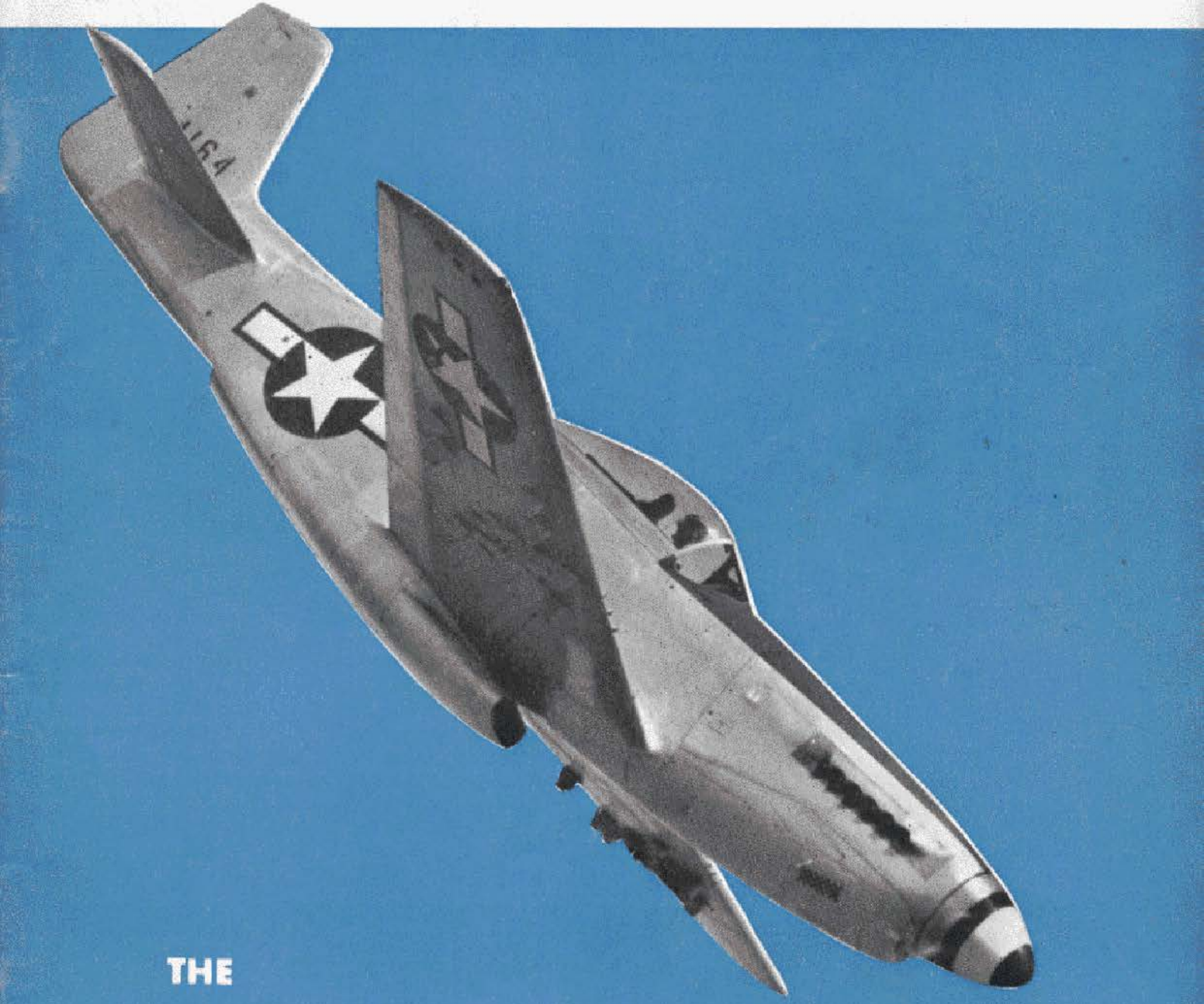
JUNE 1959 1'6

MODEL aircraft



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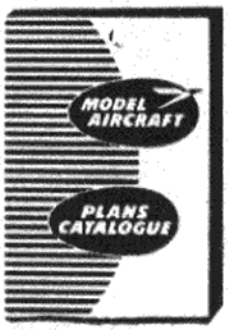
Detailed scale plans of an interesting, but little used World War I fighter. (April).

★



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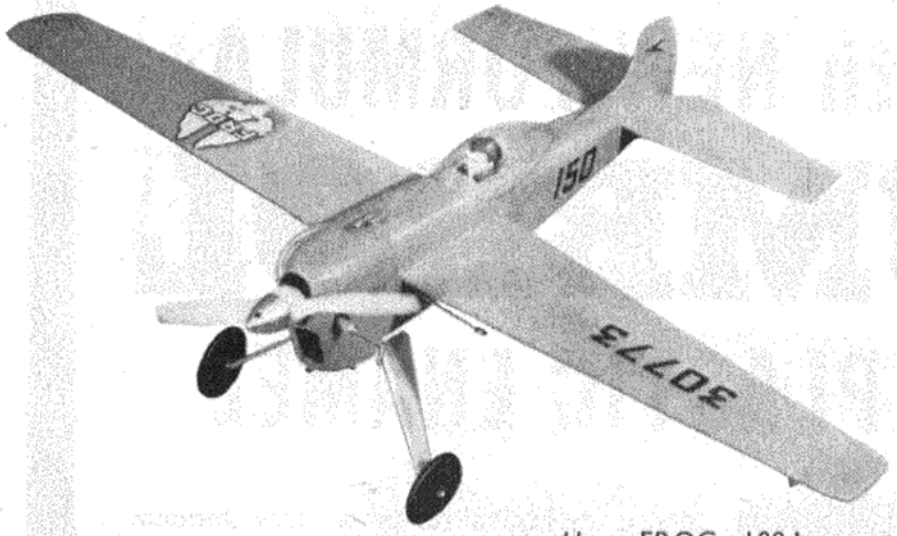

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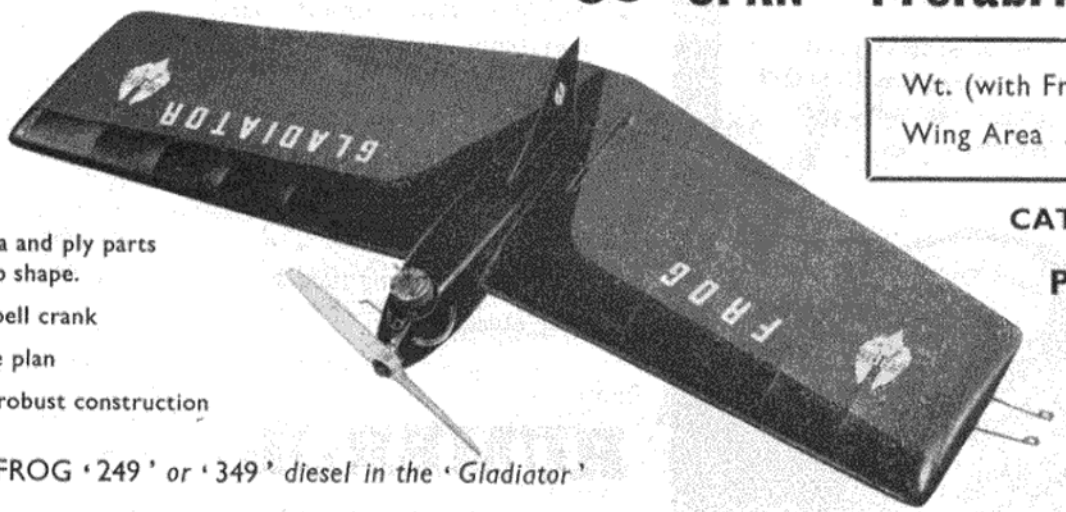

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MODEL AIRCRAFT

JUNE 1959

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IN THIS ISSUE

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Here and There

WITH the introduction this month of a new style cover, together with one or two minor changes in our editorial pages, it is perhaps an appropriate time to reassure readers that no major changes in editorial policy are planned. We know, by the number of friendly letters that we receive, that we are "on the beam" as regards the type of article that we publish in M.A. We can't please everyone, of course, and we would be the last to attempt the impossible, but we do try to balance the contents so that they have majority appeal. This is not to say that we have—or intend to—ignore the more specialised interests; there will always be room in M.A.'s pages for interesting features covering such activities as "microfilmics," Jetex, and out-of-the-rut models of all types.

And this is where you, the reader, come into the picture. There is certainly no dearth of ideas or know-how in the modelling fraternity and we are here to pass on your knowledge or ideas to others. If you want proof of this turn to pages 174-175 of this issue; ordinary modellers just like yourself have contributed something of interest and are being paid for it at the same time. Whether it be a simple sketch and a brief explanation, or a three-page article, you can be sure that we will give your effort careful consideration.

Finally, a point that in the past has aroused considerable controversy among readers—the use of full size aircraft photos on the cover. For every letter against, there is one in favour, so the honours are just about even. However, in future we intend to feature model pictures on the cover from time to time so now both "sides" should be satisfied.

A 6½ hour R/C flight

THE longest observed flight by a radio controlled model in this country was put up on March 23rd by R. P. Wilson, of Hyde, Cheshire, whose E.D. 2.46 powered machine achieved a time of 6 hr. 31 min. 29 sec.

The model was a Junior 60, modified with a stub underwing of 243 sq. in. area—all up weight, 6¾ lb. Three fuel tanks holding a total of 41 fluid ounces of "home brew" were carried amidships, and engine control was effected by an air bleed into the fuel pipe, which would cause bubbles, and thus the motor to splutter at about half revs. Wright radio equipment was used and performed perfectly.

The flight itself was fairly uneventful, and following a successful 90 yd. r.o.g. into a slight breeze at 7.11 a.m., the model was climbed to a height of between 1,000-1,200 ft., which was maintained throughout. Some difficulty was experienced with a flock of starlings at 11 a.m. and a strength-

ening breeze at one time threatened to blow the model out of range. Four hours after take-off the engine spluttered for some 15 min. but this was cured by bringing the model down to 300 ft. and putting it into a tight left bank—the fuel feed was on this side. At the conclusion of the flight the model was safely landed only 90 yd. from the transmitter.

We understand that Mr. Wilson has submitted a claim to the S.M.A.E. for a British record in respect of this outstanding flight.

No power champs

A BIG disappointment for all F/F enthusiasts this year—instead of the anticipated combined F/F World Championships, the Wakefield will be held in France, the A/2 in Belgium (for dates and venue see Contest Calendar on page 191) and there will be NO Power Championship. The cancellation of this latter event is due to the fact that no country has volunteered to run it.

To say that we are amazed at this state of affairs is the understatement of the year. It will be remembered that this country strongly opposed the bi-annual holding of World Championship events, and it would now seem that our attitude was more than justified. We are well aware that with the increasing number of World Championship contests the financial strain on countries supporting them was becoming very heavy. But at least the situation has never arisen in the past whereby a Championship could not be run,

Previously, of course, the winners of an event had the option of running, and indeed, were expected to run, the contest for the following year, thus national pride was involved. But now that the venue is decided irrespective of the previous winners' nationality, we have, in the very first year, a fiasco.

At least one thing has come out of this; with no power contest power trials are unnecessary, so the two events to select the glider and rubber teams will be run concurrently on May 31st and June 14th—the venue being R.A.F. Wigsley.

It is anticipated that a centralised event for the Power Trials Trophy will be run later in the year.

A very distinguished visitor to the High Wycombe C/L Rally was Major Draper who, in the photo above, is being shown the works of Gordon Yeldham's winning Class "A" team racer by pilot Johnny Hall. Of Major Draper's more recent exploits, flying an Auster under 13 Thames bridges is, perhaps, the best known, but in a future issue of "Model Aircraft" he will tell, in his own words, of some of his adventures with W.W.I., and other early aircraft, with photo illustrations from his personal albums. Incidentally, the Major was most intrigued with the model flying, and we hope to teach him to fly a control-liner—wish he could teach us how to fly a full-size machine as incomparably as he does though!

STAFF VACANCY

A vacancy will occur shortly on the senior editorial staff of MODEL AIRCRAFT.

Preferably, applicants should have experience of magazine production and working, together with a thorough knowledge of all aspects of the hobby.

Applications should be in writing, and give full particulars of career to date, also the salary range expected. Address letters to Executive Editor, Model Aircraft, 19-20, Noel Street, London, W.1.

Official register

IF you consider yourself a skilled or experienced aeromodeller then the F.A.I., who are collecting a register of people prepared to act as judges or officials at International events, would like to hear of you. However, it is no good getting in touch direct with them as they are not, of course, familiar with all the well-known personalities in British aeromodelling. The first approach should be made to the Secretary of the S.M.A.E., who will want to know full details of your qualifications, and if these are considered suitable then the S.M.A.E. will do the rest

Hold on!

IN future glider contests, including the trials, the throwing of a winch to release the model will lead to disqualification of the flight. This is an F.A.I. rule, and although it will no doubt meet with a certain amount of opposition from the glider fliers, time-keepers, officials and spectators (including your M.A. reporter), all of whom at some time or another have narrowly escaped injury when a winch has sailed by their head, will view the matter in a different light.

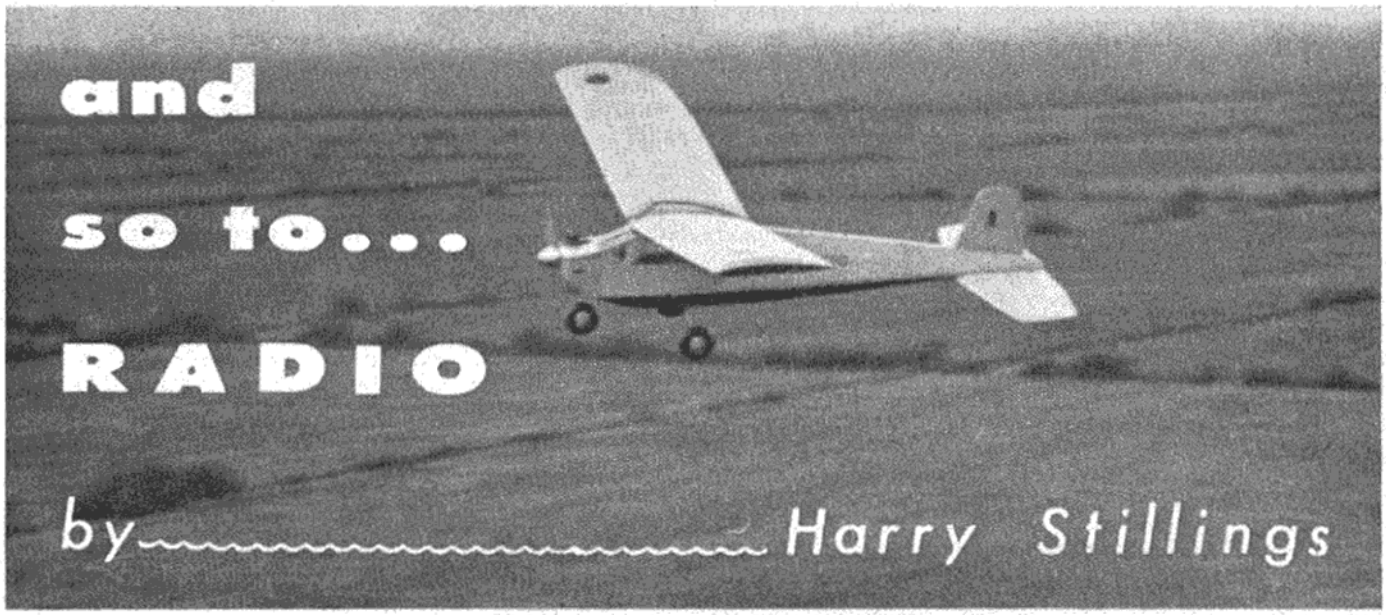
Sorry—no change!

ANOTHER new F.A.I. rule which may, or may not, affect fliers in this country, is to the effect that although competitors may interchange motors in their own models they may not interchange them with other competitors. This has been brought about by the fact that it was possible for competitors in power (F/F or C/L) events to share the same re-worked engine. This was considered rather unfair!

LOOKING BACK . . .

Ten Years Ago. In June 1949, the British Nationals were held at Fairlop and among the five events (yes, only 5!) an R/C contest was featured for the first time. The only C/L event was the Gold Trophy aerobatics contest held for the second year and won, with a memorable performance, by Brian Hewitt of Birmingham. . . . Up North, a name was beginning to appear on contest results sheets which was to become slightly more familiar in years to come . . . one J. O'Donnell. In America, the first of the "Half-A's" were coming on the market: K & B Infant-Torpedo 0.020, Baby Spitfire 0.045 and O.K. Cub 0.049. At that time there was no separate class for these "novelty" engines. They were lumped together with 0.09s and 0.19s in Class "A" (3.27 c.c.).

Twenty Years Ago. A London model shop offered fibre coffins (model variety) complete with locks and handles at prices ranging from 5s. 6d. to 10s. 6d. A Hong-Kong firm, Eastern Model Airplane Co., offered U.K. modellers flying scale kits at prices ranging from 5s. 6d. to 8d.! Dealers could have a selection of 30 kits for £1 post paid. . . . In the U.S.A. the 1939 season—the fifth year of commercial model engine production—began with nearly 30 different types of petrol engines available to the American modeller and the Ohlsson company claimed to have run an Ohlsson 0.23 "wide open" for 400 hours, replacing only sparking-plugs. . . . R/C was already on the market, with two firms offering moderately priced single valve receiver kits.



PART VI—Flying technique of rudder-only control

IN this article we shall delve a little deeper into the actual flying technique of rudder-only control. When pilots of full-size aircraft learn for the first time that a basic R/C model is controlled solely by movement of the rudder they are invariably amazed, as they are used to making more use of the ailerons and elevators than the rudder; however, as we can't have " a man in it " we have to adapt our model for the most effective response from one moving control surface, and the rudder has been found to be the answer, coupled with generous dihedral for quick return to level flight after a turn.

In any case, the primary purpose of R/C is, of course, to control directional flight, so that the model does not merely drift away down-wind as would be the case with F/F; rudder-only fulfils this aim, enabling us to fly the model within our near vicinity throughout a flight, and bring it in to land only a few dozen yards or so from the launching point. This alone is a big step forward from F/F, but it is surprising what more can be achieved as experience and confidence increase.

The basis of single-control aerobatics is the way in which the natural tendency for a held-on turn to develop into a spiral dive is used *deliberately*; in this way speed is built up, the model is taken out of its normal stable flight attitude, and this situation gives us the ingredients for quite a wide variety of stunts. The design of a stunt model should be as compact as possible, with no superfluous side area or " trimmings," a fairly short moment-arm (between wing and T/P), moderately-low aspect ratio wing, and a good motor of sufficient capacity to provide ample thrust. If necessary, downthrust must be added to cure any tendency to power-stall; the aim is the fastest possible forward speed combined with a *shallow* climb.

The rudder should be large (20 to 25 per cent. of the total fin area) with moderate movement (15 to 20 deg. from left to right); this gives the quick response which is essential for aerobatics. For normal directional control, signals will then have to be of short duration, otherwise the inner wing will quickly drop and a spiral dive develop. To make smooth turns one needs almost to " pulse " the rudder—a short signal, followed by a brief pause while the inner wing starts to rise again, a blip through the unwanted rudder position, followed immediately by another short signal to keep the turn going; and so on to completion of the degree of turn required. It takes considerable practice to get the " rhythm " just right, but, once mastered, the effect is exhilirating, as the model is moving throughout at a fast speed in a very realistic banked turn.

Fig. 1 illustrates various aerobatic manoeuvres with necessary directions, but it is helpful to appreciate how they are actually brought about. When the model is flying straight and level, with the rudder at neutral, all the trimming factors are " in balance," keeping it stable. As soon as the rudder moves, the balance is upset, the outer wing develops more lift than the inner (being on the outside of the turn and therefore moving faster through the air); the inner wing starts to drop and the nose to sink, and if the rudder is held out this reaction quickly develops into a spiral dive. Speed rapidly increases, so providing the extra momentum needed for stunts, when we are, in effect, deliberately trying to overcome the natural built-in stabilising " balance."

You must not expect to bring off these manoeuvres right away—in fact, it may take quite a while before you attain proficiency, as you have to get the feel of the model so that you almost have the impression that you are in the cockpit, and know instinctively when to press or release the button, maintaining full forward speed at all times. Bear in mind, too, that the rudder actually becomes more of an elevator in certain attitudes—for instance, in a left bank, with the port wing pointing down, right rudder becomes up-elevator, causing the model to " zoom " up in a steep banking climb to the right, and will usually turn over on to its back if held on long enough. Similarly, in the attitude quoted, left rudder becomes down-elevator, putting the nose down into a power-dive.

You will note that due regard must be paid to wind direction in attempting stunts; for example, it is essential when performing a loop to give opposite rudder at the right moment so that the model soars head-into-wind, so increasing wing-lift and helping it " over the top." Fast " blipping " at the point indicated in the diagram can also be helpful. For the roll, wind direction must be broadside to the model so that it helps to tip it over on to its back—dihedral then completes the rolling movement. To prevent the model soaring at the end of the loop or wing-over (and, perhaps, " sitting on its tail," followed by a stall), give a signal where indicated, which will put it into a climbing banked turn, and neutralise as soon as it is level fore-and-aft; the model should then quickly straighten out into level flight. It must be understood that manoeuvres will not be as smooth as in full-size practice, as, with only one control surface, aerobatics are brought about " artificially "; but perseverence will eventually bring quite respectable results.

Remember at all times that proper control is largely dependent upon full forward speed being maintained, so

avoid giving signals when the model is in an attitude which has slowed up speed appreciably, as little or no effect will be seen and control may be temporarily lost. Wait until it is again moving fast, and you will find response will be immediate, even if it may not be exactly what you intended! Rudder-only stunt flying with a necessarily fast-flying model calls for quick co-ordination of mind and button-thumb, and only experience can give you this proficiency. You will make many mistakes and often feel you are going around in circles getting nowhere, but will then quite suddenly discover that you've got the "feel" of the model, and be in full command.

There are several useful "tricks" (there isn't any other suitable word for it!) which often come in handy. The first is that, when the model is coming in to land and is about 6 ft. off the deck, fast "blipping" of the rudder helps to slow down the glide and keep the nose up, so appreciably improving the touch-down. The same trick will often help to get a model airborne if a faulty launch has caused it to dip perilously near the ground at the start of a flight. A few fast blips often give just that extra little bit of lift which is enough to clear the ground and allow the model to get airborne.

If you want to gain height quicker than usual it is possible to do this by going up in a series of "steps," using the rudder partly as up-elevator in the following way—keep model into wind, give "left" until wing is about 20 deg. to ground, then "right" when the model will climb several feet in a banking turn to the right. Neutralise as soon as wings are again level. When repeated several times in fairly quick succession (remembering to allow a little time for the model to settle down between "steps") quite appreciable extra height can be gained.

Safety Cut-out System

One of the ever-present perils of R/C is the flyaway, when a fault develops during a flight which breaks the radio link and results in failure of response to signals. With the large fuel-tanks used in R/C this usually means an o.o.s. flight, the model often remaining lost for days or weeks, or even for good. It is merely begging the question to restrict engine-runs to one or two minutes, as one might as well revert to F/F, but with the best care in the world there is always the possibility of a faulty battery letting you down after a flight has started, or other unforeseeable fault developing in the air, and there is no more helpless feeling in model flying than to see one's R/C job drifting away downwind with 10 or 15 minutes' fuel ration on board.

If I may digress slightly here (speaking from bitter experience!) the thing to do in this situation is to get downwind somehow—*anyhow*!—as fast as you can, to try to overtake the model so that it is again drifting towards you. If there has been no response after a dozen or so quick tries with the button, don't stand rooted to the spot in despair—get on a motor-bike, in a car, or even on a bicycle, and hare off downwind. If you have binoculars, so much the better, but get moving. The essential thing is to try to see roughly where the model *comes down*, so that you have a pretty good idea where to concentrate your search. If you just stand still at the launching point trying to follow it, it will usually disappear in the air, and then you'll have several square miles of countryside to cover in your search.

However, having suffered this trying experience on too many occasions in the past, I finally decided to do something about it. I found the best answer was air starvation using a sealed tank. I have tried using an auxiliary (30-second) tank which refilled only when the actuator moved, but this proved unreliable and called for a powerful electro-magnet with consequent heavy battery drain. The system I now use is not new, and is fairly easy to install. The chief problem lies in deciding the size of the air reservoir to be incorporated, and this can only be found by experiment with your own particular motor. If it is too small the engine will cut too quickly, and vice-versa. Fig. 2 illustrates the system, and it is essential that it should be completely leak-proof. Care must be taken especially in fitting the air-seal pad on the actuator pawl, so that it seats perfectly on the end of the tube (making a good air-seal) yet does not interfere with the free action of the actuator. A tiny drop of *non-mineral* oil (such as thin castor oil) helps to make the air-seal complete.

In use, the suction of fuel from the tank expands the air in the tube and reservoir until the motor suction can no longer overcome the semi-vacuum, and

Note: For "Half-roll off the top," proceed as for loop, but hold signal when model is upside-down at top of loop—neutralise as soon as right-way-up.

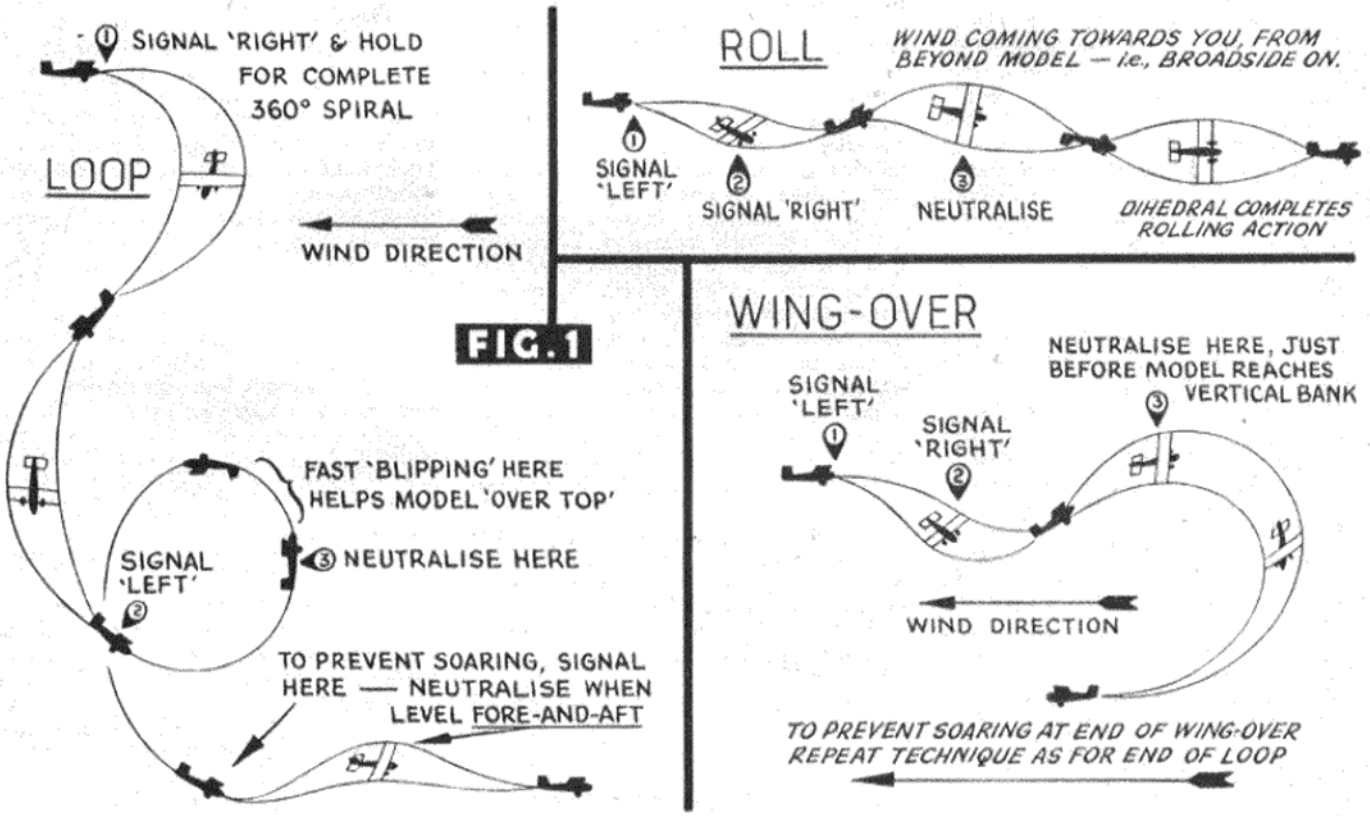


FIG. 1

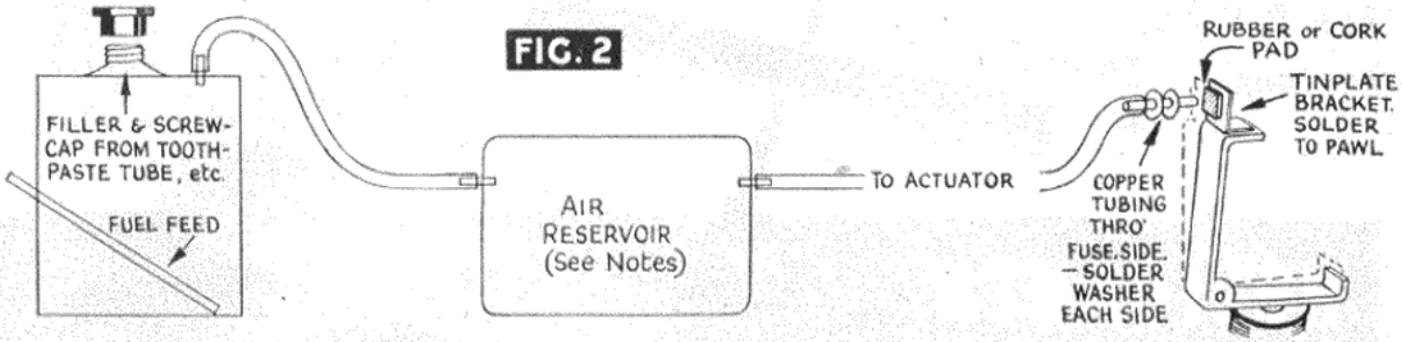


FIG. 2

so the motor stops. Thus, if there is no movement of the actuator (which is the condition in lack of response) the motor will only continue to run for a matter of 20-30 seconds, according to the air volume in the system, and so prevent the model getting far away. If the radio is responding, however, a short signal within the time-limit allows air to re-enter the tube and reservoir, and the motor will continue to run. In practice it will be found that, for normal directional control alone, correcting signals are needed at quite short intervals, so no inconvenience is caused by the use of the system, and it is a great relief to know, if radio response fails, that the motor will automatically cut out within a matter of half-a-minute or less. The extra weight is negligible and no additional batteries, servos, solenoids, or other gadgets are required.

If radio failure should occur towards the end of the motor-run the time delay may be increased, owing to the greater tank-space of air, but in this case it doesn't matter, because the fuel will be almost exhausted anyway, and the model won't get far. Having wasted far too many hours in the past trying to locate lost models I can assure you the safety system is well worth the little extra work involved in installing it, but it must be tried out and proved thoroughly before use. When filling the tank you must, of course, remember to allow an air-vent, either by fitting a large filler cap with room for both fuel-spout and air simultaneously, or prop the actuator pawl open to allow air to escape through the bleed-tube. Do not replace the filler-cap (or remove the prop from the actuator pawl) until you have the motor started and adjusted corectly, all ready to launch. Then replace cap and/or remove actuator prop and give the usual half-dozen pre-flight signals. This automatically ensures a full supply of air in the system to give time for the launch and getting to the button long before the air-seal can stop the motor. Once safely airborne all you have to remember is that you don't allow more than the time-margin between signals.

One further advantage of this method is that a flight can be ended at will merely by refraining from giving signals for the necessary period of 20-30 seconds. This stops the motor, when normal control can be resumed on the glide for the approach and landing.

In next month's article (the last in the series) I shall be giving details of a simple and reliable combined rudder/elevator system for single-channel, also an " all-position " fuel tank for advanced stunts.

(1) If position or installation of tank prevents use of large filler-cap, and neoprene tubing has to be used, air-seal on actuator pawl must be propped open to allow air-vent while filling tank and starting motor. Filler tube must then be securely plugged to seal, and air-seal prop removed to seal system.

(2) The reservoir can take any form to suit requirements, e.g., length of very large neoprene tubing; small tablet tin properly sealed with solder; piece of metal tube, etc. Capacity can only be decided by experiment with motor until desired time delay of about 30 sec. is achieved.

(3) Take special care to get a smooth, square end on bleed tube to ensure perfect air-seal against pad.

(4) Entire system, including all joints, must be completely leak-proof.

Over the Counter reviews

Performance Kits

PROTON

A C/L stunt model, the *Proton* has a tailless configuration with a flat plate wing section, which although easy to build, is rather prone to warping as it has little torsional strength.

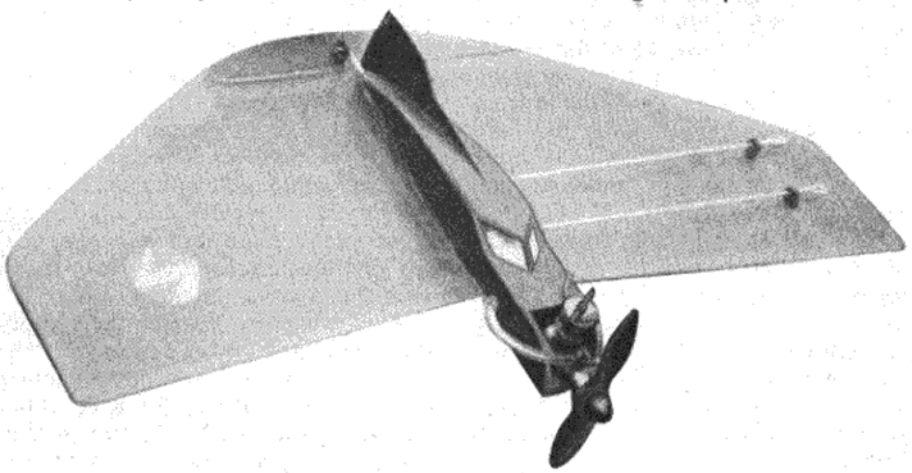
The wood supplied was of very good quality and accurately cut, with the exception of the ply parts which were stamped from $\frac{1}{16}$ in. ply, whereas the plan specifies 3/32 in. Construction was quite straightforward, although a few more notes on the fuselage plan drawing might have speeded the building, as this is drawn over that of the wing and is, therefore, rather confusing.

The model was covered with the tissue supplied; dark blue—the wings were given three coats of clear dope, the fuselage receiving one of clear and two of red.

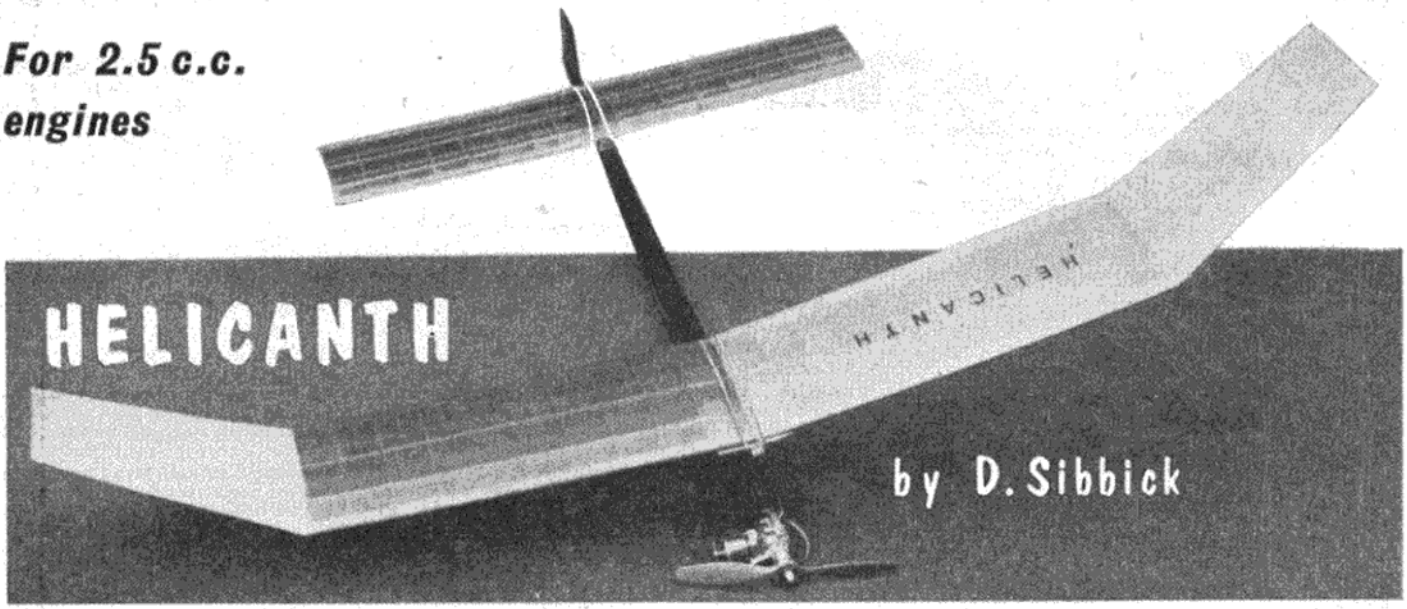
The *Proton* is stated to be suitable for engines of 1 to 2½ c.c. Accordingly, a 1½ c.c. motor was installed and with this it was possible to do loops and some inverted flying, but the model could do with more power for advanced manoeuvres. A tendency to lose line tension was noted although both rudder and engine were offset to the right. A more powerful 1½ c.c. or a good 2½ c.c. engine would, no doubt, prevent this and also improve performance considerably in all respects, overcoming the disadvantages of the flat plate wing section employed.

The model is very robust and has survived several vertical power dives into short grass with no damage at all.

For the outlay of 17s. this Performance Kits design offers good value, particularly for those who want a model that is simple and straightforward to build and fly, to this end being prepared to sacrifice some small degree of performance.



For 2.5 c.c. engines



THE first *Helicanth* was built in September, 1957, for an Oliver Tiger and it flew "straight off the board" with only a piece of $\frac{1}{16}$ in. packing under the trailing edge of the tailplane being added for final trim. Encouraged by this, another was quickly built for an A.M.35 but owing to the lightness of this engine it was found difficult to get the c.g. in the correct position, and this model was not so successful. The Mark III was the first one to have silk-covered wings, which gave great strength for a very small increase in weight.

The Oliver Tiger in the Mark I has been replaced by an E.D. 2.46, so that the Tiger could be installed in Mark IV. This was unfortunately lost for three days and when recovered had received extensive damage to the wings. However, a new pair were built and the model now flies slightly better than it did previously, best time being around the 11 min. mark from a 10 sec. engine run.

Fuselage

Start by cutting out the top and bottom from 3/32 in. sheet, then formers F1-F5 from $\frac{1}{8}$ in. sheet—the remainder being cut from 3/32 in. Cement the formers along the bottom of the fuselage, and when dry add the $\frac{3}{8}$ in. sq. hardwood engine bearers. The top can now be cemented on and pinned until dry.

The pylon is cut from three pieces of $\frac{1}{4}$ in. sheet which are joined together, two pieces of $\frac{1}{2}$ in. $\times$ $\frac{1}{8}$ in. balsa being placed across the top to strengthen, and form the wing-band retaining hooks. The whole is sanded smooth and securely cemented in a slot cut in the top of the main fuselage.

The fuel tank, made from shim steel, timer and cut-out can now be added, after which the sides are covered with 3/32 in. sheet which overhangs at the back to form a slot for the fin, which is made from three pieces of $\frac{3}{16}$ in. medium sheet, joined together, and sanded to a symmetrical section.

Cement on the wing and tail platforms, these being made from $\frac{1}{16}$ in. ply, strengthened with $\frac{1}{4}$ in. sheet. Sand the entire structure and cover with heavy-weight Modelspan, then give four coats of dope and one of thin fuel proofer. Bolt the engine in place with no side, up, or down thrust.

Wings

These are quite straightforward, so start by cutting out 18 W1 ribs from $\frac{1}{16}$ in. sheet, also three W2, and two each of the tip panel ribs. The starboard centre section is built first. Cut $\frac{1}{16}$ in. wide slots about $\frac{1}{8}$ in. deep in the $\frac{3}{16}$ in. $\times$ 1 in. trailing edge section with a small file, and pin down, together with the $\frac{3}{8}$ in. sq. leading edge which is packed up $\frac{1}{4}$ in. to give the required wash-in. Cement in all W1 ribs and add the top spars.

Now build the other half of the centre section and while this is drying, cement the previously built part to it. Cement the joints well, brace with $\frac{1}{16}$ in. ply, as shown, add rib W2, and pack up the tip 3 in. to give the correct dihedral angle.

The wing tip panels are easily built (you will find it easier to fit the ribs between leading and trailing edges before cutting the spar slots) and are joined to the centre section —packing up the tips 5 in. to get the correct dihedral. Cement the bottom spars in place and add $\frac{1}{16}$ in. sheet to the two leading edge panels in the centre. Cement soft $\frac{3}{16}$ in. sheet to the wing tips, carve and sand to follow the line of the end rib.

Sand the whole framework and give one coat of dope, cover with silk or heavy-weight Modelspan and dope accordingly.

Tailplane

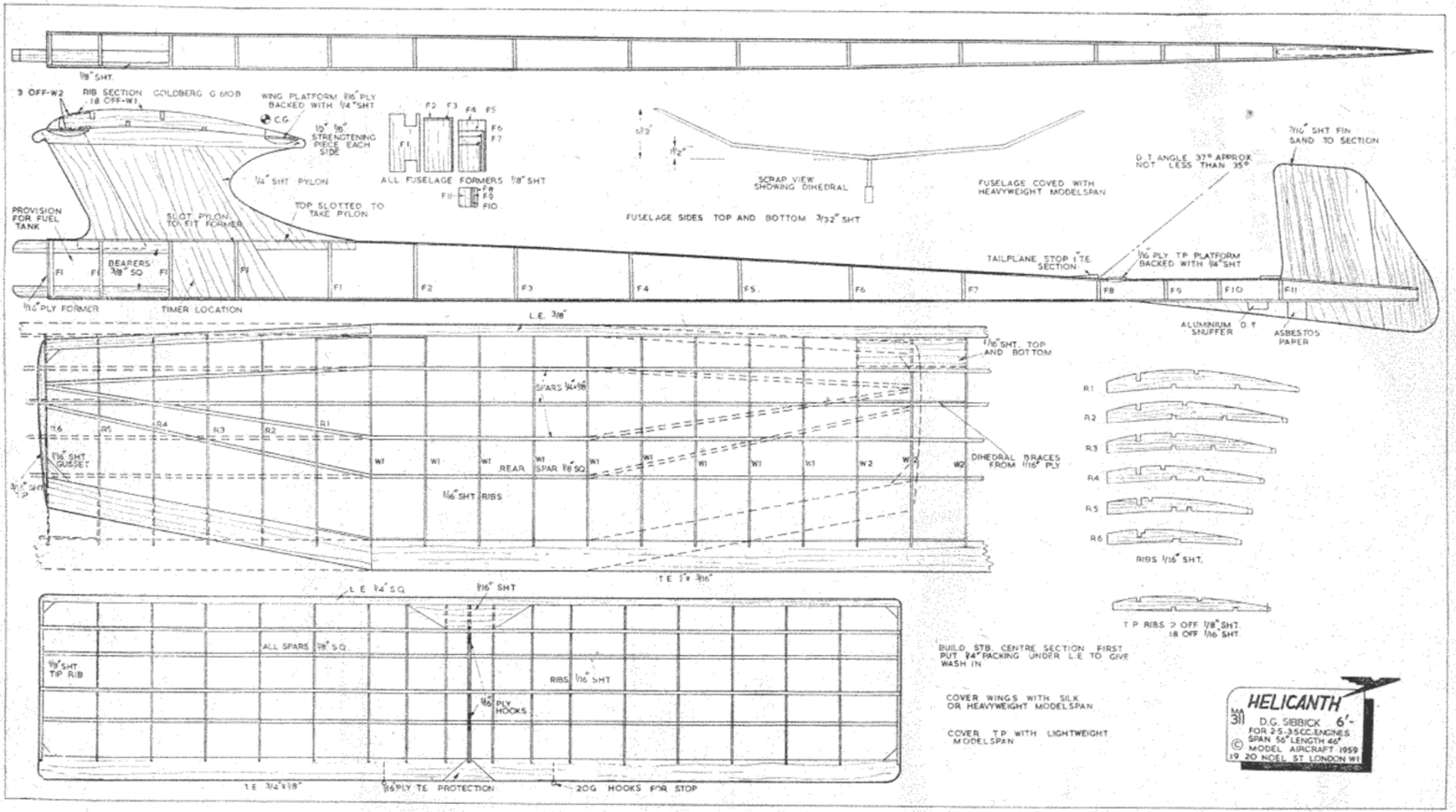
The tailplane area is 40 per cent. that of the wing. Start by cutting out 18 ribs from $\frac{1}{16}$ in. sheet, and two tip ribs from $\frac{1}{8}$ in. sheet. Cut out the $\frac{1}{16}$ in. ply d/t hooks and cement in position between two ribs. Pin down the leading and trailing edges and cement the ribs in place followed by the top spars. When dry, add the bottom spars, sand, and cover with light-weight Modelspan giving three coats of 50/50 dope and thinners. Finally, add d/t wire straps.

Flying

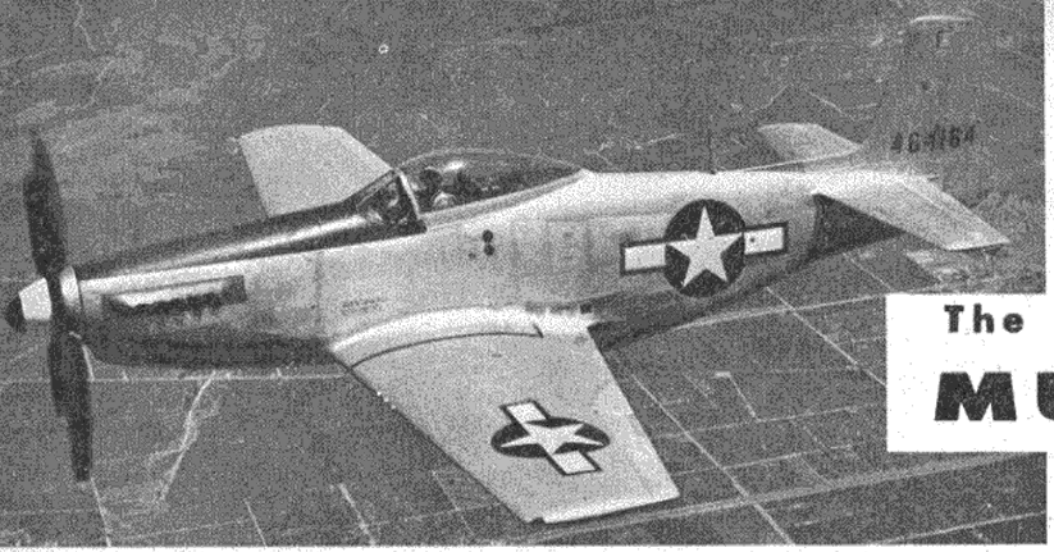
Check that the c.g. position is 1 in. from the trailing edge of the wing. Test glide on a calm day; a flat glide should be obtained with a right turn trim. The turn is obtained by packing up the right-hand tail tip.

Using a 9 in. $\times$ 4 in. wooden propeller, a power flight can be attempted on low revs. The model should climb, turning to the right in 70/100 ft. circles. If these tests are satisfactory, increase the engine revs., until the final trim—a near vertical climb with a slow spiral—is attained.

The engine sidethrust can be varied by packing under the lugs with washers to give more, or less, turn.



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, 6s. POST FREE

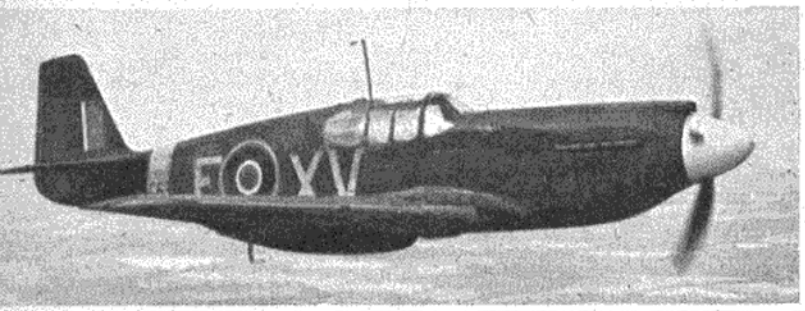


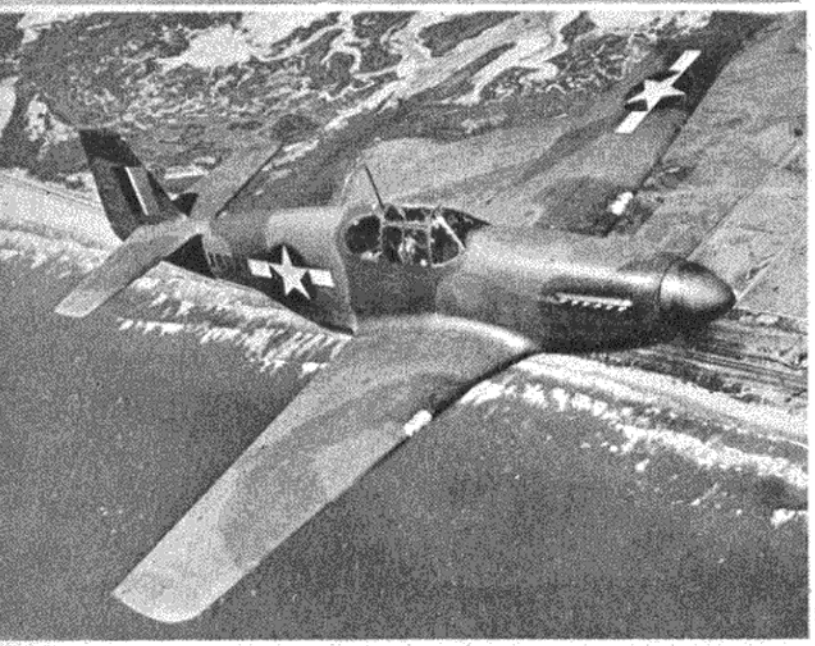
AVIATION NEWSPAGE

Plane of the month

The North American MUSTANG

See page 178 for plans of a scale C/L *Mustang*



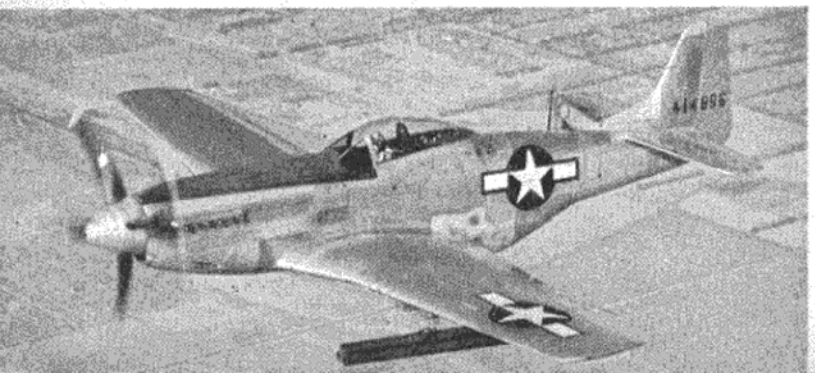


Top to bottom: The P-51H in all-silver finish. Note the anti-glare panel between the windscreen and the spinner.

Mustang I, powered by the Allison engine, was used for Army Co-operation work.

Note the unusual markings on this P-51B—American on the fuselage and wing, R.A.F. on the fin. Note also how well the camouflage blends with the ground below.

Below: P-51D with rocket gear beneath the wings. This was the first Mustang fitted with the "blister" hood, and was designated Mustang IV in R.A.F. service.



THE success story of the *Mustang* reads like something out of Hollywood. In the words of its makers: "The British, in January 1940, asked North American to build, on sub-contract, an aeroplane of another company. J. H. (Dutch) Kindelberger, then president of the firm, countered with a proposal that North American turn out a completely new ship. The British sceptically agreed, specifying only what armament and fixed equipment it should carry. The *Mustang*, roughly sketched in a London hotel room by Kindelberger and J. L. Atwood, then company vice-president, was the result.

Although the first one rolled out the door 117 days later, without an engine and on wheels borrowed from a (Harvard) trainer, it wasn't test flown for another month and a half. Kindelberger recalled that "we got that first one out fast, but it was full of bugs."

It was soon de-bugged, and after the original Allison engine was exchanged for a Merlin in 1942, the *Mustang* went on to become the best of all America's World War II fighters. Altogether, 15,367 were built in the United States during the war, in the following versions:

NA-72. Prototype, with 1,150 h.p. Allison V-1710-39 engine. First flown October 1940. Introduced new features such as laminar-flow wing and under-fuselage radiator duct which, by venturi effect, contributed thrust.

XP-51 (Mustang I). First production version. V-1710-39 engine and 3-blade prop. No. 1 machine used by N.A.A. for flight development. No. 2 (AG346) delivered to R.A.F. November 1941. Nos. 5 and 10 delivered to U.S.A.A.F. for evaluation. Top speed 382 m.p.h., but low-level rating of engine made the Allison-powered *Mustang* suitable only for low-level operations and it was issued to R.A.F. Army Co-operation Command for tactical reconnaissance. Six hundred and twenty were delivered. Two × 0.5 in. guns below engine, plus 1 × 0.5 in. and 2 × 0.3 in. guns in each wing. Oblique F-24 camera aft of cockpit. A.U.W. 8,400 lb.; span 37 ft.; length 32 ft. 3 in.; height 13 ft. 8 in.; wing area 233 sq. ft. Individual aircraft fitted experimentally in U.K. with eight air-to-ground rockets and 2 × 40 mm. guns under wings.

P-51 (Mustang IA). As XP-51, but armament changed to 4 × 20 mm. guns in wings. First version ordered for U.S.A.A.F., who had 150, named for a time *Apaches*. Total of 150 Mark IA delivered to R.A.F.

A-36A. Dive-bomber variant of P-51 for U.S.A.A.F. V-1710-87 engine. Armed with 2 × 0.5 in. guns under engine and four in wings, plus 2 × 500 lb. or 1,000 lb. bombs. Dive-brakes above and below each wing. About 500 built. One (EW998) delivered to R.A.F. Max. speed 356 m.p.h. A.U.W. 10,700 lb.

F-6A. Total of 57 U.S.A.A.F. P-51s modified for reconnaissance, with two cameras. Full armament retained.

P-51A (Mustang II). As P-51, but with 1,200 h.p. V-1710-81 engine and four wing-mounted 0.5 in. guns, plus 2 × 500 lb. bombs or 75/150-gal. drop tanks. Max. speed 390 m.p.h. Max. A.U.W. 10,600 lb. Total of 50 for R.A.F. and 310 for U.S.A.A.F.

(Continued on page 180)

DON'T WRITE OFF Bell's tilting-rotor fixed-wing XV-3 convertiplane as a dead duck following recent successes by more-sophisticated tilt-wing aircraft and the *Rotodyne*. The project is still very much alive, and Bell have been given an extension to their contract to cover additional flight testing by company and U.S.A.F. pilots.

The photo (right) shows the XV-3 soon after the big moment last December 18th when it achieved a full 90 deg. conversion from vertical to horizontal flight for the first time. Since then, during one 2½-hr. test it has made three complete conversions, and the U.S.A.F.'s continued interest in the tilting-rotor configuration stems from the fact that it requires less complex and heavy mechanism than a tilting wing. Powered by a 450 h.p. Pratt & Whitney R-985 engine, the XV-3 now has two 25 ft. diameter two-blade rotors instead of the three-bladers fitted originally.

* * *

ALL-RED WINGS on B.E.A.'s forthcoming *Comet* 4Bs and *Vanguards* do not result only from a desire to make the aircraft more eye-catching in the interests of safety, at a time when there have been too many mid-air collisions. The fact is that machined wing-skins, like those of the *Vanguard*, have to be painted anyway. If safety were the prime consideration, the paint used would be fluorescent, as on the tail of Hunting-Clan and MTCA aircraft; but this needs renewing frequently and indications are that B.E.A. does not consider the extra expense justified.

* * *

U.S. BUILD-IT-YOURSELF movement is growing at a tremendous rate. Steve Wittman, famous as a racing pilot-designer for over 30 years, tells us he has sold 107 sets of plans for his side-by-side two-seat *Tailwind* cabin monoplane, 11 of which had, by March of this year, passed their official flight tests for certification, complete with 4g manoeuvres.

Even more encouraging is that many of the amateur fliers are building aircraft of their own design, under supervision by the go-ahead Experimental Aircraft Association.

* * *

Saab's **DOUBLE-DELTA DRAKEN** fighter features several changes in its current J35A production version, illustrated (below). To reduce drag at supersonic speed, the rear fuselage has been lengthened and the afterburner cooling air intakes are now positioned on each side of the extension. A retractable dual-tailwheel is fitted to facilitate landing at high angles of attack, using aerodynamic braking.

Meanwhile, details have been released of the improved J35B, with more powerful Rolls-Royce Avon turbojet, which will hit speeds higher than Mach 2 (1,320 m.p.h.) in level flight and offer an initial rate of climb of some 50,000 ft./min., plus higher ceiling and greater range. Its armament will consist of either Sidewinder infra-red homing missiles, used in conjunction with Saab's new collision-course gunsight, or a heavy load of ground attack weapons.

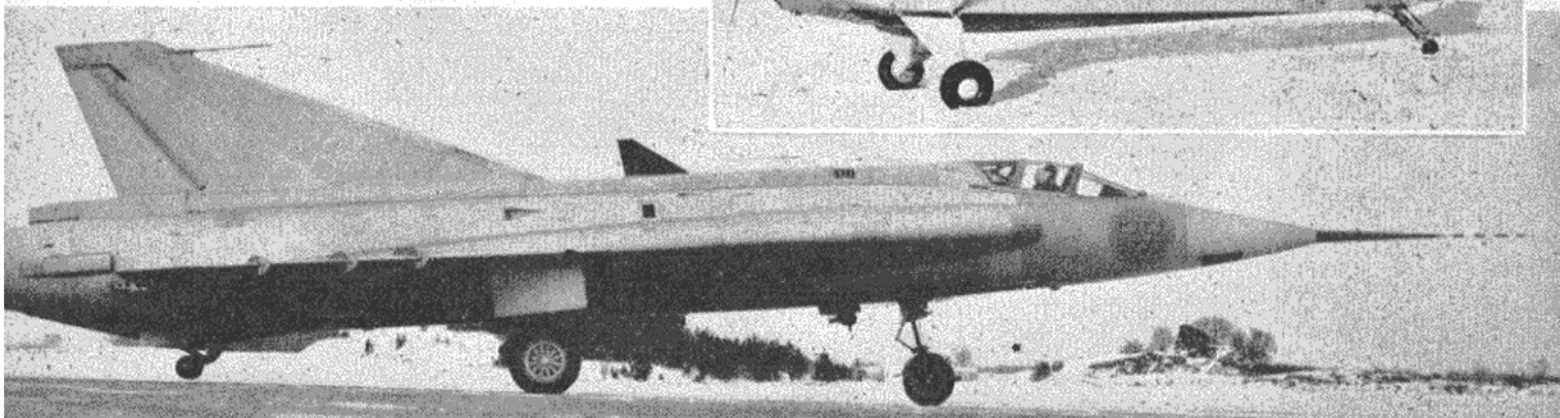
* * *

SPORTY-LOOKING SPERLING, (below), is the first post-war lightplane of German design to enter production, with deliveries running currently at two per month. Its makers, Scheibe-Flugzeugbau of Dachau, are famous for their sailplanes and when the prototype *Sperling* flew for the first time on August 8th, 1955, it had a wing of Mü sailplane section. This has given way to a more-usual NACA 23012 aerofoil on the production version, which can be fitted with a Continental engine of 65, 85 or 95 h.p., or a 65 h.p. Porsche.

AVIATION NEWSPAGE

by J. W. R. Taylor

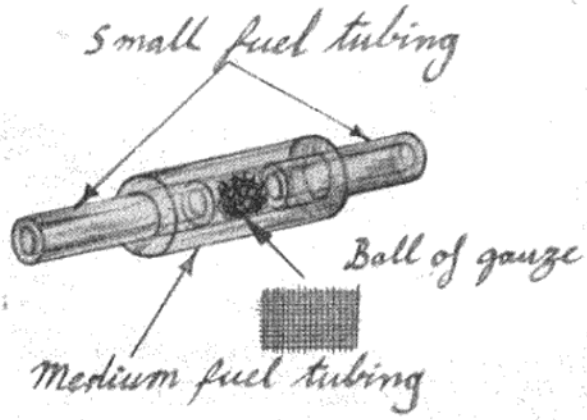
Right: The German Sperling, with a span of 32 ft. 4 in. Below: Saab's Double Delta Draken.



Response to our request for hints and tips certainly exceeded our expectations, and the first selection is presented here. We have chosen eight for this first selection, and those marked with a star have been awarded one of the magnificent Multicraft Tool Chests, while all the others will receive a cheque for 10s. 6d. All the illustrations have been re-drawn by our artist so as to be largely self-explanatory. If you have a novel idea, send it in with a rough sketch: we will do the rest. You may be awarded a Tool Chest, but if not there will be a 10s. 6d. fee for all tips published, and who knows, you may get some good ideas from this selection of . . .

Reader's Hints and Tips

★



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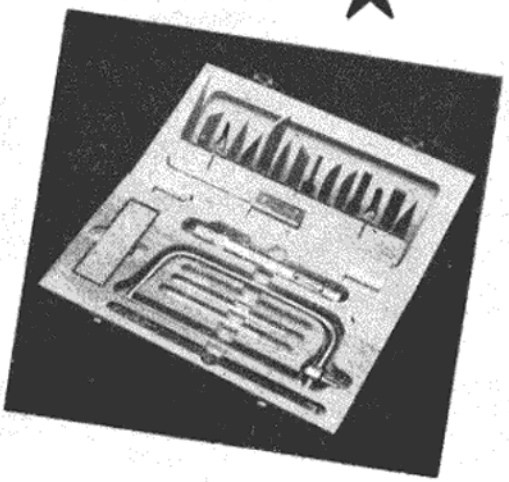
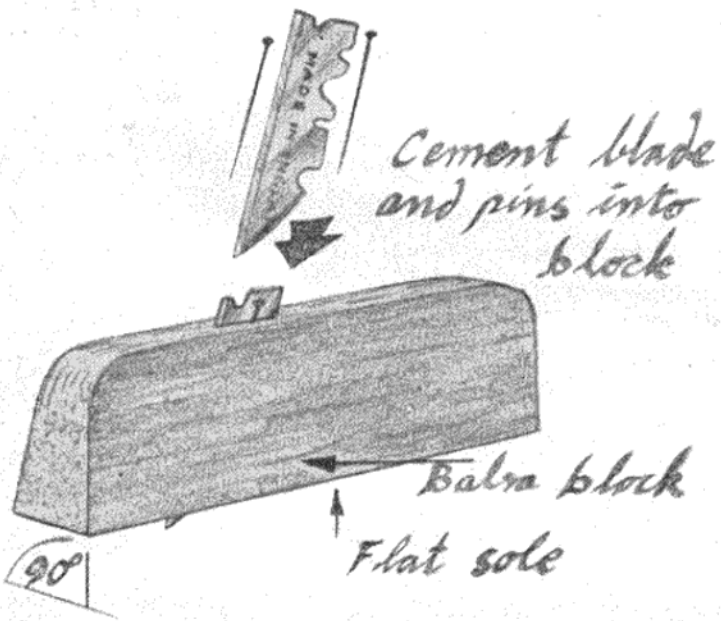
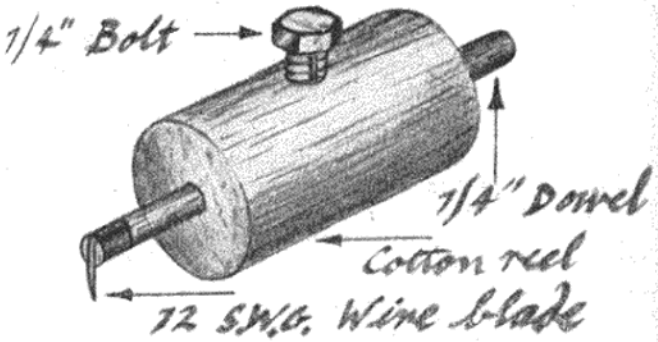
A MULTICRAFT Tool Chest (shown right) has been awarded this month to Paul Newell of Woking, Surrey, for his simple and useful idea for a home-made fuel filter. The sketch is completely self-explanatory, the gauze being of the type used in car carburettor filters of some 150 holes per sq. in., and obtainable from most garages or accessory dealers.

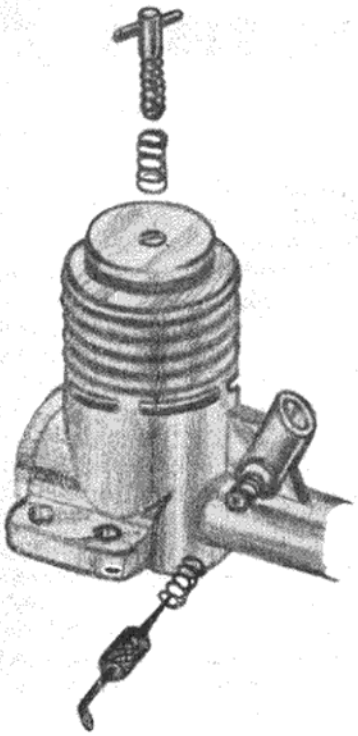




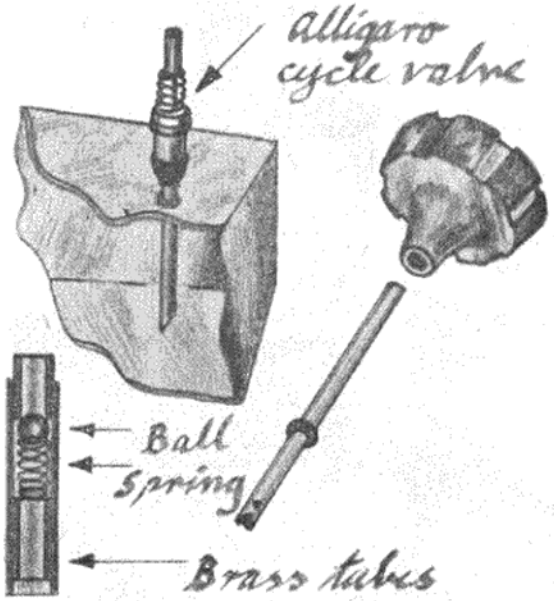


TWO simple ideas for balsa strippers are featured here. That on the left is from 15-year-old Keith Elcomb of Upminster, Essex, and enables vertical strips to be cut cleanly from sheet. The procedure is to place a straight edge on the sheet, press the side of the stripper against it, and draw along.

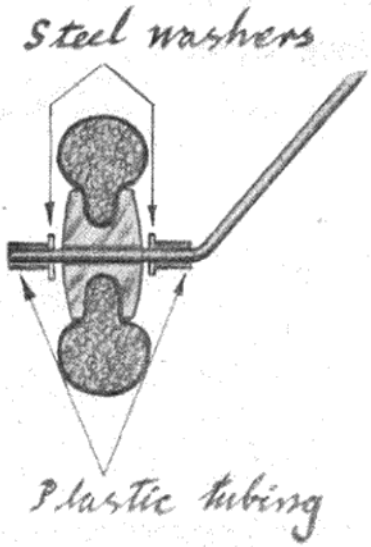
E. Gendle from Middlesbrough sent in the second idea (above) and this works on a different principle. The edge of the sheet is placed against the vertical face of the cotton reel, and is drawn along so that the blade cuts the required strip. This tool can also be used for scribing lines, while the width of the cut is adjusted by loosening the ¼ in. bolt, which is tapped into the reel, and sliding along the dowel.



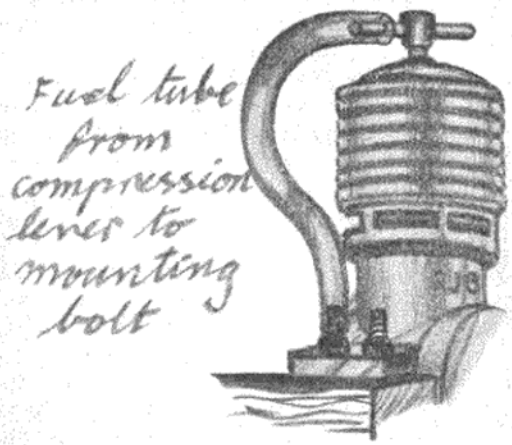
NON-RETURN ball valves are invaluable in team racer tanks, etc., and Frank Warburton of Bolton, shows how to use cycle valves for this purpose. The valve is soldered into the tank (don't forget there must also be an air vent of some sort) and for filling, a pressure bottle fitted with a notched piece of brass tube to press the ball down slightly, is used.



A REALLY simple method of preventing compression screws, and needle valves, from vibrating undone is to use the springs from retractable ball-point pens, says reader G. Mellish of Mansfield, Notts. We agree with him and the sketch above shows how to use them.



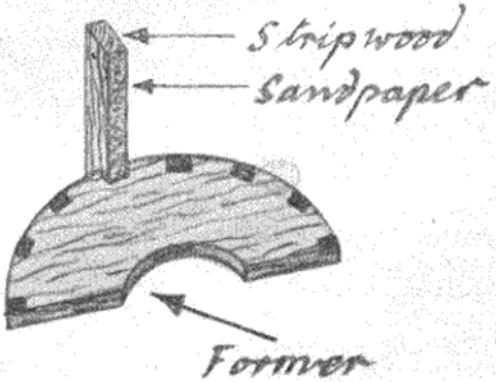
ANOTHER and even simpler method of preventing compression screws from unwinding is featured below, and is the brainchild of Graham Pheasey of Bournemouth. As a compression screw is inclined get rather hot, a thick walled tubing should be used, the best probably being of the new ribbed ones.

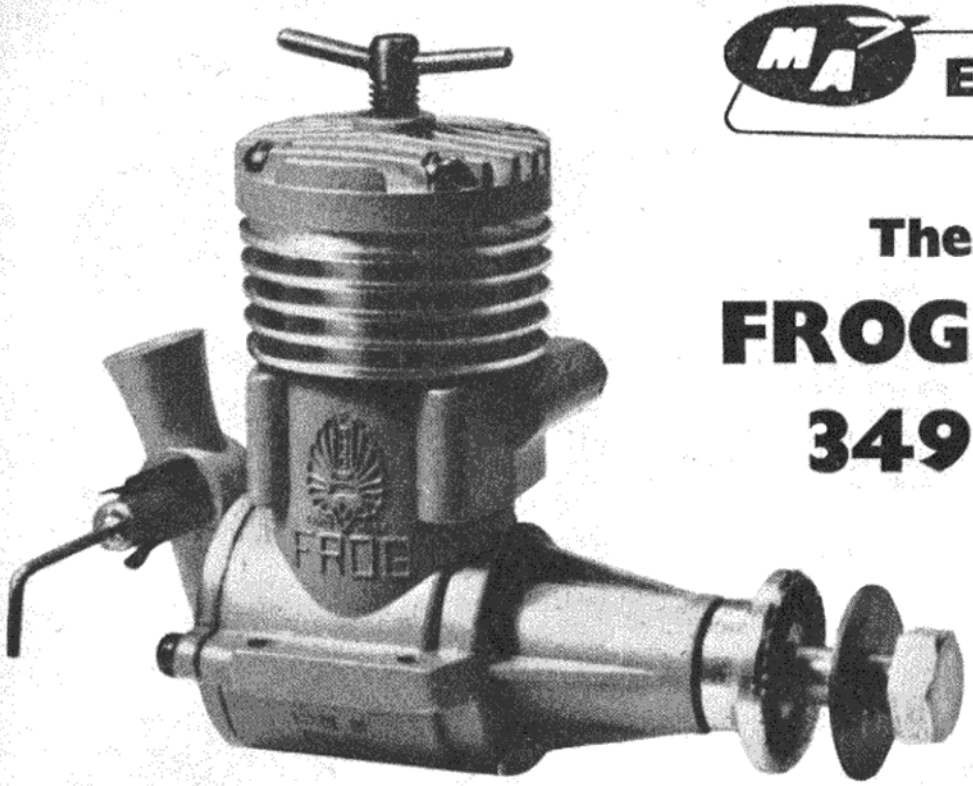


PLASTIC tube has many uses, not, we should imagine, envisaged by the manufacturers, and above is shown how 12-year-old Robert Young of York retains wheels with it. The only point to watch is that the tubing should be a tight fit on the wire, and it is also advisable to smear the outside piece of tubing with a Bostik-type adhesive, before sliding it in place.

★

CUTTING the notches in the formers, which seem to be inseparable from all small flying scale kits, can be quite a bind, and more formers are ruined by splitting when trying to prise these out with a razor blade, than ever reach the actual building board. The very simple solution to this problem shown below was thought up by G. Thomson of Stockport, and consists of a piece of balsa approximately $\frac{1}{8}$ x 4 in., the width being equivalent to the width of slot required. A strip of sandpaper is cemented to the edge and a sawing motion used until the required depth is reached. We are pleased to award a Tool Chest to Mr. Thomson for this labour-saving idea.





The FROG 349

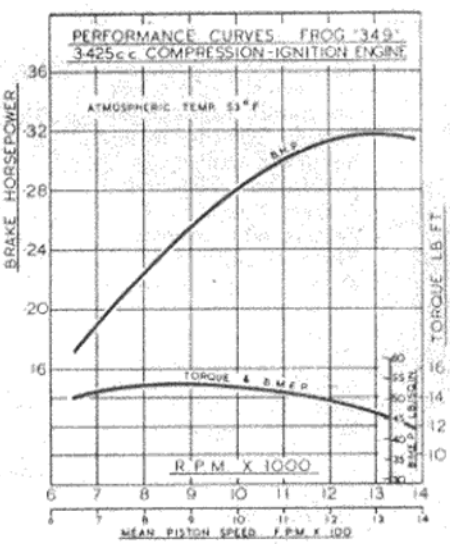
"one of the most technically interesting diesels to appear . . . for a long time. . . ."

THE new Frog 349 is one of the most technically interesting diesels to appear from a British manufacturer for a long time. Its design, particularly the form of induction valve used and its unique type of cylinder porting, lifts it right out of the rut. Its appearance is equally distinctive.

It is also, we would say, an engine which one should not judge too hastily on first acquaintance. Most model engines improve during the first hour or two of running. This, to judge from our test example, applies to the Frog not only in regard to power output, but also in respect of handling and running characteristics in general, Further comment on this follows under the sub-heading "Performance."

Two models of the 349 are currently offered, the only difference between them being in the main bearing employed. Both engines are fitted with Vandervell sintered bronze bushes, but in the more expensive model (as chosen for our test), this is supplemented by a ball journal race at the inner end. Externally, the engines are distinguished by the finish of the castings: matt grey for the ball bearing model and tumble polished in the case of the plain bearing engine.

The 349 is assembled around a neat pressure casting comprising crankcase, main bearing housing and lower cylinder block section. Substantial mounting lugs are positioned symmetrically on the horizontal centre-line and the bearing housing is webbed both vertically and laterally. The cylinder liner has a heavy flange, ¼-in. deep, which fits closely within the top of the main casting and is located vertically by a suitable seating. The divided exhaust port is cut through this flange, while the inclined, circular section transfer ports, five in number, are drilled at an angle to pass through both the skirt section of the cylinder and the lower part of the flange. While this porting arrangement is, in many respects, quite unique, it is interesting to note, in passing, that the use of a flange encompassing the full depth of the exhaust, with the transfer cut into its lower face, is, in fact, shared by two other recent loop-scavenged engines from widely separated corners of the globe, namely, the American Fox 15 and the current version of the Japanese O.S. Pet 09. This similarity can only be coincidental, as all three engines were designed at about the same time and none of the designers responsible could have been influenced by the work of either of the others.



The upper section of the liner is surrounded by a close-fitting machined cooling barrel and is topped by a finned alloy head. Four long Phillips head screws pass through the head and barrel and into deep lugs in the crankcase to secure the cylinder assembly. An unusual refinement here is the exhaust seal. This consists of a nylon gasket between the top of the cylinder liner flange and the base of the cooling barrel, which expands under the pressure of the cylinder holding down bolts and effectively confines exhaust gas and residual oil to the exhaust duct. The duct has sufficient material at the ends to facilitate the fitting of an extension pipe or exhaust throttle unit for R/C.

The crankshaft is relieved in the centre to provide, in effect, two ⅜-in. dia. journals and is drilled and tapped for a ¼-in. replaceable prop stud. This latter is of high tensile light alloy, an arrangement which should give added protection against damage in the event of a crash. The crankpin has a small spigot extension which engages the valve rotor.

This latter is another unique feature of the 349. It consists of an open ended cylinder, ⅜ in. in diameter and 5/16 in. long, sealed by a ¾-in. dia. disc at the front end, the whole being machined in one piece from steel. The cylindrical portion of the rotor has a ¼-in. dia. admission port and the periphery of the disc

is slotted at the appropriate point for the crankpin drive. The rotor is carried in a diecast light alloy housing which also forms the crankcase backplate and carburettor unit. Mixture is conveyed from the downdraught carburettor, into the open end of the rotor and thence upwards, into the crankcase, through the rotor port and an aperture formed in the rotor housing.

While the Frog 349 is neither the lightest nor the smallest 3½-c.c. diesel at present on the market, it is a compact design of attractive appearance and robust construction and should become popular among C/L and R/C enthusiasts.

Specification

Type: Single-cylinder, air-cooled, loop-scavenged two-cycle, compression ignition. Rear drum valve induction with sub-piston supplementary air induction. Conical piston crown.

Bore: 0.666 in. Stroke: 0.600 in.

Swept Volume: 0.209 cu. in. = 3.425 c.c.

Stroke/Bore Ratio: 0.901 : 1.

Weight: 6¾ oz.

General Structural Data

Crankcase/main-bearing unit and rear housing of pressure diecast LAC.112A alloy. Plain disc web crankshaft of Phoenix case-hardening steel, case-hardened and tempered and running in one ⅜ × ⅞-in. E.L. series ball journal bearing, supplemented by Vandervell sintered-bronze steel-backed bush. Brico cast-iron piston running in Phoenix steel cylinder, case-hardened and tempered. Drop-forged RR.56 alloy connecting-rod. Full floating 3/16-in. dia. solid gudgeon-pin. Contra-piston of mild steel. Machined alloy cooling barrel and separate die-cast LAC.112A cylinder head with nylon thread lock for compression screw.

Test Engine Data

Running time prior to test : 4 hours.

Fuel used : Shell Powa-Mix (nitrated).

Performance

A full four hours of running-in were given to our test engine and the all-round improvement towards the end of this period was most marked. During the first hour or two there was a power loss, amounting to 15-20 per cent., as the engine warmed up. This is by no means unusual among diesels and, in the case of the 349, the makers state that this is primarily due to the nature of the Vandervell main bearing employed. Even as this tendency wore off, however, the 349 continued to run somewhat unevenly, demanded frequent control readjustments if required to run for more than two or three minutes continuously and, in general, sounded somewhat less than happy.

But for the fact that we had already had experience of the 349 prototype some 18 months previously, we might have been tempted to begin our assessment of the 349 at this point, especially as "big" diesels are invariably rather harsh running and lack the high specific outputs of the smaller diesels of up to 2½ c.c. Prototype tests had, however, shown the design as having pleasant handling characteristics and consistent running qualities and some further running was, therefore, given to the production model in the expectation that a further improvement would eventually be realised.

Such an improvement did, in fact, become evident between the third and fourth hour. At the end of this period, the engine was given a continuous run of 12 min. on a 9/4 PAW Trucut prop and held a steady 12,400 r.p.m. without readjustment to the controls, apart from the usual slackening off of the compression setting during the first minute of warming up.

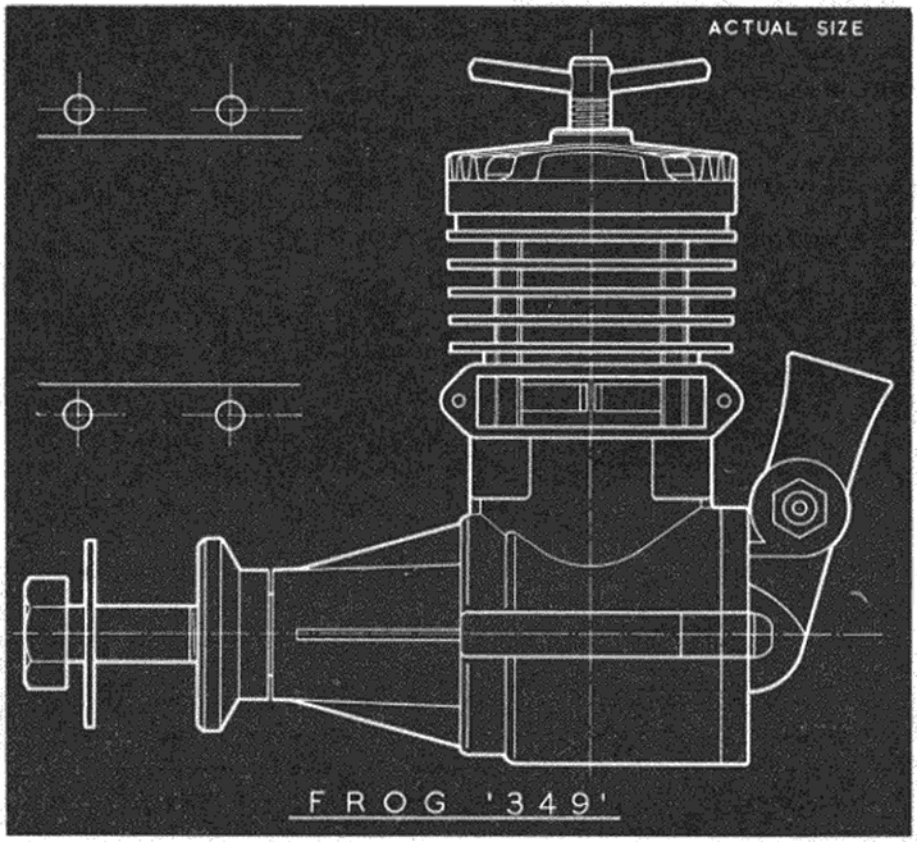
On the reaction dynamometer, the Frog now began to demonstrate a useful performance. Torque rose to a maximum figure of 0.15 lb. ft. equivalent to a b.m.e.p. of 55 lb./sq. in., at 9,000 r.p.m., and declined steadily to give a maximum b.h.p. of 0.318 at 13,000 r.p.m. Cold starting was reasonably good, if not exactly in the beginner class, and rapid re-starts were obtained easily with the engine warm.

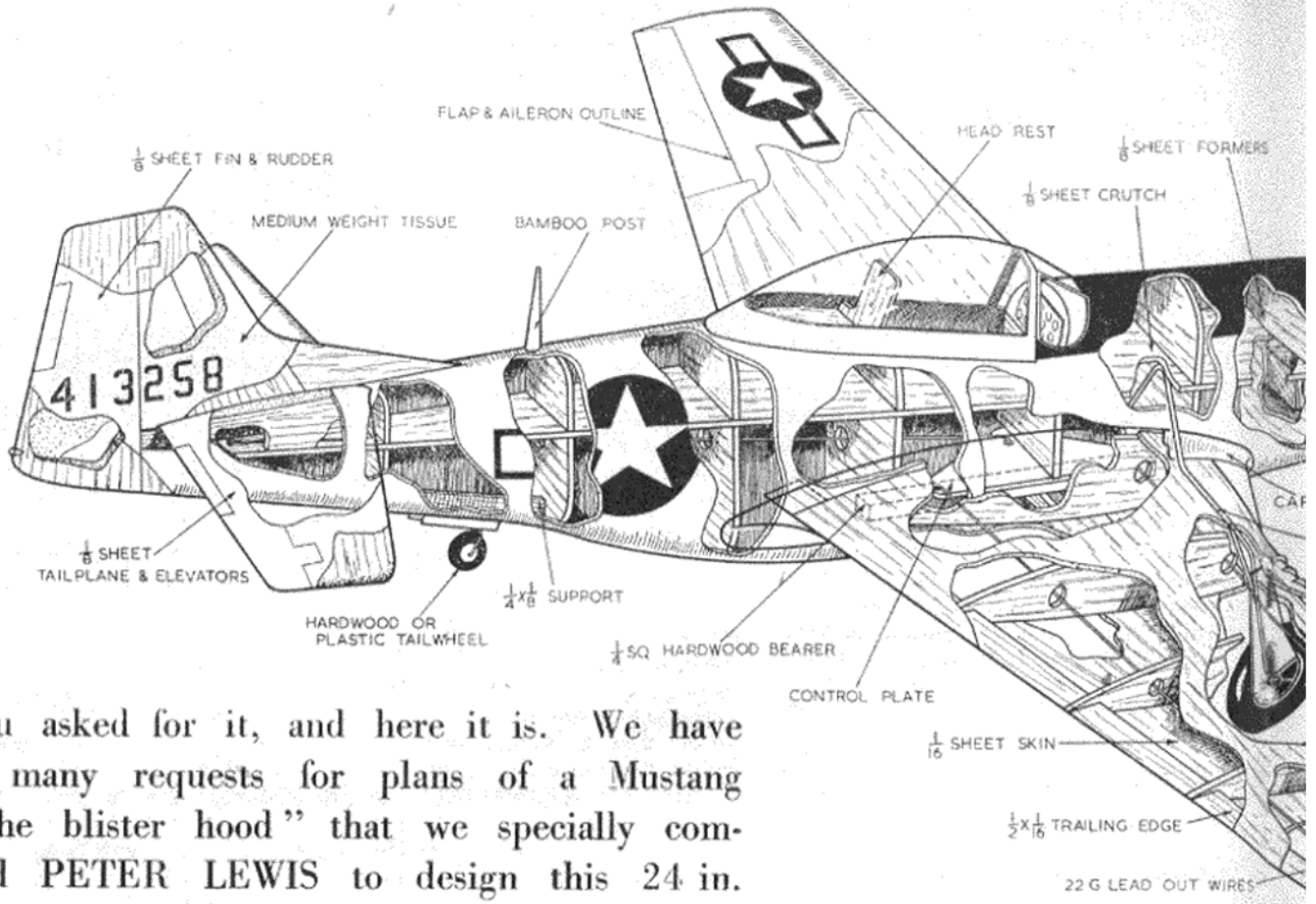
Controls were easy to adjust and held settings firmly. The nylon compression lock is very effective and there was no tendency, at any time, for the contra-piston to seize.

To sum up, the Frog 349 appears to be an engine that will "grow" on its owner. There have been more poor large diesels than good ones, but the Frog definitely belongs to the latter group. It has plenty of power (it is, in fact, the most powerful British 3½-c.c. diesel available at the moment), is well built, attractive to look at and, last but not least, very reasonably priced.

Power/Weight Ratio (as tested): 0.75 b.h.p./lb.

Specific Output (as tested): 93 b.h.p./litre.





Well, you asked for it, and here it is. We have had so many requests for plans of a Mustang "with the blister hood" that we specially commissioned PETER LEWIS to design this 24 in. span control-line version of the—

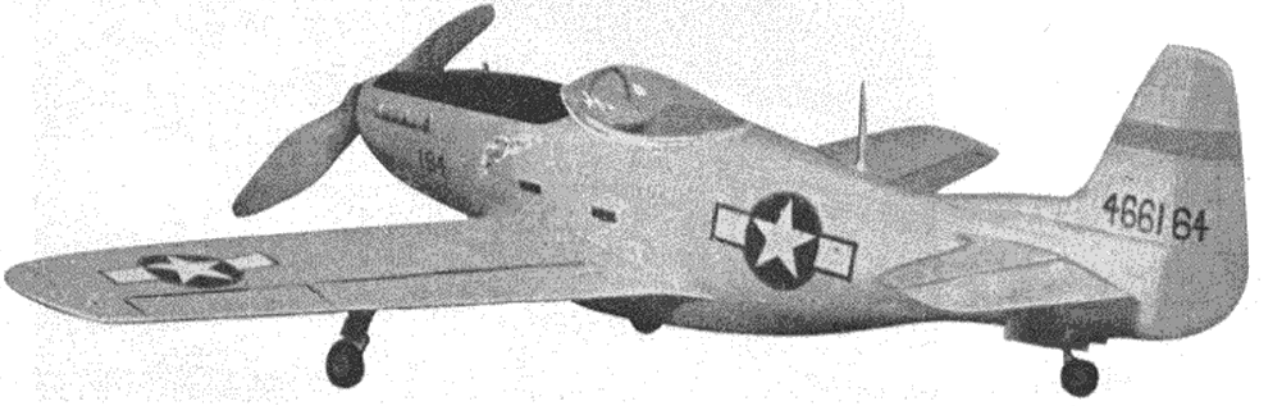
North American

P-51D MUSTANG

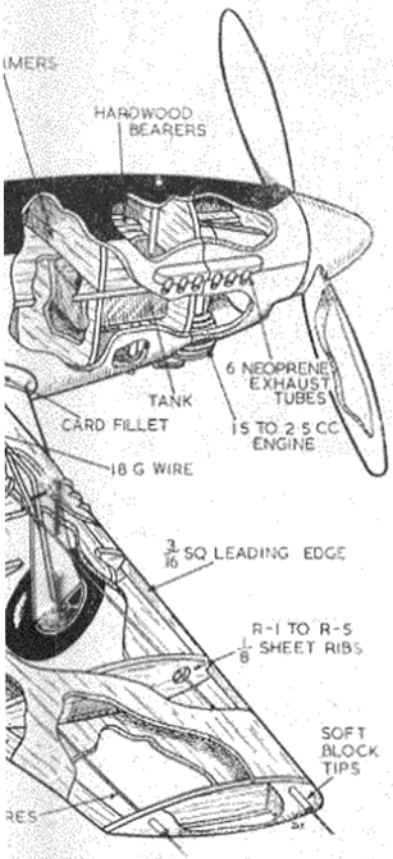
AS spirited in performance as its namesake, the *Mustang* was an outstandingly successful fighter of World War II. Continued improvements were made through successive marks of which the P-51D was typical of this fine, widely-used, long-range plane.

Compared with its heavy, bulky-looking brother-in-arms, the P-47 *Thunderbolt*, the *Mustang* evolved into a sleek thoroughbred, whose refined lines have been faithfully translated into an equally eye-catching control-liner. The reasonably deep nose allows a wide selection of 1.5 c.c. to 2.5 c.c. engines to be more or less concealed within the cowling, thus preserving the lifelike appearance.

Details are given in the plans for both the P-51D and its later version P-51H, the so-called "light" *Mustang*.



Using the full-size wo
the right), two versio
drawing is of the P-51
away perspective draw
author's model of the
no wing root fillets,
rudder than on the D
carriage wheels should
for the P-51D: they ha



the tank between F2 and F3 and the $\frac{1}{4}$ in. × $\frac{1}{4}$ in. hardwood bearer between F4 and F6, which supports the control plate by means of a 6 BA nut and bolt. Moving to the rear of the crutch, the 3/32 in. sheet tailplane supports are cemented behind F9, followed by the $\frac{1}{4}$ in. × $\frac{1}{8}$ in. tailwheel support between F8 and F9, complete with the $\frac{1}{2}$ in. hardwood or plastic tailwheel on its 20-gauge wire axle bound to it. The well behind the cockpit between F6 and F7 is bridged by a platform of 3/32 in. sheet.

The fuselage is now ready for planking with strips of $\frac{1}{4}$ in. × 3/32 in. Note that hollowed-out block is used between F1 and F2 for the nose section. The lower portion is removable and provision should be made for the engine bolts in the bearers before the upper section is fixed in place. Also ensure that the 16-gauge wire elevator push-rod is fixed to the control plate, together with the 22 gauge lead-out wires, before the planking finally covers the area.

Slots must be left to allow easy movement of the wires through the side of the fuselage. Soft block is shaped for the radiator scoop entry. Once the planking is complete and dry, the rough edges are sanded away.

Tail unit

Cut the complete tail from $\frac{1}{8}$ in. sheet and sand to section. Separate the parts and cement the tailplane on to the fuselage. Shape the elevator hinge from 20-gauge wire and pass the push-rod through the loop, securing it with a soldered washer. The four wire supports are then pressed into the rear edge of the tailplane and the elevators are cemented on to the hinge. The fin and dorsal fairing follow on top of the tailplane, the rudder being connected with an inset aluminium hinge.

Wings

These are built in two halves on the plan, the work starting with the pinning down of the $\frac{3}{16}$ in. × $\frac{3}{16}$ in. leading edges and the $\frac{1}{2}$ in. × $\frac{1}{16}$ in. trailing edges. Ribs R1 to R5 consist of $\frac{1}{8}$ in. sheet, with holes for the lead-out wires in the port set only. R1 root ribs must be steam-curved to follow the fuselage sides at the centre section. The stubs of both leading and trailing edges are taken into the fuselage to provide additional anchorage for the wings. The port tip receives 16-gauge tubing for the passage of the wires, and that on the starboard side has a $\frac{1}{2}$ oz. lead balance weight fixed firmly to it.

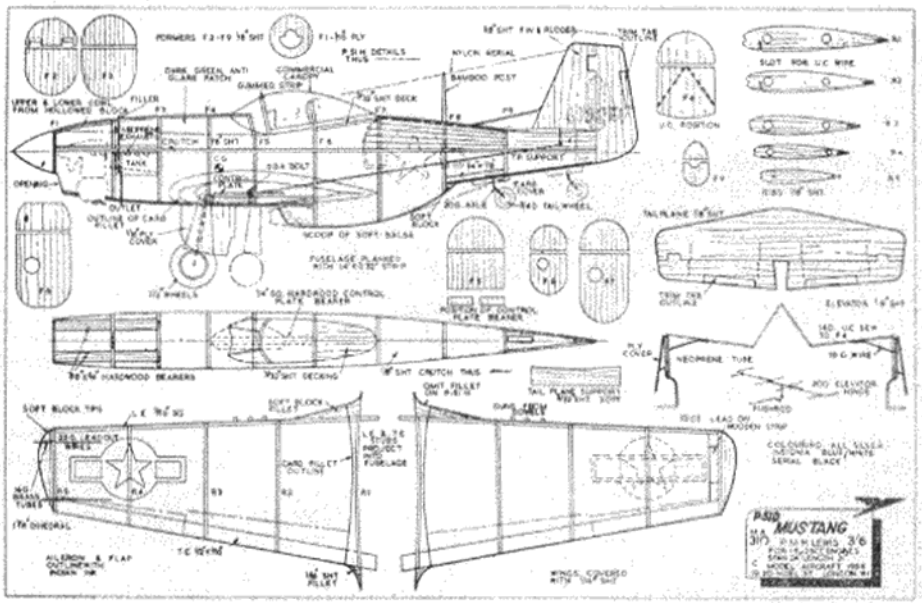
Cover upper and lower surfaces

Fuselage

The crutch is the first part to be formed, using $\frac{1}{8}$ in. sheet in which are cut slots for bearers, push-rod and the stern-post. Cut the $\frac{3}{8}$ in. × $\frac{1}{4}$ in. hardwood engine bearers to length and cement firmly into the crutch and check that their spacing suits the engine chosen for the model. The next step is to cut out the formers F2 to F9 from $\frac{1}{8}$ in. sheet and F1 from $\frac{1}{16}$ in. plywood. The latter is pinned and glued to the front of the bearers, while the rest of the formers are cemented above and below the crutch. The lower part of F4 carries the 14-gauge wire undercarriage frame which is sewn and glued to it.

When the formers are firm, add

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., 3s. 6d., POST FREE



-size working drawings (a reproduction is shown on
o versions of the Mustang can be built. The main
the P-51D, and it is this version featured in the cut-
ve drawing at the top of the page. On the left is the
l of the P-51H, which had a smaller undercarriage,
fillets, and the tailwheel was mounted nearer the
n the D. It should be noted that the main under-
s should be mounted in the same position as those
they have been outlined to the rear only for clarity.

of the wings with soft $\frac{1}{16}$ in. sheet, and add the block fairings to the root leading edges. Both wing halves are now ready for mounting on the fuselage. Cut narrow slots in the under surfaces to take the undercarriage, and pass the control wires through the port wing. Cement the wings firmly to the fuselage and add the small sheet fairing at the roots. Finally, cut the full-chord fairings from card and glue them in place.

Finishing

Give the entire *Mustang* several coats of sanding sealer, alternating with fine sandpapering. Cover with medium-weight tissue doped on and spray on the coats of finishing dope. U.S.A.A.F. P-51Ds were silver with blue and white insignia on both sides of the fuselage and on port upper and starboard lower wings. The serial appeared across the fin and rudder in black and the nose received an anti-glare panel in matt black or dark green.

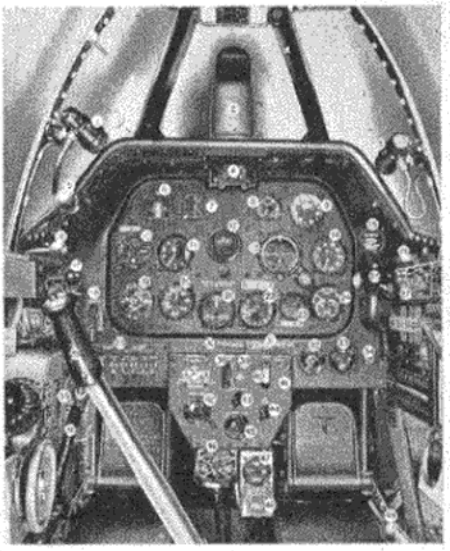
The R.A.F. version, the *Mustang IV*, was also silver with red, white and blue roundels on all four wing tips and on each side of the fuselage. The usual flash was used on the fin, and the black serial was on the fuselage to the rear of the roundels.

Details

Add the main wheels and the plywood undercarriage covers. Bamboo is used for the radio mast; the aerial is of nylon thread. Three dowelling guns are added to each wing.

Note

The P-51D is shown on the plans, with the modifications in broken line, etc., for the P-51H "light" Mustang should this version be preferred.



Instrument layout of the Mustang, which is basically correct for most Marks of the fighter.

Plane of the month

The P-51 MUSTANG

Continued from page 172

F-6B. As F-6A, but converted from P-51A. Thirty-five produced.

XP-78, XP-51B (Mustang X). Switch to two-stage Merlin engine for high-altitude performance. Four converted by Rolls-Royce, of which AM208 (Mk. I) had a Merlin 65 and AL975-G (Mk. IA) a Merlin 61, each with four-blade prop. and chin carb. air-intake. Two converted in U.S.A. with 1,520 h.p. Packard V-1650-3 (Merlin 61) as XP-78 (later re-designated XP-51B). Strengthened airframe, deeper radiator. Max. speed 441 m.p.h.

P-51B (Mustang III). As XP-51B, with V-1650-3 engine. 4 × 0.5 in. guns in wings and 2 × 500 lb. bombs. Some had cluster of three bazooka rocket-launchers under each wing. A.U.W. 11,200 lb. Range with drop tanks 1,300 miles. First version to accompany U.S. bombers to Berlin in March 1944. 1,988 built, of which 274 supplied to R.A.F. as fighters

P-51C (Mustang III). As P-51B. 1,750 built, of which 636 for R.A.F., who fitted a bulged Spitfire-type sliding hood instead of previous side-hinged type.

F-6C. As F-6B, but converted from P-51B and C. 91 produced.

P-51D (Mustang IV). First version with sliding blister hood. 1,695 h.p. V-1650-7 (Merlin 68) engine and Hamilton-Standard prop. 6 × 0.5 in. guns in wings, plus 2 × 1,000 lb. bombs or, later, 6 × 5 in. or 10 HVAR rockets. 7,956 built, of which 281 for R.A.F. 80 assembled and flown post-war in Australia. Max. A.U.W. with drop tanks for 2,080 mile range 11,600 lb. Max. speed 437 m.p.h.

F-6D. As F-6C, but converted from P-51D. 136 produced.

TP-51D. Two-seat dual-control trainer version of P-51D. Ten built. (The P-51 converted into a two-seater as personal transport for General Eisenhower in 1944 was not a TP-51 and lacked dual controls.)

P-51E. Not built.

XP-51F. Lightweight Mustang. V-1650-7 engine on integral mounting. New low-drag wing without centre-section sweep-forward. Longer canopy. 4 × 0.5 in. guns. Simplification and use of new materials and processes reduced A.U.W. to 9,060 lb. Max. speed 466 m.p.h. Three built, of which FR409 supplied to R.A.F.

XP-51G. As XP-51F, but 1,500 h.p. Merlin 145 and 5-blade prop. A.U.W. 8,880 lb. Max. speed 472 m.p.h. Two built, of which FR410 supplied to R.A.F.

P-51H. Last production version. Development of XP-51F with 2,215 h.p. Packard V-1650-9 and shorter canopy. Length increased to 33 ft. 4 in. 6 × 0.5 in. guns, plus bombs or rockets. Max. A.U.W. 10,500 lb. (12,000 lb. post-war). Max. speed 487 m.p.h. at 25,000 ft. Range with drop tanks over 2,000 miles. 555 built, of which KN987 supplied to R.A.F.

XP-51J. As XP-51F, but 1,500 h.p. Allison V-1710-119. Length 32 ft. 11 in. A.U.W. 9,140 lb. Two built.

P-51K. As P-51D, except for Aeroproducts prop. 1,337 built, including at least 593 for R.A.F.

F-6K. 163 converted from P-51Ks.

P-51L. Not built. Was to be as P-51H, but with V-1650-11 engine.

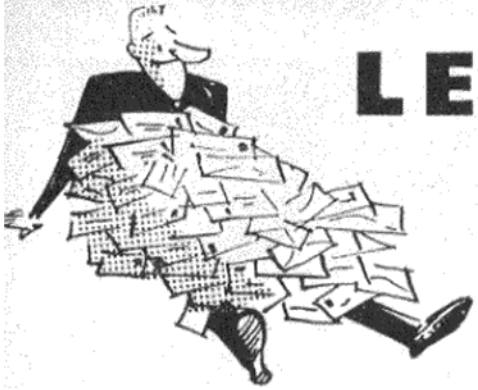
P-51M. As P-51H, but with V-1650-9A engine. One built. (Orders for 1,700 P-51Ls and 1,628 P-51Ms cancelled at end of war.)

Typical Colour Schemes

Mustang I and IA. Dark green and sea grey upper surfaces and sky undersurface, with 18 in. band of sky round rear fuselage, sky spinner and, on later aircraft, 6 in. yellow stripe along wing leading-edges. Most also had a 12 in. yellow stripe chordwise around wings a little inboard of the roundels.

P-51B. Olive drab upper surfaces and grey undersurfaces. White bands across fin and rudder and chordwise across wing-roots and tailplane.

P-51D. Natural metal finish, with black bands instead of previous white ones. A.E.A.F. black and white stripes added chordwise around wings and lower half of rear fuselage for D-Day operations. Aircraft of 361st Fighter Group had high-gloss blue undersurfaces.



LETTERS
to the Editor

Heavenly Twin

DEAR SIR,—Enclosed is a photo of my Miles *Gemini*, which was built from M.A. Plan 221.

The model is powered by two Mills 75s and weighs a bare 14 oz. Without adjustable flaps it circled at about 30 m.p.h., but with operational flaps fitted it will loop and wing-over and is a real pleasure to watch and fly. Duration is 10 min. at cruising speed on two 15 c.c. tanks. Colouring is red and

cream with black lettering. Construction follows the plan but careful lightening has reduced weight considerably. Offset fins are used to maintain line tension.

Unfortunately, on the last flight I did a nose-in from an attempted horizontal eight and buried the nose and engines in the turf but with no breakages, not even props.

This was my first attempt at a twin and despite the low power, this model has given me endless pleasure and a thirst for more.

Yours faithfully,
H. R. EYRE

Oxford Meteors.

Time for a Timer

DEAR SIR,—No doubt you often receive letters complaining about British manufacturers, but I feel somebody MUST say something candidly about the timer situation.

Without doubt, the Oliver is the best 2.5 diesel bar none, but why do not the Oliver boys, or some manufacturer of equal quality, give us a reliable timer to go with it?

Since the discontinuation of the E.D. clockwork, which, let's face it, would be pretty hopeless today anyway, we have only even less efficient airdraulic timers.

Surely, it is said to be "a bad workman who blames his tools," but have a heart, manufacturers, we are sick and tired of relying upon American goods, which are, to say the least, hard to replace.

We hear that Tatone timers are to be imported. This is O.K., but the demand will far outpace the supply, even at the high price which will obviously be demanded.

The only other possibility is to modify either the Auto-Knips timer at 26s., or a camera timer unmentioned in model journals, known as the Timex at 23s. 11d.

To talk of modifying these is easy, but this valuable time could be spent more usefully in trimming practice, which we all need badly, in order to keep ahead of the Continentals, who have already superseded us in the Wakefield and A/2 classes.

Please, manufacturers, take this to heart; give us a good clockwork timer, and we will pay for it. Give us reliability. Give us ease of replacement. Foremost, give us confidence in yourselves, and surely you will reap benefit; only then can we leave the Americans and the Japs to their timers, which, at the moment, they monopolise.

Yours faithfully,
K. CROFT

Tees Group.

Common Correction

DEAR SIR,—I happened by chance to see a copy of your issue for March 1959, and was most interested in the photograph, on page 71, taken on Wimbledon Common in 1925. [*To save looking up this issue the photo in question is reproduced again below with original caption.—Ed.*]

You have, I am afraid, got the names a bit mixed up and they should read, from left to right: Houlberg (weighing a model), Mr. "X," F. de P. Green, R. Langley (standing half behind Green), Herson, B. K. Johnson (face visible between two wings), myself (holding a model with SMAE on the wing), Bullock (holding what was probably the first speed or racing fuselage model that we had ever seen), and, holding a model aloft, I accept, Plater, though I do not remember his attendance on that day.

Mr. "X," whose name I do not know, was a great enthusiast, but was, unfortunately, deaf and dumb. He used to bring along quite fantastic models, small, but weighing several pounds, which never came anywhere near flying.

I was member No. 99 in the S.M.A.E. and I believe Bullock was No. 100.

Yours faithfully,
L. G. TUCKER

Tunbridge Wells, Kent.

Free-Flight Fancies

DEAR SIR,—Many thanks for your recent series of articles on real flying models (i.e. free-flight). It is progressive, to say the least, to publish so many contest rubber jobs in so short a time. All we need now is a few of the more exotic Continental types.

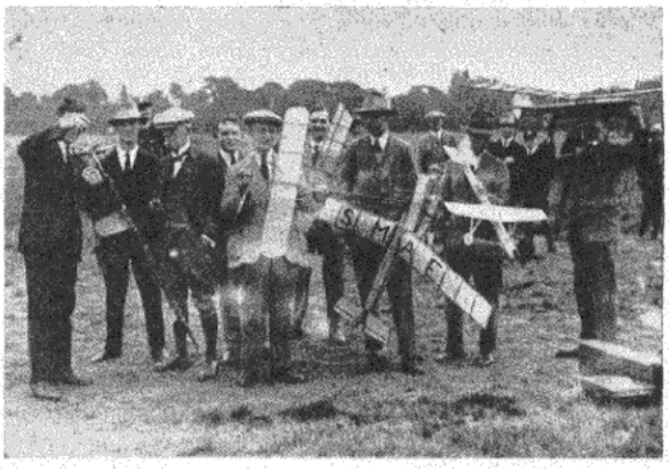
I have just read Mr. Faulkner's article on rubber models, and feel that one small point requires correction. This is the so-called "ideal" winder hook. As I see it, this hook has two basic disadvantages. (1) It is rather tricky to make; (2) At least three hands would be handy to unhook after winding.

However, I do not think that the oft-quoted remedy of simply bending the shaft winding-loop very tight, is really satisfactory.

For the past three years I have had complete success with an adaptation of

the ordinary S-hook—this is shown in the accompanying sketch.

For a correction to this caption see letter above.



This 1925 group of competitors features, from left to right, A. F. Houlberg, unknown, F. de P. Green, Levy, Richard Langley, B. K. Johnson, S. C. Herson, R. M. Bullock and Plater, who was at that time one of the best fliers of fuselage models. At that time the Common, a very popular venue, was largely grass, but following a fire it was replanted with shrub leaving it as it is today.

In use the shaft simply *cannot* climb, while to disengage, it is only necessary to hold the prop steady and rotate the whole winder about a quarter-turn anti-clockwise (i.e. without turning the winder handle). For comfortable winding, I have also increased my winder throw to 7 in. (It makes a world of difference!)

Please let us have more of these "expert" articles, and if possible details of the type of 'planes they fly.

What about an article on F/F power and one or two with specific reference to the present F.A.I. rules? (Incidentally, how about reprinting the current F.A.I. specifications, as I expect I am not alone in not being sure of the present power formulae!)

Whatever became of Bill Dean's model talks? I always looked forward to them as providing a nice selection of "model talk," and a few interesting photos.

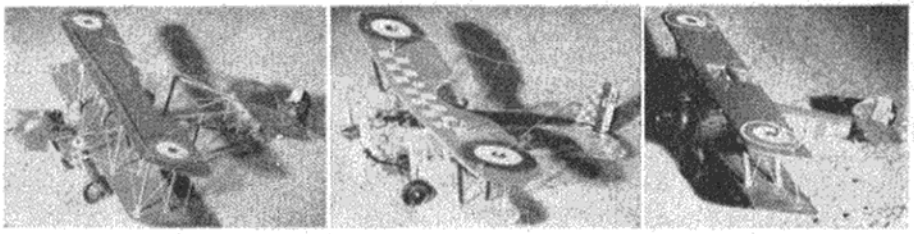
One thing I cannot commend you on has been the recent spate of "full-size" reporting. I do *not* think that there should be *no* full-size gen, but feel that a great deal of the information on individual markings was repetitive and not complete enough to be really informative.

Yours faithfully,
D. BURT

Cardross, Dumbartonshire.

We will see what we can cook up in the way of a power article for reader D. Burt, but on the question of F.A.I. rules, space will not permit us to keep publishing these, and anyway they appear in the S.M.A.E. Competition Rule Book, a copy of which is issued free to every full member. We, too, enjoyed reading Bill Dean's Model Talk, but Bill moved to America several years ago, so . . . Ed.

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.



Praise for Plastics

DEAR SIR,—The three photographs shown above are of models I made up from the Merit 1/48th scale kits.

It is indeed like a breath of fresh air to find a firm willing to produce a kit which breaks away from the more orthodox tractor type of aircraft, namely the D.H.2. This is a very fine model and being of ¼ in. scale allows plenty of detail to be incorporated and it is also easier to rig.

Yours faithfully,
J. WILLIAMSON

Leighton Buzzard, Beds.

Nostalgia!

DEAR SIR,—Your article Looking Back (March issue) brought back many memories of what I consider to have been the most romantic period of flying model aircraft.

My introduction into the aeromodelling world was in 1948, the era of the spark ignition engine; the days of models such as *Banshee*, *Powerhouse*, *Airfoiler*, etc., together with such engines as the Forster, Ohlsson, and the famous Arden.

To the ears of the enthusiast the scream of the Arden and the crackle of the Forster and Ohlssons were things never to be forgotten, also the corkscrew climb of the *Banshee* with its terrific dihedral, while the smell of burning petrol and oil was perfume.

Today, owning such engines as the world famous Fox and O.S. with their fantastic power outputs and trouble-free starting, I shall never forget the spark ignition engine which I am sure will always find a place, however small, with the aeromodellers of today and tomorrow.

Yours faithfully,
D. E. HILL

Birmingham, 21.

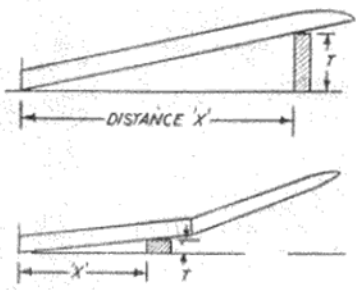
The Editor welcomes for publication letters concerning all aspects of modelling. Preferably they should be topical or controversial.

USE THE CORRECT DIHEDRAL

WHEN it comes to blocking up the two tips after joining the two wing frames, too many people make a guess at the dihedral required instead of measuring it. Sometimes they end up with different dihedrals on the two wing tips—and a model which is bound to misbehave when flown.

The table shows how "standard" wood sizes, like ¼, ½ and ¾ in. thick piles of sheet, 1 or 2 in. block, or 3 in. wide sheet can be used for *accurate* dihedral settings. The distance "X" corresponds to the distance from the wing joint or centre for the packing or block of thickness "T."

DIHEDRAL		5°	7½°	10°	12½°	15°	20°	30°
'X' DIMENSION FOR T=	¼"	2¾"	1¾"	1⅜"	1⅛"	—	—	—
	½"	5½"	3½"	2¾"	2¼"	1¾"	—	—
	¾"	8½"	5¼"	4¼"	3⅜"	2⅝"	2⅛"	—
	1"	11⅜"	7"	5⅝"	4½"	3½"	2¾"	1¾"
	2"	22¾"	14"	11⅜"	9"	7"	5¾"	3½"
	3"	34"	21"	17"	13½"	10½"	8½"	5¼"



For example, suppose you wanted to set the wing at 12½ deg. dihedral. The table shows that a piece of 3 in. sheet stood up 13½ in. from the centre, or 2 in. block 9 in. from the centre would do the job. Use packing or block thickness to give the greatest value of "X" possible for maximum accuracy.

As a rough working rule, for straight dihedralled wings, 10 deg. is a minimum for good stability. 12½ deg. is usually better on a duration model. Tip dihedral can be 15 to 20 deg., or even 30 deg. if the tip area is small.

Radio Control Notes

F/F scale expert **P. E. Norman** has at last turned to R/C in search of added realism. His inventive mind soon got to work "cleaning up" accepted practices and here is his idea for . . .

(an improved)

RUDDER LINKAGE

ALTHOUGH I do not profess to be a R/C modeller in any sense of the word, I have evolved—and am using—a system of tail and fin attachment and rudder control mechanism for scale models, which may be of value to all R/C enthusiasts. The appearance of a large crank and linkage unit on the trailing edge of the rudder is rather ugly and tends to spoil the effect of any type of scale model. It has a certain amount of weight, and is, I would imagine, rather prone to damage, or at least to be easily knocked out of adjustment in a bad landing.

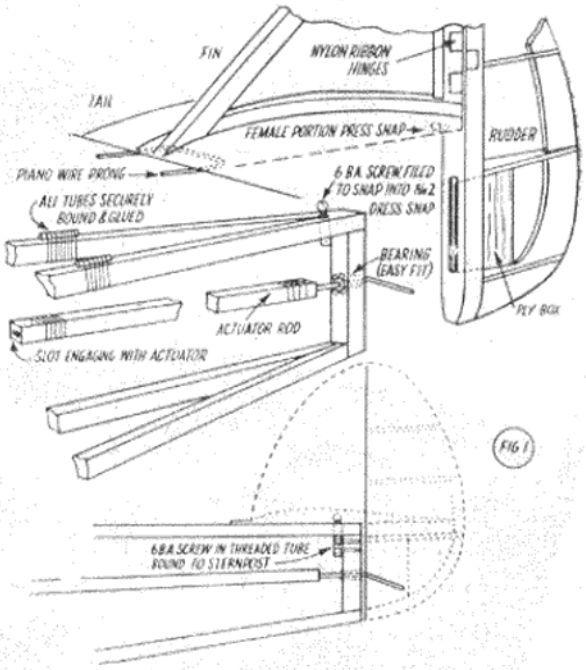


FIG 1

My idea (Fig. 1) has the advantage of extreme simplicity, is completely hidden, easily knock-offable and is not prone to damage; the rudder movement is easily adjusted, and the weight is negligible. It is suitable for a linkage rod which is either fully rotating, or a rocking type, the line-up with the Elmic actuator being ideal.

Basically, it consists of a linkage rod, made in the usual way from ¼ in. sq. balsa having the slotted end piece to engage with the link on the actuator, and the other end a length of piano wire, bent as shown on the drawing and locked securely in the rod by binding and cementing. The wire gauge is really determined by the size of the model—I am using 1/32 in. wire for models of up to 5 ft 2 in. span. An easy-fit bearing in the form of a *short length* of aluminium tube or tinplate drilled to take the piano wire is fastened to the stern post. The end of the wire is now passed through to the bearing from inside the rear end of the fuselage, and then bent downwards or upwards at a slight angle. The degree of this angle will control the amount of movement of the rudder.

The rudder itself, which is of the overhang type (i.e. the bottom of the rudder comes flush with the bottom of the fuselage), has a slot in its leading edge, in which the wire is an easy fit. A facing of 1/32 in. three-ply wood is cemented in each side of the slot to form a box in the rudder for the projecting angled prong, thus when the rudder is hinged to the trailing edge of the fin, and the actuator rod is oscillated or rotated, rudder movement follows—the greater the angle of the piano wire prong, the greater the movement of the rudder.

The complete tail and fin/rudder assembly is fastened to the fuselage by means of piano wire prongs on the leading edge of the tail, which engage in two lengths of tubing securely bound and cemented in the appropriate position on the top longerons. The angle of incidence is adjustable by means of a 6 B.A. screw, threaded into an internally tapped tube which is fastened to the inside of the sternpost, the head of the 6 B.A. screw being filed and shaped to clip into the female portion of a No. 2 dress snapper secured to the underside of the tail. If this does not prove secure enough for violent manoeuvres, two small hooks can be added to the underside of the tail on the mainspar between the tail and elevators and an elastic band added, passing under the rear end of the fuselage.

A different amount of left or right rudder may be obtained by removing the slotted bar on the actuator, and making another one in which the slot has been slightly angled, and replaced (see Fig. 2).

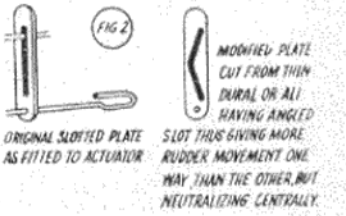
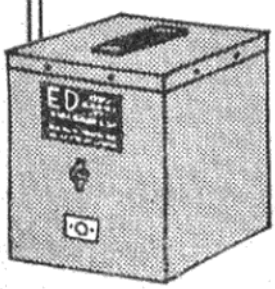
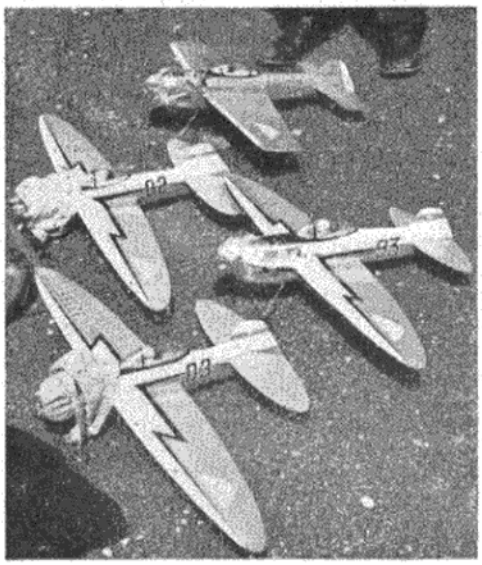


FIG 2



High Winds at HIGH WYCOMBE but

SUCCESSFUL C/L MEET



WITH the exception of one year, the High Wycombe boys have never been very lucky with the weather—if it hasn't poured with rain, it's blown half a gale—but they do, however, put on a good show which is rewarded by increasing attendances. This year their rally, held at R.A.F. Booker, was marred by a high wind, but the standard of flying was very high throughout, by 160 competitors, some of whom came from places as far afield as Bristol and Wharfedale.

All the events ran smoothly, kept to schedule, and finished on time. Combat was most affected by the wind, it being most difficult to get a cut on a streamer that is being blown out of the flight circle! but the 100 entries were kept moving, with four circles going most of the time, and few will quarrel with the result.

Class "A" was run strictly to F.A.I. rules and the standard was generally very high. Eventual winner, Gordon Yeldham, was almost eliminated in the semi-final by a duff motor run, but his time was still high enough to qualify for the final, in which his very potent dark blue and white model came home a fairly easy winner.

The "B" final was enlivened by a false start when a dog wandered into the circle just as the "off" was given, but when it did get under way, it was one of the best we have seen for a long time with all four models airborne all the time—well almost! At times Whitbread's machine, flown by Charlie Taylor, was faster than McNess's, but two short motor runs by the former unfortunately precluded the "photo-finish" we otherwise expected.

RESULTS

COMBAT

1. Tribe	..	.. Northwood.
2. Ford	..	.. S. Bristol.
3. Lovegrove		.. Northwood.
4. Devonshire		..

CLASS "B" TEAM RACE

1. McNess	..	.. West Essex	.. 7.34
2. Whitbread		.. West Essex	.. 8.09
3. Davy	..	.. Wharfedale	.. 9.59
4. Edwards	..	.. Wharfedale	.. 10.15

F.A.I. TEAM RACE

1. Yeldham	..	.. Belfairs ..	.. 5.08
2. Williams	..	.. Wimbledon	.. 5.28
3. Davy	..	.. Wharfedale	.. 7.01
4. Tyler	..	.. Wharfedale	Crashed

A smart getaway by the winning Class "B" racer of J. McNess (left) assisted in this practice session by Fred Carter.

Preparing Heller of Eshers' model for a Class "B" heat, in which, unfortunately, it did not get started.

A group of attractively finished Wharfedale racers. We leave it to you to decide which are Class "B" and which F.A.I.!

M. Langley of Dagenham is assisted by club-mate M. Hobbs in readying his Frog 2.49 powered flying wing in the Combat.

Roving Report

Brings you up to date with the latest world model news

JUST 20 years ago—engine-driven models were by that time well established—there appeared, in America, something called "G-Line" flying. Victor Stanzel, of Schulenburg in Texas, began marketing a kit for a model called the *Tiger Shark*. Powered by the popular 5 to 10 c.c. engines then available, the model was small and well streamlined and was said to be capable of speeds up to 60 or 70 m.p.h. It was flown in a circle, tethered to a short pole held by the operator. So began speed flying.

Shortly afterwards, in 1940, Jim Walker introduced "U-Control," which, of course, vastly extended the scope of tethered model flight, but, later, Stanzel responded with "Mono-Line." Mono-Line sought to give the modeller the same advantages of control as U-Control, but with one line instead of two.

In the Stanzel Mono-Line system, control movements are transmitted to the model by rotating the control-line, instead of by lengthwise movement of two lines. The main advantages of this are that (1) there is less line drag and, therefore, a higher model speed is possible and (2) control can still be maintained if the line becomes slack.

The big attraction of Mono-Line is, obviously, for speed work. In the U.S.A. Mono-Line has, in fact, become almost universal and the sort of speeds achieved with it definitely seem to bear out the manufacturer's claim that changing from normal two-line to Mono-Line will permit an increase in speed of approximately 10 m.p.h. Another point to remember is that Mono-Line speeds are far more honest than the sort of performances we have lately been seeing in many European championship speed events. With Mono-Line you cannot cheat and get away with it. Any attempt to whip with a Mono-Line handle is so clear to see that even the most clueless of judges could hardly miss it, added to which, the bending and straining of the handle actuator-rod which can result from whipping attempts is, in any case, likely to interfere with control.

We have recently been able to examine the latest Mono-Line "Speedmaster" units from the U.S.A. A special handle, equipped with a ball-bearing thrust race, is supplied for speed work. The control units, ready for fitting in the model and coupling to the elevator push-rod, are made in four sizes to suit all speed classes from "½-A" to jet. Mono-Line wire is supplied in a variety of lengths and gauges ranging from 35 ft. × 0.010 in. to 150 ft. × 0.028 in.

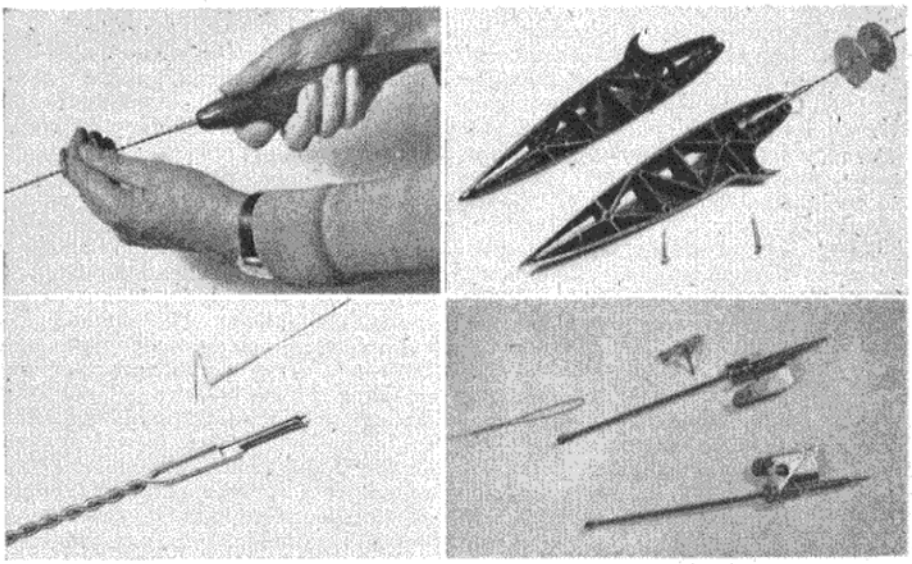
The Speedmaster handle consists, firstly, of a moulded plastic grip, 8 in. long, of streamlined shape, which fits comfortably in the hand. This is moulded in two halves which are held together by two screws and a circlip around the nose section. Inside the handle are the bearing and anchorage for the actuator rod. The actuator rod consists of two lengths of $\frac{1}{16}$ in. steel wire twisted together to form a screw thread 19 in. long. (The overall length of the complete handle is nearly 30 in.) Fitted on the actuator rod is a bobbin shaped control knob. Moving the control knob back and forth rotates the actuator rod through 20 revolutions in each direction from the neutral (central) position. The principle of the operation is, in fact, identical with that of the simple Archimedean drill.

The Speedmaster control-unit, for fitting to the model, is a neat and extremely well-made component of steel and brass. The "A" unit—suitable for F.A.I. World Championship speed models—weighs a little less than ½ oz. Torque, transmitted by the control-line, is conveyed to a brass worm-type cam, which operates a cam follower or peg attached to a small bellcrank. In principle, the design can be likened to the Bishop type steering gear well known in automobile engineering. Two turns, "lock to lock," are all that is required for the full up to full down position and the unit is self-centring (by spring-loading) in order that control-line torque may have something to operate against.

Two turns lock to lock, from a possible maximum of 40 turns at the handle, give a clue to the amount of movement that can be lost due to the torsional flexibility of the control wire. The amount of lost motion depends to a large extent, of course, on the thickness and length of the control wire used, but does mean that control response is not quite so instantaneous as with ordinary two-line control. This, to some extent, is compensated by the fact that, after flying Mono-Line for a while, one soon learns to anticipate control movements a little earlier but, in any case, is certainly no deterrent for speed work.

Commercially, single-line control is exclusive to Victor Stanzel and Company. Stanzel Mono-Line units are protected by U.S. patents and patents pending and no manufacturer outside the U.S. has, so far as we are aware, endeavoured to offer anything comparable for the highly specialised field of speed flying. This may, possibly, be one of the reasons why we have seen very little of single-line control in the U.K. or on the Continent, but, with the present improving situation in regard to imports

U.S.A. To American speed fliers, Mono-Line control is de rigueur. *Here are the latest Stanzel units, including ball-bearing handle and A and C class Speedmaster control components.*



1. *GREAT BRITAIN. Former World Power Champion, Ron Draper, with his 1959 F.A.I. power model "March Hare." A works-tuned Oliver Tiger-III is used, with Czech 8 x 4 wood prop and clockwork timer. Double covered wing of 10 : 1 aspect ratio. Weight 26.8 oz.*

2. *DENMARK. Seen at last year's Danish Nationals. A fine F/F scale model of the German Buecker Jungmeister, powered by a Danish Viking 2.5 c.c. diesel.*

3. *CZECHOSLOVAKIA. This attractively proportioned R/C model was designed and built by the well-known Czechoslovak Wakefield flier, Radoslav Cizek. Model has a span of 72½ in. and weighs 4¼ lb., including 11 oz. of batteries for the Jan Hajic designed "Alfa" receiver. Engine is an MVVS 2.5 c.c. diesel.*

1 | 2 / 3

of American model goods, there would appear to be no reason why some Mono-Line equipment should not be made available to speed experts here.

With the last sentence still in mind it is appropriate, perhaps, to mention a complaint which several readers have voiced in regard to the type of model goods which some firms are importing.

The complaint is that some of the things at present being offered are a waste of import quotas. Many modellers feel that importers should first concentrate on obtaining supplies of the type for which we have waited so many years —ever since 1939, in fact—and not squander licences on goods (in many cases bordering on the "toy" market) which might be classed as "non-essential."

There are, of course, many highly desirable foreign products now being offered—engines by Cox, Dooling, Enya, Fox, O.S. and Veco, for example—but, understandably, the firms importing model goods are interested primarily in stuff that will sell readily and at a good profit. Even so, we cannot help sympathising with serious modellers who look in vain for certain other specialised types of equipment and see, instead, goods of a kind which are already produced domestically (and therefore offer little other than some extra competition for our own manufacturers) or alternatively, of a class which belong more to the department stores than to the model shops.

* * *

First to follow the current American trend in ultra lightweight single-channel R/C equipment (as exemplified by the C.G. RX-1 and RT1-3V) is the German Johannes Graupner organisation, with their new "Mikrokombi" receiver.

The Mikrokombi consists of an all-transistor tone receiver for 27.12 Mc/s, with built-in battery box and actuator. The circuit includes five transistors, a Gruner 957 relay and responds to 400 cycles modulation. The actuator is a rubber-driven escapement type with built-in linkage for direct push-pull coupling to the rudder. One 6-volt battery only is used, which can either be in the form of four 1½-volt dry cells or five DEAC nickel-cadmium disc type miniature accumulators. Total weight of the complete unit is under 5 oz., overall dimensions being approximately 3.5 × 1.2 in. It is priced at about £11 8s. in Germany.

* * *

We have had one or two very favourable reports of the Tiger M-2 "baby" pulse-jet which was first illustrated and described in the December and January "Engine News" columns. Kevin Lindsey of the Hayes Club reports that it "starts like a diesel." All pulse-jets are a bit tricky in regard to fuel feed, with cutting on take-off a familiar trouble, but Kevin Lindsey seems to have the problem solved with the M-2. He is using an annular tank rather similar to that favoured by the Russian jet exponents (notably Vasilchenko and Ivannikov), but positioned just in front of the valve head instead of around it. Using a simple trainer type model, as a test bed, and stranded line, 90-100 m.p.h. has been achieved with the mixture slightly rich. Around 105 m.p.h. is expected with the correct lines and mixture strength and, perhaps, 120 m.p.h. with a new speed job now being constructed.

Austria's A/2s — the latest trend

PROMPTED by A/2 articles that have appeared in previous issues of MODEL AIRCRAFT, Franz Cerny of Austria recently sent us some interesting notes on current constructional methods developed in his country. Credit for the new techniques goes to Erich Jedelsky of Vienna, who has attempted —successfully we think—to overcome the disadvantages of orthodox A/2 construction. On the Continent the new method has become known as the "Standard Vienna School"—solid wing and tailplane with a really robust fuselage.

Franz says that the actual construction is extremely easy and even the raw beginner can have a model flying after only three evenings' building time. This is a good point, for he well appreciates that you can only win over beginners to the hobby if they can quickly achieve practical results.

Briefly, this new-type A/2 would appear to have the following advantages over the more orthodox design: quick and easy construction; almost unbreakable; no warps; no sagging or pierced covering; and—most important of all—a good performance. Incidentally, it is easy to transport, packing away into a container measuring only 40 × 7 × 2 in.

Reference to the drawing does not give any indication of the model's potential performance but evidently it has been proved under various conditions and is well able to hold its own against the more orthodox A/2s. (It will be remembered that Ossi Czepa's Wakefield last year used some of these constructional ideas.)

Now Franz Cerny's own words: "Of course, some skill of the modeller is needed to release it (the model) overhead and in the right moment, for if you launch any model into a downdraught it is bound to come down." Well, we can't argue with that statement! Franz goes on to say: "Another advantage is the warp-proofness, and under normal conditions it is unbreakable. If you step on it, of course, it will break." We can't argue with that one either!

Now for the construction. The wing is built in two halves, and the following is needed to complete one half: one piece of 36 × $\frac{1}{8}$ × 3/32 in. spruce, one sheet of 36 × 4 × $\frac{3}{8}$ in. soft balsa; one sheet of 36 × 3 × $\frac{1}{16}$ in. medium balsa, and nine 4 × $\frac{3}{16}$ × 3/32 in. hardwood ribs, to be spaced 4 in. apart on the wing undersurfaces. The tail is from soft $\frac{1}{4}$ in. sheet sanded to airfoil shape and bent to give undercamber; five underside ribs provide sufficient stiffness. The wing platform is from 1 mm. ply, top and bottom, the space between the wing and the platform being filled in with scrap balsa. The wing joiner and dihedral keeper consists of one—6 to 8 in. long—piece of $\frac{1}{8}$ in. dia. piano wire which fits into tubes formed from two strips of $\frac{1}{8}$ in. sq. spruce cemented into the wings. Apply the cement liberally here.

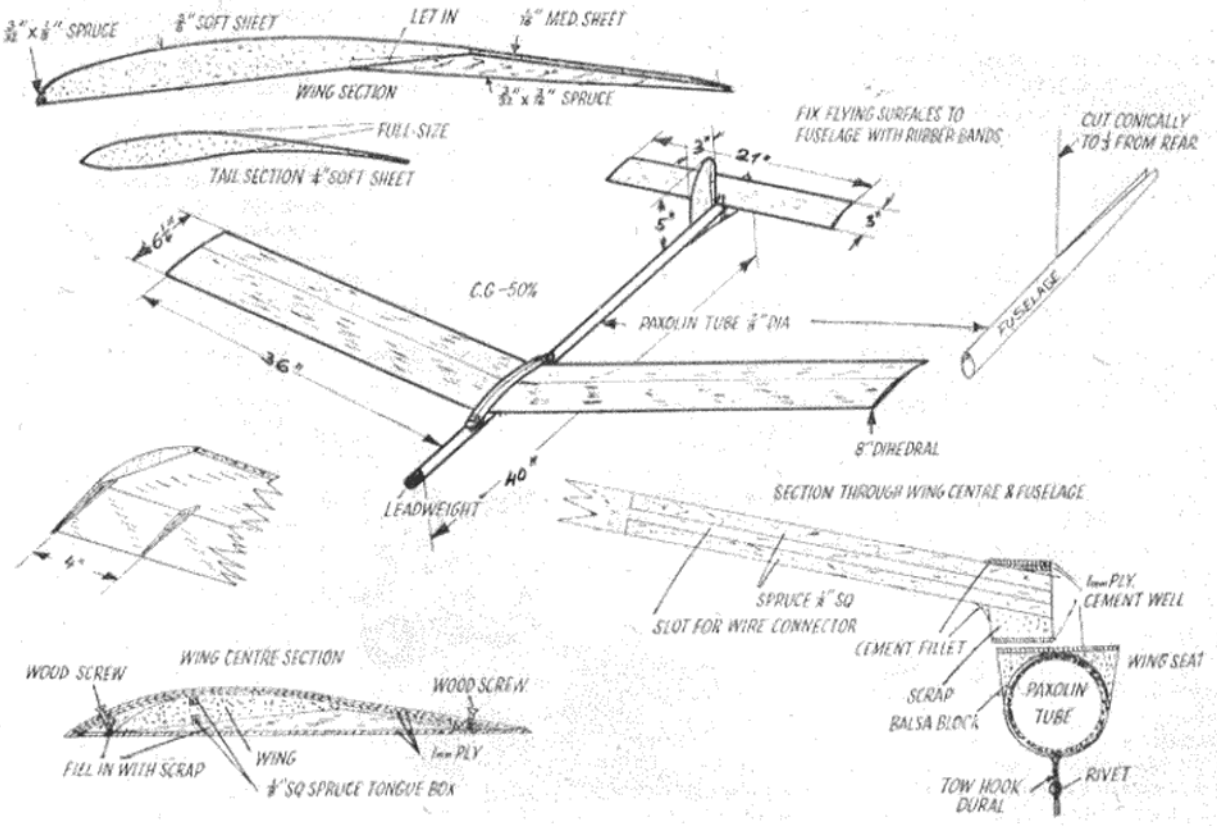
The fuselage is a paxolin tube 1 mm. thick and of $\frac{3}{4}$ in. diameter. Slot one-third conically and cement together after fitting the $\frac{1}{8}$ in. sheet fin.

To make up the wing, first take the spruce strip and cement it to the $\frac{3}{8}$ in. sheet, then sand the underside. Cement the ribs to the underside making sure that they are correctly aligned. Next step is to sand the $\frac{1}{16}$th sheet on the underside and cement it to the $\frac{3}{8}$ in. sheet, again checking the alignment. Then cement the $\frac{1}{16}$ in. sheet to the ribs. After the assembly has set, sand the upper surface to shape starting from the rear. Finally fit the tongue boxes and wing seats.

Fix to the fuselage the wing and tail seats, tow-hook, ballast, etc. Incidentally the tow-hook is made from duralumin bent around the fuselage and is, therefore, easily adjustable. Finally, apply non-shrinking dope.

You are now ready to test glide and fly, so from here on everything is up to you. Add ballast to the nose to bring the model up to weight, then adjust the wing until the c.g. is at 50 per cent. chord. With the incidence difference a minimum of 5 deg., the trim should be about right, but final trim can be adjusted by moving the wing fore or aft slightly. Note that the left wingtip has $\frac{1}{8}$ in. wash-in.

The weights should be approximate to the following: Wing—8 oz. Fuselage—3 oz. Tailplane—$\frac{1}{2}$ oz. Ballast—3 oz.



Topical Twists

by PYLONIUS

Smooth Talk

All the balsa processers seem to be flogging the " finish " gimmick for all it's worth, probably in order to keep a jump ahead of all the wonder substitutes which weigh less than cast iron, can be sawn, hacked, filed, chewed and, in some remote cases, even cut. But what is satin finish? There is wild speculation among us backwood boys who live out in the rough sticks. Is it a form of upholstery for our tired generation of model builders, or a new fashion style for lady modellers? Whatever it is, it is obvious that it has not yet reached the rustic toy-side counter where I furtively paw over the hairy 9/64th by 7/64th square in search of a usable longeron.

These new techniques make me confused. By what I read in the model mags I'm more than a bit out of date in using balsa for building model planes. The smart, up-to-date thing to do, it seems, is to buy a ready-made plastic model and use the antiquated balsa wood for storing your liquid gas. Not being a technical sort of bloke I can only hazard that liquid gas is some new-fangled sort of glow fuel which does not harm plastic surfaces.

However, I observe that a few modellers still use balsa to keep their tissue taut. Mostly the models are of the rugged sport and combat variety, where crashibility is an essential part of the fun. A particular feature of these models is the natural, contemporary finish, with square leading and trailing edges and fully textured balsa throughout. Where possible the balsa is left uncovered, the better to reveal the natural beauty of the untreated wood.

As a point of interest, you might wish to know that these primitive models are built by the " action " method; thrown together with a few brief, dramatic gestures during television commercials. The artistic creations which result, liberally garnished with such slick, modern verbiage as " I Only Arsked " and " Dig This—Out," have a vital urgency about them which might well be rendered flaccid by the use of anything but the hairiest, coarse grained, back shelf wood.

My aversion to satin finishes is of a different order. I know that, in the past, I have often cut up rough about the rough balsa I have had to cut up, but, over the years, I have developed a passion for sandpapering. It all began when I read that the difference between the beginner and expert was sandpaper. I bought up reams of the stuff, and, if there is any truth in the theory, I should by now be heading the expert field by at least two sheets of medium coarse. As it is, I am the shortest fingered beginner in the business.

But why are the manufacturers so coy about revealing the secret of these satin finishes? It's all so simple. Just examine one of those little holes you always find in the centre of a stress bearing spar. Instead of a woodworm you'll find a silkworm.

Timely Twists

It is reported that a new, all-plastic, ready-built radio job has a wing loading that even a Bell rocketplane might envy. Designed especially for the greenhorn beginner, you have to be an expert to bring it down in one piece. All that's needed now is an all-plastic, ready-built expert.

Newest craze in stamina stints is the round-the-pole marathon. Instead of squatting up-the-pole you squat outside the pole, where, fortified by pep-up-pills and strong coffee, you endeavour to keep a C/L model on the wing for 60+ hours.

The only thing that puzzles me about this, apart from any sane reason for doing it, is how they keep the machine in fuel. Must use hollow lines.

From Liverpool comes news of a power model suffering severe glide stall due to the weight of the d/t. Let this be a warning to all beginners to remove the lamp from the lampwick before attaching the latter to the model.

Common Topic

I see that I am accused of taking the mickey out of Chobham Common. This is grossly unfair. To the best of my knowledge all I have removed from that haunt of pastoral elegance is a bootful of muddy water, a few pocketsful of sand, and a charred model box, but never a mickey.

The landscape lover who brings this strange charge claims that Chobham is a piece of land. This seems to me a piece of wild overstatement. Any resemblance to terra firma is quickly dispelled in the course of a two-minute flight. You are either suspended, semi-airborne, in a deep crevice or aquatically floundering in a bottomless bog. At the end of a day's flying you don't know whether to be seasick or airsick.

But if he thinks I haven't flown on Chobham Common, let me tell him that I was one of the first refugees to take the hard road from occupied Fairlop. After getting lost for several hours in a wilderness of thorn and bracken, I was beginning to despair of ever reaching the promised flying field. And, it was not until I sighted a familiar heap of ancient motor bikes, that I realised I had arrived at the modellers' paradise. Surveying the acreage of charred bush and gorse I couldn't help wondering what the other place was like—the one to which we are often directed by an irate public.

Still, even if Chobham isn't quite my cup of char, I greatly admire the commando spirit of the assault course generation who regard it as a first-class flying field. I come from a gentler breed of modeller, reared on flat grasslands and firm foundation, but I am prepared to give Chobham another chance, if anyone can tell me where I can obtain a bathchair with caterpillar tracks.

Without Pier

Are there two Wigans? Geographers and historians are earnestly debating this question since two club reports bearing that honoured name appeared in the same issue. Some anxiety is felt that, overnight, a new Wigan has mushroomed into existence, complete with duplicate pier and model club. If this is so, where is the new Wigan?

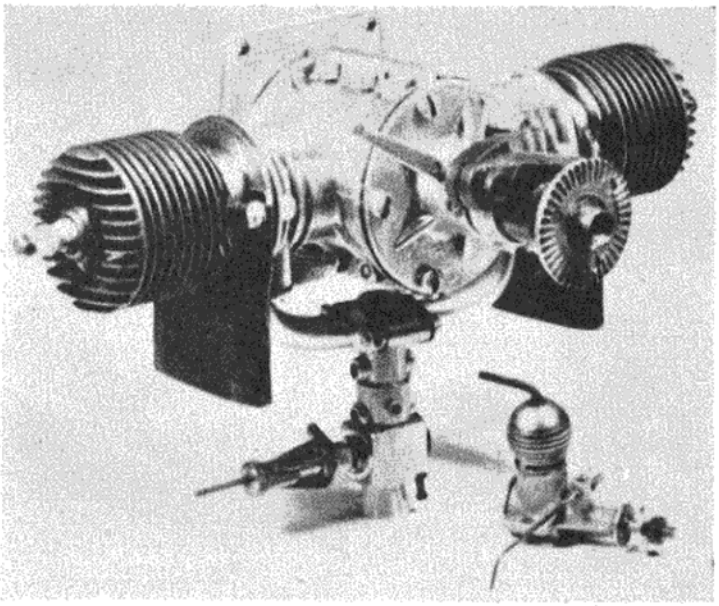
We don't yet know the answer to that, but we have good reason to suppose it is either on, or close to, a decent flying field. Living in Wigan is no fun for the model flyer. It is an historic fact that the inhabitants of this land-bound town suffer from the strange delusion that they live on the seashore, hence the fabulous pier for which the place is famous. For this reason there are no flying fields. Which is quite logical, for whoever heard of a flying field six fathoms deep?

Disgusted by this situation a few of the rational members of the model club have packed up their model boxes and struck westwards to build a new Wigan in flyable territory.

The story of this epic journey will be the feature of a new television series, called " Wigan Train."

Latest Engine News

From PETER CHINN



One of the world's smallest production engines is the Hungarian V.T. 0.25 c.c. Overall dimensions and weight are similar to those of the D-C Bambi and make an interesting comparison with the 20 c.c. American Herkimer Twin.

THE biggest problem facing designers of high performance, shaft-valve, ball-bearing equipped 2.5 c.c. diesels, today, is the question of crankshaft weakness.

If outputs in the region of 0.30 b.h.p. are to be realised—and nothing less will suffice for a " world class " engine today —this demands both high b.m.e.p. and high r.p.m. Maximum brake mean effective pressures to the order of 65 lb./sq. in. are, for example, being approached with the Oliver Tiger and Enya 15-D, corresponding to mean torque values of approximately 25 in./oz. or 0.13 lb./ft. As operating r.p.m. are increased towards the b.h.p. peaking speed, mean torque is reduced, but since the ratio of maximum to mean torque multiplies as engine speed increases, the torsional stresses set up in the crankshaft are rapidly raised. In short, we are reaching a point where a $\frac{3}{8}$ in. dia., hollow crankshaft, weakened by an induction port, can no longer be relied upon as providing adequate strength for a top-performance 2.5 diesel.

One of two courses is open to us.

Firstly, we may abandon the shaft-valve layout and use rear crankshaft induction, such as by a rotary disc or reed valve, of which the disc-valve may be preferred in the light of experience thus far with reed-valve 2.5 diesels.

Alternatively, we may strengthen the crankshaft.

The second course may appear, at first sight, to be the obvious and simplest solution. Putting it into effect, however, is not without practical difficulty.

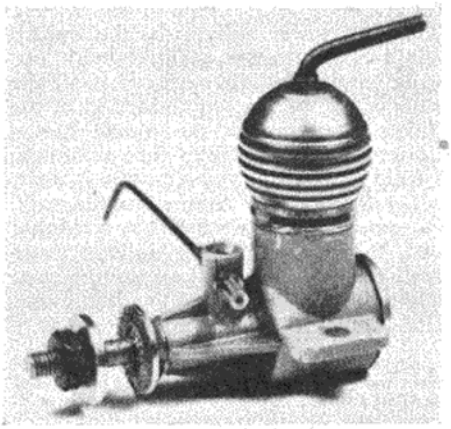
Little improvement can be expected, for example, by the use of alternative materials. Most manufacturers are already using the toughest alloy steels at their disposal. Secondly, the seemingly obvious answer—i.e. to substantially increase the diameter of the shaft, is limited by the outside diameter of the ball race ($\frac{7}{8}$ in. in the case of standard $\frac{3}{8}$ in. i.d. ball journals) that can be accommodated in the crankcase.

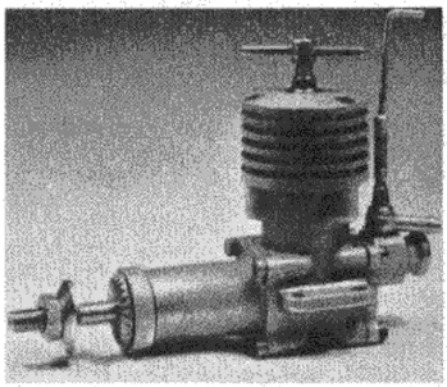
The Enya 15-D, in fact, does employ a larger shaft of 10 mm. dia. made possible by the use of a special ball bearing. The MVVS 2.5/1958, too, used a 10 mm. shaft and special bearing and it is, perhaps, of some significance that only the first 100 of these engines were so equipped. The succeeding models, re-designated MVVS 25-D have plain main bearings, due, we were told by Czech team members at Cranfield last year, to the limited availability of the ball-bearings used in the 2.5/1958 type.

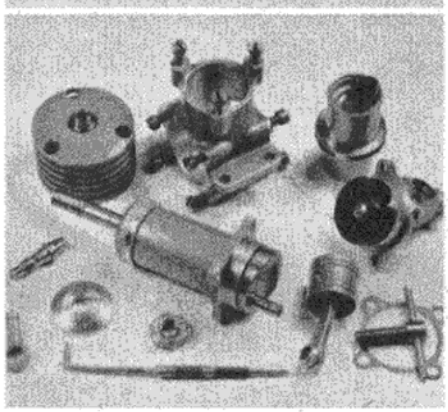
Even at 10 mm., however, shaft strength would still seem to be marginal. Several crankshaft breakages were reported with the earlier MVVS series and to overcome this tendency, the induction port was made narrower on the later models. Similarly, the makers of the Enya, concerned because the incidence of shaft failure (although actually quite small) proved to be well in excess of the very low rate to which they were accustomed with their glow-plug models, have, this year, abandoned their chrome-molybdenum steel shaft in favour of one of nickel-chrome steel.

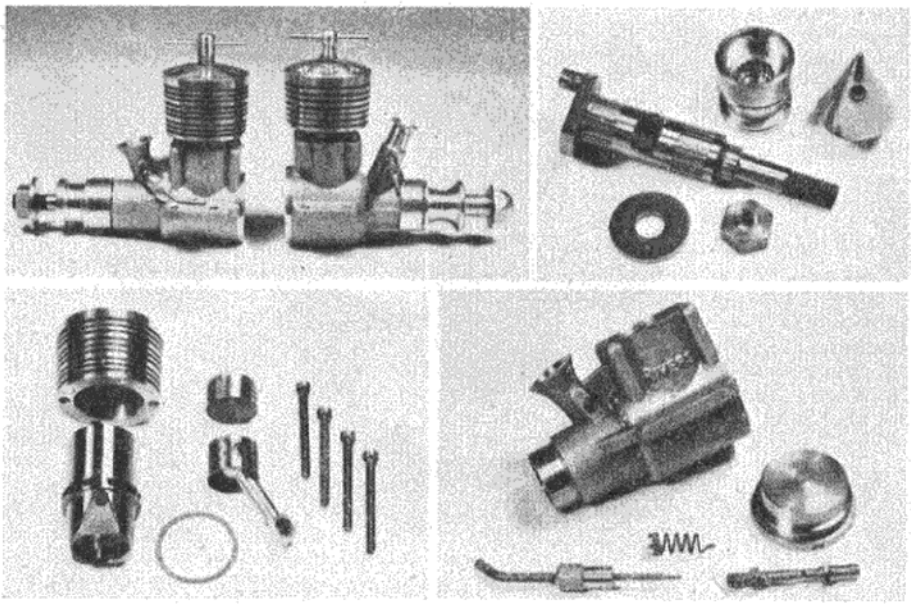
Certain modifications to the rotary-valve design can be used to improve the strength of the shaft at this point—inevitably the weakest point of the shaft. A tendency towards the use of elongated shaft ports in conjunction with squared bearing aperture is evident in the design of some of the most powerful model engines recently produced—notable examples being the Enya 29-3, Fox 29R and O.S. Max-II 35 glow engines. In each of these engines, the purpose is mainly to improve breathing efficiency, but it is not difficult to see that similar

Right: The Russian Mk-16, disc-valve, twin ball-bearing 1.5 c.c. diesel, designed by Gajevsky. The engine proved comparable in performance with British 1.5s, but suffered from serious crankshaft weakness. Below is another view of the Hungarian V.T. 0.25 shown in the heading picture.









Newcomer to the ranks of British contest diesels is the Rivers' Silver Streak. Comparison with the Oliver Tiger is inevitable and, top left, the two engines are shown together. Also illustrated are the component parts of the Silver Streak, including the unique roller-bearing crankshaft.

porting arrangements can be applied to the 2.5 contest diesel to increase shaft strength. We may use a narrower and longer shaft port (thereby taking a smaller " bite " out of the shaft diameter) and maintain the required valve timing and area by using a wider intake aperture in the bearing. This is, in point of fact, the method successfully used by the Eifflaender P.A.W. 2.49 Special.

With most modern 2.5s, nearly all of which have stroke/bore ratios of less than unity and, therefore, a short crank throw, the crankcase interior diameter is only slightly over $\frac{7}{8}$ in.—just enough to give big-end clearance and to accommodate a $\frac{7}{8}$ in. o.d. ball bearing. Any substantial increase in the diameter to accommodate a larger o.d. bearing must increase crankcase volume and reduce crankcase compression and is a course which most designers prefer to avoid. Therefore, if it is desired to increase shaft diameter and maintain a small diameter crankcase chamber, this can only be done, as we have said, by redesigning the bearing assembly. One solution is the roller bearing.

* * *

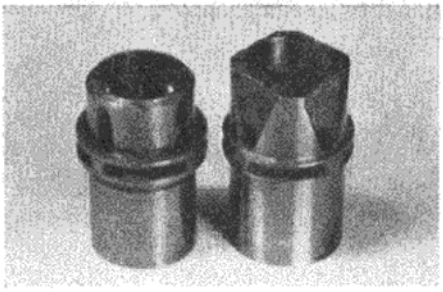
We do not know whether any of the foregoing was in the mind of the designer of the Rivers' " Silver Streak " when this new British 2.5 diesel was laid out, but it is interesting to note that this engine does, in fact, represent an almost entirely new approach to model engine crankshaft bearing design and one which would appear to provide an answer to the problems mentioned above.

In the Silver Streak, the shaft has a very large maximum diameter of 0.468 in. (nearly 15/32 in.) as compared with 0.375 in. for the Oliver Tiger and P.A.W. 249 and 0.394 in. for the Enya and MVVS. This diameter is reduced to only 0.350 in. at the bearing journals each end of the shaft, but, since the shaft port is located at the largest diameter, should still mean an all-round improvement in shaft stiffness. Each of the two bearing assemblies consists of seven 1.5 mm. dia. rollers, separated by seven spacers, the whole being inserted in a hardened steel bushing in the crankcase.

A full report on the Silver Streak will follow in a future issue of M.A.

Meanwhile, the engine clearly invites comparison with the Oliver Tiger Mk. 3 and it will be interesting to see whether it offers a serious contest challenge to the Oliver in those categories in which the latter has been so successful.

General appearance is somewhat similar to the Oliver, with just a little less attention to the finish of the casting. Due to a lower S/B ratio, the overall height of the engine is fractionally less, while length is slightly greater. Weight is about 0.2 oz. greater than that of the Oliver. Internally, the piston has a shorter skirt and higher conical crown. A solid, pressed-in gudgeon pin is used, rather than a fully-floating tubular pin. The piston is machined out to a thinner wall, the con-rod having an extra large small-end to keep the unsupported length of the gudgeon-pin to a minimum. The cylinder design is similar to that of the Oliver, but with a modified form of transfer passage and a heavier wall thickness—0.084 in. as against 0.072 in. Bore and stroke are exactly " square " at 0.5782 in. in contrast to the Oliver's 0.550 × 0.625 in.



In addition to an entirely different type of main bearing, the Rivers features a revised form of transfer passage, shown above with (left) the Oliver cylinder liner.

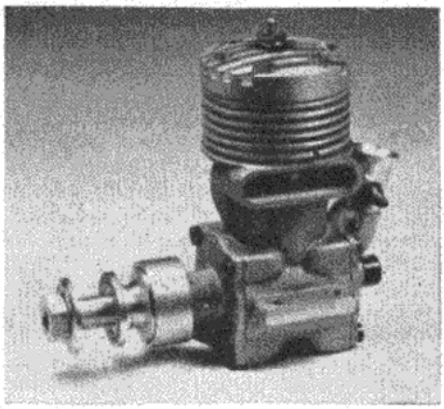
* * *

Another important addition to the British engine market is the new 1.49 c.c. P.A.W. Special—illustrated in last month's issue. We have been conducting tests on one of these engines for the manufacturer and, if all production models are as good as our test sample, this new Eifflaender design should be in keen demand.

Closely resembling the successful P.A.W. 2.49 Special, except for a cast-iron bushed main bearing, the 1.49 is a very pleasant-handling little motor with a performance which puts it in the very front rank of current 1.5s. A test report on the P.A.W. 1.49 will be featured in M.A. very shortly.

* * *

In our issue of November 1956, was featured, for the first time in a Western publication, a test report on a Russian made model engine: the MK-12 2½ c.c. diesel. More recently, a smaller model in the MK series, also of the disc-valve, twin b.b. type, has been produced: the 1½ c.c. MK-16. Kevin Lindsey, who visited Brussels last year for the *Criterium d'Europe* C/L event, at which 15 nations, including the Russians, competed, managed to acquire a used example of one of these engines and was kind enough to let us have a look at it.



One of the most outstanding engines yet to appear east of the " Iron Curtain ": the Czech MVVS 5.6 c.c. glow engine, as used by Gabris to win the world stunt championship. Only 20 of these engines were made, of which, this example is the first to reach the West.

Unfortunately, the engine proved to have an unhealthy appetite for consuming crankshafts, the original and a replacement shaft giving up the ghost in short order as soon as its new owner gave the engine its head on a 7/4 prop. The shaft is only 5 mm. dia. (0.197 in.) and clearly, this is insufficient to cope with the quite useful output of which the Mk-16 is capable.

The general design and construction of the engine can be seen from the photographs on page 189. Bore and stroke are 12.8 × 11.5 mm.

Club News

DARTFORD M.A.C.

We have decided to include a "½A" team race at our rally on June 7th, providing there are enough entries to warrant it.

Because of the popularity of the "combat" events we would like everyone to be prompt in coming forward, and if we are overwhelmed by entries we *might* have to limit the numbers.

CAMBRIDGE M.A.C.

The club contest season is now under way, F/F power and combat contests having been held. The power comp. was blessed with some extra-strong "lift," and D. Miller topped the list with 11 : 30, bottom score being 8 min.

The biggest crowd of modellers ever, was seen on our flying field when we were visited by R.A.F. Marham, Kings Lynn, and Impington M.A.C.'s who competed against us in a "friendly" combat session. The meeting was a success in spite of strong winds which put paid to hopes of a F/F contest, and the first three places were taken by Cambridge members. (Fiddle !)

In the second round, Impington M.A.C.'s pit crew resorted to flinging their completely U/S model at their opponents in a last desperate attempt to get at his streamer, and Mike Hobbs was all but scalped when a model passed over his head at nought feet as he pitted for a Cambridge entrant in the final round. He escaped by the skin of his "Andy Capp" !

With the advent of the A.M.15 and Frog 150R, "½A" combat flying is increasing, particularly among junior members.

CHEADLE & D.M.A.S.

New member M. Wilkes—late Sheffield M.A.S.—led the Wakefield results at the first eliminators using Dunlop rubber, leaving the 28s. a pound Pirelli fans scratching their heads. Meanwhile, the A/2 models were getting their annual dusting in the spring gales. After the debris of broken models and tow lines had been swept away, Brian Faulkner led the Cheadle entry with a modest 10 : 16, plus the shattered remnants of the 1954 vintage *Mousetrap*.

An exhibition was held in conjunction with the I.R.C.S. and 284 Squadron A.T.C., and although the attendance was marred by two home matches and the Grand National, a great deal of interest was created. A high standard of models was presented to the public and a modest profit resulted from the hard work put in by Messrs. Nield, Bailey, Wingate, Brunt and Whalley.

At the first power trial and second A/2 trials, heavy rain was added to the hazard of high winds. However, 4 p.m. saw calm dry weather and in some hectic flying Mike Turner edged the field out with his *Liftman* A/2, our models are still drying out.

It is hoped to hold a Cheadle C/L rally during the summer—more details later.

Seven places resulted from the Cheadle entry at the Northern Models exhibition, the Aeromodeller Trophy being retained in the club for the third year in succession, this time by A. S. Bailey.

HUDDERSFIELD D.M.A.C.

A Concours d'Elegance contest was held in the club room, free refreshments were provided and the "turn-up" was pleasing. The contest was judged by Flt. Lt. Taphouse, the C.O. of the local Air Training Corps, and the winners were:— 1st, E. Kelly; 2nd, A. Norcliffe; and 3rd, G. Mackrell. We recently played hosts to Mansfield M.A.C. for a combat contest. Out of nine combats, Huddersfield won only one, but valuable experience was gained.

OLDHAM & D.M.A.C.

During the last few weeks, we have seen a few of the club's records broken, the most promising being an 8 min. 52 sec. o.o.s. by Mr. Birch with his Contest Kit, the *Inchworm* A/2 glider. Mr. Shaw gave a fine performance with his own design 7 ft. job at the last Stretton rally in a very high wind.

We have been very fortunate in obtaining a second flying field for the use of the club for an indefinite period which will come in very useful during the summer months, also the owner of a local boating lake has given us sanction for flying floatplanes, etc., from his water, which is surrounded by meadowland.

WESTON CONTROL-LINERS

A good attendance was made at the West of England Championships at R.A.F. Colerne where a team consisting of R. Burgess, P. Heely and R. Johns won the Bath Abbey combat shield. In spite of the cold wind all the members enjoyed themselves, but were disappointed that W. Evans was unable to fly his twin O.S. jet-powered Blackburn N.A. 39. Mr. Evans had an amusing headpiece in the form of an old A.R.P. tin helmet, painted red with a flashing bulb and two miniature television aerials on top.

ST. ALBANS M.A.C.

Some members flew in the Gamage and K.M.A.A. comps., top times in the club being made by G. Fuller with a perfect score plus 5 : 12 fly-off in the Gamage and B. Dowling, a new member, with three max's + 1 : 32 in the K.M.A.A.

Interest in radio is on the increase in the club since R. Pask, our new treasurer, joined us last year.

EAST LANCASHIRE M.A.C.

We have just taken part in a hobbies exhibition where we exhibited 10 types of flying model, totalling some two dozen models. Any modeller interested in joining the club will be welcome and should contact P. Wilson, 42, Newmarket Street, Colne.

NORTHWOOD M.A.C.

At the moment we are all building frantically for the coming season's flying, especially the combat boys who are still recovering from a very watery Dagenham rally.

Recent club meetings have included some very fine aviation film shows which have no doubt increased the somewhat dwindling past attendances.

At our last meeting, Norman Butcher very kindly came down and gave us an extremely interesting talk about how the MODEL AIRCRAFT is arranged and put together before it is published.

WALSALL M.A.C.

A recent crisis in the club due to a rift between F/F and C/L members is now settled down and things are fairly normal again. The result of this rift seems to be a slight increase in F/F interest, but there is still a diehard core of C/L fliers.

In the D/C Hamley Trophy, C. Petty looked all set with an impressive score of five max's, only to learn that everybody else had flown to the three 5 min. max. rule, while he had five 3's ! Model was a Fox 0.19 *Spacer*. D. Pym flew his original Webra job and got one max, then a wayward model pranged onto his plane and that was him out of it. Altogether, a disastrous day !

Combat is still popular, with a swing to glo 0.19 models, which go like crazy, and are better in the manoeuvres than the diesel models.

ENFIELD & D.M.A.C.

We held a combat event for junior members. The results were extremely encouraging, and we hope to hold several similar events for other classes. The final was between D. Powell and A. Ewen, the latter being the eventual winner. From this contest it seems that the juniors are not so much in need of flying experience, as practice in starting their motors.

On the same day, senior members R. Moore and R. Salter went along to Chobham to fly in the Gutteridge. Although they did not put up any spectacular times they had an enjoyable day's flying, and gained valuable experience for the Wakefield eliminators.

It has now been decided that there will not be an Enfield rally this year. We apologise to the many flyers who regularly attend this hitherto annual event. However, we wish to make it clear that there will definitely be a meeting next year.

The club wish to congratulate team-race

CONTEST CALENDAR

June 7th	Dartford Rally, Central Park, Dartford. "A" and "B" T/R. Combat.
May 31st / June 14th	**WORLD CHAMPIONSHIP TEAM SELECTION TRIALS.** R.A.F. Wigsley.
,, ,,	Godalming C/L. Rally
,, 21st	Northern Heights Gala, Halton.
,, ,,	Clwyd slope soaring meeting.
,, 28th	AREA CHAMPIONSHIPS. U/R Rubber, Glider, Power. Cent. †R/C. International Class.
,, 28th	Ashford Combat Rally, Victoria Park, Ashford, Kent.
July 12th	*MODEL ENGINEER CUP. Team Glider. Area. FLIGHT CUP. U/R Rubber.
Aug. 2nd	Surbiton Gala, Chobham Common. F/F all classes and team glider.
,, 16th	Devon Rally, Woodbury Common. F/F, Combat, R/C.
,, 23rd or 24th	**U.K. CHALLENGE MATCH** (with Scottish Gala).
,, 23rd	**SCOTTISH GALA.** POWER. U/R Power. GLIDER. U/R Glider. RUBBER. U/R Rubber. TAPLIN TROPHY. R/C. TEAM RACING. Classes "A" and "B."
Sept. 6th	**NORTHERN GALA.** U/R Glider. HAMLEY TROPHY. U/R Power. CATON TROPHY. U/R Rubber. AEROMODELLER TROPHY. R/C. TEAM RACING. Classes "A" and "B."
Sept. 13th	Croydon Gala, Chobham Common. F/F all classes.
,, 20th	*KEIL TROPHY. Team Power. Area. *FARROW SHIELD. Team Rubber. FROG JUNIOR CUP. U/R Rubber/Glider.
,, 27th	"½A," "A" and "B." TEAM RACING. Area.
Oct. 4th	South Coast Gala.
,, 11th	FROG SENIOR CUP. U/R Power. Decentralised. C.M.A. CUP. U/R Glider.

All S.M.A.E. competitions in capitals.
*Plugge Cup events.
†Events selected for basis of International Team selection.

INTERNATIONAL CONTEST CALENDAR

June 7th	Germany. International Flying Wing.
July 11/12th	Austria. Alpen Cup—Glider/Power.
,, 18/20th	WAKEFIELD CONTEST. Brienne-le-Chateau, France.
,, 27/28th	Yugoslavia. Glider/T/R.
Aug. 10/11th	Yugoslavia. Hydroplanes, Rubber/Power.
mid-August	Germany. Slope Soaring.
Aug. 23rd	A/2 CHAMPIONSHIPS, Reustem, Belgium.
Sept. 6th.	Finland. C/L, all classes.
,, 26/27th	Belgium. 10th Criterium d'Europe.

AEROBODS OF NOTE

E. G. BOREHAM

Wherever model "whirlybirds" gather, rising above the rest are the helicopters of E. G. Boreham, aero-modelling's vertical-lift expert.

expert Don Walker and Peggy on their new arrival . . . a bouncing boy. We hope he turns out as keen an aeromodeller as Don.

FARNBOROUGH M.A.C.

There has been a sudden surge of activity in the club recently.

In the second club comp. of this year, both M. Brown's new Oliver-powered *Siskin* and J. Harris's *Hot Pot VI* came through with a perfect total. The latter was using a 3.5 c.c. Special based on Amco B.B. crankcase. Both models went off together in the fly-off, using 10 sec. motor run, the 3.5 c.c. Special taking the *Hot Pot VI* slightly higher; the model touched down at 3 : 29, 14 sec. more than the *Siskin*.

A small combat event was held recently for our C/L enthusiasts, Alan Leeson's Oliver-powered wing emerging victorious (and unscathed !).

SIDCUP M.S.

Our recent exhibition in aid of the 8th Sidcup (Handicapped) Scouts resulted in a profit of about 30s. for them. The models in the exhibition were of a high standard, most of them being plastics, and we received a good write-up in the local paper.

Our new transfers have arrived. If any collectors want any they can write to: D. Williams, 46, The Avenue, St. Paul's Cray, Orpington, Kent. They cost 4d. each (preferably not stamps).

WALLASEY M.A.C.

The glider boys have good reason to feel pleased with themselves after the last couple of contests. In the K. & M.A.A. Cup Stan Hinds finished second, and in the A/2 elims. John Hannay and Stan Hinds finished first and second in the area. The other glider men were also quite well placed.

Junior David Millachip is converting his 10 ft. "Monster" glider to R/C soon. It already has navigation lights ! Some of these juniors put a lot of the seniors to shame.

Club reports received after the 15th have to be held over for a month—send yours before this date !

Club flying at the moment is unfortunately curtailed due to sheep lambing on the club field.

PORT TALBOT M.A.C.

This once very active South Wales area seems to have died real dead ! Here in Port Talbot we are building for this season's contests, but now—no area, no contests ! Where are the other clubs ? At the last area meeting, only five turned up; five from how many ? Bargoed Eagles, Cardiff Dragons, Builth Wells, Aberdare, Swansea, Neath, Penarth, Llanelly, Milford, where are you ? The "Pony Express" seems to function in these backwoods, so let's have news from you and a good attendance at area committee meetings and contests.

HUCKNALL & D.M.A.C.

A flying field (C/L) has been granted by the local council, and negotiations are now in progress for the use of a Nissen hut as club H.Q. Membership is increasing and it is hoped to have regular meetings during the week, as well as week-end flying periods.

Competition practice is in full swing, and new members will find a warm welcome at our meetings; details can be obtained from our secretary, P. Watson, 24, Rockwood Crescent, Hucknall, Notts.

LIVERPOOL & D.M.A.C.

A number of models were entered in the Model Engineer Exhibition at Manchester, and we were very pleased to see Ralph Hunt and Dougie Evans bag 1st and 2nd places with, respectively, a Leoning seaplane, and Doug's S.E.5a. Well done, lads.

We have lost our Australian member for the next three months, as Bernie Spinks has gone a-wandering on the Continent. These Aussies must have itchy feet.

Due to the number of enquiries received we are forced to point out that Woodvale and Burscough dromes are only available to club members; sorry, but that is an Air Ministry rule and not ours.

A.R.C.C.

The season's first meeting of the Aircraft Radio Control Club was held at Chalgrove, but the windy and wet conditions prevented the new rules being used. These set out times for tuning and testing before the contests. Chris Olsen showed that his model could perform very well even in a high wind, and four other models took the air for short flights in the rain. The most interesting display was the printed circuit German-made equipment put on show by Ed Johnson.

WESTERN AREA

At the West of England Control-Line championships, the following were successful:

Combat (28 *entries*)

1st Ballington .. .. Exmouth
2nd John .. .. Weston-super-Mare

Bath Abbey Shield, Team Combat

1st Weston-super-Mare
2nd Bristol Aces / Bath

Team-Race "½A"

1st Steer .. .. Glevum
2nd Rudd .. .. Dursley

Team-Race "A"

1st Wyatt .. .. Glevum
2nd Langley .. .. South Bristol

Stunt

Langley .. .. .. South Bristol

Due to lack of entries at this meeting, the Weston Cup for T/R and the Lee Bowl for stunt will be held later in the season.

Do other organisers find that too much time is wasted between bouts in combat ? A system tried out at this meet which was quite successful was to have two circles beside one another, although only one circle was flown at once, the pair for the next joust getting ready in the adjoining circle. The results for one heat are written down after it has finished and then the whistle is immediately blown for the next heat; it works, although one tends to develop a rash temper and hoarse throat.

BRISTOL R/C M.F.C.

Not so much flying here last month owing to high winds—summer must be on its way. We ran off the final heat of the Carroll Trophy, however—winner Cyril Needham, runner-up John Mardon—nine entrants. This was a six-heat contest spread over the whole winter and provided a reasonable variety—nomination, a "scramble"—see who could get the most circuits and spot landings in a given time—a course steering event, 440 yd. each way, aerobatics, and so on . . . all with suitable emphasis on landing in the proper place, beside the TX ! A loading system was devised to try to put singles on an equal footing with multis and a single-channel won, with a multi runner-up. This doesn't prove much, however, as John Mardon's multi missed two heats unfortunately . . . I feel sure that had his 8-reed Orbit equipment job not been unserviceable for the last heat the result would have been different.

The elevator-wagglers in this club have been pressing on . . . they have their troubles. Mike Barnett discovered, for instance, that his "down elevator" is most effective even when every other button doesn't work ! It's repaired now, however ! Despite the weather, several new members have got active . . . four new single-channel models got airborne for the first time this month.

CHESTER M.F.C.

In our notice of the Clwyd slope soaring contest we forgot to state that S.M.A.E. insurance (associate of full) would be required for entrance and that fuse-type d/ts would not be permitted due to the fire hazard. Will all intending competitors please note?

CHANGE OF SECRETARY

OLDHAM & D.M.A.C. S. A. Stanfield, 67, Keswick Avenue, Fitton Hill, Oldham, Lancs.

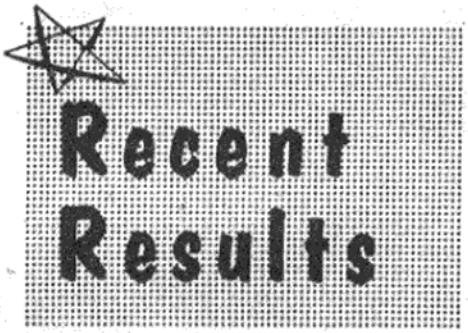
THE MIDLANDERS M.A.C. R. Wadsworth, 160, Cranmore Boulevard, Shirley, Solihull, Nr. Birmingham.

BODMIN M.M.Y.C. C. M. P. Wilson, 4, Chapel Lane, Bodmin, Cornwall.

SOUTHPORT M.F.C. D. C. Barber, 27, King Street, Southport, Lancs.

PEN PAL WANTED

By Josef Urban, letiste, Karlovy Vary, Czechoslovakia, who would like to exchange news, magazines, etc., with English speed enthusiasts.



ASTRAL TROPHY

1. Manville, P.	Bournemouth	15.00	+ 4.10
2. Smith, T. W.	Eng. Electric	14.49	
3. Faulkner, B.	Cheadle	13.12	
4. Hinds, S.	Wallasey	12.40	
5. Manville, J. H.	Bournemouth	12.10	
6. Fuller, G.	St. Albans	11.58	

39 *flew*, 26 *returned no score.*

S.M.A.E. CUP

1. Barr, A.	Coventry	11.49
2. Turner, M.	Cheadle	10.26
3. Picken, B.	Wigan	9.54
4. Wiggins, E. E.	Leamington	9.44
5. Hinds, S.	Wallasey	9.27
6. Spencer, D.	Chester	9.19

62 *flew*, 35 *returned no score.*

The following contests results will require ratification by the Council.

WOMEN'S CUP

1. Mrs. O. L. Fuller	St. Albans	3.45
2. Mrs. M. E. Filtness	Chester	0.57

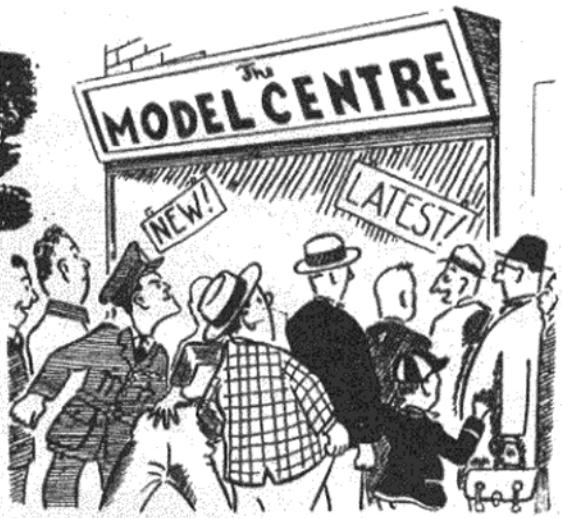
Only two entries.

JETEX TROPHY

1. O'Donnell, J.	Whitefield	20.88 ratio
2. Prenell, M. S.	Thameside	12.58
3. Roberts, R.	Bolton	9.61
4. Cockley, R.	Outlaws	8.13
5. Wisher, A.	Surbiton	3.45

Five entries.

YOUR BEST MODEL SHOPS



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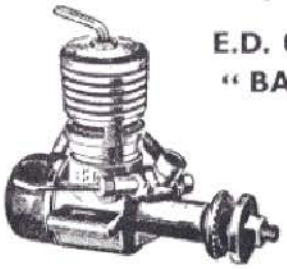

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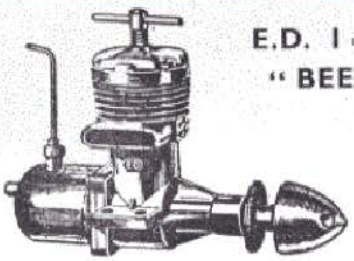

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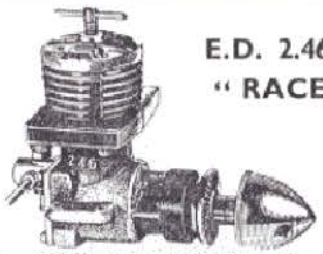

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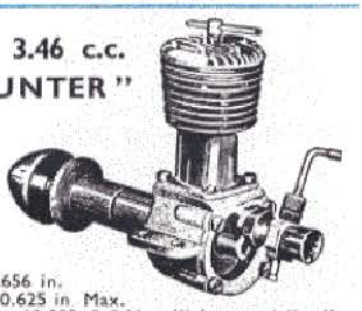

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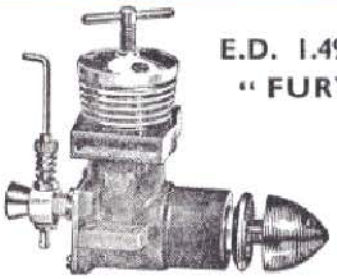

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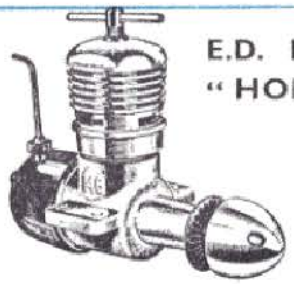

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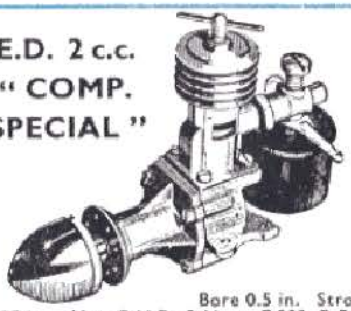

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