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APRIL 1961

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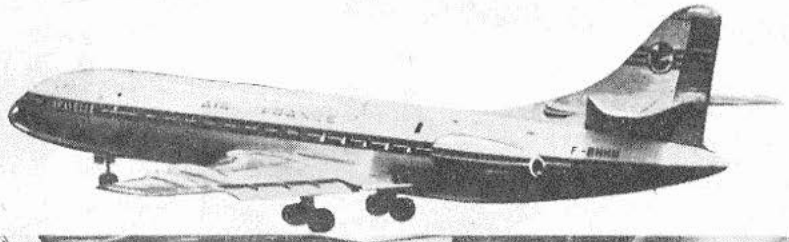

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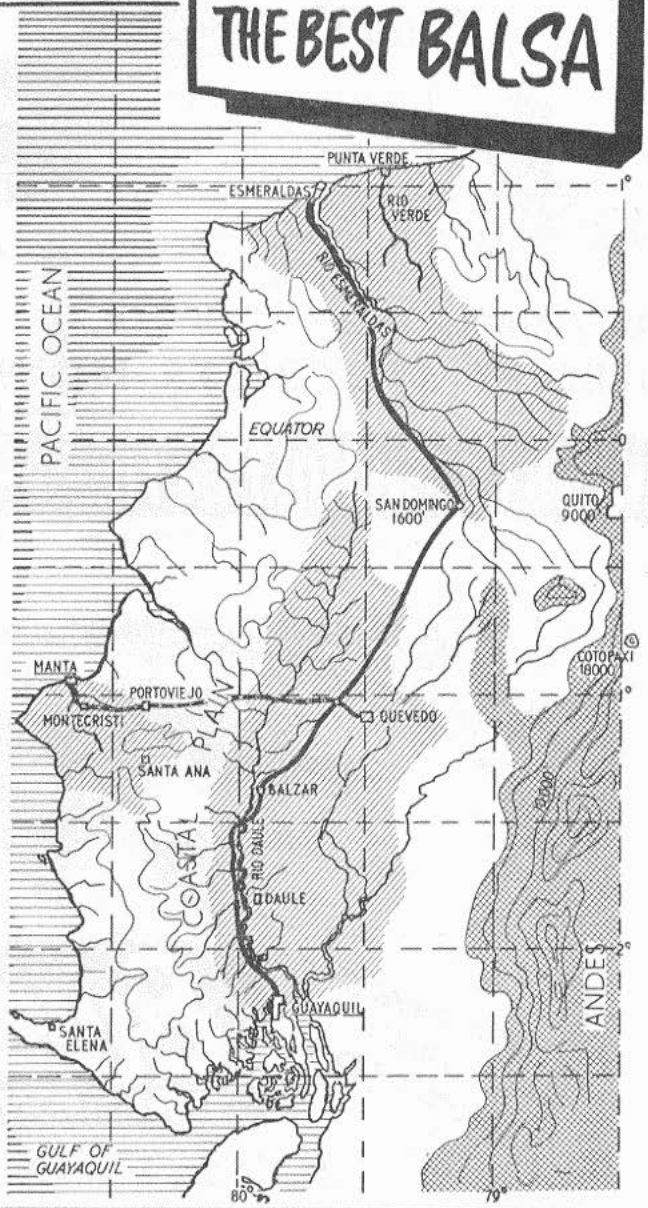
On this map of Ecuador I have indicated the main Balsa-producing areas.* The biggest of these is the Guyas Basin and its tributaries with the port of Guayaquil at its mouth. The next biggest is the Northern area which is based on the port of Esmeraldas and the third area is based on the port of Manta, but this last area is hardly a producer at all now. During the war, Balsawood was dragged out of every corner of Ecuador even on the east side of the Andes.

In Guayaquil are situated the mills of the two big American Balsawood suppliers and two other mills from whom we buy certain quantities. In Esmeraldas there are two main saw mills and we take the whole of the production from this area. Next month I am going to publish two photographs, one of each of these two mills, and I think it will give you some idea of the size of them and the amount of Balsa they cut.

On the map I have also indicated the drive I made in a Land Rover lasting from five o'clock in the morning to eight o'clock at night. Some of it was over old roads in very bad condition, but the stretch from Quevedo to Santo Domingo was over a road still at the stage of having three-quarters of it graded and one-quarter where we just had to take to the jungle.

Believe me, it was the most tiring and frightening drive of my life, and I would not like to do it again. A Land Rover is not made for long distance travel nor are the roads suitable for the speed at which South Americans drive. But I saw all our shippers and sources of supply and that is one of the reasons why Solarbo is the Best Balsa.



* Diagonally shaded areas

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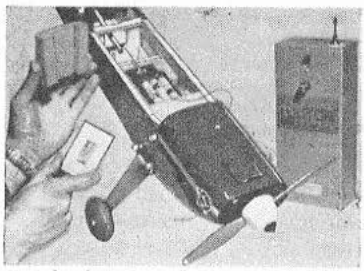
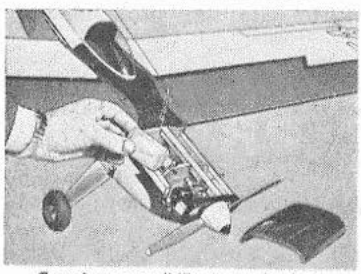
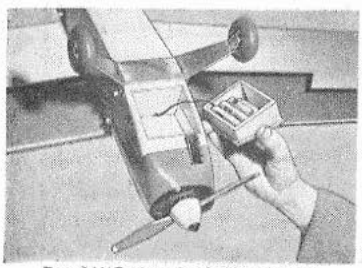


Ample room for Radio and Servos.



Complete accessibility to engine bay.



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MODEL aircraft

APRIL 1961

No. 238 VOLUME 20

The official Journal of the SOCIETY OF MODEL AERONAUTICAL ENGINEERS

IN THIS ISSUE

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Here and There

THE proposal that the S.M.A.E. should revise its form of full voting membership, changing it from a club to an individual basis, should be scrutinised with considerable care. Although there is, of course, a form of individual full membership available at the moment (Country Member), this is designed purely for persons who may not have a club in their immediate vicinity. Another current form of individual membership to the Society is Associate. This is a comparatively recent innovation which allows fliers who are not interested in contest work to belong to the S.M.A.E. and receive third party insurance cover. Neither Associate nor Country Members may hold office, nor do they have a vote.

At the moment many club members, particularly officials, are full members of the Society, and although they may not be active contest fliers, they do much useful work for the Society. Make membership wholly individual and such people would no longer have any incentive to be full members, added to which, such a move might well completely undermine the entire club movement, on which modelling largely depends for the acceptance and instruction of newcomers to the hobby.

In our opinion, should such a change be made, then only active contest fliers will pay full membership fees and, although many others would doubtless join as Associates, a considerable loss of revenue to the Society would result.

We feel that if the S.M.A.E. is to fulfil its function as the governing body of the hobby, then it has much work to do in encouraging and catering for non-contest fliers. At the moment it appears largely to exist for the benefit of active contest fliers and many first class non-contest modellers have little or no interest in the Society.

At this stage the whole question of membership is still only under consideration, but we are putting our views on record because we think that as many opinions as possible should go into the problem before the final decision has to be made. The S.M.A.E. is the butt of much ill-informed criticism, but here is a chance for modellers to put forward helpful and constructive views. Write and let us know what you think.

STOP PRESS

Due to circumstances beyond the control of the S.M.A.E. the **NATIONALS WILL NOT BE AT WATERBEACH.**

New venue will be announced as soon as possible.

Model Shop Directory

EVERY morning when we open our postbag, we can guarantee that among the host of queries will be at least one from someone who

has just started modelling, or moved to a new district, asking for the address of his nearest model shop and whether "XYZ" goods are stocked. It has now become apparent that our existing list is getting out of date, so in order to satisfactorily provide this essential service to our readers, as well, incidentally, as to provide shops with often well-deserved publicity, we are compiling a new list.

To this end we have printed a short questionaire which has been sent to the shops on our present list, but if you, Mr. Retailer, have not received one, then just drop us a line and we will forward a form for your completion.

In order to make the new list as comprehensive as possible we also ask readers to assist by drawing this paragraph to the attention of their local shop, so that if they have not received a form, or seen this paragraph themselves, they can get in touch with us.

Our address is MODEL AIRCRAFT, 19-20, Noel Street, London, W.1, and we would remind everyone that this service is free.

R/C Beginners

THE article entitled *Radio Installation* in this issue, is the first attempt by a model magazine to assist beginners in R/C over some of the snags which arise in installing specific equipment in a specific model. Previous articles have always tackled this subject in a general way, leaving it to the individual to select the points applicable to himself. We believe that this present feature will be far more useful as, basically, all single channel installations are very similar, and the answers we found to the snags that cropped up will, equally, apply to the bulk of equipment likely to be encountered.

A further unique point is that the article has not been written by a radio expert, who, by being *au fait* with the subject, is likely to overlook the sort of problem that will stump a beginner. In order that this point should not arise the article was prepared by the MODEL AIRCRAFT staff, who, although they are experienced aeromodellers, have only a limited knowledge of R/C—the exact type of person who would be graduating to his first radio model.

In case this should seem to be a case of the blind leading the blind, we hasten to point out that as problems arose which we were unable to solve by common sense, we called on R/C experts for help. Thus the benefit of authoritative advice on points obscure to a beginner is now passed on to readers who may not have ready personal access to an expert.

As you read the article you will see how our model was successfully completed and next month, weather permitting, we will describe our first flights with our first radio controlled model. The success, or otherwise, of our efforts will be told in a future article, in which the solution to any further problems we encountered will be passed on to you.

Linguist Wanted

IF there is an English modeller who can write in German, then Bernhard Kluxen, 22c, Eschweiler, Huchelnerstr. 2, Germany, who has been modelling for eight years, would like to exchange ideas, plans, etc., especially of R/C models. (*An excellent opportunity for someone to brush up on his German at the same time—Ed.*)

Camping at the Nats.

GOOD news for those who will be camping out at the Nationals this year. Arrangements are already in hand, and, to avoid the overcrowding which occurred last year, accommodation will be dealt with on an *individual* basis, the charge being 5s. each. Clubs must send the names of campers when making their contest entries and separate, non-transferable, tickets will then be issued.

Increased Entry Fees

AFTER being "frozen" for many years the entry fees for S.M.A.E. contests will be increased with immediate effect. Seniors must now pay 2s. 6d. per entry and juniors 1s. 6d. but, the special trials fee remains at 10s. 6d.

Clubs who have run out of the special competition entry forms and result sheets are reminded that these can be obtained from the S.M.A.E., 19, Park Lane, London, W.1, provided they send a stamped and addressed envelope.

1961 "Indoor" World Championships

GREAT BRITAIN will definitely be running this event at R.A.F. Cardington and a better venue would be hard to find in the whole of Europe. It is hoped that it will be possible for competitors and officials to be housed on the station and, if our August Bank Holiday weather (actual dates: August 5th-8th) is up to the usual standard, the airship hangar will be the best possible place to spend the weekend!

Further Cardington dates for your diary are: April 15th-16th, June 10th-11th, July 15th-16th and September 9th-10th, but remember at *all* these meetings it is *essential* to notify the S.M.A.E. of your intended attendance or the police control will not admit you to the station.

On the Cover

AGAINST the advice given in our article on photography in last months' issue, our cover shot was taken with the sun almost in the camera lens, which does prove that you can ignore the rules—with striking results—provided you are an expert, or very lucky!

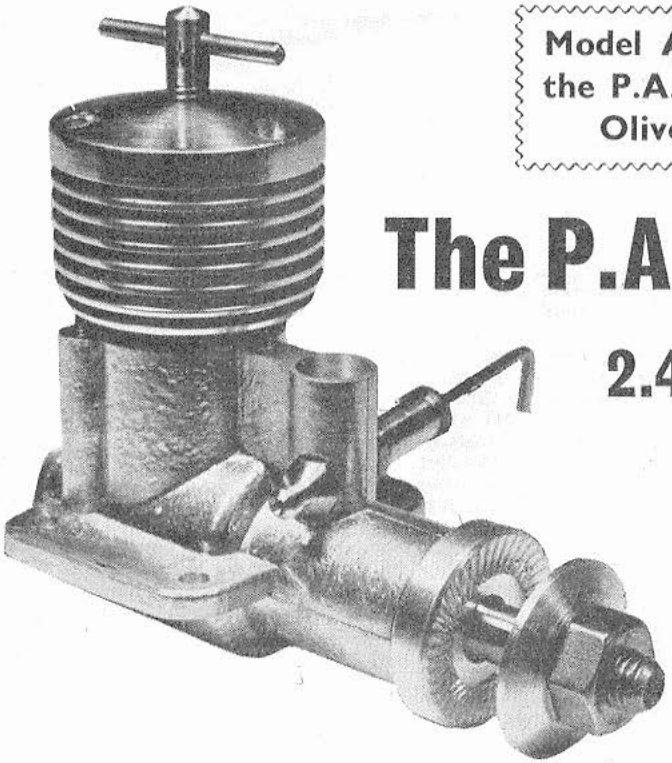
The subject is Andras Meczner, a member of the winning Hungarian team at the 1960 World Power Championships, where this photo was taken. The striking decoration is typical of the Hungarian models, which were all impeccably turned out.

We were present recently when the Esher & D.M.A.C. held a successful exhibition, film show and parents evening. The photo shows Mr. & Mrs. Rissen, parents of two juniors, presenting a cup to club Chairman, J. E. Jones, for future competition. Some of the speakers seated from left to right are —W. Titcombe, Vickers designer; C. F. Andrews, Vickers P.R.O. (who provided the films) and A. F. Houlberg, M.B.E., A.R.Ae.S., Chairman of the S.M.A.E.

Model Aircraft Engine Tests—the P.A.W. 2.49 Mk. 3 and the Oliver Tiger Cub Mk. 2

The P.A.W. 2.49 Mk. 3

2.47 c.c. diesel motor



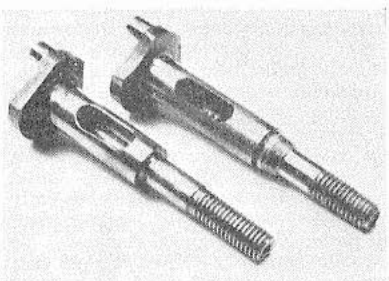
"... the most powerful 2.5 c.c. diesel available at less than £5 ..."

AS mentioned in our February issue, the new Mk. 3 P.A.W. is an improved version of the P.A.W. Special 2.49-D that has been on the market for the past four years and the Mk. I and Mk. II versions were tested in our July, 1957, issue.

The principal changes include transfer timing more closely approximating the exhaust timing, re-shaped exhaust ports, modified intake timing, a new cylinder material, a slightly smaller diameter cylinder jacket, a lengthened main bearing, a stronger shaft and a revised prop driver. These changes are accompanied by a 22 per cent. reduction in price to £4 18s.

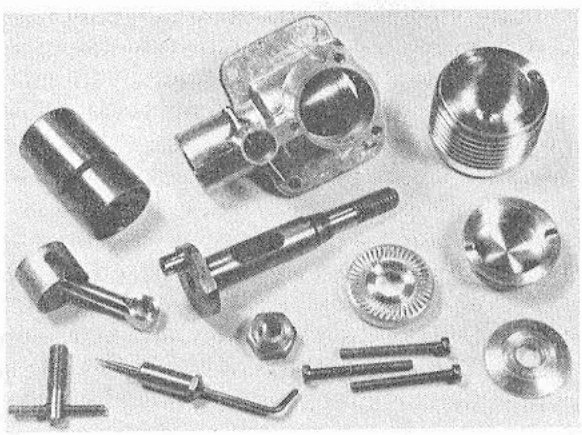
The P.A.W. is a single ball-bearing engine with the shaft intentionally made a very easy fit in both the ball-bearing and the outer supporting bush. In our engine, the fit was, in fact, so free as to cause the shaft, when turned by hand, to rotate in the race and the latter probably operates as much as a thrust race as a journal bearing. The shaft, which is now hardened, is of normal diameter ($\frac{3}{8}$ in.) and has a 7/32 in. gas passage. As on the previous model, however, the rotary valve port takes only a relatively small segment out of the shaft circumference and thereby avoids the structural weak point of a large port in a normal sized shaft. In fact, in the Mk. 3 the width of the port is further reduced by comparison with the Mk. II and this, in conjunction with a narrower induction aperture in the bearing, reduces the rotary-valve period quite appreciably—from 175 deg. to 140 deg. The valve now opens at approximately 65 deg. ABDC and closes at approximately 25 deg. ATDC. The all-important free flow of gas is, nevertheless, maintained by extending the length of the valve port (it is now some $\frac{9}{16}$ in.) and by using a correspondingly long parallel-sided aperture in the thick walled front bushing. This means that the valve opens and closes very abruptly to make maximum possible use of the intake period.

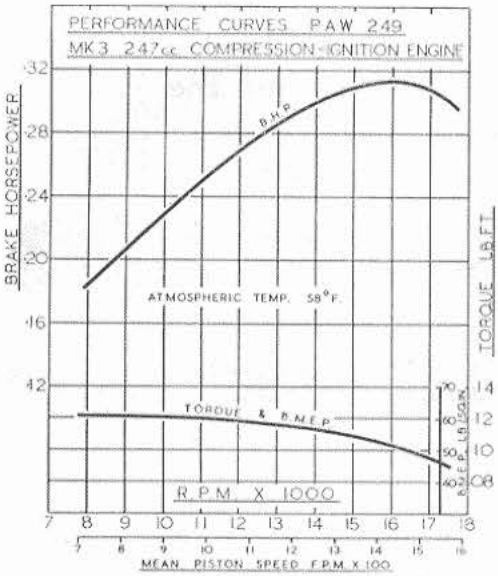
The characteristic P.A.W. transfer port system, consisting of three very wide and smoothly contoured internal flutes, is continued in further enlarged form, in the Mk. 3. These now extend higher up between the exhaust ports to give a longer transfer period and the exhaust ports, therefore, have, of necessity, been reshaped and are wider at the top edge and narrower at the bottom



Left—the Mk. III P.A.W. crankshaft (right) compared with that of the Mk. II. Note the slightly narrower valve port, lengthened journal and tapered (hub fitting) section for added strength.

Right—component parts of the P.A.W. 2.49 Mk.3.





edge. The cylinder remains basically the same, being plain and parallel externally and located at its bottom edge by a narrow annular seating in the crankcase casting. It is, however, now made in heat-treated high-tensile steel instead of silver-steel as hitherto.

The main casting is slightly changed and has a lengthened nose section carrying a $\frac{3}{16}$ in. longer main bearing bush. The eight-ball Hoffmann ball journal bearing, as used in our previous test model, is replaced by a seven-ball Ransome and Marles bearing in the present engine. Overall crankshaft length is unaltered, but, by virtue of a longer journal section and an integral tapered section for prop driver fitting, the reduced diameter ($\frac{1}{4}$ in.) propshaft section is shortened by 30 per cent. to improve resistance to crash damage. The cup shaped prop driver partially enclosing the main bearing housing, as used on the earlier model and which was mounted on the shaft by means of a split tapered collet, has been abandoned in favour of a conventional, heavy duty alloy driving disc.

The long beam mounting lugs, reducing frontal overhang and giving more balanced support, are continued in the Mk. 3. Weight has gone up very slightly, but, at 5¼ oz., is still moderate for an engine of this size and type. The spraybar is installed at an angle through the carburettor to bring the needle-valve control further back from the prop and cannot, therefore, be reversed from its left-hand position. There is sufficient shaft length ahead of the prop driver to accommodate props of all pitches likely to be required.

Specification

Type: single-cylinder, air-cooled, reverse-flow scavenged two-stroke cycle, compression ignition. Crankshaft type rotary-valve induction with sub-piston supplementary air induction. Conical crown piston with matching contra-piston.

Bore: 0.597 in. Stroke: 0.538 in.

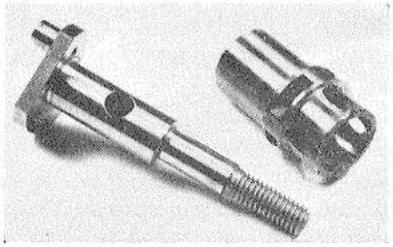
Swept Volume: 0.1506 cu. in. = 2.468 c.c.

Stroke/Bore Ratio: 0.901 : 1.

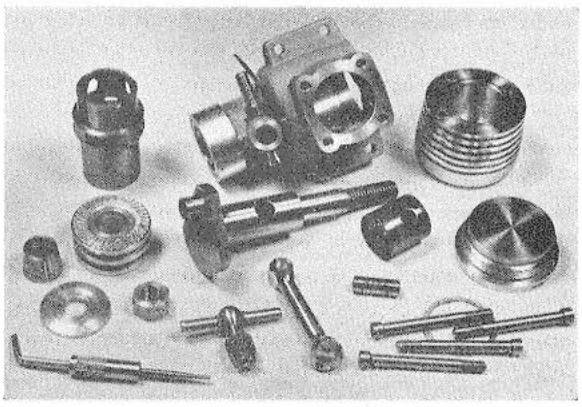
General Structural Data

Gravity diecast aluminium alloy crankcase and main bearing housing with integral carburettor intake. Screw-in rear cover. Hardened high-tensile steel counterbalanced crankshaft with $\frac{3}{8}$ in. dia. journal and 13/64 in. dia. crankpin and running in $\frac{3}{8} \times \frac{5}{8}$ in. R. & M. ball journal inner bearing supplemented by pressed-in Meehanite outer bush. Cylinder sleeve of high tensile steel, heat-treated, ground and lapped, located by narrow annular seating in crankcase and axially clamped by cylinder head screws. Lapped piston of Meehanite with pressed-in gudgeon-pin and machined RR.56 aluminium alloy connecting-rod. Machined alloy finned

Continued on page 104



Left—the crankshaft and cylinder of the Cub Mk. 2. Shaft is a generous ⅜ in. dia. at the valve port.



Right—component parts of the Tiger-Cub Mk. 2.

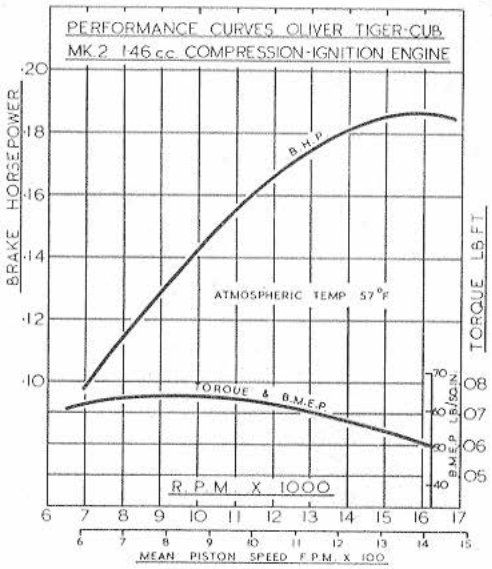
for them and the position has been such that purchasers have often had to wait months for delivery.

This is not merely a case of lack of enterprise on the part of the Olivers. Their policy is to build only top grade engines. The Tiger Mk. 3 motor has been so successful in team-racing and F/F contest work only because it is built to the most exacting standards, not because it is radically different in design. To attempt "quantity production" of such a motor, the Olivers believe, could only result in a deterioration in quality and performance. Therefore, the Oliver Tiger continues as it began: as a craftsman-built product.

The reputation of the Oliver diesel in the model aircraft world (previously J. A. Oliver specialised in model racing car units) has been built up almost entirely by the 2.43 c.c. Tiger Mk. 3, now in its seventh year of production. At the time when the Mk. 3 superseded the Tiger Mk. 2 in 1954, a 1.5 c.c. model, called the Tiger-Cub, was also put on the market. After being in production for a year or so, however, the Tiger-Cub was withdrawn. Primarily, this was because demand for the 2.5 c.c. Tiger for international class contest flying indicated the need for a one-model policy to try to supply this important market. Secondly, despite a slightly lower selling price, the Cub was actually more expensive to produce than the Mk. 3. Thirdly, the makers were, themselves, not entirely satisfied with the Mk. 1 Cub, for, although its performance and handling were unsurpassed at that time, its use of a ¼ in. dia. crankshaft proved to be a weak point and a complete re-design appeared to be the only answer.

Some time elapsed before the prototype Tiger-Cub Mk. 2 appeared. Two engines were constructed in 1958, one of which was submitted to us for a preliminary test. Now, the Cub Mk. 2 is at last in production and the indications are that this has been well worth waiting for.

The Tiger-Cub Mk. 2 is of typically "Oliver" design and construction, but is a completely new model and none of its parts are interchangeable with the equivalent Mk. 1 component. The engine has a shorter stroke and larger bore than the Mk. 1 and a much more robust crankshaft. The shaft has, in fact, the same sized journals as the 2.5 c.c. Tiger. This has permitted the use of a very large gas passage (¼ in. dia.) through the shaft, although the valve port and intake aperture through the bearing are of normal size and give a quite modest induction period of approximately 130 deg. (75 deg. ABDC to 25 deg. ATDC). The exhaust period is approximately 134 deg. (as measured on our test motor) and the four exhaust ports are quite narrow in order to make room for enlarged transfer ports. These latter are of the usual Oliver pattern, drilled at a steep angle through the skirt of the liner to emerge between the exhaust ports. Incidentally, these ports extend almost to the level of the top edge of the exhaust ports to give a transfer timing which is close to that of the exhaust timing. Such advanced transfer timing is a current trend in high performance model engine design, but is not new to the Cub: the Mk. 1 had a similar degree of transfer overlap.



Needless to say, fits and finishes throughout are first class. Exterior appearance is in the usual Oliver tradition: a superb shot-blasted main casting and a fine machined finish on all other parts.

Specification

Type: Single-cylinder, air-cooled reverse-flow scavenged, two-stroke cycle, compression ignition. Crankshaft type rotary valve induction with sub-piston supplementary air induction. Conical crown piston and matching contra-piston.

Bore: 0.465 in Stroke: 0.525 in.

Swept Volume: 0.0892 cu. in. = 1.461 c.c.

Stroke/Bore Ratio: 1.129 : 1.

Weight: 4.1 oz.

General Structural Data

Gravity die-cast crankcase and main bearing housing of LAC.113B aluminium alloy, fully machined, shot blasted on main external surfaces. Screw-in crankcase backplate machined from alloy bar stock. Counterbalanced crankshaft of EN.202 steel, hardened and ground, with ⅜ in. dia. inner and ¼ in. dia. outer journals, 13/64 in. dia. crankpin, and mounted in one ⅜ × ⅞ in. and one ¼ × ⅝ in. ball journal bearings. Hardened, ground, honed and lapped cylinder liner of EN.32 steel, flanged at exhaust level to seat on crankcase and encased by finned cylinder barrel and head unit. Cylinder assembly secured by four long screws into casting. Machined RR.56 high-duty alloy connecting-rod, coupled to Meehanite piston by 5/32 in. dia. fully-floating gudgeon pin. Machined alloy prop driver mounted on shaft via steel split taper collet. Brass spraybar type needle-valve assembly with ratchet device and reversible for left- or right-hand control. Beam mounting lugs.

Test Engine Data

Running time prior to test: 3 hours.

Fuel used: Record Powerplus diesel.

Performance

Starting qualities of the Cub were excellent. Port priming was found to be quite unnecessary and the engine

started promptly, hot or cold, after choking the intake only. Easy starting, free from any tendency to "bite" was obtained even on 6 × 4 props, although such diameters, permitting speeds well above peak power r.p.m., will not normally be used.

No power loss on warming up was detected over the speed range tested which extended from 6,500 to 17,000 r.p.m. At high r.p.m., however, control adjustment was fairly critical in so far as a tendency to misfire began to occur as the engine warmed up irrespective of fuel used and to control this, very precise setting of the needle-valve and compression adjustment was required for load speeds above 12,000 r.p.m. As this occurred only after the engine had become fairly hot, however, it is quite possible that it would not be encountered under normal flight conditions where cooling might be better.

The performance of the Cub was, from the outset, clearly exceptional for a 1.5 c.c. motor. Torque reached a maximum of 0.075 lb. ft. or 14.4 oz. in. at between 9,000 and 10,000 r.p.m., equal to a b.m.e.p. of nearly 64 lb./sq. in. which is the best 1.5 we have recorded.

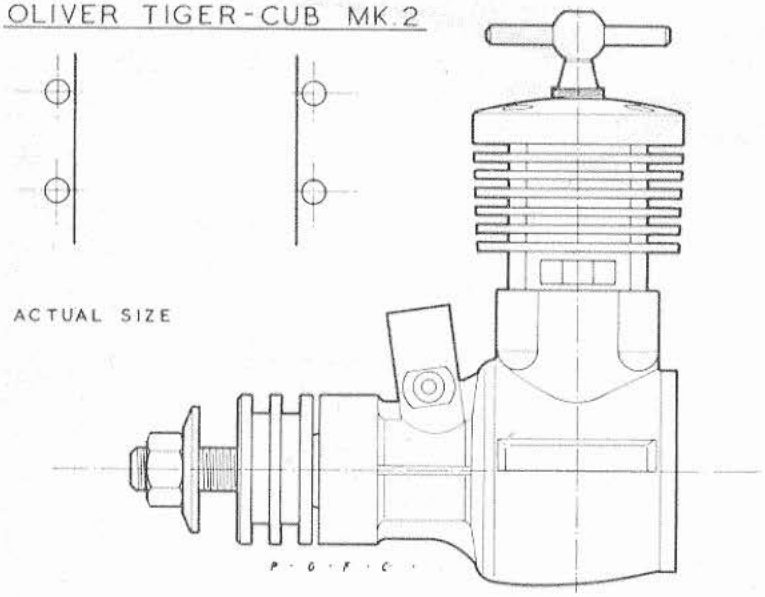
The decline of the torque curve as speed was increased was quite moderate and, as a result, the engine delivered 0.18 b.h.p. at 14,000 r.p.m. and went on to reach a peak output of 0.186 b.h.p. at 16,000 r.p.m. In terms of prop r.p.m. the Cub proved capable of turning a 7 × 3 P.A.W. prop at 16,200 r.p.m., a 7 × 4 at 14,500 r.p.m., an 8 × 4 at 12,300 and a 9 × 4 at 8,700.

In conclusion, we would rate the Tiger-Cub a really outstanding motor and a worthy companion to the famous 2.5 c.c. Oliver Tiger. For a motor of only 1.5 c.c. it is rather expensive (£6. 11s. 6d. including tax) but, even so, it will doubtless find plenty of willing purchasers among keen contest enthusiasts.

Power/Weight Ratio (as tested): 0.72 b.h.p./lb.

Specific Output (as tested): 127.4 b.h.p./litre.

OLIVER TIGER-CUB MK.2



P.A.W. 2.49 Mk. 3

Continued from page 102

outer cylinder barrel, sliding fit over cylinder sleeve and held down by three machine screws into main casting. Alloy prop drive hub, taper fitted to shaft. Angled brass spraybar type needle-valve assembly fitted for left-hand operation. Beam mounting lugs.

Test Engine Data

Running time prior to test: 4 hours approximately.

Fuel used: Record Powerplus diesel (castor base, 4 per cent. nitrated).

Performance

Starting qualities of the P.A.W. were extremely good and a rapid start, both hot or cold, was obtained at all times after finger choking only and without port priming. This easy starting was maintained on props down to the smallest sizes likely to be employed.

Some loss of power on warming up was evident when the engine was loaded for speeds below about 12,000 and was particularly noticeable at the lowest speeds. No measurable power loss was, however, detected at the more important speeds above 13,000 r.p.m. As a result of this power loss at moderate r.p.m. the torque developed at speeds below 12,000 r.p.m. was slightly below that of the Mk. II model but above this figure, a flatter torque curve was maintained, resulting in improved top-end power. The actual b.h.p. peaking speed was raised by approximately 500 r.p.m. to 16,000 and output improved to a figure of 0.314 b.h.p. This clearly puts the Mk. 3 among the hotter varieties of 2.5 diesels currently available.

In terms of propeller speeds, 9,900 r.p.m. was obtained on a 9 × 6 Frog nylon, 10,500 on a 9 × 4 Trucut wood, 14,700 on an 8 × 4 Trucut and 17,400 on a 7 × 4 Trucut. The best choice for contest F/F (F.A.I. class) would appear to be an 8 × 4, static speeds ranging from 13,500 to 15,000 being obtainable on these, according to type, and allowing the engine to approach, or reach its peak, in the air.

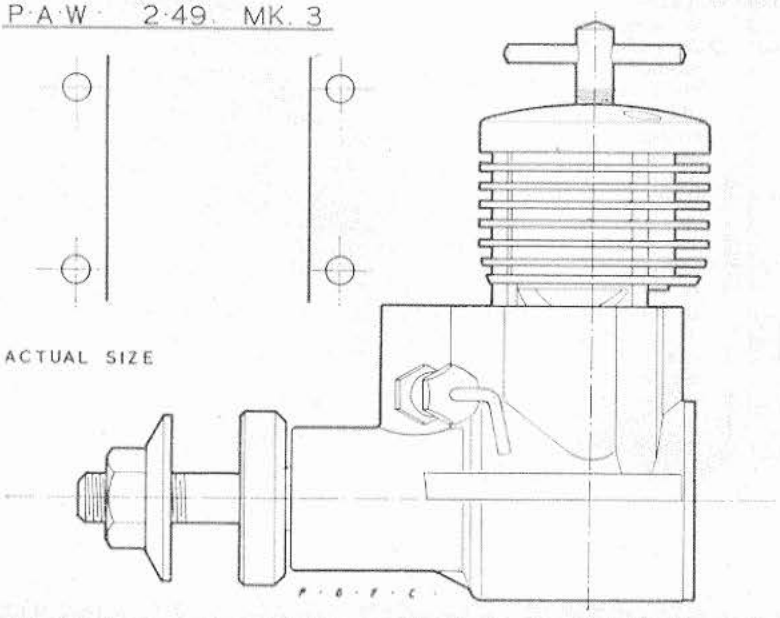
Running qualities were generally good and both controls held their settings firmly at all speeds.

To sum up on the basis of our findings with the test engine, the P.A.W. Mk. 3 offers excellent all-round performance and, as the most powerful 2.5 c.c. diesel currently available at less than £5 inclusive of purchase tax, is very good value.

Power/Weight Ratio (as tested): 0.97 b.h.p./lb.

Specific Output (as tested): 127.5 b.h.p./litre.

P·A·W· 2·49 MK. 3



TOPICAL TWISTS

by PYLONIUS

Flounder Members

I suppose it's all right to go round, cap in hand, to the local councils and other land-grabbing bodies for the use of a corner of one of your old model flying sites. You're not asking very much; just enough elbow room for a combat beat up. But you might as well ask for the moon. In fact, you stand more chance of a bit of off-beat flying space if you filed your application with a Russian rocket station. The air on the moon might be a bit thin, but not as thin as the air into which all our flying fields are rapidly vanishing.

Still, I prefer to do my flying with no strings attached, official or otherwise, and somehow or other I manage to grab me a bit of gash lebenraum for a spot of acre touring free flight. So I'm surprised that the C/L situation has got to the point where the handle wavers have to wade waist deep in the briny in order to scavenge a bit of unprohibited air. Not quite up to their necks in trouble yet, but not far off.

And what are these surf users likely to do for helpers? No man is an island, even if he is completely surrounded by water. Most adults would be frightened off by the thought of double pneumonia, while the eager small boy, standing two feet below sea level, would be a dead loss in more ways than one.

However, if you happen to be the adventurous type, the romantic appeal of winging your way around the creeks and inlets of the historic Cornish coast would make light of these drawbacks. What was once the haunt of smugglers and wreckers would become a modeller's paradise; though, if our record of model crashery and engine importation is anything to go by, fings won't be all that different from what they used to be.

Perhaps when the last modeller has been driven off the semi-aquatic wastes of Chobham, we'll all go down to the sea in earnest. And the day may not be far off when the Nationals will be held at some more literal Waterbeach like Southend. While toddlers romped on the sand and Mums paddled, contestants in the Gold Trophy would be fighting it out in three feet of muddy water.

" That was a remarkable display of stunting, Mr. Bloggs. We have never seen such extraordinary manoeuvres. How is it you have not shown such brilliant form in the past? "

" Never had a blinking crab on me toe before."

Of course, in due time, the coastal traffic, which is already pretty fierce, will become overwhelming. Then we'll have no other choice but to go the whole hog, or rather fish, and do our flying under water. It shouldn't be all that difficult with snorkels and things.

Come to think of it a submarine modelling session would make a good feature for Hans and Lottie. It could start off with the usual blurb: " Two thirds of the earth's surface is covered by water, one third of it falls on Britain," etc. The commentary might then proceed thus:

" Now ziss model is a very interesting one, having many of the characteristics of zer Moravian Terpsichord. Zee same way of propelling itself by the rapid rotation of its forward gills. And, there, you zee, zer zame curious 'abit of suddenly darting down and burying itself in the sandy bottom. . . ."

10 cc. and All That

Club histories are in the news just now, giving a look back into our glorious past more in sorrow than in anger. And, with all the famous names lined up for a " This is Your Life " duffy, it would be a pity to overlook some of the smaller club fry, especially those with character, like the Little Ditchum M.A.C. Therefore, just in case the dossiers don't get that dossy, here's a short history of that unique club:

It was back in 1920 that the first A Frame Pusher blazed an epoch making trail over the Little Ditcham Common to terminate its historic flight in the back of the Squire's neck. Since that time the club has been without a permanent flying field, but, in spite of this initial setback, the club has survived through a long and chequered career—an achievement for which all praise is due to our Chairman and Founder Member, Mr. I. Prangem.

In 1930 the club moved into a phase of greater expansion when it acquired a second member, a Mr. D. M. Witt. The new member was given the post of Hon. Treasurer, and although it is many years now since he severed his connections with the club, the Chairman has not forgotten him. Anyone knowing of his whereabouts should notify the Chief Constable of Wettex.

It was in 1935 that I. Prangem built his famous Wakefield; the first heavier than hot air machine that the club had produced for a decade. It was no world beater, although it had given that part of it which comprised Farmer Modclopper's meadow one or two nasty clouts. Possibly, it was one of the first models to have a folder—the village constable had a systemic way of keeping his records.

Membership increased rapidly in the immediate post war period, when excitement ran high at the prospect of a model other than the Chairman's pre-war Wakefield taking the air over the meadow. Alas, nothing was to come of this, although it is on record that a fully fledged chuck glider was actually completed, the remains of which can be seen to this day doing valiant work on the village wind pump.

A notable event in the club's history was a visit to the 1950 Nationals, for which the club provided its own transport. The journey to York took two days, but the Farmer's brood mare completed the trip without mishap, and, in doing so, earned itself the name of Black Bess. The sense of humour of the villagers was further demonstrated by an enthusiastic turnout for Farmer Modclopper's pitchfork party. Understandably, the good Farmer was a trifle sore over the borrowing of his bony horse, but not nearly so sore as the Chairman.

Of late the club has stepped up its activities by a display at the village fete, which, incidentally, caused more excitement than the Ankle Contest. Also, we were guests of the local Women's Guild, although, it should be said, that this was due to some slight confusion over the exact meaning of a " Model Demonstration."

The new club insignia is both smart and modern. A power model rampant with two headless spectators regardent. New members are always welcome. In fact, just one would do—to take the strain off the Chairman's winding gadget.

Counter Intelligence

Model shopping in this plastic day and age usually means a furtive dive into the side door of the toy shop, so it may surprise some of the younger of you to know that, back in the days when aeromodelling was a hobby and not a junior " do-it-yourself " stint, model aircraft shops, exclusively devoted to our bizarre needs, flourished on almost every street corner. In fact, if you didn't have one just down the road you were really in the sticks.

These balsa dispensaries would meet your most outlandish demand without so much as a twitch of an eyebrow. Unlike the toy shop they wouldn't start dragging out the rocking horses if you asked for a bobbin, nor would they enquire the age of the child if you were after a kit.

It might surprise you even more to know that some of these model only establishments still survive, though they only exist in the big cities and are fashionably known as hobby centres.

Naturally, in such high toned places, you are met with real efficiency, plus an intimate knowledge of the trade.

" Brass bushes? Sorry, Sir. No demand for that sort of thing nowadays. Perhaps you would care to see instead our new line in fully transistored transmitters—just in from the States."

Service in the local toy-cum-model shop hasn't quite the same smooth assurance:

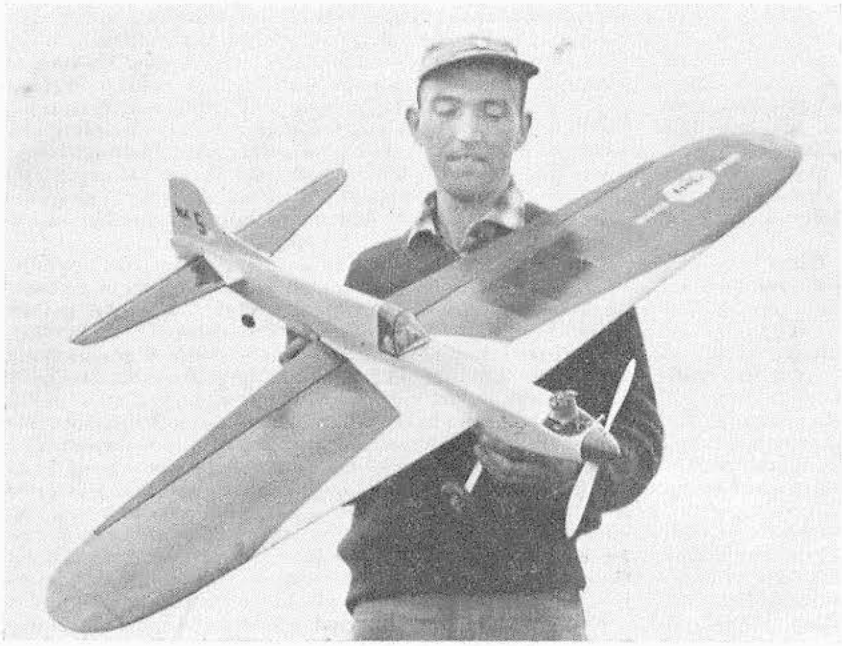
" Bert! Gentleman 'ere wants to know if we've any glass bushes."

Bert heaves into view from behind a screen of teenage dolls.

" What's that? Oh, you mean brass bushes. Nah, let's see. Try that matchbox down there. No, not the one with ' Dolls Nappy Pins ' on—the one next to it. Ah, there you are, sir."

And, there, sure enough, you are. Amazing.

Ray Brown's – COY-KAT



The top British stunt design of 1960

WITH first placings in stunt during 1960 at the Nationals (Gold Trophy), Sidcup, London Area, Enfield, Ashford and High Wycombe Rallies, plus the World Championship Trials, it can justly be claimed that *Coy-Kat* is contest proven! How it compares in performance with "classic" American designs must remain a matter of individual pilots' opinions and prejudices, but compare with them it does, as witness the performances of Don Still and Bob Palmer when they flew *Coy-Kat* after the contest in Budapest, which, incidentally, also showed that it is not a "one man" model.

The straightforward construction presents no difficulty to a builder who considers himself competent to handle a large stunter, but the following "sequence of events" will prove useful.

Construction

Fuselage—Cut two sides from $\frac{1}{8}$ in. sheet and attach the m.m. ply doublers and motor mounts. Sandwich the front U/C wire between the ply formers then assemble the fuselage with the ply formers and $\frac{3}{8}$ in. sq. tail post. The shaped rear block should also be added at this stage.

Wing—The ribs are cut sandwich fashion, as shown on the plan, except for the two tip ribs which are cut separately. Cut the trailing edge from $\frac{1}{16}$ in. sheet, pin the lower section to the plan, and cement the ribs in their correct order. Lightly cement the mainspar, sub-spar and leading edge in place, then add the top half of the trailing edge. Remove from plan and sand lightly. Now lightly cement the remaining main spar and sub-spar in place and add the tip plate with supporting ribs. This applies to both wings of course, except that the inboard wing has one extra rib.

Join the wings together with braces as shown and *now* liberally cement all joints, then pin the trailing edge to a flat board, making sure that there are no warps, and allow to set. When dry fix a $\frac{1}{2}$ oz.-1 oz. lead weight in the outboard wing tip.

Next add the bellcrank platform and supports, also the leadouts. At this juncture, a short length of 12 s.w.g. wire is fixed to the bellcrank to form part of the push rod. Finally, the leading edge and centre section are sheeted with *soft, pliable* $\frac{1}{16}$ in. sheet, and the capping strips added.

Tail—Cut from $\frac{1}{2}$ in. sheet, add the $\frac{1}{16}$ in. ribs and shape as shown. Now another length of 12 s.w.g. wire is fixed, this time to the control horn, and it should just be long enough to overlap the push rod from the bellcrank by approximately 1 in.

Assembly—Slide the wing through the fuselage, cement in position and add the remaining formers. Place tail in position, and with elevators and bellcrank fixed at neutral, bind and solder the two ends of the push rod together.

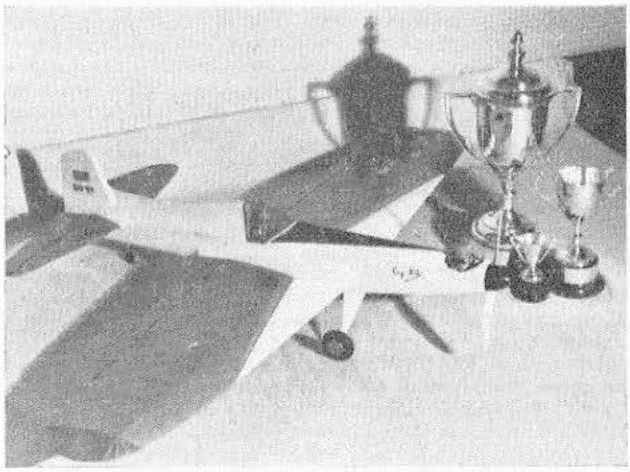
Make up the two flaps and flap horns, place the latter in position, pierce the flaps for the horn wire and hinge to the wing T.E. Bend up two 16 s.w.g. flap rods, position the flaps, bellcrank and elevator at neutral, then bind and solder the 16 s.w.g. flap rods to the push rod.

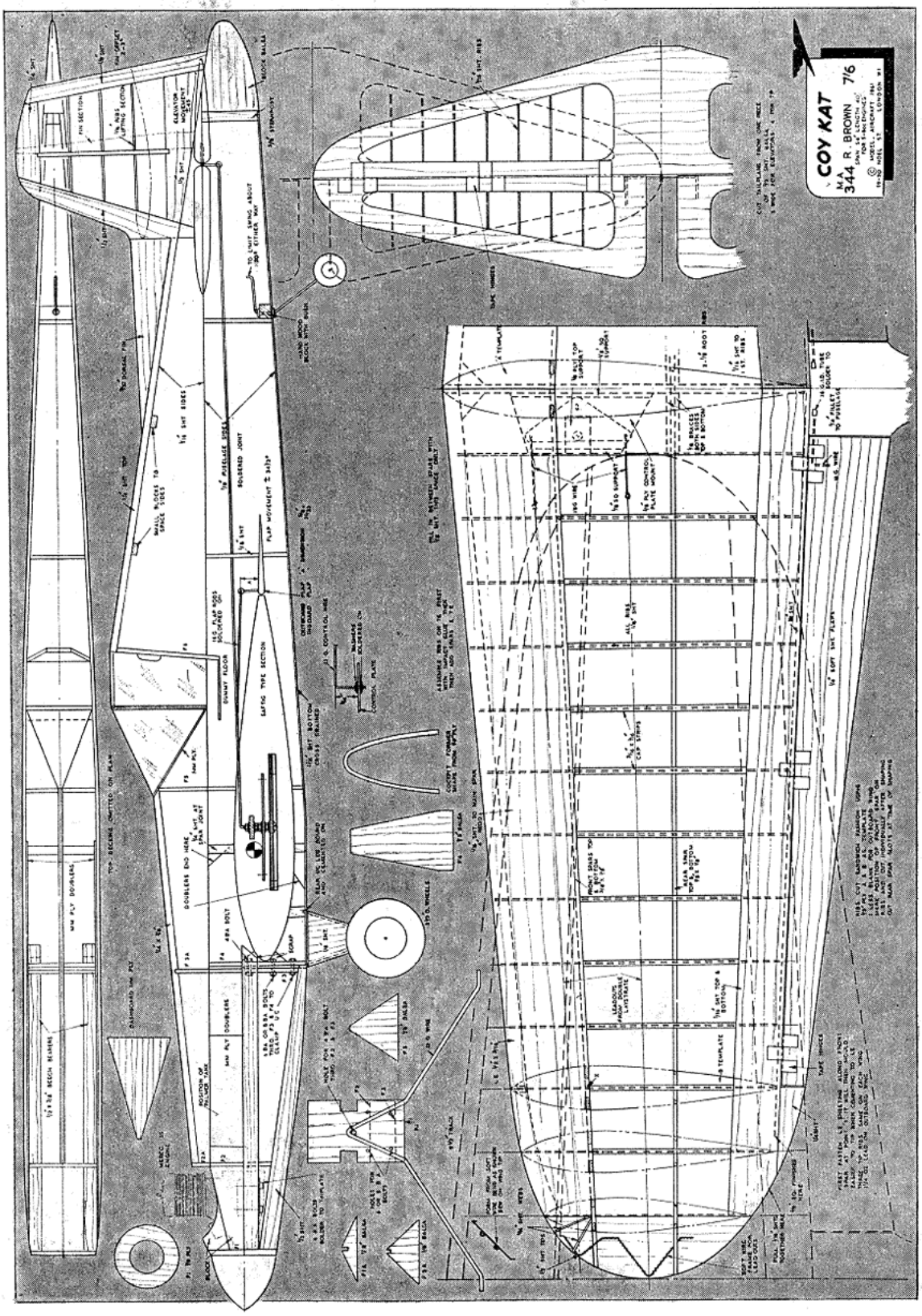
Build up the fin, shape to a lifting section as shown on the plan, and cement in place with approximately 2 deg. offset. Add the $\frac{1}{16}$ in. sheet fuselage sides and spacers, cement the $\frac{1}{4}$ in. backbone in place, shape this as shown, and cement the 3/32 in. dorsal fin in position. The cabin, $\frac{1}{16}$ in. sheet top, and $\frac{1}{2}$ in. floor can now be added.

Make up the rear U/C leg and fix in position, also the swivel tail wheel assembly, then complete the $\frac{1}{16}$ in. bottom sheeting. With the motor in position and nose blocks cemented in place, shape the nose to match the 2 in. spinner used. Fill in between the U/C wires with $\frac{1}{8}$ in. sheet.

Give the complete assembly a coat of filler and sand well. Cover the fuselage with lightweight tissue and the fin, tailplane and wing with heavyweight. A standard Palmer tank was used on the original with a Merco 35 driving a 10 × 6 prop. The completed model should weigh between 38 and 42 oz. and I fly on 58 ft. light Laystrate lines.

Just a word of advice to any younger exponents of our noble art—add some lead under the motor, so that the c.g. is well forward of the indicated position for the first few flights, as although the model flies very smoothly, it is extremely sensitive with the c.g. as shown.





FULL SIZE WORKING DRAWINGS ARE OBTAINABLE FROM YOUR LOCAL DEALER, OR BY POST FROM THE "MODEL AIRCRAFT" PLANS DEPARTMENT 19-20, NOEL STREET, LONDON, W.1, PRICE 7s. 6d., POST FREE

Radio Installation

SINGLE channel R/C equipment is becoming so foolproof, that more and more modellers are buying it. However, having made their purchase and got over the initial excitement of seeing the escapements click when the transmitter is keyed, there comes the problem of fitting the various bits and pieces of equipment into the airframe. It is most unlikely that the newcomer will find anywhere a description of the snags that may arise while installing a specific receiver, etc., into a specific model. This may be a comparatively minor consideration to the expert, but for the novice it can spell failure; for if incorrectly installed, a radio outfit will certainly hasten the end of a perfectly good model and itself as well ! This feature will, we hope, go a long way towards filling this need, as the equipment and model we have elected to use—the R.E.P. Mini-Reptone and Keilkraft *Super* 60—are both designed especially for R/C beginners.

Before we start to describe the radio installation, we would warn all prospective R/C modellers that they *must* hold a special licence before operating the equipment, *even indoors*. This is quite simple to obtain from Radio Branch, G.P.O., H.Q., London, E.C.1., costs £1 and is valid for five years. It is illegal to use a transmitter without this licence and should one do so, prosecution may follow, but more important, the happy relationship which exists between modellers and the P.O. authorities will be placed in jeopardy. This could easily lead to their withdrawing our privilege of using one of the hard-fought-for "free" wavebands. Four shillings a year is not much to pay for the enjoyment of R/C flying, so *before* buying *your* R/C outfit—*buy* your licence.

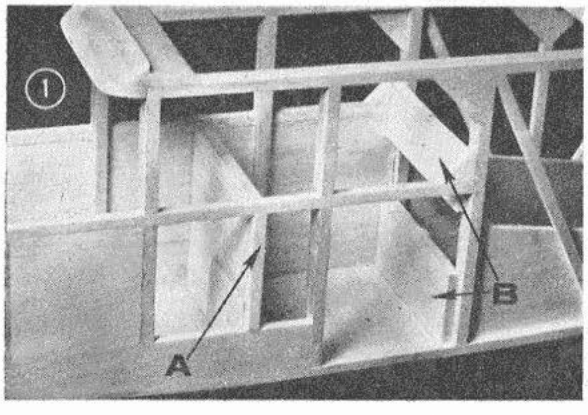
THE first steps must be to prepare the airframe mountings for the receiver and actuators, etc. Photo 1 shows the position of these auxiliary mounting bulkheads, which are cut from $\frac{1}{4}$ in. hard sheet balsa. Bulkhead "A" is cut so that its outer sides *project right through* the $\frac{1}{4}$ in. sheet fuselage sides. This adds considerable rigidity to the whole cabin area and protects the receiver in a crash landing. (See also Fig. 1.)

There are two $\frac{1}{16}$ in. ply facings in the lower left hand corner of bulkhead A which are for mounting the optional second escapement which operates the engine throttle. If this is to be fitted, we recommend the use of the Fred Rising F.R. Mark I Lightweight Clockwork Escapement, fitted with the two position pawl. The four-position escapement is not suitable for our purposes, and it is also important to ensure that the 2 volt version of this escapement is used, not the 4 volt model. No extra batteries are needed to work the escapement, and the satisfaction of being able to alter the motor speed in flight is certainly worth the additional cost of this piece of equipment.

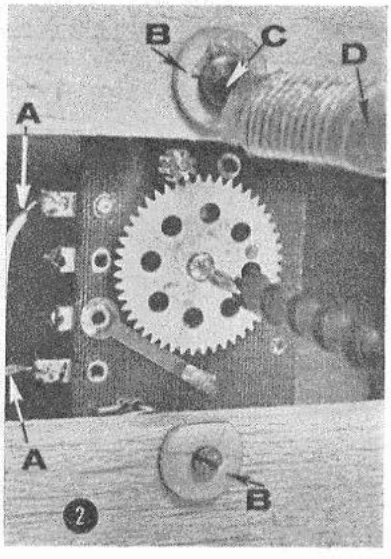
To return now to the mounting on bulkhead A. The ply plates must be pre-drilled to take the escapement which is mounted right down in the corner of the fuselage as shown in photos 8 and 9. We will describe the linkage from escapement to motor throttle later in this article.

Bulkheads B are also cut from $\frac{1}{4}$ in. hard balsa sheet and are arranged to locate *between* the $\frac{1}{4}$ in. sheet fuselage sides. They are cemented securely in front of the double $\frac{1}{4}$ in. sq. uprights at the rear of the cabin, as shown in photo 1. The bottom bulkhead is 2 in. deep and the top one $1\frac{1}{4}$ in. deep, the space between them should be sufficient to allow the two gear wheels on the rear of the rudder escapement to rotate freely, see

Heading photo shows all the radio gear and linkages installed in the partly completed K.K. Super 60 fuselage.



Left: The additional structure required is shown here. Nearside fuselage sheeting is omitted until radio is installed.



Right: The rear face of the mounted rudder actuator showing:—torque rod "D," rubber motor, and the leads ("A") to the clockwork throttle actuator.

photo 2. Two small $\frac{1}{16}$ in. ply discs are cemented to the rear of the bulkheads (Photo 2B). The top one is drilled to take a 16 s.w.g. screwed brass bush, of the type used for rubber powered model propshaft bearings (photos 2C and 3E). This bush, *which must be exactly lined up with the tail post*, doubles as torque rod bearing and upper escapement fixing. The lower fixing is a $\frac{1}{2}$ in. 6 B.A. bolt and nut. A balsa block is cemented just ahead of the tailpost as shown in photos 5, 6 and 7.

The rubber driven rudder escapement must be modified as in photo 3. There are several ways in which this can be done, but we believe ours to be as simple and effective as any. First of all a crank must be fitted to the escapement spindle A. Ours was obtained from a Rising escapement and we soldered to it an 18 s.w.g. steel arm B. This completed crank was screwed and secured to the spindle with Araldite. This method avoids soldering on the spindle as the heat from the soldering iron could damage the nylon escapement pawl. The crank is shown in photo 3 half way through a cycle, in the "on" position. When the escapement is in the "set" position, the crank should be pointing upwards.

A yoke must now be made of 16 s.w.g. wire (photo 3C). The sides of the yoke must be perfectly parallel, allowing crank B to travel freely, but with the minimum amount of side play. The top of the yoke is bound and soldered as at C. A washer is soldered on to the yoke torque rod D, in such a position that the yoke is situated about half way along the escapement crank. This is shown quite clearly in photo 3. When the escapement is operated, there must be no binding or stiffness of any kind in the crank/yoke/bushing mechanism. *This is important.*

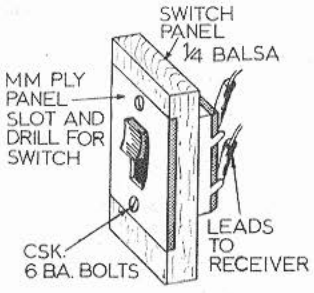
The next stage is to fit the torque rod which is made of $\frac{1}{4}$ in. sq. HARD balsa. The front of the rod is bound and cemented to a piece of 16 s.w.g. wire doubled back on itself to prevent twisting (photo 4B). This wire is eventually joined to the yoke torque rod by means of a connector which is supplied with the escapement (photo 4A).

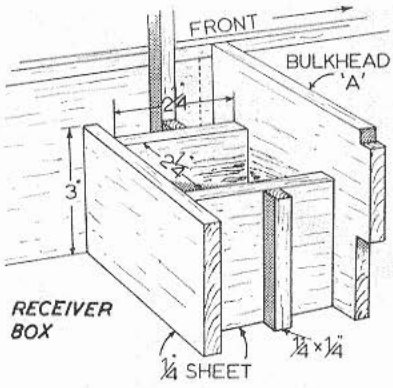
The rear end of the $\frac{1}{4}$ in. sq. torque rod is bound and cemented to another length of 16 s.w.g. wire in the same way (photo 5B), and this is in turn supported in a brass tube running through the tailpost block (photo 7F). The end of the wire is bent upwards (photos 5 and 7D) and the upright length should be not less than 2 in. A washer (7E) is soldered in place to prevent the torque rod from travelling forwards.

We cannot over emphasise the importance of correctly lining up the torque-rod bearings, etc., as any stiffness or jerkiness will surely lead to trouble—so be warned, and take extra care.

The rubber motor, which drives the rudder escapement, must be wound up after each flight and we have devised an efficient but simple built-in device which is shown in photos 5 and 6. A piece of 12 s.w.g. brass tube is passed through the tail block and the rear end filed as shown in 6A, this allows the rear rubber anchorage wire (5A) to be wound ANTI-clockwise by means of its crank shaped rear end (6C) and prevents its unwinding. The length of this 16 s.w.g. wire enables it to be pulled out at the rear to release unwanted turns and also keeps the rear of the two-strand, $\frac{3}{16}$ in. flat rubber motor well clear of the torque-rod. (A loop could be incorporated in the wire for those who prefer to wind the rubber mechanically.) The brass tube is firmly held in place with a piece of 18 s.w.g. wire wound twice round the tube and soldered. The ends of this wire are bent as in 6B and then the whole tail block is covered with bandage soaked in cement.

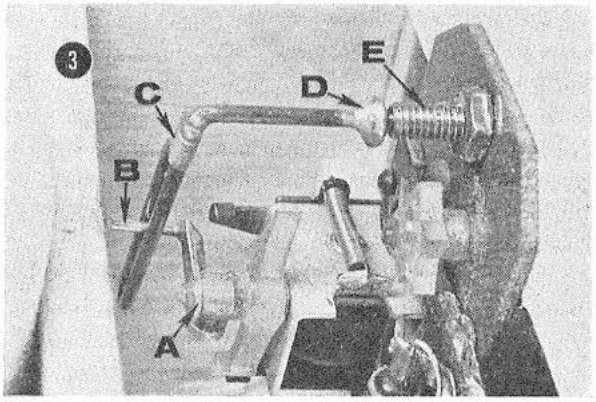
The adjustable rudder yoke is bent up, as in photo 7C, from 20 s.w.g. wire. It should project at least $\frac{1}{2}$ in. behind the rudder trailing edge and the fixing nut and bolt (7B) should be no more than $\frac{1}{4}$ in. above the lower end of the rudder. The area of the rudder immediately surrounding the fixing point is bandage covered, so that the yoke, both ends of which are shaped into circles under washers at B, can be firmly clamped



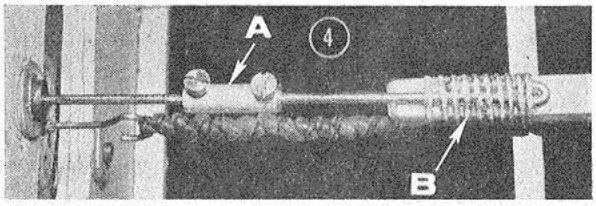


Above: The switch panel construction.

Right: Receiver box sizes.

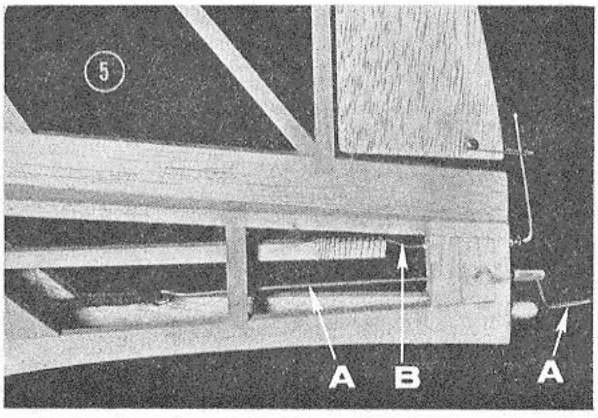


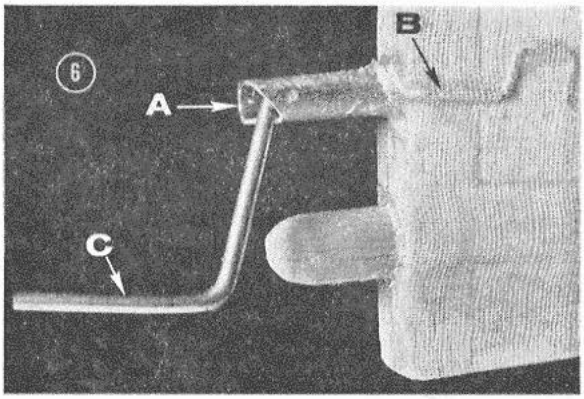
Above: Front face of the rudder actuator showing crank ("B") and torque rod yoke.



Above: Torque rod coupling. Note how wire is doubled back before binding to ¼ in. sq. torque rod to prevent twisting.

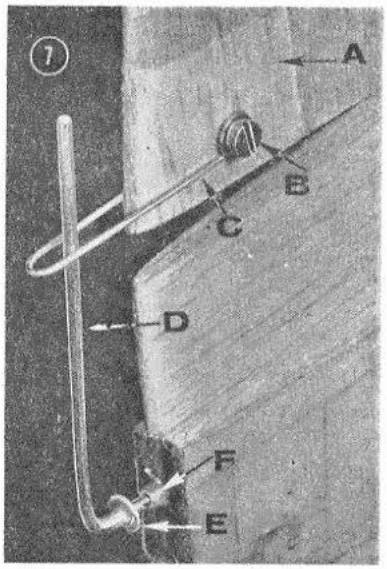
Below: The "works" end. Wire "B" is bound to torque rod in similar manner to above.





Left: A close-up of the rubber winding crank.

Right: The rudder yoke and torque rod rear end bearing, shown in greater detail.



Below: The "radio room." Switch panel "A" is not yet fixed in place, and the receiver, wrapped in foam plastic, is being pressed into its box.

against the rudder surface without danger of splitting.

The yoke should be *just* sufficiently wide to allow the torque arm D to take the rudder to its fullest travel without binding. It will be seen that by loosening bolt B the yoke height can be varied, to adjust the degree of rudder movement.

The rudder actuating mechanism is now complete and with the receiver plug connected and the slide switch "on," the rudder should operate when the transmitter button is pressed. Arranged as described, one press and hold gives right rudder, two quick presses and hold, left rudder. By rotating the crank A in photo 3 through 180 deg. this sequence can be reversed, but as the first signal one is likely to need is "right," one press for this is probably advantageous.

Wrap a strip of sponge plastic around the receiver and push it into the receiver box as shown in photo 8. Note that the side of the receiver containing the batteries should face *forward*. This lessens the chances of damage to the receiver from the comparatively heavy batteries travelling forward following a crash.

The black leads to the receiver switch are quite long—intentionally. This allows the receiver to be removed from the model for checking, etc. The wires must *not* be cut short and resoldered, but the excess length should be taken up by knotting as in photo 8. Notice the switch mounted in its ply-faced panel A, with the leads passing through the fuselage bay where the panel will eventually be cemented. See also the sketch of the switch panel construction (page 109).

Photo 8 also shows the position of the optional second escapement, with its two leads connecting it to the two outer solder tags on the rudder escapement. These are also seen at A in photo 2. Stranded wire must be used for this connection—never use single strand wire for any R/C hook-up as the engine vibration would fracture it. For the same reason, all wiring should be secured as far as possible to the airframe and not left to "float" about. Many radio failures result from this latter fault.

A $\frac{3}{16}$ in. hole should be drilled at B (photo 8) to enable the clockwork to be wound from outside the fuselage.

The linkage to the motor throttle will now be described, and a study of photos 9 and 10 will make the whole thing clear. First of all an 18 s.w.g. piano wire pushrod is connected to the centre of the three holes on the escapement crank. This can be done by any of several different methods but we found the best and neatest way was with a bent pin! We selected a good stout $1\frac{1}{4}$ in. example, and bent the top $\frac{1}{4}$ in. at right angles, passed it through the escapement crank, soldered a washer on the outside, and bound and soldered the "long sharp end" to the end of the pushrod. This system allows small adjustments to be made to the pushrod length when the throttle is connected up. A short piece of piano wire would serve just as well, but it would then be necessary to solder retaining washers either side of the escapement crank.

Photo 9 also shows the 16 s.w.g. cranked operating arm, the lower end of which is bent at right angles to pass through the loop in the escapement pushrod and the upper end is bent into a loop. Don't forget the $\frac{3}{4}$ in. length of brass tube which must be threaded on the wire before bending. This forms a bearing which is soldered to the brass plate (photo 10A). Each arm of

Continued on page 122

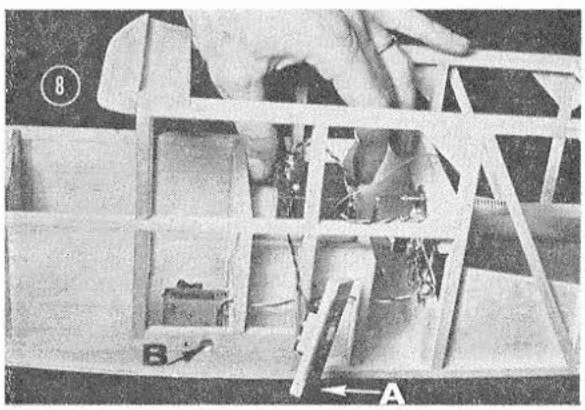
The Financial Side

This is what it will cost you for the major items of equipment used in this feature. The total cost may seem excessive at first to the non-R/C modeller, but remember that many of the components can be expected to outlast several models, and, of course, payments may be spread over instalments.

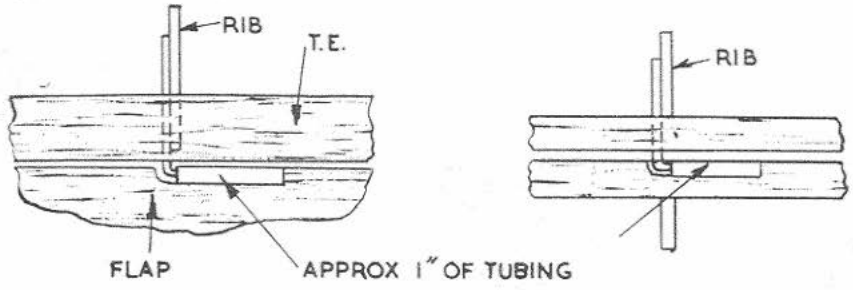
	£	s.	d.
Keilkraft Super 60 Kit	4	17	6
One pair of $3\frac{1}{2}$ in. Keilkraft Airwheels	1	8	0
R.E.P. Mini-Reptone Transmitter and Receiver (Receiver and Actuator may be purchased separately for £9 6s. 0d.)	16	16	0
Fred Rising two-pawl two-volt Clockwork Escapement	2	1	4
Merco 35 Multi-Speed Glow-Plug Motor ...	7	12	0
	32	14	10

It should be noted that if no motor control is required, the clockwork escapement is unnecessary. A cheaper motor without throttle control could then be used and the initial cost could be reduced by as much as £6.

This list does not take into account sundry items such as balsa cement, dope, etc.

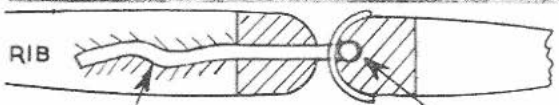


INVISIBLE CONTROL HINGES



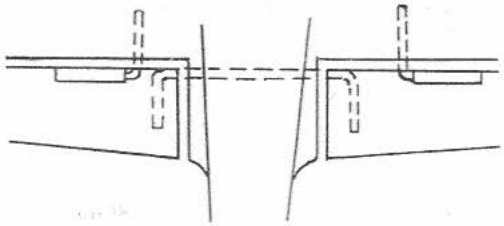
FLAPS ELEVATORS

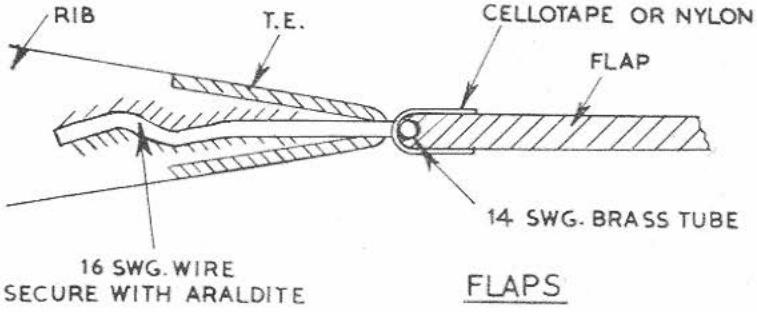
NOTE THAT WIRE SHOULD BE BENT OTHER WAY ON OPPOSITE SIDE OF FUSELAGE TO PREVENT SIDEWAYS TRAVEL OF CONTROLS AS BELOW:-



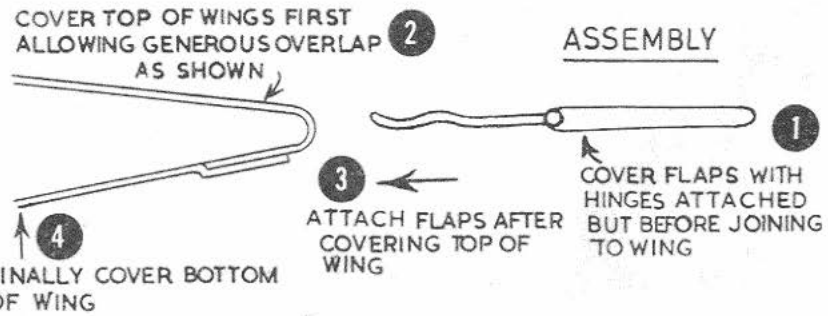
ELEVATORS

Impressed by the smooth, but completely hidden, hinges on DAVE DAY'S stunt models, we asked him how it was done. The accompanying sketches are self explanatory and the system can, of course, be used equally well on radio models.





FLAPS



MODEL AIRCRAFT WINGS CLUB

The Day London Stopped

ONE September morning in 1907 the traffic of London suddenly stopped. Trams ground to a halt; cabbies tugged at the reins of their horses. Everyone was looking upwards to the sky—at a little dirigible, which floated five or six hundred feet above the housetops and circled St. Paul's Cathedral.

It was low enough for men to be seen inside. They sat in the tiny control-car, and now and then one of them would lean over the side and wave. Some, among the gaping crowds, knew that they were looking at Cody and Capper in the *Nulli Secundus*. All London was agog as the airship crossed the Thames just above Staines, passed over Brentford, reached Kensington Palace at noon, dropped low over Hyde Park and cruised along the front of Buckingham Palace. Members of the Army Council waved from the roof of the War Office—and Cody waved triumphantly back.

The *Nulli Secundus* was War Office property. After sailing across the Channel in a canvas boat towed by a kite and winning the International Kite Trials held on Worthing Down in 1903, Samuel Cody was elected a member of the Aeronautical Society (now, of course, the Royal Aeronautical Society), and was engaged as a kite expert at Farnborough. With his sons Leon and Vivian, he developed kites for the new Kite Section of the Royal Engineers. In the army manoeuvres of 1904-5 they proved such a success that Cody was made chief kiting instructor to the Army and was given a workshop in the Crystal Palace.

Sitting in the basket-chair of one of the kites, Sapper Moreton remained up for an hour, at a height of 2,600 ft. In another trial Captain Brooke-Smith, by ascending more than 3,000 ft., broke the world record. There was also an occasion when Lela Cody went up in the chair. While she continued to rise, Cody slipped into his workshop and became so engrossed in whatever had distracted him that he forgot all about her until he heard faint cries from high above.

All the time Cody was thinking beyond kites to aeroplanes. His ideas were shared by Colonel J. E. Capper and when Capper became commandant of the balloon factory at Farnborough, the two worked together on a small airship, powered by an eight-cylinder 50 h.p. Antoinette engine from France. Some of the bureaucrats disliked the experiments down at Farnborough and regarded them as a waste of money. Nor did they take well to Cody; they were no more used to picturesque cowboys than they were to outlandish ideas. On the whole, the more important officials, like the general public, admired the kite-man from the West. After Edward VII had addressed him as "Colonel," he became Colonel to everyone, thus adding to the confusion. "Not Buffalo Bill," people would explain.

Sometimes he would ride a big white horse across Laffan's Plain looking eerily like his namesake with his high boots, wide-brimmed hat and flowing hair. The construction of British Army Aircraft No. 1 was a hush-hush project until the machine was ready for its first cross-country flight.

Cody's airship excursion over London had very nearly ended in disaster when high winds made a normal landing impossible, and to bring it down at the Crystal Palace, Sergeant Ramsey had to rip the gas-bag. Afterwards the dirigible was dismantled, to be rebuilt completely by the Army as *Nulli Secundus II*. As the Antoinette engine would not be used in the new airship, Cody decided to build his aeroplane around it.

The machine which eventually came into view at Farnborough was a thing of bamboo struts, with wings of 52 ft. span. It weighed a ton without pilot or fuel. When the public saw it, they called it various names from "Cody's grasshopper" to "Cody's mowing machine." Obviously, it would never, never fly . . .

—(*To be continued next month*)

ALAN WINTERTON.

Dear Alan Winterton—I am between 10 and 16 years of age and would like to become a member of the Model Aircraft Wings Club. With this coupon I enclose a postal order (overseas readers should send an International Money Order as local postal orders cannot be cashed in England) for 1/- to help cover the cost of the badge, transfers and membership book. *All membership applications must be on this form.*

Name in full.....
(Underline christian name normally used)

Address.....

.....

..... Date of birth.....

School or College.....

Name of other club or clubs to which I belong (if any).....

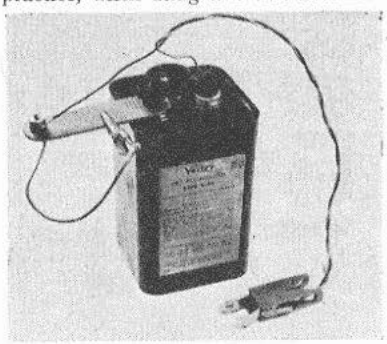
.....

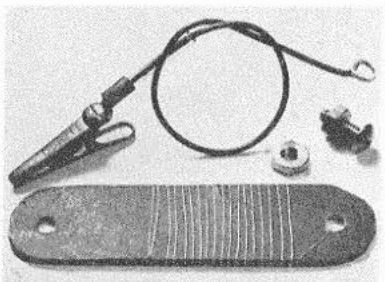
Send to—MODEL AIRCRAFT WINGS CLUB, 19-20 NOEL STREET, LONDON, W.1.

Peter Chinn's ENGINE TIP

MANY users of glowplug engines prefer to use a 2 volt accumulator, for starting, rather than 1½ volt dry cells. An accumulator, costing, perhaps, 25s., is rather expensive when compared with a dry battery, but it has two big advantages. Firstly, being rechargeable it is, in the long run, much cheaper than continually buying fresh dry cells. Secondly, since it has power to spare, one need not suffer the annoyance of suddenly being confronted with a "flat" battery in the middle of a flying session.

Most glowplugs are designed for operation on 1.5 volts and a common practice, when using a 2 volt accumulator, is to employ long, thin leads to drop the applied voltage to about 1½. A much better system, however, is a simple variable resistance. With this, you can compensate for the gradual





Continued on opposite page

This month 'Workbench' is handed over to LEN RANSON who advises you to—

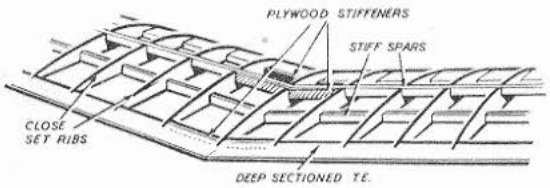
Watch that Warp

DOES your model fly like a lame duck? Pitching itself violently into the deck at the least provocation? If so, take a look at that wing. You may find the incidence varying from 15 deg. positive at one tip to 12 deg. negative at the other. Not even expert trimming can do much with a wing shaped like a propeller. And, if you are just a beginner, your attitude to modelling will become as warped as your wing.

Warping is invariably due to over-enthusiastic doping. Two liberal coats of full strength dope may impart an aesthetically pleasing high gloss, but it does horrible things to a fragile structure. So, too, does old dope, which has thickened up to a treacly consistency. Up to 50 per cent. thinners can be added to medium strength dope for the surfaces of lightweight F/F models. Go easy, too, on the bigger jobs. One coat of evenly applied dope should be sufficient to take up the slack; non-tightening banana oil or fuel proofer adding the necessary protective skin. If possible keep surfaces pinned down after water spraying or doping.

Naturally, a weak or faultily designed framework, is a sure warp inducer. A soft, under-sectioned trailing edge is often the chief culprit. Good stiff spars, with closely set, or geodetic ribs, are the surest safeguard. Note also that warps often originate at the dihedral break. See that the joint is well shored up with fillets. Or, better still, fit V-shaped ply inserts along the spars.

Warps can often be removed, but sometimes only temporarily, by the application of intense heat. Not too intense, however, as you may remove the wing as well as the warp. A guarded electric heater provides the safest form of heat, and the wing should be held near it just long enough to soften up the dope tension and allow the warp to be twisted out. Excessive heat will cause the tissue to go brittle.



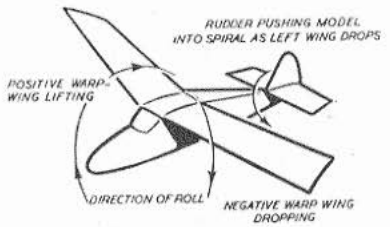
Warps, however, have a way of turning up on the flying field in spite of all preventive measures, and it is as well to know something of their nature, and how they can affect the flight of your model.

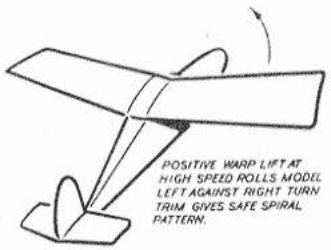
Take first the full span twist, where the trailing edge droops at one tip and rears up at the other. One wing will have an increased angle of attack, whilst the other might well be operating at a negative angle. The effect of one wing developing appreciably more lift than the other is to rotate the model around its longitudinal axis, victory roll fashion. Unfortunately, or otherwise, our F/F models are too slow and over stabilised to execute this delightful manoeuvre. Other factors intervene. As the model rolls, the inboard wing slips away, and the rudder exerts a downward force to precipitate the model into a tight bank at best, and a spiral dive at worst.

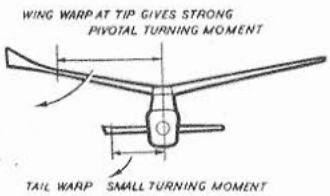
Where the warp is such that the right hand, or starboard, wing is washed-in (positive angle of attack) and the left hand, or port, wing washed-out (negative angle of attack), the rolling tendency will be to the left, or with torque. However, as most F/F models are trimmed for a right hand circle (*low powered sports models are often an exception to this rule, but we described the trimming of such models in the January*, 1961, MODEL AIRCRAFT.—*Ed.*), a considerable amount of side thrust and rudder will have to be applied as a corrective. The consequent flight pattern will generally take the form of a crabbing, left wing down, motion, with the over angled wing stalling on the turn.

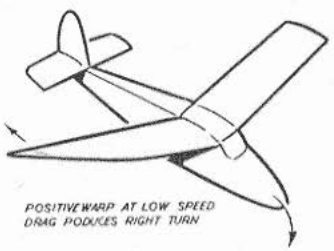
Conversely, if the warp takes the other direction, i.e. positive incidence on the left hand wing, the rolling motion will be to the right, or against torque. What happens when the right hand wing drops away we can leave to the anti-litter campaign.

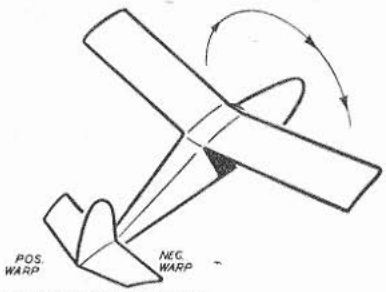
When only one wing is affected, the upset is of a slightly different order, and is sometimes intentionally used to produce a required flight pattern. If the warp is on the right hand wing, giving it an increase of incidence, then that surface will produce more lift than the other, but, at the same time, more drag. The drag will slow the wing down and cause the model to turn to the right. But, as the extra lift keeps the inboard wing up in this type of turn, the banking tendency is reduced, and there is less chance of loss of height











ENGINE TIP

continued from previous page

discharge of the battery and thereby maintain a bright glow at the plug filament. Also, you can adjust the resistance to suit different types of plugs.

Our photographs show how such a variable resistance can be made. Fuse wire or a strand of wire from a piece of electric flex can be used. Length required will depend on its material and thickness. We used 34 s.w.g. tinned copper wire and 36 in. of this will give just the right resistance on a fully charged battery. This is then wound around a strip of fibre 4 in. × 1 in., having first drilled two holes as shown. One end of the wire is passed through one of the holes and this end attached to one terminal of the accumulator as shown. At the other end, a piece of covered flexible wire fitted with an alligator clip is secured by a screw and nut, with an extra nut for plug lead attachment, as illustrated.

or spiralling. On power duration models operating at high speed, the lift generated by the positive warp can outweigh the drag factor to the extent of holding the model in straight flight, or causing a veer to the left.

These considerations on some of the possible effects of wing warp on flight behaviour are only applicable in a general sense. Much depends on model speed and degree of warp, plus the variable effects of constitutional factors in the model design. At one speed the affected surface might be operating at high efficiency, giving maximum lift and minimum drag, whilst at another it would be in a stalled condition. The important thing is to become warp conscious. To eliminate them where possible, and to be aware of some of the ways in which they can upset your trim calculations.

As a tail piece, just a word about tailplanes. These, being smaller, are less prone to serious warping. But, if warps do become apparent, they have a less dramatic, yet sometimes insidious, effect on flight trim. Often a slight tail warp will be quite innocuous until full power is applied, when it can make just that critical difference. In assessing the effect of a tailplane warp it should be remembered that the drag induced is of a lesser order. Whereas, at low speed, the drag set up by a positive warp on the right wing will slew the model to the right, a similar warp on the tailplane will have the positive effect of turning the model in the other direction.

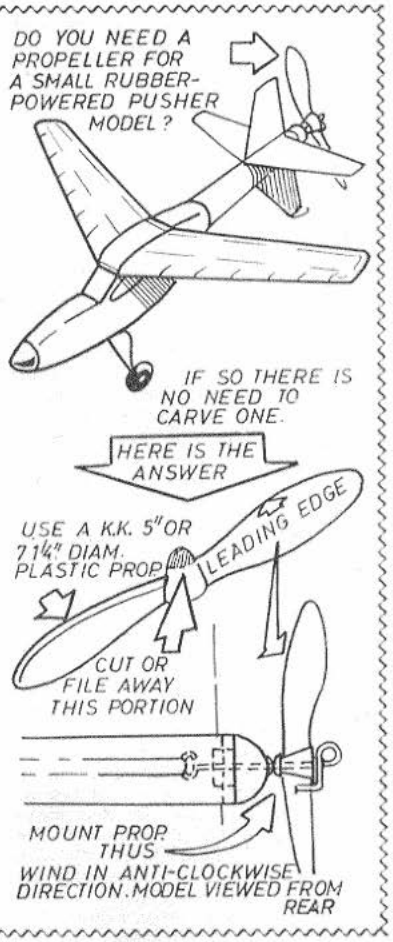
So, keep an eye on those warps, and, next time you see one of those well organised continental types gently rocking his wing in a wooden cradle, don't laugh—just watch that beautiful, warp-free flight.

IMPROVE YOUR MODELLING *with this month's*

BY RAY MALMSTRÖM

A READY-MADE PUSHER PROPELLER

AT some time or other most of us are tempted to build a model that is "different"—a rubber powered pusher type for example. However, the thought of carving a balsa "pusher" type propeller can be a bit "off-putting." If this is your problem—relax, your troubles are at an end! Simply take a normal 7¼ or 5 in. dia. K.K. plastic propeller and cut or file off the front part of the hub. Make sure you make a *flat* surface, then mount the propeller on your pusher model as shown in the last diagram. Simple is'nt it? By the way, remember to wind in an ANTI-CLOCKWISE direction—otherwise you'll have your pusher flying in reverse gear!



READERS' LETTERS

Later for Ladies?

DEAR SIR,—I see from the S.M.A.E. newsletter, that the Women's Cup event is, once again, to be held in early April. Did the S.M.A.E. officers learn nothing from last year's fiasco when only two entries were made? The usual windy conditions of March and April do little to encourage potential women aeromodellers, most of whom, quite naturally, have not the same enthusiasm for model flying as have the husbands and boy friends who persuade them to take it up. By July or August with the flying season well under way, and the weather warmer and, with luck, calmer, I think one would find quite a number of women prepared to support the contest.

However, that is an idea which cannot now be taken up until next season's contest dates are fixed. Meanwhile, *please*—can we have a better showing this April? I know of four likely entrants in East Anglia alone, and with like support from other areas, we could perhaps put an end to those caustic and derisive remarks that annually appear in the modelling press after the Women's Cup event has been held.

Yours faithfully,
S. ALLSOPP, (MISS).

Cambridge.

Singularly unfair?

DEAR SIR,—We (Sutton Coldfield R/C M.A.C.) wish to register the strongest protest with regard to the decision to delete from the British National Championships the Radio Rudder only class, since practically without exception all radio enthusiasts start with rudder only. As with so many other sports today, finance plays a most important part and by deleting the rudder only class from this number one event in the British Contest Calendar, many hundreds of modellers who are unable to afford the relatively costly multi equipment, are debarred from taking part and therefore this competition is limited to a comparative few.

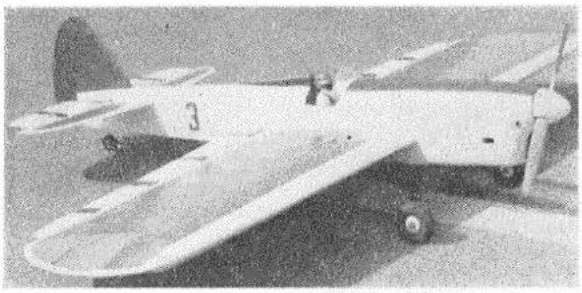
If, as is suspected, this event has been removed for the reason that it is a time waster, then the obvious answer is to have some stringent form of selection for competitors entering the National Competition. In this way there would certainly be a much better quality of flying, requiring as much skill, or even more so, than with the far more flexible multi control.

Apparently this decision has been taken without any reference whatsoever to the many hundreds of interested single channel enthusiasts, and it is very strongly resented that a decision of this nature was taken in this manner.

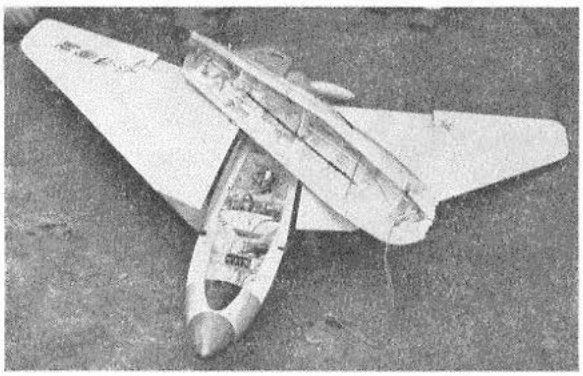
Yours faithfully,
G. A. V. MARSH.
President, Sutton Coldfield R/C M.A.C.

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

PHOTONEWS— *brings you a selection of readers' photographs*

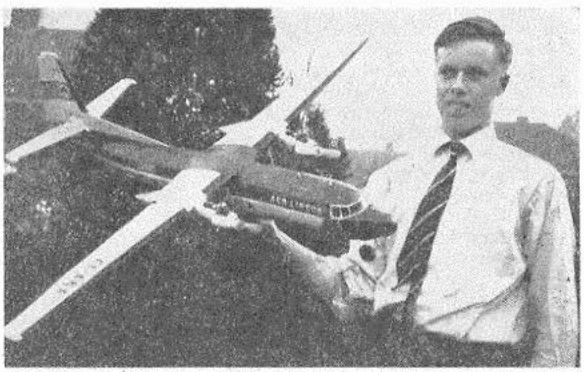


Bill Morley's Scimitar (*M.A. Plan* 270) *has proxed one of the most popular medium size stunt designs in our range. This replica by M. Bates is silk covered and powered by a Frog* 500. *Photo by P. Crowley.*



Intriguing pusher delta that secured first place in the radio event at the '58 P.A.A. Contest at Abbotsinch. Photo by Robert Forrest but no other details—sorry !

Built from Model Aircraft *plans, this Piper* Tri-Pacer *powered with a Frog "* 50," *has given hours of flying fun to Harry Adair of Belfast.*



This 4 *ft. span Fokker* Friendship *in Aer Lingus livery was designed and built by* 16*-year-old Roger Cooper of Dorking. The fuselage is built up with* $\frac{1}{16}$ *in. sq. stringers round a basic box and the completed model, silk covered, has an all up weight of* 34 *oz. Two Mills .*75*'s provide the power and the coupled flap/elevator controls ensure minimum take-off run.*

Magnificent multi from Czechoslovakia. This 1/10*th scale Aero-*45 *is powered with two* 2.5 *c.c. diesels driving metal propellers. The all up weight of* $4\frac{1}{2}$ *lb. is accounted for by the superb detail, which includes a retractable U/C and landing flaps operated by a* 24 *volt motor. Vladimir Beno of Banska Bystrica did all the work.*

RADIO TOPICS

THE Bonner Transmite multi-servo, with built-in transistor amplifier for relayless operation, earns our complete respect and admiration as an engineering production. It is, of course, the standard Bonner servo with amplifier unit added, the latter also being available separately for "home" conversion of existing units (which merely entails soldering up the respective leads). The complete amplifier is on an L-shaped printed circuit mounting the six transistors and attendant sub-miniature resistors and capacitors, ingeniously arranged to fit inside the existing servo case.

We have always regarded the original Bonner servo as a "standard" for reliability and performance as well as being representative of that high quality of both design and production, which is so essential for R/C work. The transistorised version is equally the "standard" for use with the relayless receivers now becoming popular, the outstanding advantage of such a combination being, as we have stressed before, the elimination of a number of switching contacts which are the inherent "weak points" of any complex electronic circuit.

We do not feel that the transistorised servo in this present form is the complete answer, however. It has one weakness, in that, with the circuit employing the transistors for direct switching, there is always the possibility that some malfunctioning can lead to conditions where one or more transistors are burnt out. The "Transmite" instructions, for example, specifically warn against allowing both neutral contacts to touch both neutralising segments at once (a matter of adjustment). Similar destructive conditions could arise if both reeds in the circuit were operated simultaneously, or possibly even with a dirty reed contact.

To overcome this limitation and produce the "foolproof" unit it would seem necessary to employ the transistors in "trigger" circuits switching from one signal condition to another, rather than for direct switching. But do not let these remarks detract from the virtues of the Bonner unit. We have no hesitation in recommending it to anyone who can afford the price (and even if you cannot truly afford it, it is worth making that extra sacrifice).

* * *

The one objection to the relayless multi-channel hook-up is the price. In round figures, the amplifier unit to convert a servo costs 20 dollars, replacing two relays at a cost of about 5 dollars. The expensive reed bank is still retained in the receiver, and the apparent attraction of the lower priced receiver, becomes very much less when you add up the cost of the transistorised servos. In this country, it means adding something like £4 to £5 *per control channel*. It does give advantages—especially as the relay is usually the weakest link in the whole chain—but it does cost you real money.

People already frightened by the cost of "orthodox" multi equipment are going to feel that relayless equipment is quite outside their means. For that reason there is a necessity for *both* types to continue and not to regard the relayless receiver as "outdating" or replacing the conventional circuit. There are alternative—and cheaper—modifications to be explored, such as transistor amplification of output *to* relays, which, because of the power available, can then render the latter a virtually non-critical unit.

* * *

Another possible approach to multi, which cropped up in a discussion recently, is the operation of rubber-driven escapements direct from reeds. That eliminates the group of relays (which account for a large proportion of the cost of a multi receiver), and the cost of expensive servos. It could also free a number of channels for further control circuits, if normal sequence operation of escapements was accepted. There is nothing against this, because of the rapid response of escapements compared with motor-driven servos.

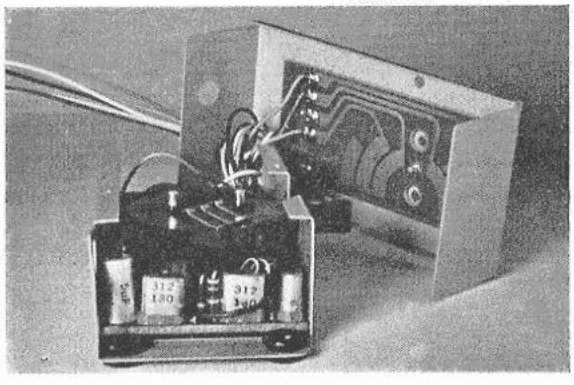
The snags? Quite a number. The mechanical side of the hook-up is complicated, with a number of individual escapement motors to wind up. There is also the limited operating power available from rubber driven escapements. Quite enough for rudder, marginal for elevators. Ailerons a different proposition again, but with the possibility of using the escapement motion as a trigger, controlling a suitable booster unit (more mechanical complication). All these problems seem well worth thrashing out, for the relayless receiver, with simple escapements, *could* provide genuine low cost "multi"—just four channels for selective sequence switching of rudder, elevators, ailerons and motor, for example.

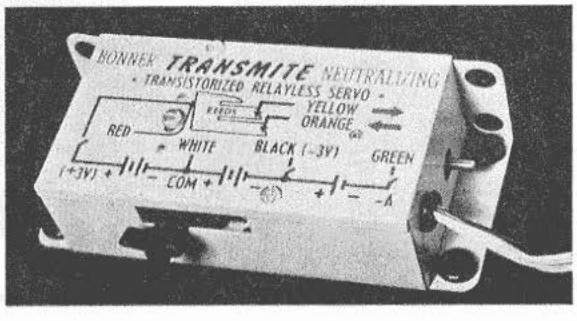
* * *

R.E.P.'s new power converter gives 130 volts output at 25 milliamps for 6 volts input, with further terminals giving 1.5 volts low tension supply. The latter must be correctly balanced by the use of a 3 watt resistor connected between 6 volt+ and 1.5 volt− terminals, the value of the resistance required being given by:

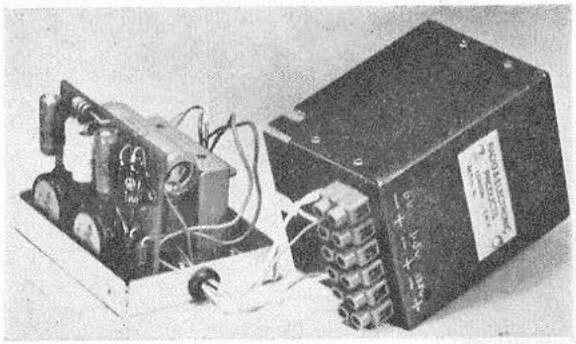
$$R = \frac{4{,}500}{\text{nominal LT consumption in mA}}.$$

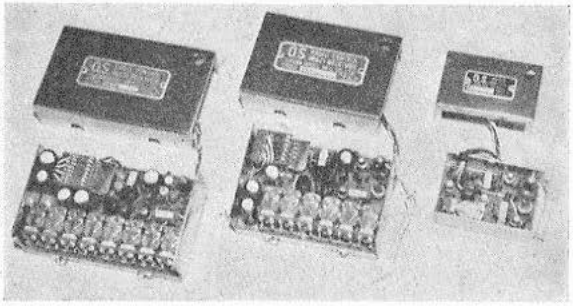
In other words, the size of resistor required must be calculated for individual sets.

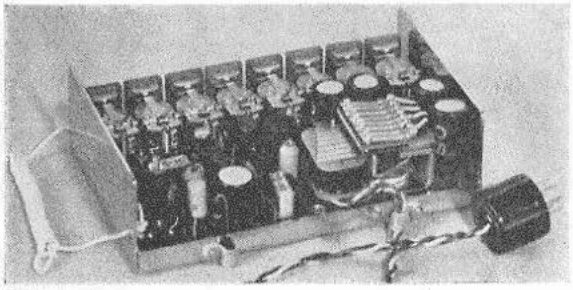




These two photos show the Bonner Transmite and its inner workings. Some of the amplifier components are seen in the opened unit on the left.







Above: The new R.E.P. power converter shown here with the lid removed. Top, right: New all-transistor receivers from O.S. include single, six and eight-channel units. Right: Close-up, cover removed, of the new O.S. 8-channel transistor receiver with its O.S. reed-bank and special O.S. mini-relays in a single deck layout.

The R.E.P. Converter utilises virtually an identical circuit to that we published in a previous issue, enclosed within a case $2\frac{5}{8} \times 2\frac{1}{4} \times 2$ in., taking up less space than the average size of transmitter batteries. Recommended batteries are five Deac D.35 for internal fitting, or one Exide 3-Ec.7 or three Exide PRA3.U for external fitting. Performance appears to be eminently satisfactory. (Every bit as reliable as the MODEL AIRCRAFT unit!)

* * *

Two photos just received from the O.S. company show the latest all-transistor receivers now being manufactured. These sets are at present available in 8-channel, 6-channel and single-channel versions. O.S. are also putting on the market new single-channel, 5-channel and 6-channel valve/transistor sets and already make 10- and 12-channel receivers of this type. O.S. R/C equipment manufacture has expanded considerably during the last year or so and includes receivers and transmitters of up to 10 channels made for an American company and sold in the U.S. under another name.

* * *

Reader Dick Pirt of Canada supplies some interesting comments on our earlier plea for suggestions for positive motor control via a single simple escapement. He finds the Babcock Mark 3 escapement quite satisfactory for smaller motors—this unit, with a quick-blip wiper arm built in, giving: one pulse and release—motor control; one pulse and hold—right rudder; two pulses and hold—left rudder. For motor control he connects the leadout wires to a clockwork actuator that has four positions and no neutral, this giving push-pull control to the motor.

Actually, of course, this dodges the question. We wanted some direct solution without using a second actuator as such, as this is more or less standard practice utilising a "blip" switch contact on the actuator. The call is for an electro-mechanical "flip-flop" triggered by the "blip" contact (with enough mechanical power to operate the throttle control); or some means of controlling an electric motor (operating the throttle movement) between limits, *and being able to be sure that it stops positively at each end limit.*

Dick Pirt mentions a Canadian servo, which gives right and left rudder, up elevator and has leadout wires for a servo for motor control, which he has been flying with success. A quick "blip" advances the motor servo one position and holds. He has been using this with a Bramco three-position servo coupled to motor and wing flaps, giving high, medium and low throttle with "down" flaps coupled to "low" throttle. He reports no failures in over 70 flights—more details to follow shortly.

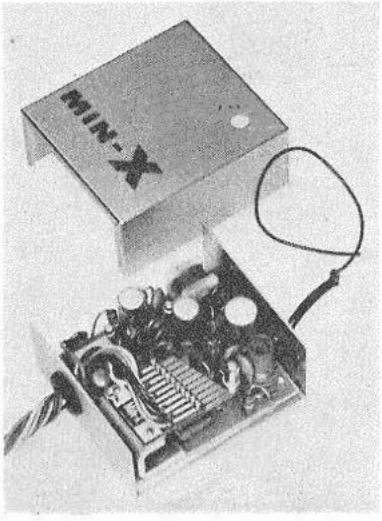
* * *

The new Min-X superregen., multi-channel receiver which supersedes their present 8-, 10- and 12-channel models, is designed to operate on 4.5 to 6.3 volts and features the new improved reed bank, complete rearrangement of components on a new circuit board, and improved tone separation on 10-channel and 12-channel. Specifically, too, the receiver is designed for nickel-cadmium battery operation and they state that the same batteries used for operating the servos can be used for the receiver—with appreciable saving in weight and cost. We are still awaiting details of the new Min-X superhets.

* * *

Superhets, incidentally, which at one time were claimed to be "the complete answer," are presenting something of a problem to the kit manufacturers. Building equipment from kits is very popular because of the considerable cost saving, and in America there are now more kits offered than complete ready-to-go units. But the superhet is *not* easy to build from a kit and presents problems in alignment.

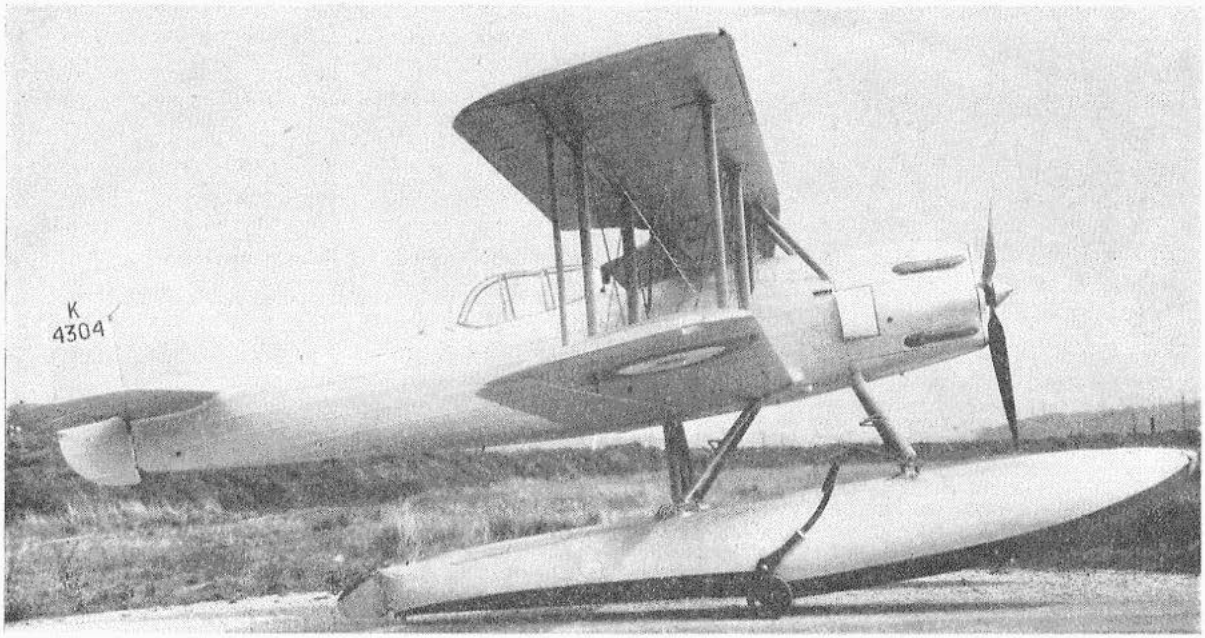
The most likely approach on the commercial side will be to produce a "hybrid" kit with the RF sections completed wired and tested, leaving the do-it-yourself customer to add the back end for relay, reed banks, etc. An ideal answer from the point of view of dodging the main assembly snags—but it is not going to make these kits very cheap.



Right: Latest from Min-X is the 10-channel superregen. receiver shown here. The extremely neat layout is worthy of note.

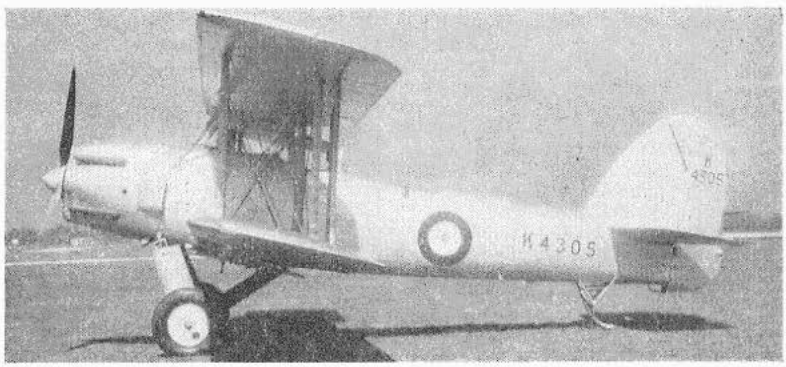
STOP STOP PRESS

After Here and There had gone to press we were informed that the new venue for the **Nationals** is **R.A.F. Barkston Heath**, near Grantham, Lincs.



Plane of the month

The FAIREY SEAFOX

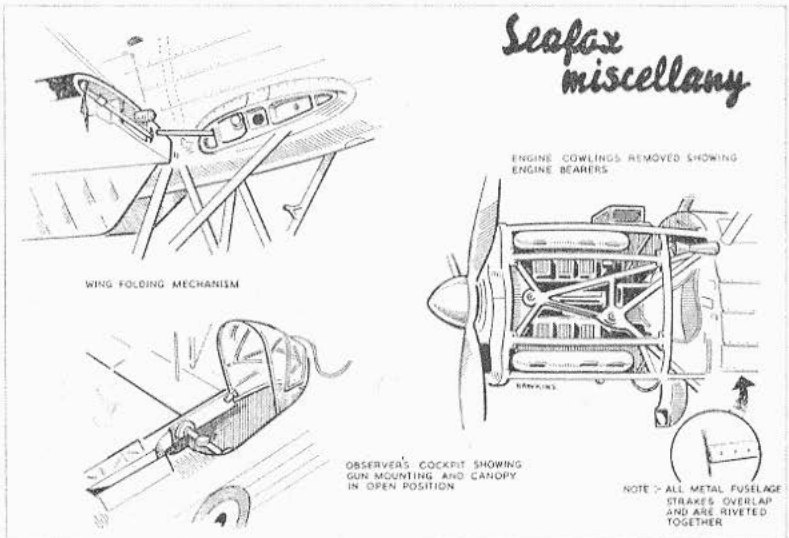


DESPITE its name, the *Seafox* had nothing in common with the earlier *Fox* day-bomber, except that both were designed and built by Fairey Aviation. Whereas the *Fox* was a single-bay biplane of wooden construction, the two-bay *Seafox* had an all-metal structure, with monocoque fuselage and fabric covering only on the wings and control surfaces. Its loaded weight was more than 25 per cent. greater than that of the *Fox*. As a result, with a 395 h.p. Napier Rapier VI air-cooled engine, compared with the bomber's far more powerful Kestrel, its performance was comparatively modest.

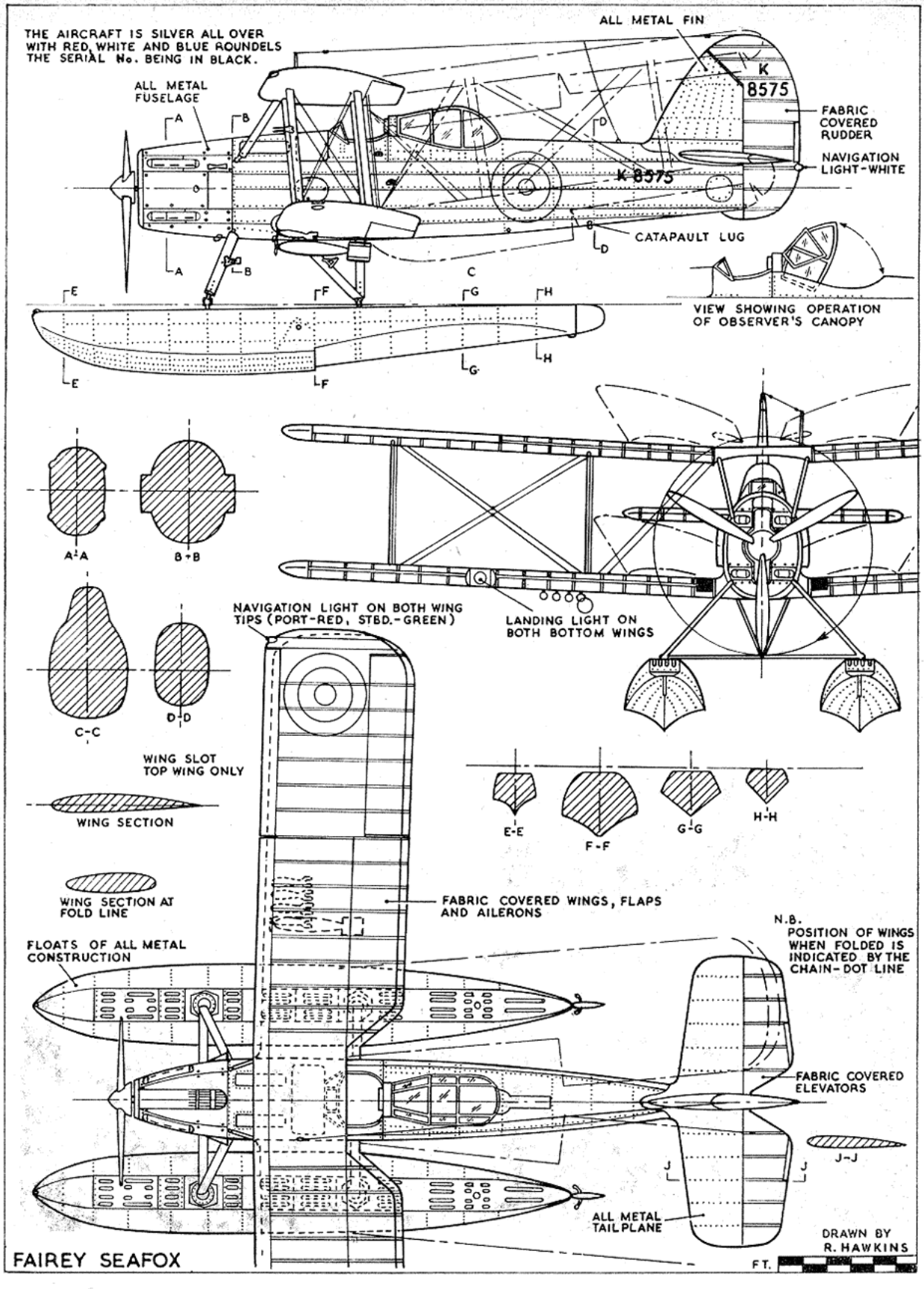
This was unimportant. The *Seafox* was designed to Specification 11/32, as a seaplane which could be catapulted from cruisers of the Royal Navy, for reconnaissance and gunnery spotting duties. So the main requirements were: capability of being catapulted and of landing on rough water, ability to be handled and stowed on board ship, and sturdy all-metal construction, with interchangeable components.

Fairey's put forward two designs, one with the Rapier and the other with a Bristol Aquila radial. The Air Ministry

Continued on page 127



1/48th scale drawings of the *Seafox* are available from our Plans Dept., price 9d.


THE AIRCRAFT IS SILVER ALL OVER WITH RED, WHITE AND BLUE ROUNDELS THE SERIAL No. BEING IN BLACK.
ALL METAL FIN
K 8575
ALL METAL FUSELAGE
FABRIC COVERED RUDDER
NAVIGATION LIGHT-WHITE
K-8575
CATAPAULT LUG
VIEW SHOWING OPERATION OF OBSERVER'S CANOPY
A-A
B-B
C-C
D-D
NAVIGATION LIGHT ON BOTH WING TIPS (PORT-RED, STBD.-GREEN)
LANDING LIGHT ON BOTH BOTTOM WINGS
WING SLOT TOP WING ONLY
WING SECTION
E-E
F-F
G-G
H-H
WING SECTION AT FOLD LINE
FABRIC COVERED WINGS, FLAPS AND AILERONS
N.B. POSITION OF WINGS WHEN FOLDED IS INDICATED BY THE CHAIN-DOT LINE
FLOATS OF ALL METAL CONSTRUCTION
FABRIC COVERED ELEVATORS
J-J
ALL METAL TAILPLANE
DRAWN BY R. HAWKINS
FT.
FAIREY SEAFOX

OVER the COUNTER

IN our February issue we stated that we could not endorse the manufacturers' claim for the fuel proof qualities of the **Joy Plane** plastic enamel. Our tests were conducted after the samples had been left overnight to dry, whereas we have subsequently been informed by the manufacturers, that for this enamel to withstand fuel, it must be allowed to dry for at least 24 hours. Readers should particularly note this as it is not mentioned on the tin.

We therefore conducted further tests, allowing 27 hours to dry, and found that this enamel is in fact resistant to fuel, and does not soften under the neat application of Mercury 6 or Keilkraft Record Methanex. It also has extremely good brushing and covering qualities.

The fluorescent finish from the same manufacturer also does not soften with fuel, however, it does absorb fuel, so it is essential for it to be applied over a fuel proof base. In fact, for best results, fluorescent finishes must be applied over a white undercoat, so a base coat of white Joy Plane enamel is essential before any fluorescent colour is applied. These finishes are only available in matt, but do add greatly to the visibility of a model.

The enamels cost 1s. per ½ oz. tin and the fluorescent finishes 1s. 3d. per ½ oz. tin or 4s. per 2 oz. bottle.

* * *

Good news for **Keilkraft** stockists in the north of England. Keil's have acquired the wholesale business of Hamilton Model Supplies, Bensham Station, Gateshead 8, Co. Durham, in order to establish a northern depot, which will serve Scotland, Northumberland, Durham, Westmorland and Cumberland. Full stocks of the entire K.K. range will be held, and this will result in speedy deliveries to areas where, in the past, transport delays have inevitably occurred. The depot will be under the supervision of S. Hamilton Craig.

* * *

Hamilton Colourcraft Ltd. are not affected by the above change and will, as an entirely separate concern, continue to supply dopes and enamels to the wholesale trade. We recently received samples of their Craft "Jet" 30 min. drying plastic enamel. This has excellent covering properties, does go off in the stated time, is available in both matt and glossy and best of all, costs only 6d. for a 1 oz. bottle (8d. for gold and silver), which is excellent value.

* * *

Group of accessories shown in the photo below are from the **Davies-Charlton** range. The engine test stand is a useful investment for anyone who does a lot of bench running, and comfortably accommodated everything from our Merco 35 down to the Dart shown. In fact the "jaws" open out to 1¾ in. (the Merco crankcase measures 1¼ in.) so it is safe to say that it will take *any* beam mounted motor. Price 12s. 3d.

Quickstart nylon propellers have already established a name for themselves for efficiency and four sizes—5¼ × 3½ (1s. 6d.), 6 × 4 (1s. 6d.), 7 × 4 (2s. 4d.) and 8 × 4 (2s. 6d.)—are available.

Especially manufactured for Davies-Charlton by K.L.G.'s, three types of Quickstart Glowplugs are available—E.G.98 short reach 1.3 amp. 1½ volts, E.G.99 long reach 2.4 amps 1½ volts and E.G.150 short reach 2.4 amps 1½ volts. The 99 and 150 are designed for the larger, higher performance, engines and all cost 4s. 2d. each.

The C/L handle is attractively finished in stove enamelled yellow, has a spike at the bottom for sticking into soft ground and is comfortable in the hand. Some 1¼ in. adjustment is obtainable via a knurled nut at the top and the price is 5s.

* * *

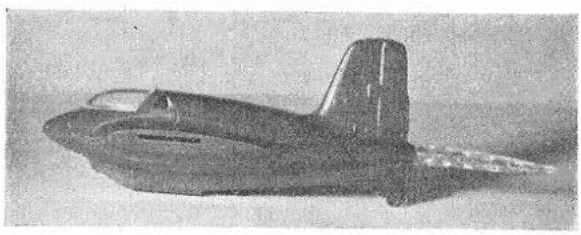
In the report in our February issue of the fuel proof dopes manufactured by the **Humber Oil Company,** we unfortunately labelled these under their trade name "Britfix." This is incorrect as none of the Britfix range of clear and colour dopes are fuelproof. It is the "Humbrol" range of dopes which *are* fuelproof and none of these should be used over a Britfix base.

The Humbrol range consists of Butyrate Clear Shrinking Dope (which is not in itself 100 per cent. fuel proof), Butyrate Sanding Sealer, Fuel Proof Colour Dopes (which are not butyrate, but must only be applied over butyrate clear or sanding sealer) and Clear Fuel Proofer (applied over clear butyrate when 100 per cent. proofing is required).

A new addition to the Humbrol range is Hi-Glo, a matt fluorescent waterproof finish. This really does "fluoresce" well, provided it is applied as directed over the special white undercoat. Available in ½ oz. tins the undercoat costs 1s. and the five fluorescent colours 1s. 6d. each.

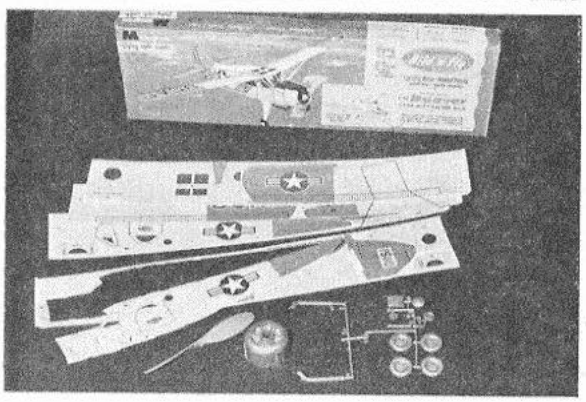
* * *

To many modellers, the mention of Japanese tissue means something from pre-war years. In fact this is not so, as a large proportion of the top contest modellers still use this material and not

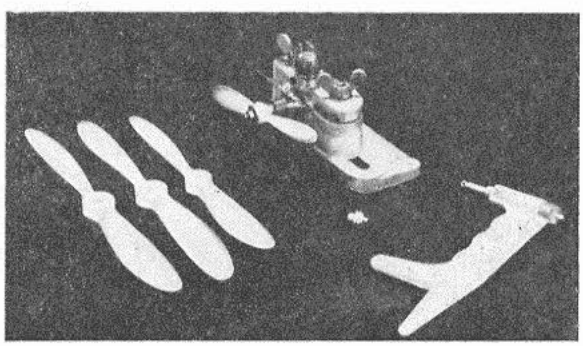


Left: The Hawk Me. 163 "Komet" comes complete with rocket flame.

Below, left: The Monogram Bild'n Fly "Beaver."



Below, right: A group of Davies Charlton accessories



from old stocks. Well known contest flyer and International team member Ron Draper, of 74, Morris Avenue, Wyken, Coventry, has been importing **Esaki Jap Tissue** for some time.

He recently sent us some samples, and it was interesting to note that they differ greatly from the pre-war tissue, being rather more finely textured and without such a marked grain. Three grades are available—"Superfine" an extra-lightweight in red, yellow, orange, light blue and black at 6d. per 17½ × 23½ in. sheet, "Standard" for Wakefields, etc., in the same colours at 3½d. per 18 × 20 in. sheet and "Bamboo" for small power models etc., in red, yellow, light blue and black at 8d. per 21¼ × 32¼ in. sheet. The latter is roughly equivalent to the pre-war lightweight bamboo tissue, and perhaps a more accurate word picture of its texture is to describe it as heavyweight "Jap."

All grades are glossy on one side, can be applied with extreme ease and take very little dope to "fill," thus an appreciable saving in weight is possible, while still attaining a good surface finish. The only possible criticism is that the tissue is a little "brittle," but this is only really apparent if an excessive quantity of dope is applied.

* * *

Readers may remember our feature in the February issue on collecting plastic models. In it we emphasised the importance of scale and it was, therefore, with considerable pleasure, that we recently received two superb new American plastics each to the widely accepted 1/48th scale.

The most impressive is undoubtedly the **Monogram** Douglas *Dauntless*. The midnight blue mouldings in this kit are absolutely superb and besides this, the split dive brakes operate, the bomb release swings down, the machine gun pivots and the landing gear is genuinely retractable, as is also the arrester hook. The kit also includes crew and bombing-up gear complete with "spare bomb" and many other attractive features. This is indeed a connoisseur's model and costs 17s. 6d.

The other 1/48th scale kit is the Messerschmitt Me 163 *Komet*—the little rocket fighter which came into limited use towards the end of the war. We could not fault the kit for accuracy, and the mouldings are very crisp, with neat panel lines and "see-through" wing slots. The landing skid is retractable and a scale take-off dolly is provided. An extremely novel feature is the inclusion of an orange plastic rocket flame! This is shown in our photo and is in fact much more effective than one would think. The *Komet* is a **Hawk** kit and costs 5s. 11d.

A completely different project from Hawk is a colourful Vickers *Viscount* in Capital Airlines colours at 11s. 6d. This model is nicely detailed, has transparent cabin windows and comes complete with four passengers.

The smallest of our plastics this month is a 6¾ in. span replica of the Russian TU-16 *Badger*. This is a very shapely model of a purposeful looking prototype which is infrequently modelled. The kit is again from Monogram and costs 5s. 11d.

* * *

Kit prefabrication is now the rule rather than the exception, but not only are the **Monogram** "Bild'n Fly" series of rubber powered scale models pre-cut but they are also completely pre-coloured! These kits, which are over 20 in. span, are of the all-sheet-keyed-together type, but all the sheet balsa parts are bonded to a tough decorated paper surface which, besides providing considerable strength and a smooth coloured finish, also enables the 1/20 in. sheet balsa to be more cleanly and intricately die stamped. The wood in the D.H. *Beaver* which we examined was of excellent quality.

Examining the box contents further, we find a beautifully moulded plastic engine in a full depth 2 in. cowling and a "tree" of interesting plastic accessories—wheels, washers, motor peg, tailwheel, etc., not forgetting an efficient looking 5½ in. propeller. A 2 ft. sq. double sided photographic instruction sheet removes any possibility of incorrect assembly. There are two other models in the range—the *Cosmic Wind* Goodyear Racer and the *Mister Mulligan* Bendix racer.

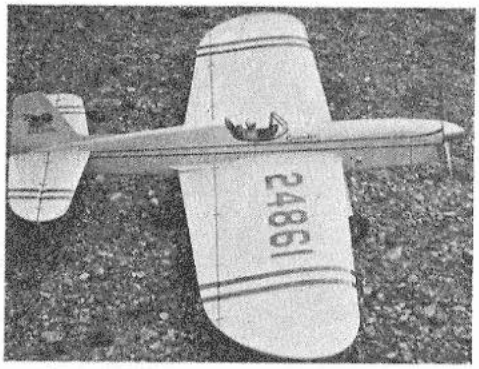
These kits are not cheap—17s. 6d.—but the time saved in the finishing process (which with these models is non-existent) will be considered, by many, to be well worth the extra cost.

The Monogram and Hawk range of plastic models are imported by S. Guiterman Ltd., 37, Soho Square, London, W.1.

Over the Counter reviews

- **Advanced '35' Stunt Model**
- **Designed by Bill Morley**
- **Price 69s. 8d.**
- **Test Report by Dave Platt**

The Mercury CRUSADER



THE *Crusader*, latest kit from Mercury Models, is the second "large" stunt C/L model to come from British manufacturers since the type became acknowledged as ideal for serious competition flying. Although obviously designed in the Palmer-inspired trend, with medium moment-arm, asymmetrical wing etc., the *Crusader*, with a span of 56 in. and 630 sq. in. of area, is quite the largest model ever to appear in commercial form, for a 0.35 cu. in. class motor.

The lines of the model, which is designed by Bill Morley, who, with Ron Checksfield, manufactures the Merco range of engines, are well-proportioned and tasteful, with pleasing tapered wings, cowled inverted engine, sleek fighter type fuselage and good general streamlining. In plan view the effect is similar to the Bell *Airacobra*.

Constructionally the *Crusader* is orthodox. The sheet fuselage sides have ply doublers and a sturdy block forms the front decking to the cockpit. The wings have a sheeted leading edge and a substantial secondary spar and trailing edge. Flaps are of ¼ in. sheet, the tailplane is built up of healthy sizes of strip and sheet and the finished model is very strong.

The plan is of "Veco" type, with pictorial building sequences, and although, personally, I have never liked this type of plan, to be fair, the model does assemble without any trouble. There is a full-size drawing for the tailplane on a separate sheet.

The kit is completely prefabricated, the builder having no parts at all to cut himself. The die-cutting of both balsa and ply parts is to a really excellent standard, possibly the best yet seen, the 10 s.w.g. wire U/C is preformed, and the bearers are nice and hard. The T.E. pieces are worthy of special mention, being slotted for the ribs, sectioned and rounded at the trailing edge.

No wheels, spinner or tank are included so for the test kit I used a 2 in. Veco spinner and 2½ in. Veco wheels. These latter are quite thick but axle length was ample. The engine cowl is held on by a bicycle spoke (provided) and the elevator and flap horns are silver soldered and completely trustworthy. As a test, I tried unsuccessfully to break this joint, but I twisted the wire instead. The U/C is

bolted to a ply former with clips provided.

In general, the standard of the hardware was very good but the brass-bushed paxolin bellcrank needs watching. The bush could fall out, so I suggest the builder replaces this with another bush properly bolted in. The pivot is of 4 B.A. size.

The model was completed, ready for covering, in four days and was finished with countless coats of I.C.I. "Belco" rubbed down, in spite of which the structure did not sag or warp at all. Finished weight was 56 oz., accounted for largely by the heavy finish, television-type jack-plug used for the glow connection and heavy tank made in brass, as well as the large size of the model. The designed weight is given as 48 oz. which could easily be attained if desired.

Flying

A Merco .35 was used for flying tests, the tank was my standard pattern having one vent, lines were 30 g. single-strand × 60 ft., fuel was Mercury 45, and the prop a wooden 10 × 6 in. Top Flite.

Originally 65 ft. lines were tried experimentally, but the model flew so slowly that a reduction to the standard 60 ft. was necessary for good line tension in overhead manoeuvres. This length proved to be perfect and the steady-speed looping radius is so small as to place vertical eights well within a 70 deg. line angle. The model made clean, crisp squares and triangles, the somewhat above-average weight seemingly making no difference. Afterwards, I realised that the large area probably has much to do with this. At one stage, just out of interest, I ran the Merco at a four-stroke throughout the flight and still managed all of the current manoeuvres. The glide proved good and 40-point-type landings are easy, no ballooning tendencies being apparent. Actually the flying performance proved faultless, and, aided by the slow airspeed, some normally difficult manoeuvres were easily positioned exactly.

Comments

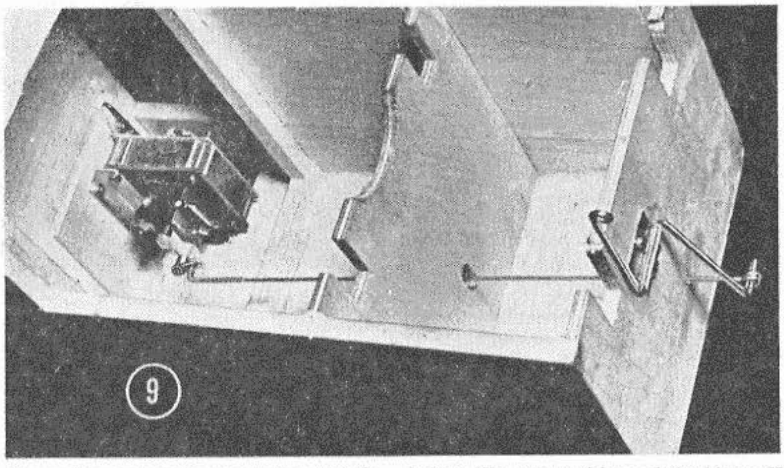
The 16 s.w.g. wire proved too weak for the tailwheel leg so I would recommend using 14 or even 12 s.w.g. Also, the use of a piece of plywood in the fuselage bottom for mounting same is a weak point, and I would recommend that the last fuselage former is cut from plywood and the leg bound to this.

The instructions advise covering the wing before it is inserted into the part-completed fuselage. I did not do this and would advise against it, as the tissue (or silk) will prevent a strong joint being made.

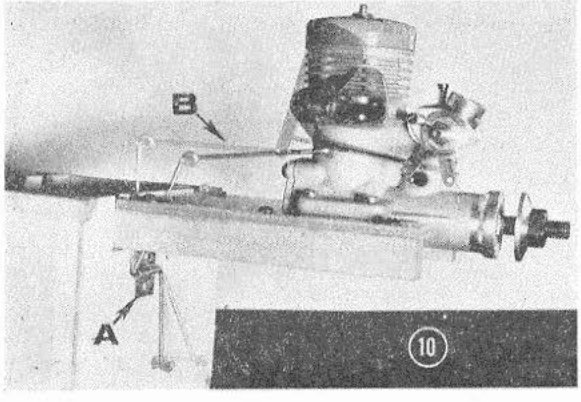
The fuselage is too slim at the rear end to completely enclose the elevator horn and push rod. This means a fair amount of cutting-away of the fuselage sides and fiddling about before the tailplane can be installed. While this does not actually weaken anything, it is a bit "scrappy."

Summarising, this is about the best kit yet from Mercury. It stands favourable comparison with any American model for design as well as quality, while I consider the price (69s. 8d.) very fair, if not downright low, especially as the performance of the finished model makes it a real contest threat.

RADIO INSTALLATION



Above: The linkage to the engine throttle control, attached to the escapement.



Below: The two positions of the Merco 35 throttle are clearly shown.

Continued from page 110

this crank is of similar length and although not the simplest method of working the throttle, among other advantages such as neatness, etc., the crank does enable adjustments to be made very simply, by bending the top arm. This arm passes up through a slot cut in the Paxolin engine mounting plate and is connected to the throttle arm by a 16 s.w.g. pushrod B (photo 10). The length of this arm should be such that when the upper crank arm is fully back, the exhaust valve is fully closed.

The operation is shown clearly in photo 10 and when finally fixed, retaining clips will be fitted over the rear end of pushrod. Check for correct operation by giving the transmitter switch a *very* quick "blip." The rudder escapement should complete a full circuit, returning to neutral without stopping at either left or right rudder positions, and the throttle escapement should click over one position. The rudder can now be operated quite normally, without altering the motor speed. But when it is desired to operate the engine throttle, another very quick blip will send the motor escapement through another cycle. It must be emphasised that the signal to operate the motor escapement must be very short indeed and consistent success comes only after a little practice.

This completes the installation, and the remaining fuselage side sheeting may now be fitted after once again checking that everything is functioning smoothly.

Next month, weather permitting, we hope to give you our first impressions of flying our *Super* 60. The Merco 35, which we have installed, is a more powerful engine than we would recommend to a novice for his first R/C job, but it is one of the very few suitable British made engines at present available with full throttle control. Thrust could be reduced by fitting the propeller back to front, and we intend to do this when we carry out our first test flights.

Brings you up to date with the latest model news

THAT very progressive Californian organisation, the FAST Club (initials derived from its formation in the forties as the " first all-speed team " and the originators of team-racing) who were among the first to take up radio-controlled racing, have introduced a new R/C pylon racing class for small sized models. Maximum engine size allowed is 0.049 cu. in. (0.8 c.c.) and minimum wing area 250 sq. in. There are also rules covering minimum fuselage dimensions, etc., aimed at maintaining reasonably attractive and scalish lines. As in the case of the established 0.19 cu. in. pylon racing class, the flying circuit consists of two straights and two U-turns which must be covered five times, but pylons are placed 264 ft. apart instead of 528 ft., to reduce the course to ½ mile.

Is this a class of R/C racing that might catch on in the U.K. with the coming of all-transistor lightweight equipment?

Average speeds in American pylon racing are now touching the 50 m.p.h. mark. John Wisniewski won an event at St. Louis, Missouri, at 49.85 m.p.h., using a four-channel model powered by an O.S. .15 engine.

* * *

In the recent Australian Nationals, Olivers, once again, cleaned up the 2.5 c.c. team-racing class with a 1, 2, 3 win by H. Flanagan, M. Tandy and K. Green and three Max-29's topped the 5 c.c. class for Green, Farnan and Oswald; 10 c.c. speed was an all McCoy success with McGee's Mac 60 model returning 138.25 m.p.h. to Finneran's and Boughton's second place tie at 126 m.p.h. In 5 c.c. speed, Lloyd's Enya 29-3 ousted two Doolings with a speed of 123 m.p.h., but 2.5 c.c. fell somewhat short of expectations with Finneran's Super-Tigre clocking a winning speed of 97 m.p.h. A separate team race, to F.A.I. rules, was won by Flanagan's Oliver model with Eta 15's second and third. D. Harlow, L. Follett and G. Brooks won the stunt, junior stunt and combat events, respectively, all flying Max powered models. Multi-channel radio was won by T. Prosser's O.S. equipped Glo-Chief powered model.

* * *

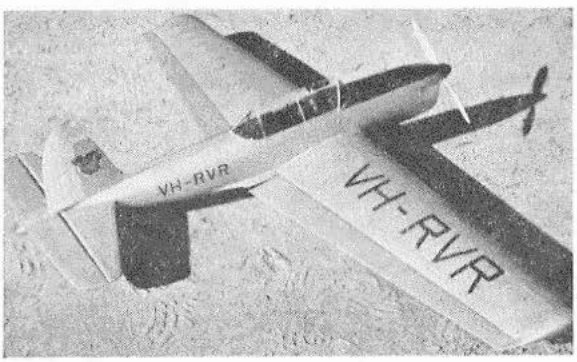
With the trend towards closer alignment of F.A.I. and A.M.A. (American) contest rules, from both sides, an increasing interest is being shown, these days, by American modellers in what the " other side " is doing. With the present expanding F.A.I. activity in the U.S. we, in our turn, may see some interesting developments from there.

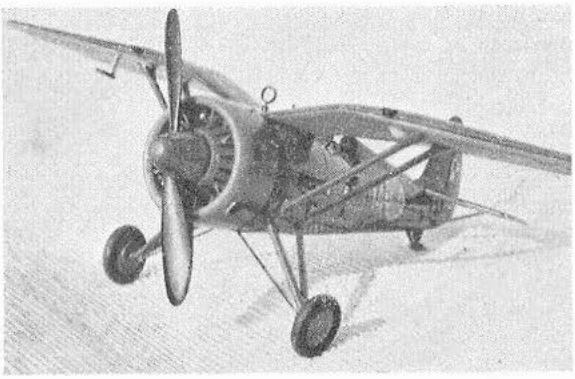
The Minneapolis Club reports that they will continue to stress F.A.I. events during the coming season. This club has been particularly strong in F.A.I. F/F power for some time now and is very " internationally minded," experimenting with foreign engines and model designs in addition to their own. The two currently favoured engines are both foreign, the Italian Super-Tigre Jubilee and the Japanese O.S. Max-II, both of which are invariably reworked and pressurised. Pressurisation is very much the trend as a means of obtaining increased power, steadier running and more precise cut-off and even Half-A's are now being pressurised. Some members are currently experimenting with smaller models for F.A.I. and for the A.M.A. " A " class, powered by Holland Hornet .051's modified K & B .09's and P.A.W. 1.49's.

Heading photo shows neat, German A/1 class glider by Wolfgang Rupers. Model took second place in German Nationals.

Below: Sensation of last year's Australian Nationals was this beautifully built Chipmunk *scale stunter Max 35 powered. Designed and built by Derry Brown who competed in the U.K. in* 1953.

Below: An outstanding large-scale " solid " model of the Polish pre-war P.11.-c fighter built by Benedykt Dybrowski. To a scale of 1/25 and largely of built-up construction, it was voted the best non-flying model exhibited in Poland during 1960.





LATEST ENGINE NEWS

By PETER CHINN

First reports of the latest engines to reach the model market

Promising to far outstrip current European 2.5 diesel performance, Cox's new "Tee-Dee" 15 from the U.S.A. will be an engine to watch during coming months.

CLEARLY, 1961 is going to be a bumper year for outstanding new engines and in no capacity group is this more apparent than in the 2.5 c.c. international contest class.

For a long period, the modified Oliver Tiger Mk. 3 stood out as being the only 2.5 c.c. engine capable of substantially and consistently bettering 0.30 b.h.p. A couple of years ago, however, we began to feel, after researches into what design changes could be made to boost output into the 0.35-0.40 b.h.p. bracket, that a big jump in 2.5 c.c. performance standards was not far off, especially in glowplug engines. A certain amount of evidence to support this view came with some impressive figures obtained with engines of relatively orthodox but highly developed design in other classes, examples being the 0.8 c.c. Holland Hornet and 4.9 c.c. Enya 29-III. We even began drafting, merely as an exercise in design, an experimental 2.5 c.c. shaft valve glow engine, the main features of which were to be a shaft large enough to permit a 0.300 in. gas passage, squared intake apertures for rapid valve opening and closing, pressure feed and closely related transfer and exhaust porting.

Not long after this—early last summer in fact—the expected break-through became a reality and we were subsequently able to report on two of the first engines to achieve significant new standards of performance, the O.S. Max 15 ball-bearing glow special from Japan and the Super-Tigre Jubilee G.20 from Italy. Now, these engines have been joined, or will shortly be joined, by several other motors which, in varying degrees, exceed the old performance yardstick, among them the Eta 15 and tuned Rivers Silver-Streak Mk. II from the U.K., the Mk. II Enya 15-D from Japan and at least two engines from the U.S.A.

One of this latter pair is the Cox "Tee-Dee" 15 briefly mentioned last month. Pre-release test samples of this engine have just been received from the U.S.A., kindly sent to us by Mr. L. M. Cox. We may as well say, straight away, that this new Cox looks like being a real winner judging by brief checks we made while running-in one of these engines, just before starting to write this article.

One of the props we often use for running-in is an old K.K. Tru-Flo 9 × 4—one of those very serviceable Hydulignum props made 10 years or so back. Actually it is only about 2½-3 in. average pitch and consequently absorbs less power than a true 9 × 4, but a spot check on the Tee-Dee 15 on Super-Nitrex fuel gave a tachometer reading of some 14,800 r.p.m. We then checked the same prop on an Olympic: 13,500 r.p.m. Tach readings were also taken on a Trucut 9 × 4: 11,500 for the Olympic and 12,300 for the Tee-Dee. The extra power required to drive these two props at the higher speeds would amount to 22 per cent. in the case of the Trucut and 31 per cent. in the case of the Tru-Flo. Even allowing for the fact that prop/r.p.m. tests are not 100 per cent. reliable means of determining engine performance, it is pretty obvious that the new Cox 15 is going to be an outstanding performer. Our guess is that its peak output will fall somewhere in the region of 18,000-20,000 r.p.m. We shall, of course, be featuring a full performance report in the Engine Test series at an early date.

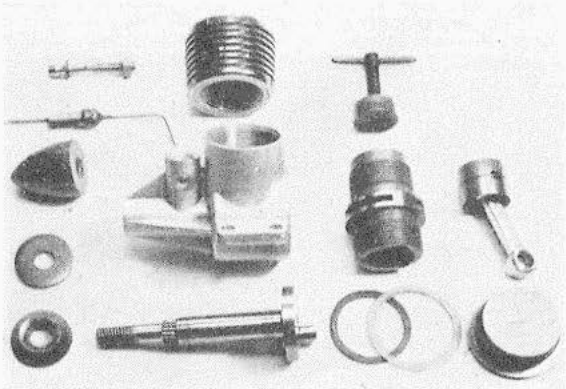
Meanwhile, some details of the engine's design and construction may be of interest.

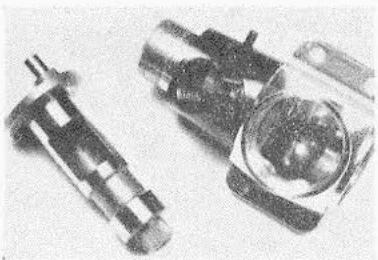
Resemblance to typical Cox design is obvious in the cylinder components of the new motor. It is, in fact, basically identical with the Olympic model in this respect, although the internal cylinder head contour has been changed and the former hemispherical combustion chamber gives way to a "pagoda roof" shape. A similar piston and conrod assembly is also retained but beyond this, the new engine is markedly different.

The two major changes are the adoption of shaft rotary valve induction, in place of rear reed-valve and the abandonment of ball-bearings. The new shaft is, undoubtedly, the key to the high performance of the engine and is the strongest possible argument in favour of the "big shaft" layout to which we have so often given prominence in M.A. over the past three or four years.

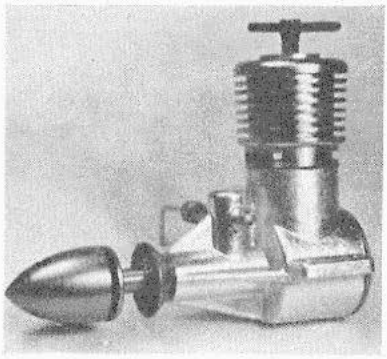
The new Cox shaft is no less than $\frac{7}{16}$ in. dia. (only the Enya 15D-II has a larger shaft) which is probably the

Left — shaft and crankcase of the new Cox 2.5. Advanced rotary-valve design and an immense shaft passage contribute to a performance in the 0.4 b.h.p. bracket.





Right—parts of the Rebell engine. An unusual feature is the external circlip on the piston which retains the gudgeon-pin.



The German Rebell 1.5 c.c. diesel, a low-priced unit which is actually made in Hungary.

reason why ball-bearings were ruled out. In return, however, we have an induction passage through the shaft of $\frac{5}{16}$ in. (0.312 in.) bore, which is even bigger than that of the O.S. Max 15 Special (0.295 in.) and is by far the largest yet seen on a 2.5—and, incidentally, is as big as those of many 0.29s and 0.35s! In addition, we have a correspondingly large rectangular valve port, $\frac{7}{16}$ in. long, which registers with a bearing aperture of similar size and shape giving an induction period of about 170 deg. (approximately 55 deg. ABDC to 45 deg. ATDC). The shaft has a crescent counterbalance, is relieved for a short distance just ahead of the valve port, dividing the journal into two unequal lengths, and is hardened.

The shaft housing is something rather unique in model engine construction. The actual crankshaft bearing is part of the crankcase unit, the whole being machined from special extruded bar stock with the bearing forming a tubular extension to the crankcase proper. The large rectangular intake aperture is cut through this and the extension is then encased in a tightly fitted black moulding carrying a threaded boss into which the carburettor is screwed. This casing, seemingly of nylon, or one of the newer high strength materials, also features a moulded-in nipple for a pressurised fuel system.

As supplied, the engine is set up for standard suction feed and the pressure point is sealed off by the alloy bearing. To convert to pressure feed, it is necessary to remove the crankshaft and continue the bleed hole through the bearing by carefully drilling out. The carburettor choke can be enlarged to $\frac{3}{16}$ in. bore at the same time and can be expected to give some increase in power. The carburettor is of a similar pattern to that so successfully used on the Olympic, Space-Hopper, etc., in which the fuel is metered through a valve outside carburettor throat and then enters the venturi through three fine jets. It permits the needle-valve control to be located on either side of the engine and safely back from the prop disc.

In some respects, Cox's first F.A.I. class engine, the Olympic, introduced nearly two years ago, failed to live up to the high promise of its bench performance, being somewhat sensitive to fuel variation under flight conditions and, in consequence, the engine was not as popular with contest men as it might have been. We have a feeling that the Tee-Dee 15, however, is going to make the grade and in a big way.

* * *

From Saburo Enya of the Enya Metal Products Co. Ltd., of Tokyo, we learn that a new Mk. II Enya 35, rated at 0.8 b.h.p. is now in production.

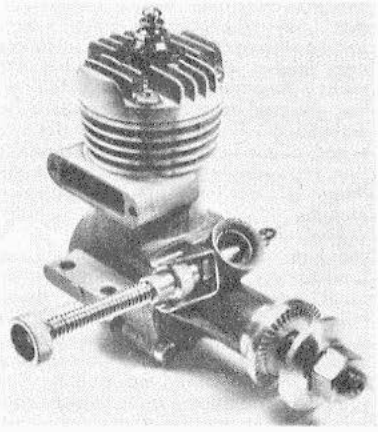
Deliveries of another new Enya, the 15-II glow 2.5 c.c. engine are under way and this model should be available in the U.K. during coming months. The 15-II supersedes the previous 15-IB model and is an entirely fresh design similar in layout and construction to the smaller 09-II featured some months ago in the M.A. tests. It is not claimed to offer any substantial increase in performance over the 15-IB but will be more economically priced.

Like the 09-II, the 15-II features the use of a very substantial cylinder liner in which the transfer is fed via twin internal flutes. Other than this, the 15-II is generally similar in design to the larger Enya glow engines. It features a hardened counterbalanced crankshaft running in a bronze bushed separate front bearing housing and a rigid one-piece crankcase and cylinder block with beam lugs plus provision for bulkhead mounting. The cylinder head has a brass bushed plug hole and makes a metal-to-metal gas joint with the cylinder. The piston is fitted with a fully-floating tubular gudgeon-pin with machined brass end-pads and the conrod is bronze bushed. There is the usual high-quality Enya needle-valve assembly with a choice of two venturi insert sizes. The 15-II has a bore and stroke of 15 × 14 mm. and weighs 4.7 oz.

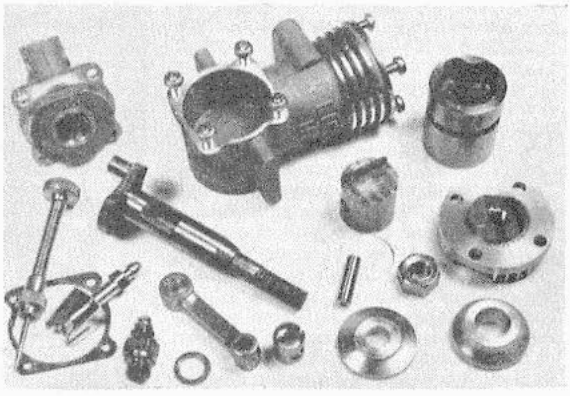
* * *

Last year, the most outstanding commercially built engine in 2.5 c.c. speed was the newly introduced Italian Super-Tigre Jubilee G.20 and the Rossi brothers of Brescia, who used these engines so successfully in speed events, have, for some months, been offering "modified" Jubilee G.20s at 12,000 lire (approximately £7). The standard engine costs 8,900 lire. Recently, Cliff Petty of Great Barr, Birmingham, received one of these motors from Italy and was kind enough to send it along for our inspection.

To what extent these Rossi modified engines resemble the units flown by the brothers in contests we do not know, but, from comparison with our stock 1960 model Jubilee G.20, it would seem that the work carried out on the engines being offered is limited mainly to polishing operations. On the example examined, the crankshaft passage had been ground to a smoother finish and the rear face of the crankweb polished. The crankcase interior had been smoothed in places and the exhaust duct shortened. The crankshaft was a much easier fit in the bearings. The cylinder and piston assembly appear to be untouched and although the gudgeon-pin was no longer a fully-floating fit, this may well be a recent factory modification to the original design, as the latest Jubilees no longer have a gudgeon-pin extraction hole in the rear of the cylinder casting. An annealed copper cylinder head gasket of 0.007 in. thickness replaced the 0.020 in. aluminium gasket, presumably to slightly raise the compression ratio.

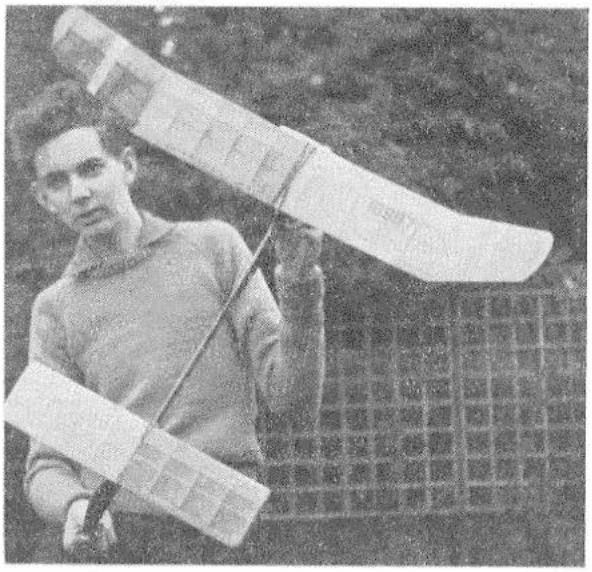


Above right—the new low-priced Enya 15-II, a well-built 2.5 c.c. engine of good performance which is also available in a throttle equipped R/C version.



Right—parts of the Enya 15-II. General design is similar to that of the 09-II.

½A WUNDA by P. Newell



A simple design for the new .049 power class. Ideal for beginners

IMMEDIATELY the .049 power contests appeared in the calendar, I decided that here was a class where everybody was starting from scratch and consequently the chances of success were higher than for any other F/F event. A test model, using a Mills .75, was designed to explore the possibilities and thus *½A Wunda* grew on the drawing board. Time being limited, construction was kept simple and consequently the design is ideal for a first contest power model.

The original was completed in six evenings and flight tests followed immediately. After initial trimming the model was turning in 90 sec. flights following 10 sec. motor runs, until a rough landing broke the original built-up fuselage, and so the all-sheet version shown on the plan was built. This second fuselage was ½ in. longer than the original as it was felt that the c.g. was too far forward. All-up weight with the new fuselage was just under 6 oz., yet the model still climbed to quite a good height, and duration, after a few minor adjustments, went up to around 2½ min.

I then decided to fit a proper timer and cut-out in place of the coil of fuel tubing, so an Elmic Mini-Diesel combined timer and cut-out was fitted, and a Dunlop french chalk container provided an ideal tank. An unexpected difficulty was encountered in the form of a delay between the cut-out operating and the engine stopping. This was caused by the low fuel consumption of the Mills, which continued to run on fuel vapour within the crankcase, but a different oil content in the fuel eventually caused the engine to slow down and stop approximately 1 sec. after the cut-out had operated. In flight this "lag" gives a very smooth change over from power to glide, and in fact some timekeepers have complained that they cannot tell when the engine cuts!

All that now remained was to find the best propeller, and although wooden 7 × 3 Stants gave excellent results, they were abandoned because every landing meant a new propeller. I therefore tried a Keilkraft 7 × 4 nylon, and surprisingly, the climb improved so that 3 min. maximums became possible.

Construction

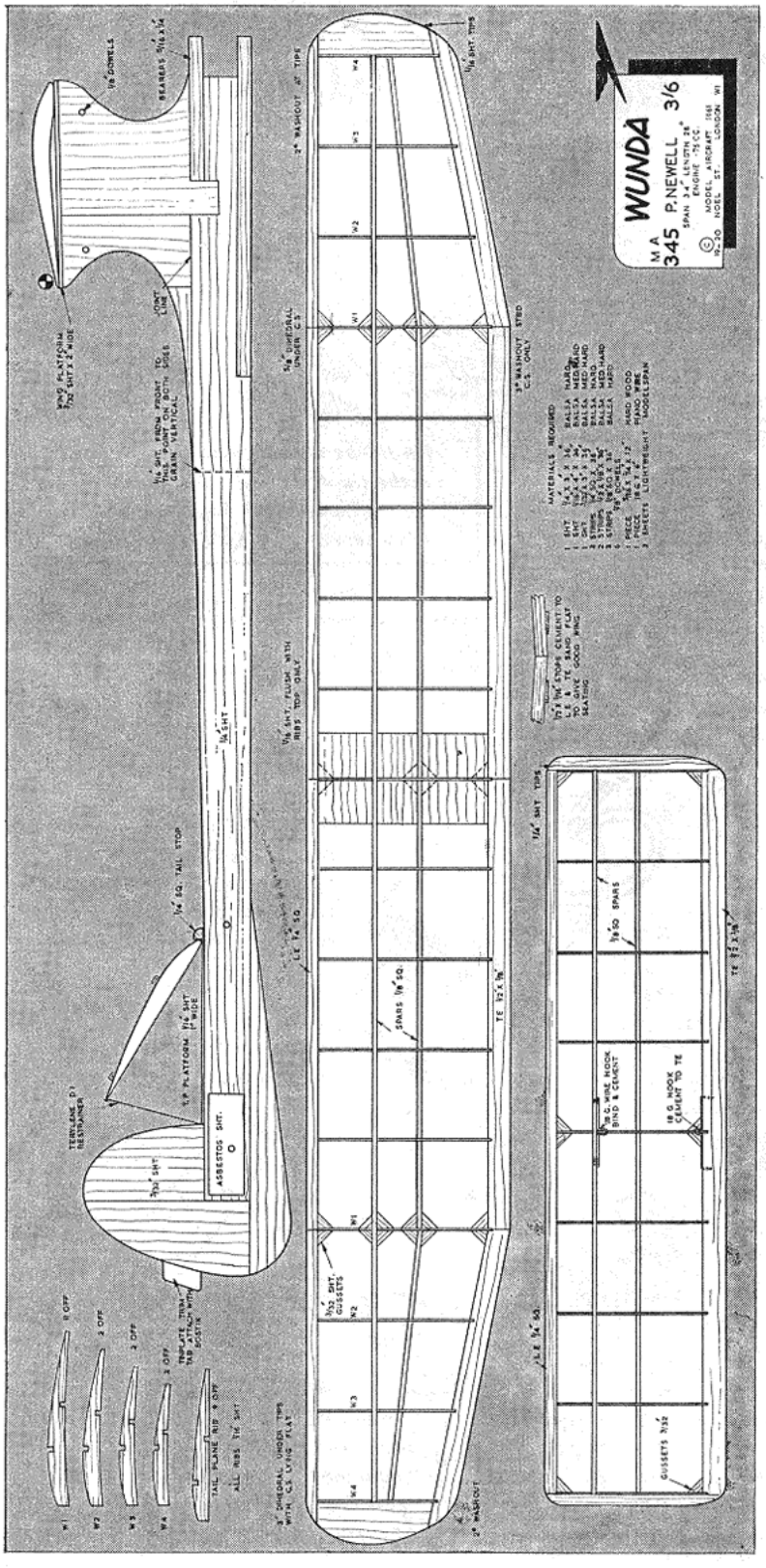
This has been kept simple and should not present any problems to anyone. If a 0.5 c.c. engine is used, lighter grades of wood should be selected, but with a 0.75 c.c. motor, strength is more important than weight, provided the latter does not exceed 7 oz.

Fuselage—This is made from ¼ in. sheet with the bearers let in flush and spaced to suit the engine used. Particular attention should be paid to the joint where the pylon is keyed into the main fuselage. The extreme rear of the fuselage is sanded down to the fin thickness and the fin then attached. The vertically grained 1/16 in. sheet is then cemented on both sides of the fuselage from the front to the point indicated, and the wing and tail seatings added, with the grain running across the fuselage. A tail stop and ⅛ in. dowels complete the job.

Wing and tail—These are built over the plan in the usual manner. Build the port inner wing panel first and when set prop up 1¼ in. at one end, then build the starboard inner panel, incorporating wash-in during construction. The complete centre section is then propped up and one tip panel built, repeating for the other tip. The 1/16 in. sheeting on top is let in flush and then two strips of ½ × 1/16 in. are cemented underneath and sanded so that the wing seats squarely on its platform.

The whole model is now sanded down and the wings and tail covered with lightweight Modelspan. Two coats of dope are applied and the wings and tail then given a coat of fuel proofer. On the original model, the fuselage was painted with Humbrol plastic enamel, which provided both colouring and fuel proofing in one coat. Humbrol Butyrate dope will also give a fuel-proof finish and dries more quickly.

Trimming—Check alignment of flying surfaces and make sure that there is no side or down thrust. Test glide to make sure no unwanted turn exists, and then try a short motor run. The final trim should give an almost straight climb with only one complete turn in 15 sec., half of this occuring during initial acceleration. The model should turn off the top into a smooth left-hand glide circle, the power turn being to the right.



The FAIREY SEAFOX

Continued from page 118

ordered two prototypes with Rapier engines and the first of these (K4304) flew on May 27th, 1936, from Fairey's Hamble factory. Its design was conventional, except that only the observer, in the rear cockpit, had a canopy. It was felt that the pilot had to be in the open for contact with deck personnel during catapulting. Armament consisted of a Lewis gun in the rear cockpit and underwing racks for light bombs.

The second prototype, K4305, flew on November 5th, 1936, and was fitted at first with a landplane undercarriage. Later it was put on floats and given a standard rear canopy, and only one other *Seafox* (L4523) was built as a landplane.

The initial contract for 49 aircraft (K8569-8617) was placed in January, 1936, four months before the prototype was completed, and was followed by a second contract for 15 (L4519-4533) in September of that year. K4304 began its sea trials from H.M.S. *Neptune* in March, 1937, and production deliveries started in the following month. *Seafoxes* were soon serving with Nos. 702, 713, 714, 716 and 718 Catapult Flights and Nos. 753 and 754 Training Squadrons.

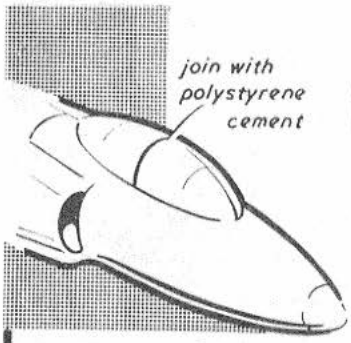
Among the cruisers equipped with *Seafoxes* was H.M.S. *Ajax*, which had two (K8581 and 8582). Three months after the outbreak of war, on December 13th, 1939, this ship was sailing in company with the cruisers *Exeter* and *Achilles* in the South Atlantic when they encountered the German battleship *Admiral Graf Spee*.

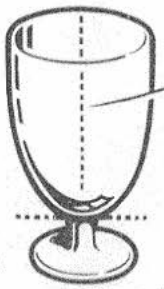
Before the *Exeter* could fly off her two *Walrus* amphibians they were damaged by gunfire. *Ajax* got off a *Seafox* and this aircraft spotted for the guns of the British force throughout the epic Battle of the River Plate which followed. After the enemy sought safety in Montevideo, the *Seafox* kept her under observation until, on December 17th, its crew signalled the surprising news that the great battleship had been scuttled by her crew. The pilot of the *Seafox*, Lt. E. D. G. Lewin, was awarded the D.S.C. for his splendid work and so became the first officer of the Fleet Air Arm to be decorated in World War II.

Eleven *Seafoxes* were still in use on January 21st, 1940, when the Catapult Flights were combined to form No. 700 Squadron. They joined 42 *Walrus* and 12 *Swordfish* aircraft and continued in service for some time. But the Battle of the River Plate remained their finest hour.

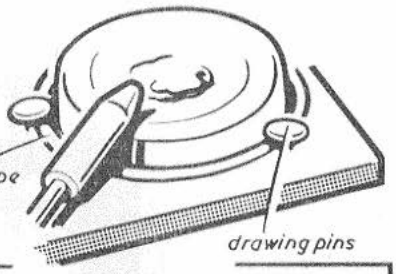
Data: Span 40 ft.; length 35 ft. 5½ in.; height 12 ft. 1 in.; chord 6 ft.; wing area 434 sq. ft.; weights, empty, 3,805 lb., loaded, 5,420 lb.; max. speed 124 m.p.h.; cruising speed 106 m.p.h.; endurance 4¼ hours.

Readers hints and tips...

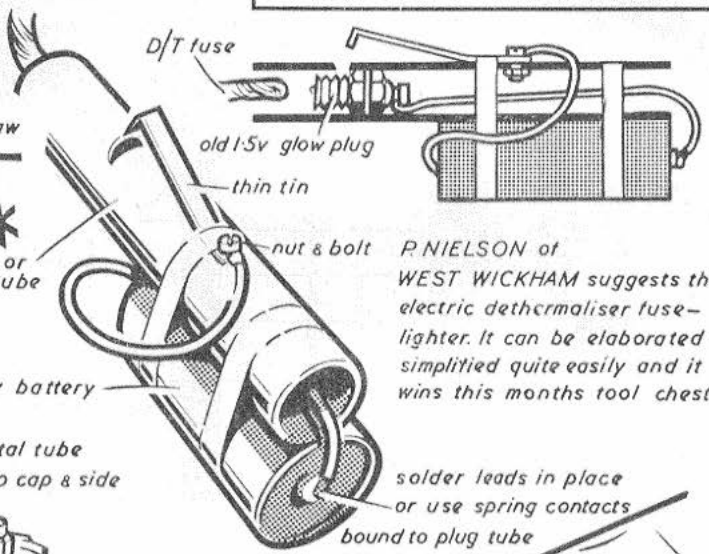




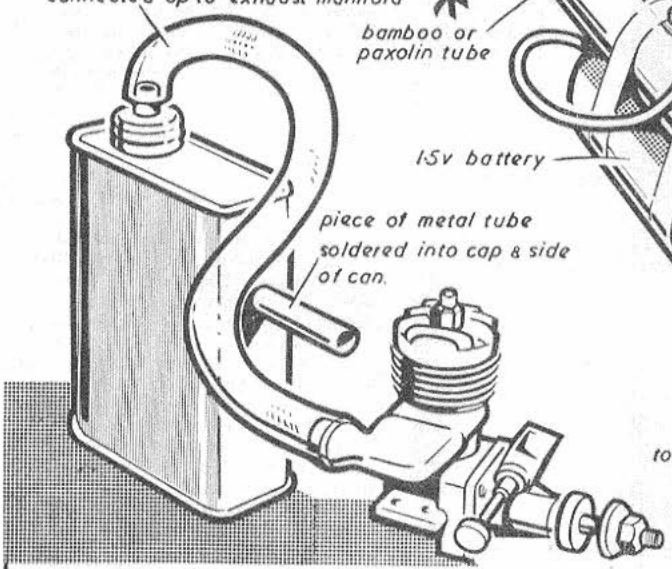
Plastic water glasses (Woolworths) can be made into excellent cockpit canopies.
A.D.ANSPACH of BEDDINGTON who sent us this idea points out that the brittle plastic must be cut very carefully with a fine tooth X-ACTO saw or a junior hacksaw



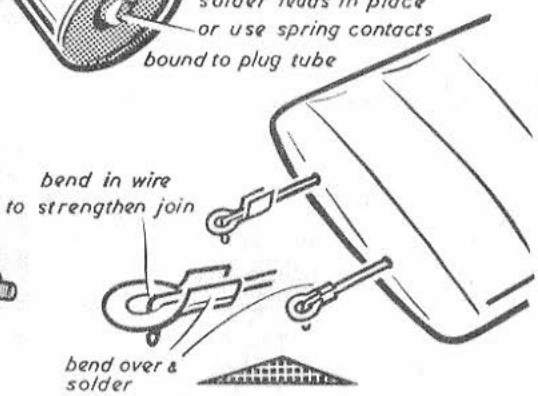
Tin lid as a solder holder is the tip from
I. TANNER of GILLINGHAM.
Also serves as a soldering iron rest.



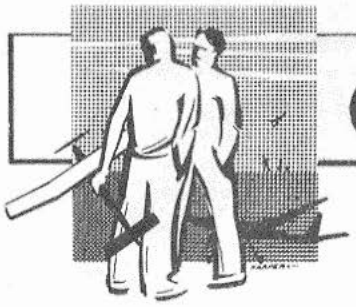
P.NIELSON of WEST WICKHAM suggests this electric dethermaliser fuse-lighter. It can be elaborated or simplified quite easily and it wins this months tool chest



Waste oil from an engine exhaust is very messy, particularly when running in a new engine.
J. DIGNUM of BATTERSEA collects it in an old fuel can and cuts down the engine noise at the same time. Can may be packed lightly with steel wool to further reduce noise.



J. HARTWELL of BIRMINGHAM makes neat lead-out loops like this. It is important to bend the end of the lead-out wire as shown and to solder securely.



CLUB NEWS

LIVERPOOL D.M.A.S.

Flying is back in fashion in the club, with a multitude of new models taking the air for the first time. Outstanding are Alan Jones' *Galloping Ghost* controlled saucer for 2.5 c.c. motors, which is highly manoeuvrable, turning on a sixpence, and Joe Barnes' new rubber models, developments of last year's with an increase in performance with less weight. Arthur Searle has a sheet covered A.2 under test which looks promising.

Recent contests attended were the Northern Area Winter Rally and our own Area Rally. Mick Duce managed fourth in Rubber at the Northern in near perfect conditions for the time of year. Joe Savini, who was dogged by timer trouble through the day, made a valiant effort to come third in power, being unable to get back in time for the fly-off. Joe Barnes had rubber trouble and Alan Carter had two over-runs in power after drowning his No. 1 model in a ditch after a max.

Conditions at the North West Area Winter Rally were poor. Only our power flyers attempted anything and only Geoff Lowe managed to put a time in. Messrs. Carter and Savini had sticking autorudders and damaged their models.

FORESTERS (NOTTM.) M.F.C.

Dave Adcock, who held the closed circuit R/C distance record last year until Harold de Bolt took it from him, is preparing another *Uproar*, with Bramco 10 relayless Rx and Tx, to have a go at the world distance record currently held by Charlie Dance.

HORNCHURCH M.A.C.

Winter indoor activity has featured R.T.P. Jetex. The old pylon has now been replaced by a new one of welded steel strip, which screws to the floor for greater safety. The line length is, unfortunately, restricted to about 6 ft. due to the room available, but this is, perhaps, a good thing due to excessive line drag at longer lengths. Speeds around 80 m.p.h. have been achieved with supercharging, but we are running into difficulties over timing these small models, and one or two members hope to invent an electrical device for this.

WHARFEDALE & D.A.

The date for our C/L Rally is now definitely Sunday, June 4th, and we would like to extend a cordial invitation to all enthusiasts in the U.K. to attend. Venue is R.A.F. Rufforth (near York) and we can assure you of plenty of good competition. Events include "½-A," "A" and "B" T/R, plus Combat and Stunt. Pre-entry is requested (2s. 6d. per entry) to: L. Davy, "Sunnyside," Burley-in-Wharfedale, near Ilkley, Yorks.

On the home front we are pleased to be able to report yet another successful Northern Area Winter Rally. Wharfedale successes were evident in the three T/R events with the Edwards/Adams (ETA 29) "B" entry taking first place, and the Long/Davy team (ETA 15) claiming first place in FAI.

A gallant effort by junior J. Northage (Oliver Tiger Cub) gained him fourth place in "½-A" after putting up the fastest heat time of the day (5.03).

Stop press news—November 5th is the provisional date for this year's class "B" Rufforth 1,000. More information at a later date, with possibility of an FAI 1,000 lap race under consideration.

HIGH WYCOMBE M.A.C.

This year's C/L Rally will take place on April 30th at R.A.F. Booker. As in other years the events include "A" and "B" T/R, Combat and Stunt, we would like to include "½-A" T/R and Speed, but we have not the personnel or space to run additional events.

Pre-entry is required at 2s. 6d. each competition and should be sent to: J. Elphick, 102, Suffield Road, High Wycombe, Bucks., together with S.A.E. for return of heat times, etc.

Latest date for entries is April 22nd, and all entrants must be members of S.M.A.E. or be covered with comparable insurance.

SPRINGPARK M.A.C.

The second round of the L.D.I.C.C.C. was reached by beating the West Middlesex M.A.C. by a narrow margin; in the semi-final, however, we were overwhelmed by St. Albans. We achieved what we consider to be the club's best team effort yet, 11th out of 58 teams in the Model Engineer Cup. Through the agency of Andy Smith the club found itself owning the holder of the Helicopter Trophy from the St. Albans Gala; we have not got over this yet!

Regular meetings are held at the Assembly Rooms, Coney Hall, West Wickham, Ken., on Tuesday evenings at 7.30, to which new members are welcome.

CAMBRIDGE M.A.C.

Wild scenes have followed R.T.P. flying of Jetex models in the clubroom. An unknown member put a second pin in the top of the pole, next to the pivot, so that the model rapidly wound itself up to the centre of the circle, hissing only inches from the head of the club chairman, who thought that the safest place in the room was the foot of the pole.

We are hoping to repeat the success of last year's slope soaring rally—date and place are to be decided shortly.

BRIGHTON D.M.A.C.

At the A.G.M. Ian Mullett accepted the post of President, which had been vacant since the death of his father Arthur Mullett.

The Club Championship, based on flight times over selected contests during the year, was won by John West.

ST. ALBANS M.A.C.

At a recently held engine starting contest, contestants had to run the length of the clubroom, fill the tank and start the engine. Carl Simeons won this comp in the dazzling time of 3.8 sec. A raffle was drawn on the same evening which was in aid of the club funds. Prizes were two engines, donated by a club member, and a bottle of sherry, needless to say the funds are now better off.

Tony Young is off to a flying start in pursuit

CLUB HISTORIES NO. 2 NORTHERN HEIGHTS M.F.C.

THE Northern Heights M.F.C. is the oldest (founded 1931) and one of the most famous active clubs in this country. The name, which many people find mysterious, refers to the "Northern Hills" of London—(Parliament Hill, Alexandra Palace, etc.) and emphasis in the club is placed on the actual flying side of the hobby.

C. A. Ripon (Rip) was one of the founder members, and although no longer residing in the London area, he still maintains contact with the club. This is typical of Northern Heights members, who are a group of like-minded friends, who consider the social and friendship aspect of their association to be of prime importance. Also the "fly-for-fun" side of modelling is much encouraged. This gives a clue to the longevity of the club and why "moved-away" members never entirely lose touch. Another famous name in the hobby is Dr. A. P. Thurston who has held the post of club President since the immediate post-war years, and like Rip is still very actively interested in the game.

F/F has always been the major interest, and among the many "firsts" claimed by Northern Heights members are—the invention of rubber motor bobbins, wound formers, the "White" method of rubber tensioning and the introduction of Gala days. The first Northern Heights Gala was held in 1933 and it is still one of the most looked-forward-to dates in our contest calendar. Although perhaps tempting fate, it is an interesting fact that every N.H. Gala day for many years has been blessed with fine weather. What's that little ditty about the sun and the righteous?

After the war N.H., in company with their traditional friends and rivals Bradford M.A.C., virtually recreated F/F power flying in Great Britain. This was fitting since, in the immediate pre-war years, the Northern Heights club dominated the contest scene.

The "vintage" contest year for N.H. was probably 1946 when Ken Tansley won the Sir John Shelley, Bob Copland the M.E. No. 2, and R. Teasel the Thurston Cups, while Bob Copland was second in the Bowden and Ken Tansley second in the Keil Trophies. Also the club beat Streatham to win the L.D.I.C.C.C., Bob Copland won the Rubber event at the Irish Nats and was also the individual National R.T.P. Champ. The club won more monthly R.T.P. contests than any other and also won events at the Brentford and Chiswick Gala, Chingford, Bushey Park and St. Albans rallies as well as first, second and third places at their own Gala!

In international competitions, Bob Copland has represented the U.K. more times than any other individual—without his due share of success. Nevertheless, N.H. have a Wakefield winner among their members—Roy Chesterton who has been with the club for over 10 years.

In the field of indoor flying Bob Copland's record of 1938 stood for nearly 20 years, and Ken Young was the first to beat 3 min. with an R.T.P. model in 1939.

First Editor of Model Aircraft, *F. E. Wilson, is still a member of N.H. and a close association with the S.M.A.E. has always been maintained.*

Although latterly active membership has declined the club is still virile—witness the fact that they still hold the R/C gliding record and in 1960 they again won the fiercely contested L.D.I.C.C.C. event. A Northern Heights member whom even the newcomer will know, is Henry J. Nicholls who served his modelling apprenticeship with the club, and of course, Bob Copland is the current London Area Chairman.

N.H. have often run national events almost unaided and on many occasions have contributed to funds for S.M.A.E. and International events.

Sec.: K. Tansley, 36, Falkland Avenue, New Southgate, London, N.11.

If you would like a brief history of your club to be published send us the details, together with a copy of the club transfer and/or badge, but keep the details brief please.—Ed.

of the Club Championship, having gained first in chuck glider at East Lancs., first in chuck glider and scramble, and second in power, at the Northern Area Winter Rally.

WOLVES M.A.C.

We were top club in the Midland Area last season. All our points were gained in C/L, however, so now, by having F/F contests for the "Models and Hobbies" cup, donated by model shop proprietor Bill Daniels, we hope to arouse interest in this field.

HALIFAX M.A.C.

There was a large entry in C/L events at the Northern Area Winter Rally, although the competitors were dogged by misfortune. In "½-A," Bruce Lewis's model got through the heats with a rough engine run, but doing 60 laps to a tank, only to spin on take-off in the semi-final.

LEICESTER M.A.C.

Eleven C/L stunt model frameworks lined up for the first round of the winter building competition, S. Wade and our competition secretary doing the judging. M. Bailey, a junior member, was joint first with the club secretary, both getting 70 marks out of 80. The lowest mark was 51, so all have a chance of taking the lead in the second round, when the completed models will be judged. The sum of £12, in the form of vouchers for the local model shop, will be awarded as prizes in various club competitions this year.

CROYDON & D.M.A.C.

Croydon's seven league boots have taken quite a thrashing recently as a result of the rash of rallies held in the wild north. Several car loads of bods and models went to Nelson, Rufforth and Chetwynd and, apart from nearly driving into a canal in the fog on the way to Nelson, getting mixed up with the Monte Carlo Rally en route for Rufforth and sinking into the middle of a waterlogged Chetwynd, all arrived back intact and not entirely empty handed.

Al Wisher and Jack North took first and second in Rubber at the East Lancs event, Dennis Partridge and junior Brian Sulway, both flying Dennis's developed *Nebula* variant, *South Cone*, took first and second in glider at the Northern Winter Rally, and Al Wisher used up quite a lot of his stock of open models to come second in rubber at the N.W. Area "do."

CHEADLE & D.M.A.S.

The new season started with a bang—Alan Whittaker taking first place in S/C Radio at the Colne Rally and Derrick Brunt and Wally Nield taking second and third respectively at the Northern Area Winter Rally. Unfortunately, Mr. Whittaker did not repeat his success at Colne due to shedding half a wing in his wingover and thus providing the crash of the day.

Most sad note is the club's shortage of members. However, efforts are being made to step up enthusiasm with more comps. and other activities. New members will be made most welcome at meetings held every Tuesday at the A.T.C. Headquarters, Banks Street, Cheadle.

HAYES & D.M.A.C.

After tales, by the club members who went to Hungary last year as British C/L team members, about the amount of monoline control which Z. Pech had during his 2.5 World speed record run, we attached a 35 ft. length of Laystrate to a conventional U-control handle and to the rear leadout of a Silver Streak powered flying wing, with no elevator.

The model was flown in breezy weather but "grooved" with only occasional raising or lowering of the handle being necessary to keep the model level. Loops were not possible but we got in some two dozen flights with no more than superficial damage (model has a fibreglass fuselage and a new type Semo 7 × 8 nylon prop., both of which seem to be absolutely unbreakable).

The results of this "experiment" show that a stable speed job should fly perfectly with only a square inch or so of elevator, for control.

EAST LANCS M.A.C.

Our Winter Rally attracted no fewer than 107 competitors from all over the country. Messrs. Thomas and Preston of Sutton Coldfield kindly gave up their time to judge the R/C comp, so on behalf of everyone—thanks.

RESULTS

Rubber: 1st—A. Wisher, Croydon, 9.0 + 3.10; 2nd—J. North, Croydon, 7.20; 3rd—J. O'Donnell, Whitefield, 7.17. *Junior*: J. Birks, Charlton, 3.23.

Power: 1st—P. Manville, Bournemouth, 9.00 + 4.00; 2nd—D. Barber, Southport, 8.46; 3rd—J. Shaw, Oldham, 7.43; 4th—A. Garnett, E.L.M.A.C. *Junior*: J. Bates, Ashton, 4.03.

Glider: 1st—J. O'Donnell, Whitefield, 8.41; 2nd—J. Chadwick, Ashton, 8.09; 3rd—P. Verity, E.L.M.A.C., 7.00; *Junior*: P. Walker, Whitefield, 6.56.

Combat: 1st—A. McKay, Prestatyn; 2nd—R. Gordon, Southport.

Radio: 1st—A. Whittaker, Cheadle; 2nd—R. Donoghue, Kersal; 3rd—A. Miller, Oldham.

After making enquiries it was obvious that a rally in the summer would be well supported. The date of this meeting will be fixed by the clubs interested. All you have to do is to send your suggested date on a postcard to the club sec. (see under Changes of Secretary). We will arrange the rally for the most favoured date. Any suggestions or ideas on comps to be held will also be welcome.

BAILDON M.F.C.

At the Northern Area Winter Rally, held in very calm damp conditions with little lift, Henry Tubbs and Tom Stoker had quite a good day, Henry placing second in the Rubber fly-off (12.00 + 5.02) and Tom, newly introduced to

CONTEST CALENDAR

Mar. 5th GAMAGE CUP. U/R Rubber.
" " PILCHER CUP. U/R Glider. Decentralised.
" " WHITE CUP. U/R Power.
" 19th *KMAA CUP. AIF Glider Elim. Area.
" " GUTTERIDGE TROPHY. FAI Rubber Elim. Area.
" 26th C/L Speed. Centralised.
Apr. 9th *ASTRAL TROPHY. FAI Power Elim.
" " SMAE CUP. FAI Glider Elim. Area.
" " WOMEN'S CUP. U/R Rubber/Glider. Area.
" " JETEX TROPHY. Jetex.
" " Dagenham Combat Rally, Central Park, Dagenham. SMAE Combat, "35" Combat (60 ft. lines). Stunt.
22-23rd R/C and C/L TRIALS. Centralised.
" 30th *WESTON CUP. FAI Rubber Elim. Area.
" " HALFAX TROPHY. FAI Power Elim. Area.
" " †High Wycombe C/L Rally, R.A.F. Booker. "A" and "B" T/R, Combat, Stunt. Pre-entry (2s. 6d.) to J. Elphick, 102, Suffield Road, High Wycombe, Bucks., by April 22nd, 1961, with S.A.E. please.
May 6-7th RAFMAA Championships. R.A.F. Debden.
" 7th †Sutton Coldfield R/C Meeting. R.A.F. Wellesbourne. Single, Multi and Scale. Entry forms and full details—R. Masters, 30, Western Road, Wylde Green, Sutton Coldfield, Warwickshire.
" 7th. †Stockport Advertiser Rally, Woodford Aerodrome, Cheshire. R/G/P, R/C single and multi, T/R, "A," Combat, Flying Scale for E. J. Riding Memorial Trophy.
" 7th †Surbiton Gala, Chobham, R/G/P, ½A Power.

*Plugge Cup events.

May **BRITISH NATIONAL CHAMPIONSHIPS.**
21-22nd Venue to be announced.
THURSTON CUP. U/R Glider.
SMAE CUP. R/C FAI Multi.
LADY SHELLEY CUP. Tailless.
KNOKKE TROPHY. C/L Scale.
" 21st GOLD TROPHY. C/L Aerobatics.
DAVIES A TROPHY. FAI Team Racing.
COMBAT. Preliminary Heats.
SPEED.
SIR JOHN SHELLEY CUP. U/R Power.
MODEL AIRCRAFT TROPHY. U/R Rubber.
SHORT CUP. PAA-Load 2.5 c.c.
SUPER SCALE TROPHY. F/F Scale.
" 22nd SMAE CUP. R/C FAI Multi.
TEAM RACING. Class ½A.
DAVIES B TROPHY. Class B T/R.
COMBAT. Final Rounds.
SPEED.
June 4th †Wharfedale C/L Rally, R.A.F. Rufforth, near York. "½-A," "A" and "B" T/R, Combat, Stunt. Pre-entry (2s. 6d.) to L. Davy, "Sunnyside," Burley-in-Wharfedale, near Ilkley, Yorks.
" 11th †Midland Area Rally, R.A.F. Wellesbourne, near Stratford-on-Avon F/F all classes, "½-A," "A" and "B" T/R, Stunt, Combat, R/C Single and multi, Concours, Chuck Glider. Pre-entry (2s. 6d. double on field) to S. Wade, 10, Storer Road, Loughborough, Leics., by May 28th, 1961, limited to first 50 in R/C, 64 in Combat, 72 in T/R.
" 18th *MODEL ENGINEER CUP. U/R Team Glider. Area.
" " FLIGHT CUP. U/R Rubber. Area.
" " Godalming C/L Rally.
24-25th F/F TRIALS. FAI Rubber/Glider/Power. Centralised.

SMAE events in capitals.

July 9th C/L SPEED. Centralised.
" 15-16th F/F TRIALS. FAI Rubber/Glider/Power. Centralised.

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Aug. 7th **INDOOR WORLD CHAMPIONSHIPS.** R.A.F. Cardington.
" 13th SPEED. Centralised.
" 13th †Novocastria M.A.S. Rush Trophy Gala. Open R/G/P, "½-A" Power, Combat.
" 20th †Devon Rally, Woodbury Common Open R/G/P, "½-A" Power, Combat.

Sept.
1-3rd **WORLD CHAMPIONSHIPS, F/F.** Germany.
" 3rd **NORTHERN GALA**
GLIDER. U/R Glider.
HAMLEY TROPHY. U/R Power.
CATON TROPHY. U/R Rubber.
RIPMAX TROPHY. R/C Rudder only.
TEAM RACING. Class "½-A," "A" and "B."
" 24th *KEIL TROPHY (PLUGGE). U/R Team Power. Area.
" " FROG JUNIOR TROPHY. U/R Rubber/Glider. Area.
" " SPEED. Centralised.
Oct. 1st †South Coast Gala. Venue to be announced.
Oct. 8th "½-A" Power.
" " *FARROW SHIELD U/R Team Rubber. Area.
" " TEAM RACING. Class "½-A" "A" and "B."
" 15th **AREA CHAMPIONSHIPS**
" 22nd FROG SENIOR CUP. U/R Power. Decentralised.
" " CMA CUP. U/R Glider. Decentralised.

†SMAE sanctioned contests.

the class, managed third place with 12.00 + 4.39. He was also third in Open Glider with 7.55.

Tall but true story concerns one of our members, who, at the Winter Rally, lost his power model out of sight overhead due to timer failure. He gave it up for lost but, driving home in the evening, he noticed a model in a field—yes, you have guessed right, it was his, without a scratch on it.

SURBITON M.F.C.

Our annual F/F Gala will be held this year at Chobham Common, on Sunday, May 7th, commencing at 10.30 a.m.

Events will be Open Rubber, Glider, Power and ½A Power, three flights, but maximum will be fixed on the day as will engine run, to depend upon weather conditions and wind direction.

This is an event run by contest fliers for those who like a contest and not a garden party, and has been granted S.M.A.E. sanction. We look forward to seeing those who have previously supported us, together with anyone else who wants a good day out contest flying.

COSMO M.A.C.

Our first " Brains Trust " with Instructors Ron James, Fred Andrews and Stan Robinson, under fire from Juniors and Seniors alike, proved extremely popular, with many Juniors taking the opportunity to " get at " the Instructors. Fortunately the panel managed to cope with all questions.

Mass production of large 2.5 diesel stunters for displays next season is well under way with one *Skua*, three M.A.N. *Peacemakers* and four *Kentish Winds*. It will be interesting to see how many survive the season !

We already have four demonstration bookings and many more enquiries on hand. We find it pays to advertise.

SMALL HEATH M.A.C.

Many flyers will remember last year's C/L Stunt Competition which we organised, and will be pleased to know that it will be run again this year but date and venue have not yet been fixed. Midland Area Clubs only can be considered and invitations will be sent when all arrangements have been made.

NOVOCASTRIA M.A.S.

Many members attended the Northern Area Winter Rally, where our T/R enthusiasts did well, winning the " ½-A " event and collecting third and fourth places in the " B " final. In F/F George McGowan took fifth place in open glider with W. Lee and E. Stephenson getting ninth and eleventh places in open power.

R.A.F. M.A.A.

The newly introduced series of postal contests has gone some way towards keeping interstation rivalry alive between the annual championships.

In the most recent " postal," an International Class Team Race, S.A.C. Lambert, of Waterbeach, took first prize—a Veco *Mustang* kit. More contests of this type are in preparation and all Service modellers are urged to support them—the prizes are certainly worth while.

This year's championships, at Debden, on May 7th, look like being the best so far if the amount of preparation is any criterion. For the first time accommodation will be available for a limited number of servicemens' wives and we understand that there are plans afoot for a barbecue and other delights still on the secret list !

CHANGES OF SECRETARY

CAMBRIDGE M.A.C. Miss S. Allsopp, 83, Guildford Way, Cherry Hinton, Cambridge.

CHEADLE & D.M.A.S. B. Faulkner, 3, Burns Avenue, Cheadle, Cheshire.

EAST LANCS M.A.C. A .Buckel, 41, Elizabeth Street, Accrington, Lancs.

MIDLAND AREA. R. Jones, 3, Nimmings Close, West Hoath, Birmingham 31.

NORWICH M.F.C. D. G. Bridge, 63, St. George Street, Norwich, Norfolk.

OUTLAWS (CANNOCK) M.A.C. E. Burke, 27, Brookland Road, Walsall Wood, near Walsall, Staffs.

SPRINGPARK M.A.C. H. C. Hayward, 106, Tubbenden Lane, Orpington, Kent.

ASHTON M.A.C. W. Hadfield, Bradley Hurst, Dukinfield, Cheshire.

BRISTOL R/C M.A.C. J. V. Punter, 14, Acacia Road, Staple Hill, Bristol.

CHINGFORD M.F.C. G. H. R. Rigden, 27, Woodland Road, Chingford, E.4.

DUNFERMLINE M.A.C. A. Erskine, 69, Drynaps Green, Dunfermline, Fife.

ESSEX M.F.C. N. C. Willis, Flat 2, Springbok House, Vicarage Lane, Great Baddow, Chelmsford.

GATESHEAD M.F.C. C. Hall, 147, Brinkburn Avenue, Gateshead 8.

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READING & D.M.A.C. E. Nicholls, 81, Wolseley Street, Reading.

RICHMOND & D. GREMLINS M.A.C. M. Fox, 210, Castlecombe Drive, S.W.18.

SOUTHPORT M.A.C. P. E. Rigby, 49, Gravel Lane, Banks.

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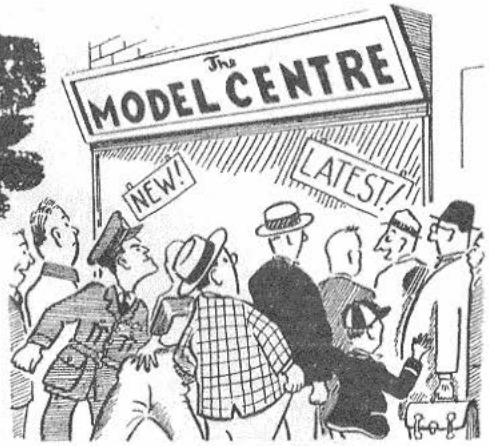

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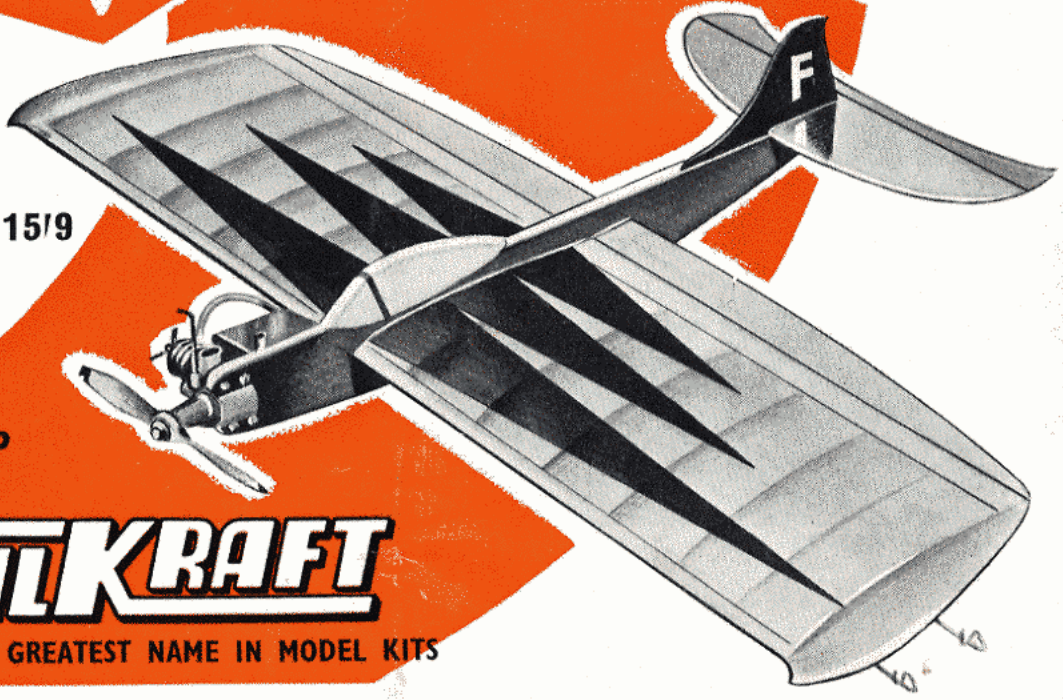
19/9

Firefly



Control Line Stunt Model for 049 glowmotors and under 1 c.c. diesels. Die-cut parts for quick building. 20 in. wingspan. **15/9**

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