3}{8}$ in. I arranged for the top centre part of this body to be detachable for access to engine controls and was secured very quickly by two spring clips at the side. The lower half is fixed by four small aluminium angle pieces and four 6 B.A. bolts. The grille was made from $\frac{3}{8}$ in. x $\frac{1}{16}$ in. square brass wire with the number cut from brass sheet and soldered to the bars. The whole secured by small angle pieces of brass sweated to the grille. Two small openings were cut in the top of the body to provide cooling for the cylinder.

It was my intention to make a G.P. body for the chassis, but this was shelved in favour of a new spur drive McCoy 60 powered model which is very nearly completed. The performance of the car was all I'd hoped for being completely reliable, the speed being



45-50 m.p.h. It is remarkably steady on the track. I would extend my thanks to the Bristol Model Car Club for the use of their excellent track on my occasional visits, also for very helpful assistance and advice so freely given. I am a member of the Trowbridge and District Model Engineers, and as model car interest is restricted to two or three members only, this does not warrant the funds for the construction of a track here in Trowbridge, our home track being a not-very-smooth school playground. My thanks are also due to a friend, A. H. Thomsett, for the excellent photograph of the chassis.

Dimensions of Model

Track—Front	$7\frac{1}{4}$ in.
Track—Rear	$7\frac{3}{4}$ in.
Wheelbase	13 in.
Overall length	18 in.
Weight	$6\frac{1}{4}$ lb.

HOME CASE HARDENING

By H. C. Baigent

I HAVE found that case hardening is not always successful in an open hearth with the powder one buys, as the "skin" is very seldom uniform, and where small tools and dies are concerned this is most important. Also, it is sometimes necessary to completely finish a tool, even to sharpening, before hardening, and with normal case hardening a scale nearly always forms, thus ruining the edges of the tool or die.

By using the following method the work can be completely finished in every respect, as there will be no scale, and if carried out properly, no distortion, and the finish is a very pleasing mottled effect, which when oiled can look very professional.

All that is required is a handful or two of leather chips or offcuts from skins, but they must be leather and not imitation; these are easily obtained from your snob or handbag shop, as they are as a rule only too glad to get rid of them. An ordinary open living room fire is good enough, and it is essential to have a large quantity of water ready near the fire; always have plenty of water, and a little common salt added helps.

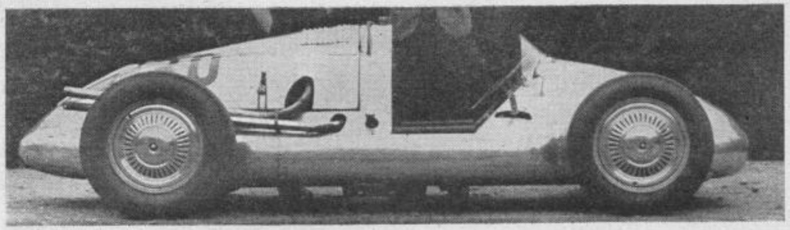
When the work is ready for hardening, make a container to enclose it completely. Practically anything will do for this; if the article is of a long type such as a tap, a piece of steel tube will do, squeezed up at both ends (I go to any scrap iron shop and buy old bicycle frames and cut them up). If it is an unusual shape, make a crude sheet iron box. Its object is not to keep the air out so much as to hold the whole box of tricks together, but it is advisable to exclude as much air as you can.

When this is ready, pack the work in the container with all the leather chips you can get in, the tighter the better, close the container, and place it in the middle of the fire, breaking the coals up round it. When it gets red hot (and this needs to be a normal red heat, although the exact temperature is not critical) leave it for approx. half an hour. This will give you about a 0.005 in. skin.

Now this is where the quick bit comes in! Have two pairs of pliers or tongs ready, and open the container if you can before it leaves the fire. If you can't do this, make sure to be quick when you do open it, then tip the whole contents into the water, stirring at the same time to ensure even cooling. You can let the whole cool off without first dipping, then reheat the work and dip, but this is likely to cause scale and is not recommended for finished articles.

The skin obtained by this method is hard enough to cut glass, and is very smooth and uniform.

NOTE: Don't entirely seal off the container, but don't leave it open, and do use plenty of water, and have the water near the fire.



PROTOTYPE PARADE No. 28

Photos by courtesy of Spike Rhiando

The Rhiando "TRIMAX"

described by G. H. DEASON

IT is to be wondered why more people haven't built powered models of racing 500 cars, those Class 1 motors, descendants of the racing cycle-cars of the past, which have grown so quickly in popularity all over Europe in the last four years. They are the logical prototypes for the ultra-small engine, and a far better choice for a 1 c.c. power plot than a G.P. Mercedes Benz! True, the early ones often had a very visible engine, and lots of machinery whirring round in the public view, but if that was ever a drawback, it doesn't hold good now.

When I first visited Spike Rhiando's home at Cobham a year or two ago, and was introduced to the newly-born Trimax, I wondered even more! At that time the car was still untried, and couldn't even be said to be finished, but I made a mental resolution to include it in "Prototype Parade" when it was off the "secret list". So here, by permission of Spike himself, it is!

"Trimax" isn't in point of fact, purely a "500", and although it has appeared in races in this guise, it seems unlikely that much will be seen of it in Class I in future. As its name suggests, it was designed to be run in three forms, namely, 500 c.c., 1,000 c.c., and as a Formula 2 unblown 2 litre. All its future lies before it, so to speak, in the latter class, but as a "1,000" it is already showing its paces, and it is shown in this form in Maurice Brett's drawing, the power unit being a big Jap V twin.

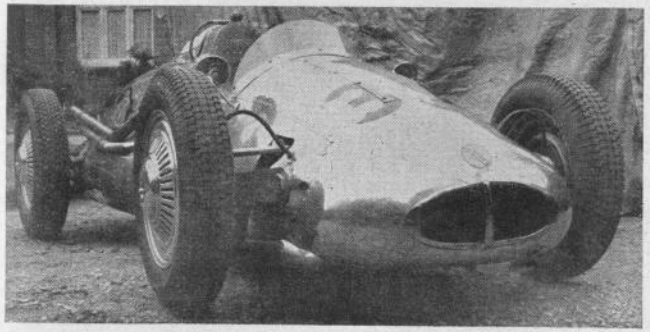
My first impression on examining the Trimax was of a racing car designed and built to an ideal, regardless of expense, and that is what it is.

Much of aircraft practice and experience had gone into the car, which was really beautiful to behold, and reminded one of a miniature G.P. Auto Union.

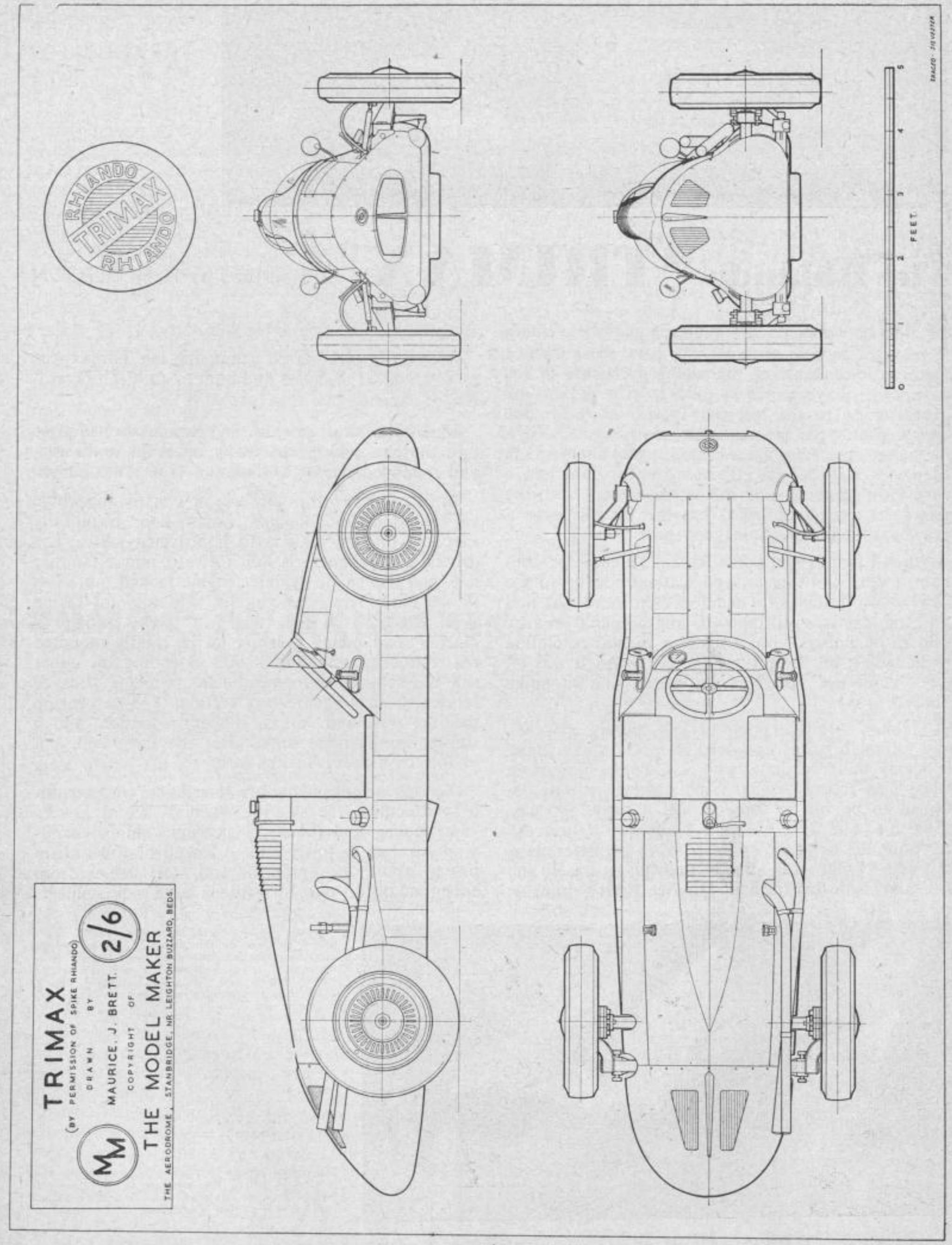
In its original form there was no chassis, the whole car being of monocoque construction, beautifully executed in light alloy with pop-riveted joints. The driving compartment is well forward, and a familiar five-stud Jap single cylinder engine looked quite lost in the back, lying horizontally with forward facing head. Drive from the "dirt Jap" went through a Norton road racing gearbox to the rigidly mounted rear sprocket, and half shafts extending on either side were carried in forward facing swinging arms, of fabricated steel square box section. The suspension medium was, and still is, rubber in torsion, and a similar arrangement looks after the front end, but in this case the swinging members are set to trail.

Steering arrangements are interesting, and beautifully executed, the steering wheel is set at a very "flat" angle, and the short steering column carries a sprocket at its lower end. A length of roller chain passes round the sprocket, and steel cables from either end of this pass forward via large radius pulleys

(Above) An excellent impression of the car's profile is given by this picture, taken before the wheelbase was lengthened by three inches. Note the ample space available to accommodate a larger engine unit, and the handsome wheels, which should reproduce very pleasingly in a model.



The frontal aspect of "Trimax" is impressive, and lacking in frills. The aperture in the nose will be useful as well as ornamental if a liquid cooled multicylinder engine is installed.



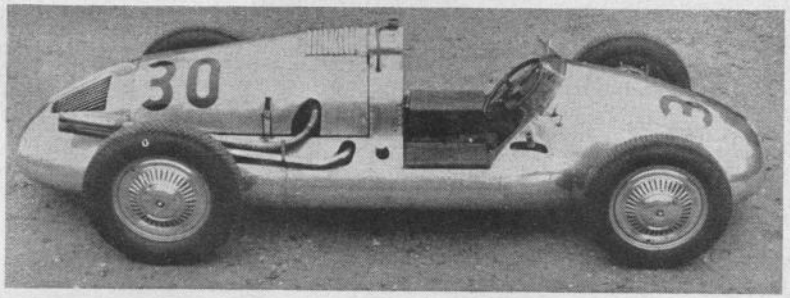
and operate on a control plate and system of bell cranks mounted on a vertical column at the front of the chassis. From this point the divided track rods operate as in normal practice. The seating position is extremely comfortable, providing an unrivalled view of the accident and/or the front wheels. Luxurious leather arm pads give the whole thing a very cosy atmosphere, and the angle and positioning of the hand levers for gear change and brake, with their grips protruding from the sponsons, adds to the impression of "controllability".

The body shape has been the subject of extensive wind tunnel tests, and in its original form the whole strength of the car lay in the completely boxed sponsons or side louvres, which also contain the rubber fuel tanks of about 6 gallons capacity on either side. Braking is hydraulic, and 16 in. light alloy perforated wheels are fitted, with 5.25 and 600 section tyres at front and rear. The weight was not quoted on my visit, but that it is far from excessive was demonstrated by Spike, who picked up the front end of the car quite negligently to prove the point!

Since that time, however, practical tests on a number of circuits and hill climbs have proved that, although monocoque construction is a beautiful thought, it isn't so hot in practice, at anyrate when used in conjunction with a motor-cycle-type power unit. Vibration, plus the inevitable weaving that takes place under the stress of high speed and cornering was found to "unpop" the pop rivets, and caused loads of other trouble, including fuel starvation. The single cylinder engine wasn't too happy in the recumbent position, relying on a retractable air scoop in the floor for cooling, and what with one thing and another, plus the decision to use the car mainly in the larger capacity classes, it was decided to lengthen the wheelbase from its original 7 ft. 3 in. to 7 ft. 6 in., and to instal a tubular chassis. It is in this guise that our drawing shows it, and a further modification in the wind is the combining of the two exhausts into a single tailpipe when using the big twin.

Although all the development work of the past season has prevented the car from giving of its best in actual racing, Spike has every reason to be optimistic! That entertaining American journal *Road and Track*, said of him recently that he usually drove "with his foot in the carburetter", and by the time this method of conducting has found out the weak spots, and the enthusiastic team has corrected them, Trimax is likely to be a powerful force in any class it enters. Last season it collected a third place as a "500" at Brands Hatch, a fifth at Goodwood with the "1,000" engine fitted, and finished 14th at Silverstone in the *Daily Express* meeting again as a "500". As a hill climb job it clocked second fastest practice time at Rest and be Thankful, but succumbed to a slipping clutch in the official run. Enough in fact, to show that it's got what it takes!

Model builders, however, needn't wait for next season before starting on a replica of this really elegant motor car!



In this view the strengthening sponsons can be seen, also the swinging suspension members, fabricated from light gauge steel sheet. Note the angle of the hand control grips.

Photos by courtesy of Spike Rhiando

Seen from above, the resemblance to the G.P. Auto Union will be remarked. Ten "chimney pot" louvres are fitted in the top of the engine cover, and the air outlets in the tail assist the cooling flow, which enters via a retractable scoop in the underpan.

MODEL MAKER

MODEL CAR ASSOCIATION

AT the recent delegates' meeting held at Derby it was decided that the 1951 National Championships should be held at Cleethorpes, on September 2nd, and the Regionals on August 19th, as follows:

North W. : Bolton
North E. : Bradford or Ossett
Midlands : Derby
South E. : Edmonton
South W.: Bath or Bristol
Scotland: Dundee

The following open dates were also agreed:

May 14 Edmonton
May 14 Sunderland
May 20 Ossett
July 8 Edmonton
July 15 Bolton
July 29 Cleethorpes
June 10 Guiseley
June 24 Derby
July 1 Bradford
Aug. 6 Harrogate
Sept. 9 Bradford and P.M. Trophy

Further dates will follow as soon as available.

The 1.5 c.c. class is now official, and will be catered for in the National Championships.

The proposed grading scheme for Open Events was approved, with slight alteration in the 5 c.c. class, Grade B in this class to be from 65 m.p.h. to 85 m.p.h., and Grade C to be up to 65 m.p.h.

The new Constructional rules were accepted as follows:—

1. CAPACITY CLASSES. Cars shall be divided into classes by engine capacity, as follows:

Class 10. Cars propelled by internal combustion engines of cubic capacity exceeding 5 c.c. (.305 cubic inches), but not exceeding 10 c.c. (.610 cubic inches).

Class 5. Cars propelled by internal combustion engines of cubic capacity exceeding 2.5 c.c. (.153 cubic inches), but not exceeding 5 c.c. (.305 cubic inches).

Class 2½. Cars propelled by internal combustion engines of cubic capacity exceeding 1.5 c.c. (.092 cubic inches), but not exceeding 2.5 c.c. (1.153 cubic inches).

Class 1½. Cars propelled by internal combustion engines of cubic capacity exceeding zero, but not exceeding 1.5 c.c. (.092 cubic inches).

No tolerance shall be allowed for reboring, etc.

2. WEIGHT. The weight of each car shall be taken when in running order, with fuel in tank, and shall include all parts carried by the car, except the tether if detachable.

The cars in each class shall not exceed the following weights:

Class 10	7½ lb.
„ 5	6 lb.
„ 2½	4 lb.
„ 1½	3 lb.

3. WHEELS. (a) Not less than four rubber tyred wheels shall be fitted; (b) Wheels on the same axle shall be of equal diameter, and type; (c) If different sized wheels are used on front and rear axles, the smaller wheels shall not be less than three-quarter of the diameter of the larger wheels when at rest.

4. LAYOUT OF WHEELS. (a) The wheels shall be arranged in an approximately rectangular pattern in plan view; (b) If the track of the front and rear wheels is not the same, the narrower track shall not be less than 9/10th of the wider track; (c) The wider track shall not be less than 1¼ times the diameter of the larger wheels; (d) The wheelbase of the car shall not be less than 2¼ times the diameter of the larger wheels.

5. DRIVE. The drive must be applied by a direct mechanical connection between power unit and road wheel or wheels, when the car is in motion.

6. EXHAUST. The exhaust outlet, or outlets, must be so arranged as to prevent discharge directly on to the track.

7. BODY. All cars must be equipped with, and race in competition with, a body which complies with the following:

When the car is viewed centrally from axle level in side, front and rear views, the engine, gears, etc., shall be generally within the limits of the body, and not visible. Spark plugs, glow plugs and exhaust pipes will be permitted to protrude within reason subject to the decision of the scrutineer.

The only major exception to this rule is in the case of a scale model of a definite prototype, such as a "Shelsley Special" in which case the entrants must produce a clear photograph of the original car for comparison.

8. TETHER OR BRIDLE. All cars must be provided with a tethering attachment attached to the car in such a manner as will be capable of withstanding the following loads:

Class 10 c.c.—65 lb. per lb. of car weight. (Equivalent to 130 m.p.h. on a 52½ ft. diameter track, with safety factor of 1.5).

Class 5 c.c.—46 lb. per lb. of car weight. (Equivalent to 110 m.p.h. on a 52½ ft. diameter track, with safety factor of 1.5).

Class 2½ c.c.—28 lb. per lb. of car weight. (Equivalent to 85 m.p.h. on a 52½ ft. diameter track, with safety factor of 1.5).

Class 1½ c.c.—21 lb. per lb. of car weight. (Equivalent to 60 m.p.h. on a 35 ft. diameter track, with safety factor of 1.5).

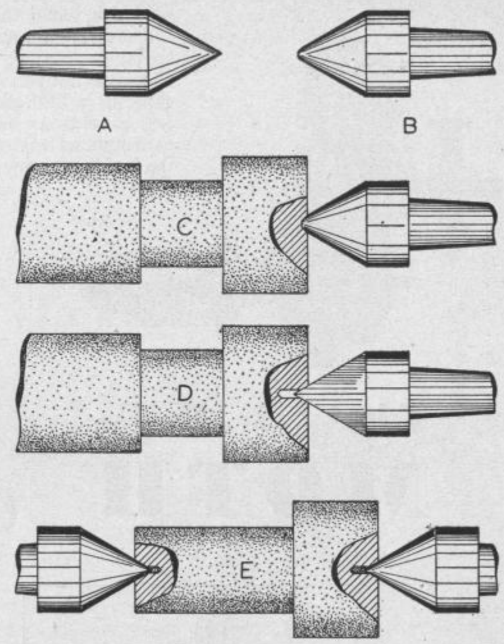
The length of the tether shall not be less than 9 in. and not greater than 10 in. from its apex or connecting hole to a line drawn centrally between the wheels of the car in the plan view.

9. STOPPING DEVICE. All cars must be equipped with a device capable of stopping the engine whilst the car is in motion, either by switching off the ignition or fuel supply, or both.

10. RUNNING. (a) All cars shall be designed to run on all four wheels as far as is possible, i.e. intentional positioning of tether so as to make the outer or inner wheels ride clear of the track shall be barred; (b) All parts shall be securely fastened when running, and any car dropping any major part, except tyres burst and lost during running shall be disqualified from the run, unless timing had already been completed.

11. COMPLIANCE WITH RULES. All cars shall be inspected for compliance with these rules before racing and shall be run in the same condition as when scrutinised. Replacement of any part which fails shall be permitted at the discretion of the scrutineer, provided that the car still complies with the rules. Subject to compliance with rules, tyres, glow and sparking plugs, batteries, etc., may be changed without permission.

Hints on Lathe Centres



IF good accurate turning is to be expected where work is done between lathe centres, a few important points must be remembered. The centre indicated by A in the accompanying illustrations is in sound condition with its point intact. In view B, however, the centre is shown with its point completely burred over, and accurate work becomes difficult with a centre in this condition. Moreover, the centre in B is often the cause of work flying out of the lathe when cuts are applied, since the bearing is reduced to a very weak condition.

Lathe centres when not in use should be carefully placed in the rack; if simply dropped down in any odd spot the tips can easily become damaged. Many centres are given a final tap home with a hammer, and this is the cause of many points becoming blunted. Any adjustments of centres should be made with using a piece of hard wood between the point and hammer, or by using a skin hide hammer.

Many lathe centres quickly become burred-up at the tip due to the poppet centre tip becoming overheated during the work revolving. It is most important to see that the poppet centre is carefully lubricated in order to prevent burred-up tips as in B.

It is little use lubricating a badly made centre bearing in a piece of work, however, since it is readily seen in view C. The point of the centre is forced on to the bearing, and much friction, with resultant heat, quickly takes place, with burring-up at the tip.

First drill the ends of the work, and then form a good centre bearing with the square cutting centre in the poppet end as shown in view D. The square centre is adjusted for cutting by putting a little pressure on the tailstock wheel, and use a little oil for lubricant. The small hole in the end of the work should be deep enough to allow for cutting a good bearing without taking the drill hole completely away.

The square cutting centre should be removed from the poppet as soon as the work is done, and the ordinary centre replaced. The work is thus provided with well-formed bearings for the lathe centres to seat in, and a glance at view E illustrates the point. Here it will be seen, the tips of the centres are free in the drill holes, which is a vast improvement on the badly made bearing in C. Before commencing work the bearings should be packed with grease or graphite.

VANE STEERING GEAR

(*Continued from page* 203)

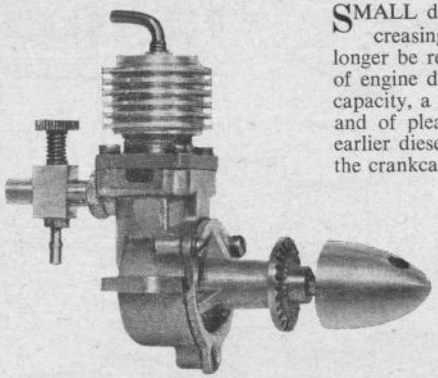
Friction on the main spindle (and the rudder) should be reduced to a minimum. The top of the main spindle is, therefore, ground to a fine point and rests against a piece of ⅛ in. brass soldered into the top of the main bearing tube, thus forming a needle point bearing.

Quick adjustment, vital in any race, is obtained by lifting the main body of the gear so that the engaging pin is clear of the holes in the main quadrant. The vane can then be moved to any desired angle and simply dropped back into position so that the pin again engages the main quadrant. The other pin fitted to the main body, is used when running before the wind when the main body is turned through 180 deg. to bring the vane feather inboard. The vane feather is made of ⅛ in. balsa wood and varnished. To be effective the area of the feather should be five times that of the rudder.

It is hoped to contribute another article on sailing with a vane gear. Different boats require different settings, but it is most interesting trying out a boat with a vane gear. Any adjustments made to the vane setting show up immediately in the boat's behaviour.

The Braine gear was undoubtedly a great step forward in the methods of steering model yachts, but when one realises that the gear was originally invented in 1904 and that it has been in general use, practically without modification, to the present day, it is apparent that the time has come for a further step forward in this direction.

In my opinion the vane gear is a very great improvement and definitely more positive in action. Having used a Braine gear for several years it took a long time to convince me that the new idea was better, but after one race with the vane gear, it was decided that the time had come to change over.

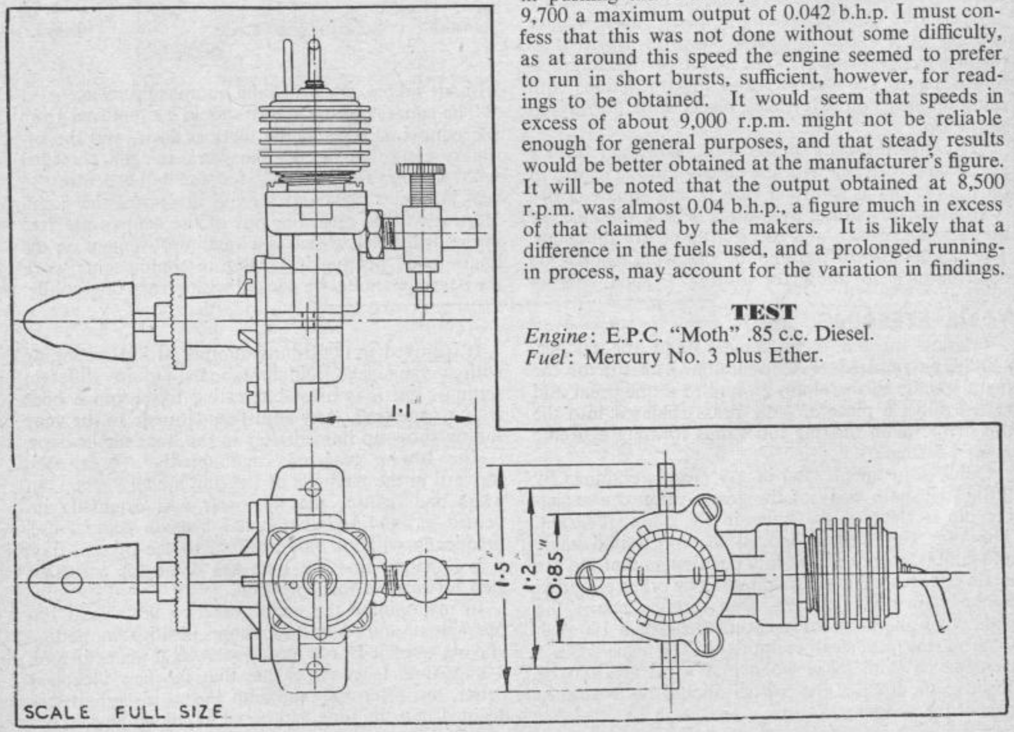


The E.P.C. MOTH

SMALL diesel engines of under 1 c.c. capacity are appearing with increasing frequency upon the British market, so that they may no longer be regarded as a somewhat experimental venture into the realms of engine design. The latest to reach us is the E.P.C. Moth, of .85 c.c. capacity, a little engine which seems to be extremely well made, robust, and of pleasing appearance. In design it is rather reminiscent of the earlier diesel engines of larger capacity, and the use of die-castings for the crankcase, stout steel cylinder, and turned, screwed-on cylinder head, call particularly to mind those Italian engines which gave us such good service.

It will thus be seen that this engine falls rather into the utility class than in the "hot-stuff" category; in fact, the whole engine appears to have been designed for hard wear and rough usage—which is not such a bad aim after all. No attempt has been made to incorporate high-speed porting arrangements, short-stroke, and other features usually associated with super high-speed motors, and the result has been to give us a robust little unit, at a weight of around 2 ozs., which should appeal to the man who runs his model for pleasure rather than for records.

As speeds go today, the maximum r.p.m. of the "Moth" may be considered modest. The engine did not seem too happy when running in excess of 9,000 r.p.m. In the maker's literature, the b.h.p. is given at .038 at 8,500 r.p.m. Nevertheless, I succeeded in pushing the revs. beyond 9,000, and obtained at 9,700 a maximum output of 0.042 b.h.p. I must confess that this was not done without some difficulty, as at around this speed the engine seemed to prefer to run in short bursts, sufficient, however, for readings to be obtained. It would seem that speeds in excess of about 9,000 r.p.m. might not be reliable enough for general purposes, and that steady results would be better obtained at the manufacturer's figure. It will be noted that the output obtained at 8,500 r.p.m. was almost 0.04 b.h.p., a figure much in excess of that claimed by the makers. It is likely that a difference in the fuels used, and a prolonged running-in process, may account for the variation in findings.



TEST

Engine: E.P.C. "Moth" .85 c.c. Diesel.
Fuel: Mercury No. 3 plus Ether.

Starting: Following the maker's instructions for settings, the engine started readily enough with hand-flicking, but a little trouble was found in adjusting the controls to give steady running at speed above about 7,500 r.p.m. Once the settings had been found, however, no difficulty was experienced in duplicating the correct adjustments for good performance. The carburettor needle control seems to be rather on the sensitive side.

Running: The preceding paragraph really gives the running characteristics of the enigne, but, as already stated, the engine was happiest at speeds below 9,000 r.p.m.

B.H.P.: The engine was tested from 5,000 r.p.m. onwards, and at the lowest speeds a b.h.p. output of .023 was recorded. Output then rises steadily, reaching .0335 b.h.p. at 7,000 r.p.m., .038 b.h.p. at 8,000 r.p.m. with a maximum of .042 b.h.p. at 9,700 r.p.m. Beyond this speed output falls rapidly, until it is but .029 b.h.p. at 10,900 r.p.m.

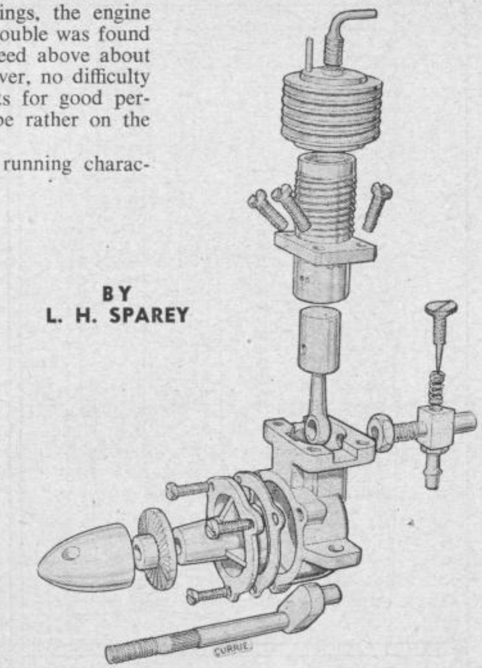
The useful part of the curve lying between 7,500 and 9,000 shows a difference of only .005 b.h.p. between these points.

Checked Weight: 1.9 ozs. (less tank) maker's weight, 2 ozs.

Power-weight Ratio: 0.354 b.h.p./lb.

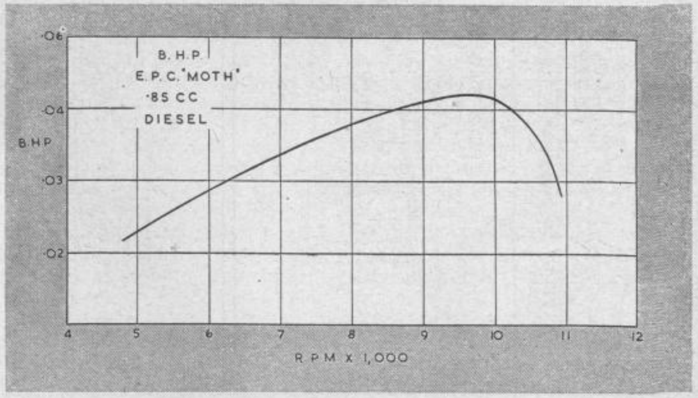
Remarks: This engine, selling at the remarkably low price of 35s. 11d., including purchase tax, is extremely good value, and shows no signs of cheapness in appearance, quality or workmanship. All parts have a clean, machined appearance, and seem to be remarkably sturdy in construction. It should be ideally suitable for the beginner's small general purpose model and looks a likely power unit for the latest developments in small car rail racing.

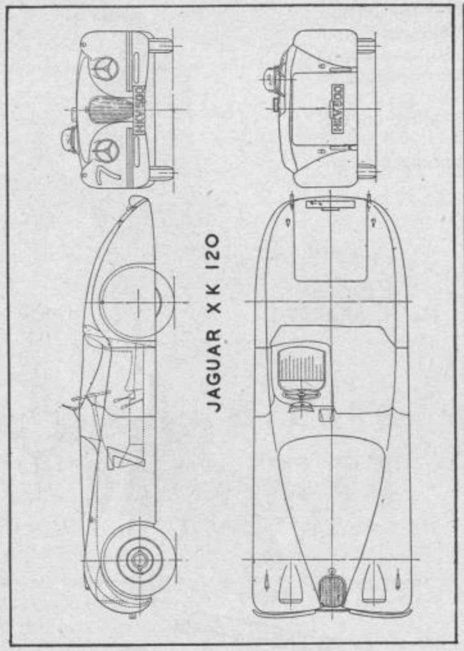
BY
L. H. SPAREY

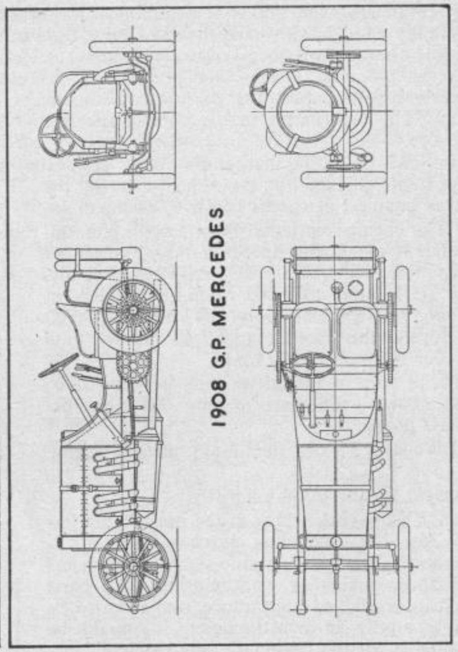


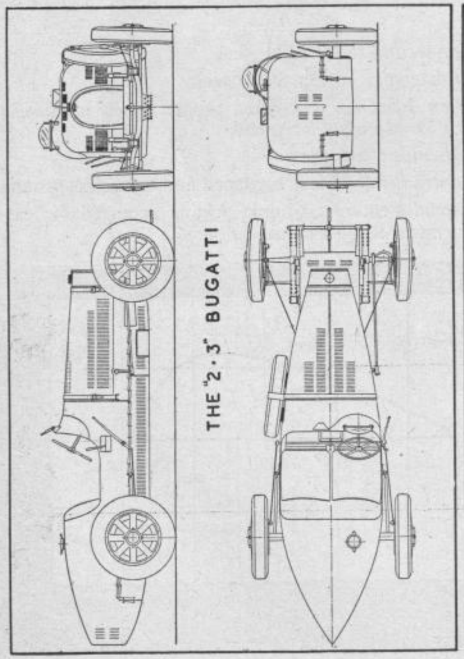
GENERAL CONSTRUCTIONAL DATA

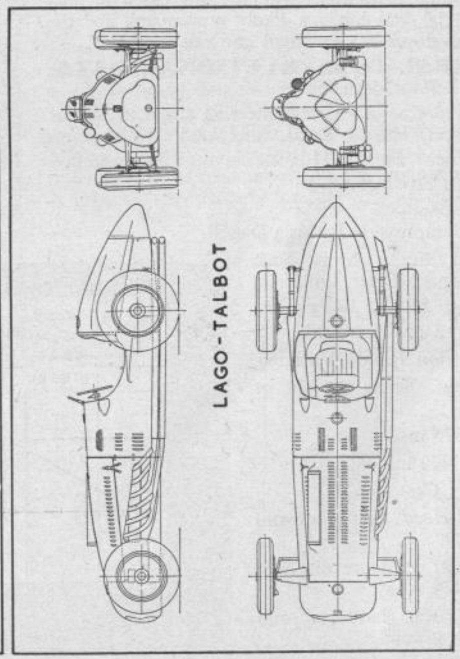
Name: E.P.C. Moth.
Manufacturers: E.P.C. Engineering Co. Ltd., Cameron Street, Haydn Road, Sherwood, Nottingham.
Retail Price: £1 15s. 11d., inclusive of purchase tax.
Delivery: Ex-stock.
Spares: Ex-stock.
Type: Compression Ignition Diesel.
Specified Fuel: Mills Blue Label 2 pts., Ether 1 pt.
Capacity: .85 c.c., .048 cu. ins.
Weight: 2 ozs. less tank.
Compression Ratio: Variable.
Mounting: Beam upright or inverted.
Bore: .375 ins.
Stroke: .472 ins.
Cylinder: Cast Iron.
Cylinder Head: Alloy, integral with fins.
Crankcase: Pressure die cast. D.T.D. 424 Alloy.
Piston: Steel, hardened and centreless ground.
Connecting Rod: Mild steel.
Crankshaft: 10 ton shear steel.
Main Bearing: Phosphor bronze bush, in die-cast D.T.D. 424 alloy front end.
Induction: Sideport.
Contra Piston: Steel, hardened and centreless ground.
Special Features: Simple porting arranged for easy starting. Robust construction.











FOUR FAMOUS PROTOTYPES: MONTH BY MONTH WE HAVE PRESENTED THE READER WITH A SUGGESTED PROTOTYPE FOR HIS FUTURE MODEL MAKING, DESCRIBED THE HISTORY AND MAIN MECHANICAL FEATURES OF THE ORIGINAL, AND INCLUDED A SCALE OUTLINE DRAWING, ENLARGED COPIES OF WHICH ARE AVAILABLE FROM THIS OFFICE FOR 2/6 EACH, POST FREE. HERE IS A REMINDER OF THE WIDE RANGE OF TYPES COVERED, EACH SPECIALLY DRAWN BY HAROLD PRATLEY FOR OUR PLANS SERVICE.

Improving the Miniature Railway Layout

H. A. ROBINSON DISCUSSES SHUNTING & COUPLINGS

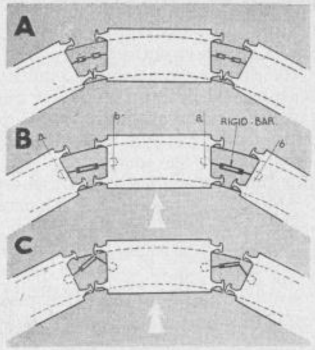


Fig. 1. A full sized method in which 'push' between trucks is transmitted by inner buffers on a curve. B. If a coupling can be made a "rigid bar" transmitting 'push' by a coupling link is sound. C. Shows how wrong pressures are set up.

MUCH model rolling stock while otherwise perfect has the failing of not shunting backwards satisfactorily. All marshalling depends on being able to *push* as well as pull strings of vehicles, but with most trains of any size it is found that backward propelling results in a truck or two somewhere in the length cockling sideways and becoming derailed—particularly if working over a series of curves.

This is a pity, for there is no more intriguing train movement than a backward shunt, and to see vehicle after vehicle slide with precision into some siding, weaving a way into seemingly impossible spaces between other standing stock. If only the backward shunting trouble can be solved a whole range of movements for demonstration running (as well as one's own pleasure) becomes feasible. Thus it always looks realistic to see a goods train arrive at a station and then for it to be run forward and be backed on to tracks behind the platform to clear the way for an express which comes up sharply after—the goods train once more being pulled out to the main line when the "flyer" has passed. Another interesting manoeuvre is for a passenger train after leaving the platform to be stopped and slowly backed into a loading bay for the purpose of picking up a couple of horse boxes or theatrical vans—a movement often carried out in real life with less important trains. Becomes possible too, the splitting and re-making of passenger trains at junctions. Two trains coming in on different routes can, for the purpose of the movement, each have through coaches which must be put into the other train—the necessary marshalling giving some very interesting working.

But to do all these things, back-shunting must be precise—continual derailments spoil the whole effect.

The writer has found that when the subject of "cockling" is brought up, most people give as the reason why it occurs with model stock and not with the full-size, that the model stock "is so light". This, however, is not the real reason, for although a truck may not be its correct weight in model tons neither are its neighbours in the train, and so any undue lightness should be cancelled out. Neither is the fact that curves on a miniature line are sharper than a full-sized system the trouble, for one has but to see what sharp-radius curve strings of trucks can safely be propelled round in factory yards to realise that very small radius curves can be negotiated.

Briefly, the whole weakness in much model stock lies in the way the "push", if we might call it so, is translated from vehicle to vehicle. When this is parallel to the track the vehicle to which the force is transmitted is propelled safely in that direction. When, however, that force becomes badly askew, especially on a curve, then the end of one vehicle or the other is forced from the rails. And here we bring in the whole subject of model couplings.

In full-sized stock the "push" is translated either through side buffers or a central buffer. Side buffers are standard in the British Isles, on the Continent, in India and other places where the influence of English design is, or has been felt, while the central buffer is found in America and Canada and countries where American design is favoured. We have a few examples in these islands of the central buffer, as the Buck-eye coupler on certain G.W.R. coaches, the method of junction between the trucks of twin timber-carrying units, while the standard way of joining tenders to engines is a central buffer system. But the examples are few, and we are really wholeheartedly a side buffer nation.

With model stock, unless of ultra precise construction, and running on precisely laid track, the side buffers seldom function correctly. This, in better class models is generally due to too much side-play at the ends of the vehicles which allows them to take up positions crabwise to the rails. The buffers thus fall out of alignment and buffer-locking may occur if the heads slip one behind the other.

In cheaper stock, as well as there always being enormous side-play, heavy coupling arrangements purposely prevent the buffer heads coming together. This is an attempt on the part of designers to solve the coupling problem in less expensive items, by ignoring the buffers entirely and transmitting the pressure from vehicle to vehicle through the coupling itself. With the scale 3-link chain the buffers of course come together, but the side-play is still there and the 3-link coupling—correct as it is—has a number of drawbacks when in miniature, from an operational point of view.

That no completely satisfactory method of joining up small-size stock has been found is shown by the fact that once one steps outside the scale "hook and chain" there are well over half a dozen different coupling arrangements to be seen on the market, where the push from vehicle to vehicle is through the link. Transmitting through a coupling hook and link is really quite a sound practice if the arrangement can be turned into *a rigid bar* between the points of swivelling (see 'a' and 'b' Fig. 1). Indeed, it is as good a method as any if true buffering action cannot be used, as the bar so formed keeps the vehicles apart, the buffer heads never being allowed to touch.

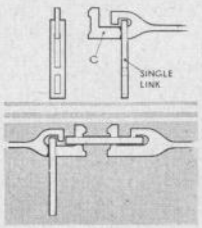


Fig. 2. The earliest form of coupling used on model trains.

The earliest form of coupling on model trains was of this type (see Fig. 2), and in theory it should work perfectly, for upon a train being shunted backwards, the single link should settle into the recess (c) and so form a rigid connection—with the front end (with its narrow slot) sitting tightly over the next hook. But in practice the links and hooks of this kind of coupling are invariably made of soft metal. The link expands readily and the hooks get bent, with the result that the "bar" will take up angles as (C) Fig. 1. This causes sideways forces to come into action, and certain vehicles are prised in the direction shown by the arrow and derailed. Moreover, once forced by pressure into an angled position, this coupling does not readily straighten out again, and although rounding a curve will cause derailment when the vehicles come once more to the straight.

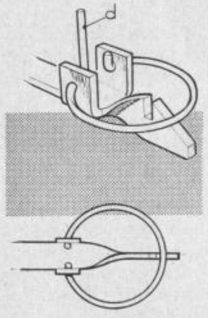


Fig. 3. A commercial attempt to give room and automatic coupling.

However, this sort of coupler can be kept better in trim by occasionally squeezing the hooks in the jaws of a flat-nosed pair of pliers. The links should also be given a squeeze.

Model couplings have, among other things, to be long enough to give space for the fingers to go between trucks for coupling up and yet not let the vehicles be ridiculously far apart when in the pulling position, and an attempt by one firm to give room and automatic coupling at the same time is shown in Fig. 3. The hook has an inclined front surface up which slides a wire ring from the next vehicle. Uncoupling is effected by pressing sideways on the length (d). Here again, however, the whole arrangement is apt to get into "knots" when a train of any length is being pushed back, and so cause derailment.

A combined coupler and central buffer suggested some time ago is as Fig. 4. Here two hooks fall over the face of the buffer head, and so form a solid lock and rigid bar between the vehicles. This idea is sound till one or the other coupler gets depressed, when either the vehicles will not couple or else the lower one is lifted off the track.

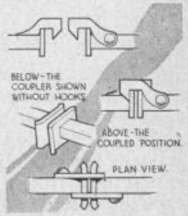


Fig. 4. Suggestion for combined coupler and central buffer.

And so we come back to the correct method of side buffers and hook, with three-link chain, for this really offers the best "universal joint" of all, and a coupling *must* be universal in action. But to get good back-shunting action with these, certain things have to be watched. The track over which shunting operations are to take place must be particularly precisely laid as to gauge and levels—the latter is important, but it is not easy to detect dips from above, so longitudinal inspections with eye at rail level should be made. With regard to the vehicles themselves intended for shunting movements, it is best to affix buffer heads rather larger than standard. This is not altogether outside all actual practice, for engines working on factory and dock estates often have buffers twice the normal size, while the oval buffer head on long vehicles is quite common. Vehicles, too, should be checked to prevent too much side play on the axles. Sometimes the pressing in of the axle guards will effect this. In other cases the introduction of minute washers between the wheels and guards will take out the side-play and give tightness.

With all these precautions together then, it will be found that back shunting can be greatly improved and most of the odd derailments eliminated.

The main trouble with the "correct-practice" coupling in small sizes is the difficulty experienced in coupling and uncoupling—the links and hooks being so tiny—this being one of the faults that it was attempted to cure in the more clumsy designs. However, with a small coupling stick, or even a pair of forceps, one can with practice become quite adroit.

When dealing with scale model stock one must, of course, keep to scale dimensions, but better back-shunting it will be found can always be effected with vehicles that have a short end overhang—that is a short distance from the nearest pair of wheels (fixed) to the buffer heads (see Fig. 5). Thus short, stubby trucks invariably shunt better than long wheelbased ones, which normally have a bigger overhang. (In

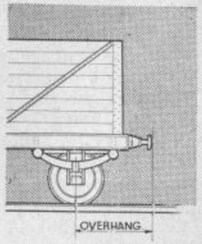


Fig. 5. Short overhang designed to improve back-shunting.

(*Continued on page 251*)

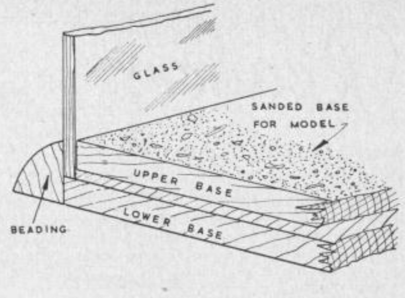
Displaying "Will' Everard"

FOR a model of a barge the orthodox method of supporting it on two shaped segments screwed to a base board is, in my opinion, unsuitable. I would, therefore, recommend a more natural setting showing the barge at rest on the foreshore at low tide, which shows off the model to greater advantage and is more in keeping with the prototype.

The materials required for such a base are two boards of ¼ in. ply, a packet of bird cage sand, a few very small well washed pebbles and a few short lengths of twig. The use of two boards will be explained later when the question of a glass case is discussed. At present we are only concerned with one of them—the upper layer as it were—which must be planed on all its edges to true right angles so as to ensure that it is perfectly square—or rather oblong.

Rest the model on the base in the position it is to occupy and run a pencil line around the bottom outline, remove the model and cover the rest of the board with a good layer of casein glue. Upon this spread as much sand as the glue will take up, add a few pebbles here and there, add also short pieces of twig, pressing both well into the surface, a sprig or two of moss cut very fine should be added to represent weed, and the whole allowed to set. As the colour will be far too yellow it must be toned down to a mud colour.

Should you decide to enclose your model in a glass case, which I strongly advise as any ship model is a veritable dust trap, and dust quickly spoils the pristine freshness of a model, you must make the upper layer of the base $\frac{1}{16}$ in. smaller on all edge dimensions.



SECTION OF GLASS CASE FOR MODEL.

Remove the model from the base which can now be used as an assembly jig. Place the side pieces in position in the base grooves and get an assistant to them upright. Coat the side edges of the end pieces with adhesive and place them in the end grooves: now bring the sides and ends together and hold until the adhesive has set. When all is firm coat all the top edges with adhesive and lay on the top glass.

This adhesive will not be strong enough to hold the case together without additional support. You may use "passe-partout" binding, but I prefer ¾ in. strips of heavy gummed parcel paper tape. The strongest is 2 in. wide of tough Kraft paper, and the ¾ in. strips are cut with a straight edge. Crease the paper down the centre, cut into exact lengths for all edges, damp well, and press into position. When dry give two or three coats of shellac varnish and you will have a case which will last for years.

IMPROVING THE MINIATURE RAILWAY LAYOUT

(*Continued from page 250*)

the case of bogey stock the overhang is considered from the bogey centre.) This is another reason why non-scale cheaper stock is poor at back-shunting, the wheelbases having often been shortened with the idea of better working round tight radius curves, but at the expense of the end overhang which is disproportionately long.

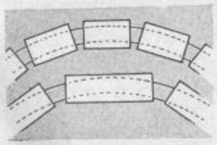


Fig. 6. Aim to achieve a wheeled "snake" for ease of running and realism.

In home-made freelance stock there is some latitude, and reducing the above to a rule we can say that the nearer the last pair of wheels of one vehicle is to the leading pair of the next the better the shunting properties. That is the closer the train comes to being a wheeled "snake" rather than a string of individual items spaced well apart (Fig. 6) the better its running will be (forward as well as backward).

From the above it will be seen that the question of coupling small-sized models has not yet been fully solved and as the subject holds much scope for the inventive model railwayist let us summarise what the ideal model coupling should do from the back-shunt point of view, or otherwise.

(1) It should either (a) be sufficiently free to allow the buffer heads to come well in together, or (b) form a rigid bar to keep the vehicles apart and make the buffers non-operative.

(2) It must allow for room for fingers or a stick to go between vehicles for joining up or separating, but on the other hand it must not make them too far apart as this looks silly and tends to trucks "pulling over" on a curve.

(3) It must be fully universal in action without any tendency to bind.

(4) If possible, automatic in action.

And finally as a tail-piece, it has always seemed to the writer that the ideal thing would be for a coupler that could be engaged or disengaged by pressure of finger and thumb on the side of the vehicle near the endes in question. A moment's thought will show that when wishing to join two vehicles together the natural action is to place one's hand over each vehicle near the ends to be joined.

Readers' Letters . . .

MORE LETTERS ON PAGE 254

More on Model Yachting

Dear Sir,

I am delighted with the announcement that you are bringing out a new magazine to be known as *Model Maker*.

My chief interests are in aeromodelling and model yachting and for some time past I have been considering writing to you on the urgent need for a magazine dealing with model yachting.

At the moment model yachting is not catered for by any magazine, and there has been a very strong feeling among model yachting enthusiasts that this great sport has not received the support and publicity it should have.

I notice that your new magazine is covering model yachting and I am sure that it will receive every help and support from members of the Model Yachting Association.

Model yachting like aeromodelling, is increasing daily, and one often finds that a modeller who is keen on one is also very interested in the other. Both sports are closely allied in design, building, etc., and I sincerely hope that you will be able to do full justice to model yachting in your new magazine.

Surely it would be possible to offer first class model yacht plans by some of the best designers in this country and America, in the same way as aeromodeller plans are now obtainable.

In conclusion, I would strongly urge you to act without delay on my suggestion. I feel that you have here an excellent opportunity to increase your scope, and I am quite sure that an organisation such as yours would be able to produce the very thing that model yachting enthusiasts throughout the country are waiting for.

Yours faithfully,
K. P. MORRIS.

Cleveland, Som.

Advice from a Ship Model Expert

Dear Sir, May I tender you my congratulations for an excellent show. I passed the copy of the *Model Maker* to the Committee and members of the Brighton S.M.E., and I thought I ought to let you have their comments.

They all agreed that it was a splendid issue, but all thought that the car side of model making rather overloaded it. We have found from experience at our own large exhibitions, and visiting exhibitions elsewhere, that interest in railways, particularly the large steam locomotives from $2\frac{1}{2}$ in. to 5 in. gauge, and that of ships, are the two main forms of model making, and other Clubs and Societies have the same experience. To equal this there is of course, model aircraft, which as you know has a tremendous following, but in the usual way the model aeroplane enthusiast is catered for by the clubs exclusively for this type of model maikng and do not come in the model engineering class. Now lagging far behind are the model cars, and real interest in this form of model making is largely confined to the clubs whose interest is centred in the sport and have facilities for racing. Next, we find there is considerable interest in general engineering models and also an increasing interest in architectural models. We think that a feature of ews and views from the clubs, with a monthly feature in which a member of your staff may perhaps visit a selected club from time to time and report on its activities, its workshop, etc., etc., would be of great interest and draw in new members. There are also the beginners that should be considered. These people are rarely catered for in the other model engineering papers, and "how to make" articles and illustrations something on the lines of those in the *Popular Mechanics Magazine* of Chicago, would be of interest, but the "things" to be made always being models and not pieces of furniture, etc. I may add that I think ship construction plans for modern ships is a long felt want. Immediately after any ship drawing of mine appears in *The Illustrated London News* I get letters from far and wide from model makers, but time forbids me supplying them "with the full details and plans" they usually ask for, as they forget this would take time and trouble, and they usually do not even enclose a stamp for reply. With best of luck.

Yours sincerely,
G. H. DAVIS.

Brighton, Sussex.

Railway and Locomotive Articles Please

Dear Sirs,

I had the pleasure of reading No. 1 of the *Model Maker* and have placed an order for it, receiving No. 3 during the week—I am sorry I did not get No. 2.

I am writing this to tell you what articles I like, although I know other people like other things.

My chief interest is $3\frac{1}{2}$ in. and 5 in. gauge locos, traction engines, flash steam plants.

I found in the *Model Maker* a number of articles on different models, to suit a large variety of tastes. The point is, I dived in and had a real good read because you described plenty of models which your paper sets out to do. I thoroughly enjoyed the whole lot including adverts., and if my loco, a 5 in. Liverpool dock tankie, turns out good, I'll send a picture of it to you.

While you keep on telling us about models you can depend on my buying *Model Maker*.

Please excuse rambling letter,
Yours faithfully,
F. DUDLEY.

Nottingham.

Dear Sir,

I have read with interest the first two issues of the *Model Maker*, and as I am keenly interested in the Model Railway Section, I would naturally like to see it expanded. I see that you invite contributions in the form of articles and photographs, and I would be pleased to know if you would be interested in any, on such subjects as rolling stock—either model construction thereof, or the description of both modern and now extinct types such as that seen on many of the private railways, or scenic work.

As a few other suggestions, some good articles on the electrical side would always be welcome as would any contributions on the new 2 mm. scale. As a member of the Model Railway Club I know there are several who could contribute first class material on the latter subject.

Yours faithfully,
A. H. DADD, B.Sc., A.R.C.S.

West Wickham, Kent.

Variety Appreciated

Dear Sirs,

I've just received your copy of *Model Maker* No. 1.

I like your copy very very much, and I think it's what most of us model engineers need as it covers a very wide field. Most other books I take, and have taken, cover just one thing only such as model railways taking one-third of the copy and the rest loaded with adverts.

Yours truly,
S. SPITTLES.

London, S.E.

SCRAP-BOX by "Tailstock"

"... most curious fact ..."

Yes! We Have No Bananas. . . .

THE immaculate reputation for accuracy that these pages have acquired has recently suffered a sad blot. A reader has written an indignant letter pointing out that a recent *Scrapbox* illustration contains a serious botanical inaccuracy, insofar as it depicts a banana palm with the fruit growing *downwards*, whereas the merest child in Polynesia knows that it bears its fruit erect and aloft, like a chieftain's plume of feathers.

Now that the consternation and hubbub, and the great noise of many confused voices, has subsided in the editorial office, we quite calmly offer the apologies of the whole staff — from the Managing Editor upwards. How such a glaring error escaped my eagle eye is unexplainable, because I am, of course, a well known authority on almost every subject under the sun—not the least of which is bananas. By way of proof I will state immediately that the Banana (*order Musaceae*) is now understood to be a variety of the Plantain; the one being *Musa Sapientum*, and the other *Musa Paradisiaca*, the former alluding to a statement by Theophrastus that its fruit was the daily fare of the wise men of India; while the latter points the tradition that it was identical with the Tree of Knowledge of Good and Evil which grew in the Garden of Eden.

The present range of the banana is almost universal, but it thrives best in humid localities and in spots sheltered from the wind, where it attains a height of 15 to 20 ft., with large floating leaves, 6 ft. long and 2 ft. broad, and. . . . Phew!

Industrial Design

"... comes off after a slight struggle ..."

Not the least lovable aspect of my character is my innocent simplicity, which inevitably leads me to take things at their face value. Thus, I have always imagined an Industrial Designer as a man concerned solely with the beautification and utility of his products. Hard experience has, however, gradually forced me to the conclusion that his activities may have a deeper and more sinister significance. Take tins, for instance.

Now, I should think that the designing of a tin or container that cannot be easily knocked over would be a relatively simple business — a conical shape with a wide base would do the trick. But no! With what cunning do our tins of soldering fluid remain tall and top-heavy, so that, with a roaring blowlamp in one hand and a piece of hot solder in the other, we must sooner or later give that tin the light, accidental tap that will send its contents streaming across the workbench. And soldering fluid is so good for the micrometer. . . .

Similarly, how readily do the flat, open tins of soldering paste invite you to put your hand or elbow into the sticky mass, or to submerge your thumb as the awkward lid suddenly comes off after a slight struggle. I have even sat on an open tin of soldering paste taken from the crowded bench and placed temporarily on a chair. Manufacturers should realise that model makers, like children, need protecting from themselves.

Capstan Lathes and Automatics

"... fascinating sight ..."

The machine tool experience of the average model maker is confined almost solely to that provided by a small lathe and a drilling machine, and it is difficult for many to imagine the high pitch of efficiency to which machines designed for high-speed production have been raised.

This has probably reached its greatest peak in the motor-car industry, and a visit to any of the great automobile plants can be a shaking experience. Nevertheless, most firms engaged in constant production on any great scale employ lathes and automatics by comparison with which the amateur's machine looks like a hand drill.

The large capstans in particular turn out work of high precision at amazing speeds, and I have seen billets of high tensile steel, $7\frac{1}{2}$ in. across, turned to two outside diameters, flanged, bored to two internal diameters, undercut in two places, and internally screwcut 10 threads per inch, in a total machining time of 7 mins. 15 sec. On a centre lathe the job would probably have taken a good turner about a day — and it would have to be a large lathe at that.

Automatic lathes, while not usually dealing with such large and heavy jobs, turn out components such as nuts and screws at a speed which almost defeats the eyesight. Such machines are a fascinating sight to watch, as once they have been set running, individual attention is not required except to feed in new material.

The tool slides are operated by carefully worked-out cams, which present the tools for successive operations with split-second accuracy. In goes the bar at one end, against a stop to position it; in a flash this is away, and the shank is already being turned to size; then the self-opening die to cut the thread, and snap! over comes the parting tool—and another screws falls into the bin. And before you can pick it up another is on its way.

And the Old

"... backwards and forwards ..."

It is curious to think that in this age of capstans and automatics there also exist in certain rural districts wood-turning lathes of the most primitive kind, used principally for the making of chair and table legs. The motive power for these machines is supplied by a sapling, which is bent over the lathe, and connected to the spindle by a length of rope which is taken around it a full turn, with the end then connected with a foot treadle. When the treadle is depressed the spindle is turned and the sapling bent down still further. On releasing the foot-pressure the pull of the sapling as it straightens up revolves the spindle in the reverse direction. Thus, rotation is alternately backwards and forwards, although the hand tool is only employed on the forward turn. It is customary to erect these lathes under a small growing tree, and for this reason they are quite often in the open air.

Not only is this type of lathe centuries old, but many of them in actual use today have been in the same families for generations. Crude as they may be, the skill of the craftsmen who operate them produces work which equals, and often surpasses, modern machine-made products.

Such lathes are also used for turning wooden bowls and similar ornaments, and have even been employed for turning metal objects. The most curious fact, however, is that lathes of almost exactly similar design and operating principle are used in the rural parts of India, and throughout the East. At what period in history the idea was taken from one place to the other; whether the transfer was from East to West or the other way round, or whether the ideas were independently developed is not known.

ON THE RIGHT TRACK (*Continued from page 207*)

est piece of advice that can be offered to a beginner, namely, that while he should bear in mind the possibility of ultimately possessing and running an extensive railway system, he should confine himself, in the first instance, to something less ambitious—something that it is within his powers to lay down and carry through to a reasonable state of completion.

Indeed, the great fun of the thing for us as beginners is to get the wheels turning—to marshal up a goods train in the sidings and send it forth upon an imaginary journey, even though that journey ends abruptly at the buffer stops by the bookcase 6 ft. away. It is in the elementary exercises of laying down the track, wiring it up and running a few simple trains that we gain such invaluable experience. Then when we come later on to tackle something more ambitious we shall be able to give undivided attention to the problems of the day without being perplexed by a lot of additional difficulties that should have been cleared up during our apprenticeship. Therefore, whilst still keeping in mind the possibility of building that large shed in the garden, boarding up and lining the loft, or installing heating in the basement, we shall defer these expensive luxuries and make a start on a light trestle table in the boxroom, or a suitably strengthened table tennis top that can be folded up and stowed away when not in use, or hauled up on pulleys to the ceiling of the spare room or garage.

Sites of this kind, being under living room conditions, can enjoy reasonable protection from damp, dust, and temperature extremes and, what is of at least equal importance, they permit the operator to work in conditions of comfort.

ODDITIES ANSWERS . . .

1. Bottom of the groove in a V-block. 2. Hinge of round nosed pliers, from between the open jaws. 3. Bell centre punch viewed from the point. 4. Back of small adjustable spanner jaws.

MORE READERS' LETTERS

Model Car Comments

Dear Sir,

I am very pleased to see that the model car section has not suffered in the amalgamation of the two magazines, and also the other branches of the hobby are just as well represented. I do feel that model cars as a hobby have a great future if only the Press are encouraging. I notice that some journals are always bleating about speed and foreign engines and parts, but I think that some people will always buy ready-made models. I know someone who makes a good living selling model locomotives, yet his customers claim all the credit at the loco shows.

I think that there is just as much model engineering in cars as any other branch, and I hope to build all my own engines in the future. When I say engines I mean good engines—up to now I have already made sixteen since 1941.

May I make a few suggestions for your excellent journal, lots of people ask me what a Dooling 61 and McCoy Series 20 is like inside. Is there any reason why a detailed drawing and description could not be published; also would it be possible to get some gen. from U.S.A. on engines and cars. By what I have seen no one over there uses standard engines, gears, etc.

All the best to *Model Maker*.

Bristol. B. W. MORRIS.

Slip-up on Bananas

Dear Sir,

Congratulations on the *Model Maker*, of which I have just received No. 1. A nicely timed Christmas present, and very well produced.

Two comments: (a) Please give us more K. N. Harris on locomotives. We have not seen him since the August issue though there have been various other articles for the steam fraternity.

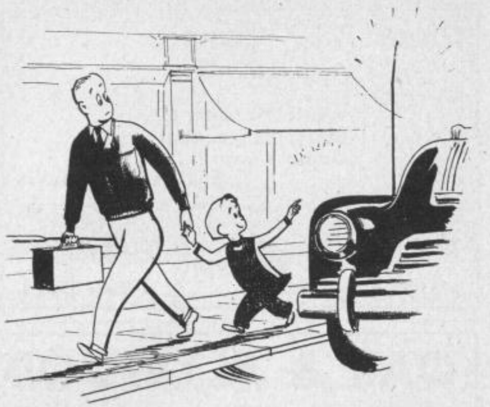
If you could persuade him to write his articles into a book, a companion to the *Amateur's Lathe*, there would be many loud cheers from many of us; (b) "Scrapbox" p. 63. We can't have "duff" technical gen in *Model Maker*. Bananas grow *upwards* on the tree (yes, really!).

Yours sincerely,

Aden Colony. P. N. ISAACS.

DOPE & CASTOR

By JERRY CANN



Look daddy — he has a knock-off switch too ! ! !

WOT! a new cartoonist? In point of fact the amusing sketch at the head of this page was sent in by our old friend and Edmonton Club member L. A. Manwaring, and when I saw it, I wondered how many others must have had the same thought when looking at a car radio aerial! Any other readers with bright ideas and artistic ability?

Our artist of this month sends an eye witness account of Edmonton's first meeting of the season, held at the canteen of Rego Clothiers in Angel Road, scene of the earlier meets. Forty models were present, including plenty of new jobs produced during the winter. Arthur Poyser's golden hued Dooling powered "flying banana" sheared a key in the transmission, lots of Arrows, McCoys and other quick stuff ran, Bill Hearne from Bristol ran three cars, and Eric Snelling has produced yet another new 5 c.c. motor, in this case for the Teardrop.

The 2.5 c.c. class produced a crop of new models, including two Snelling Streamliners and a 4/CLT/48 Maserati with wire wheels and powered by an Elfin, built by Cyril Hart, and an unfinished Ferrari and a $1\frac{1}{2}$ litre G. P. Delage made their maiden runs, also Elfin propelled. Our correspondent's ETA fell sick with valvular disease of the crankcase, so he ran his old original M.G. Trophy car, "Monoposto".

Peter Hugo, busy preparing to defend his Speed Championship title of 1950 in the coming season, tells me that the South African $\frac{1}{4}$-mile record has been pushed up to 124.13 m.p.h. by a Dooling Arrow. Nice work!

The Meteor Club is a hive of activity just now, and the reason is none other than a Rail Track, a real dyed-in-the-wool transportable G.P. circuit for 1 c.c. jobs, as per Henri Baigent's specification, plus any mods. the boys find necessary. This should be good. Incidentally, please note, both the Meteor boys and Henri B. himself point out that although $\frac{1}{4}$ in. dia. tube is stout enough for small circuits, it should be no less than $\frac{5}{16}$ in. for larger and faster tracks.

Following on their heels with other rail schemes are Eaton Bray and Chiltern M.C.C., and it is hoped to tie up the specification to enable cars to be interchangeable on all tracks. More about this in our next issue. In the meantime, it should be made clear that H. C. Baigent is taking out patents on this form of racing, so those who intend to join the fun should contact him direct, at 10 Beverley Gardens, Ensbury Park, Bournemouth. He will not stand in the way of bona fide clubs, but does not desire to see the scheme commercialised.

Gerry Buck writes to say that whilst he deplores even the slight family resemblance to the Old Character referred to last month, which in any case is purely coincidental, he is most grieved to learn that the Old Gentleman should have turned so cantankerous, and wishes it widely known that he disassociates himself with the awkward old so-and-so! It would appear that certain readers, not yet innoculated to the peculiar Cann brand of humour, actually believed that a *cause celebre*, Buck v *Model Maker*, was about to break in the Sunday papers! We hate to disappoint any seekers after sensation, but relations between the parties remain entirely cordial, and *Model Maker* v The Old Character has been settled out of court (in the Goat & Compasses, if you must know!).

Welcome to the new 1.5 c.c. class, now blessed by the M.C.A.! It will give lots more folks a chance to break into competitive racing, and should be both amusing and instructive. Incidentally, even 1.5 c.c. engines are likely to grow too big for rail racing, new style, as it won't be long before this class is really fast. It looks as though 1 c.c. will be the top limit for the circuit racers, at anyrate for the time being, and on the size of tracks at present contemplated.

Will Club Secretaries please bear in mind the availability of this page for notices of impending events. As I remarked a month or so ago, a Coming Events list can be a permanent feature if the necessary information comes to hand in time for inclusion, which means roughly four weeks before publication.

Londoners who would like to see a spot of high-speed stuff should put a tick against March 17th on their calendars, as being the occasion of another of those popular demonstrations staged by Bill Warne and fellow clubmen at the Croydon premises of Messrs. Hubert Dees, the Ford folk. Note, however, that this is a one-day show only, not a week, so don't miss the occasion, which was a great success last year. Speeds of over 100 m.p.h. are quite feasible on this temporary track, and racing demonstrations will commence at about 2 p.m.

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.

EXPERIMENTAL 40 c.c. flat four cylinder two-stroke. Light alloy domed pistons, exhaust manifold, main shaft mounted on ball bearings. Estimated horse power 1.5 at 5,000 r.p.m. Weight 56 ozs. complete with contact breaker unit, but less plugs. A first class engineering job, little used and ideal for extra large radio controlled model aircraft or boat. Selling at a fraction of cost, £15. Box No. 53.

FOR Disposal: Cowlings, plugs, coils, races, castings, semi-machined spares and drawing for four 18 c.c. Comet engines; also unused Good Bros. Beacon receiver, transmitter, less valves. Any reasonable offer considered. Box No. 54.

FULL Samples, lists, patterns, for model makers, toy-makers and home handymen. Advice given on all branches. Get your copy now. Full set 2/6. Sutton Models, Billericay, Essex.

SMASHING Bargains: Wide range Plans for Cars, Planes, 00 Locos, Rolling Stock, Launches, etc. All half price and less. Send requirements. ALSO 1066 Racing Car 5 c.c. Keil engine. Has exceeded 60 m.p.h., £7. HYDROPLANES. Frog Whippet, with 100 diesel engine, £4. Free lance with 5 c.c. Hornet engine, £6. Both new super jobs. Wanted: Hornby Dublo sets and parts for cash. Hammonds, 5-6 Marine Court, St. Leonards-on-Sea.

FOR SALE: Cisitalia car, 10 c.c., McCoy 20, Z.N. wheels, tyres and gears complete. Offers to B. P. Winter, 71 Oakington Avenue, Wembley Park, Middx.

MODEL Racing Car complete, less engine, diff., clutch body, tank, etc., £6/10/-. R. Smith, Burley, Nr. Oakham, Rutland.

TWELVE ex-Government super detailed (100 ft. - 1 in.) British and enemy Warships, £4. Worth treble. Photographs loaned. Rhodes, 62 Eastern Avenue East, Romford.

EARN Cash Spare Time making scale model bungalows at home. Top rates paid. Send stamped addressed envelope for free details. Bennett Models, 10 Duncan Road, Richmond, Surrey.

FOR SALE: Elfin 1.49, run 3 minutes only; boxed as new 47/6. Howes, 8 Hooton Street, Pitsmoor, Sheffield 4.

WANTED: Clockwork P.2 Alfa Romeo, complete and in good condition. Please state price required. Box No. 51.

WANTED: *The Model Car News*, Vols. 1, 2 and 3, bound or unbound, but must be absolutely in perfect printers mint condition including photographic front covers. Box No. 51.

MODEL MAKERS! Bargain Prices still prevail. Informative catalogue. Materials, Books, Tools, 4d. M.E.S. 21, Kenilworth Road, Edgware, Middx.

THIMBLEDROME .099 Arden in box, £8; 1.49 Allbon powered car, £4. Both new, and complete. Details given. Stephenson, 9 Westbourne Grove, Manchester 20.

WANTED: Hornby, Trix, Hornby Dublo, or similar train sets, accessories or layout. Halton, La Court, 40 Garthdale Road, Liverpool 18.

McCoy: Duro-Matic New Midget Racer, hot point plug; with push-off stick. New. Offers to Box 55.

4 INCH Drive Tyres to fit Dooling hubs; 8 pairs at 10/- per pair. P. Hugo, 98 Swarkestone Road, Chellaston, Derby.

BAIGENT 2 c.c. Maserati for sale; in perfect running order. Bargain, £15. Complete with lock-up box. Box No. 56.

GALLEONS: Kit to make galleon approx. 12 in. long, easy to build, lovely model when finished, 12/6 post free, stamp for full list. Trade enquiries invited. The Hobby Shop, Bold Street, Southport.

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.