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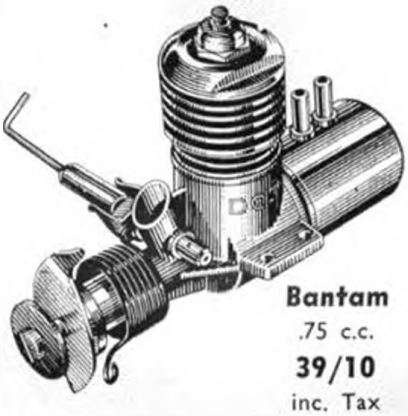

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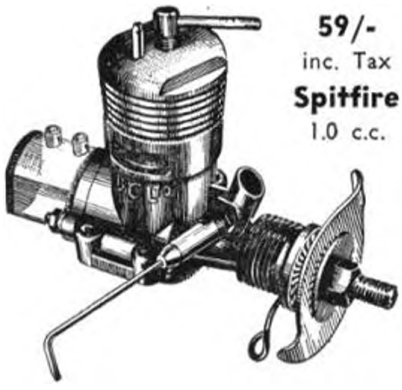

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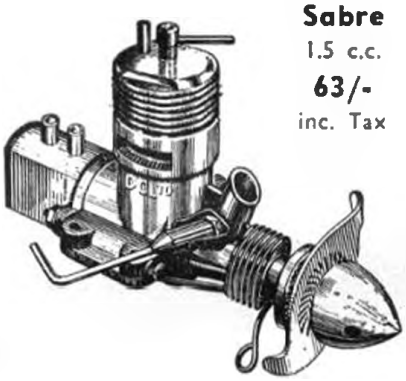

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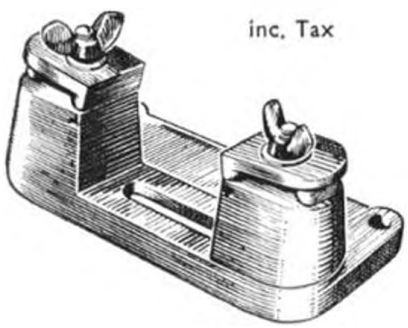

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other modelling angles . . .

November **Model Maker** contains a full report plus pictures of the Ulm International Regatta and the British R/C Speed Championships. For the youngster "Bambino", a 13 in. runabout made from all commercial parts is given as the free full size plan. Drawings for a new Marblehead yacht design. Simple submarine construction, advice on selecting timber, a drawing for a fifteenth century ship and details of geared electric motors plus feed pump details for steam engines are just some of the interesting features.

For the advanced car fans **Model Cars** feature a magnificent four wheel drive chassis design plus steering. Collectors have a new series on, "Chopping Miniatures", plus more on Dinky Toy History. Protoype cars have a U.S. flavour with the Ford Mustang and Galaxie, plus Stock Car drawings. How to motorise the Mercedes 1904 G.P. car by G. H. Deason, a nine hour school race report, first A.R.R.A. open meeting, ard news of a 24 hours Endurance Trophy. Special Dragging gen and a host of other features make **Model Cars** a must for November.

In **Radio Control Models & Electronics** full-size plans for Clyde Puffer single channel boat, how to convert low price actuators for relayless operation and details of H.M.S. Devonshire R/C installation. Contest news from the U.S.A., and Northern Heights Gala. High stability oscillator and modulation monitor for experimenters. Gadget Review, Pilots Page and Commercial Developments plus the blue Dutch Biplane cover make a very interesting November issue, not to be missed.

Editorial and Advertisement offices

38 Clarendon Road, Watford, Herts

Telephone : **Watford 32351** (Mon.-Fri.)

CORRESPONDENCE anticipating a reply to addresses within the United Kingdom must be accompanied by a stamped and self-addressed envelope. News reports should be submitted to arrive not later than the 15th of each month for publication in the next immediate issue. Photographs should be accompanied by negatives where possible and can only be accepted for use on an exclusive basis for British copyright.

AERO MODELLER

MAP HOBBY MAGAZINE

November 1964

VOLUME XXIX No. 346

contents

cover

Two Squadron colour schemes, two different marks of Lightning Fighter. At top a Mark I, retro-modified with fin and spine aerials but without the external flute along the fuselage side which distinguishes it from the Mark 1A below. The markings are of No. 74 Squadron with black fin, 56 Squadron in red. 74 Squadron has since re-equipped with the Mark 3 square top fin Lightning but retains the same colour scheme. Scale details of this outstanding interceptor will be found on pages 553-6 of this issue.

next month . . .

Christmas issue . . . and by tradition much more for just a little extra cost. Very special efforts have been made to ensure your complete satisfaction with a really bumper number this year. Full-size plans will be for John Barker's simple, yet attractive, .8 to 1 c.c. 42 in. span **sports flyer** which we venture to suggest will be adapted to radio control by many, plus two great **chuck glider** plans which we know will be liked by a vast majority of our readers. Cover feature will be Laurie Bagley's presentation of the **Boeing F4B4**. One of the most colourful between-wars Biplane fighters—the subject of George Cox's Famous Biplane in extensive detail as usual. A.P.S. plan of the month hails the return of that veteran scale expert, Harold J. Towner, and he brings a twin engine control line scale model of beautiful lines, the **Miles-Beagle 218**. Retractable undercarriage gear, interior information and a host of other details will make this a gem for flying scale addicts. Book Reviews, Old Timer Contest Report, latest glider developments and many other features are in our boiling pot ready for your enjoyment when Christmas issue appears on November 20th. We suggest you reserve yours now, at 2/6d.

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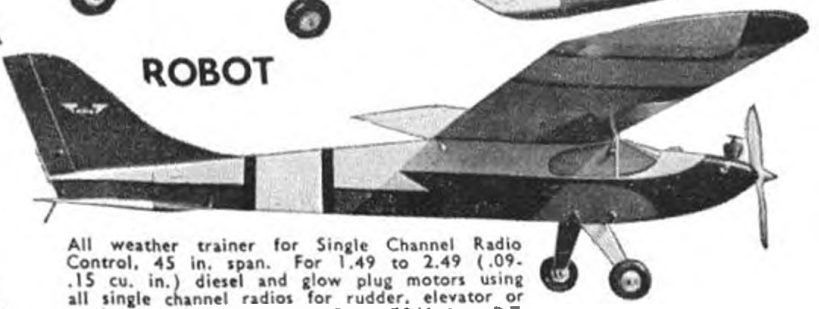

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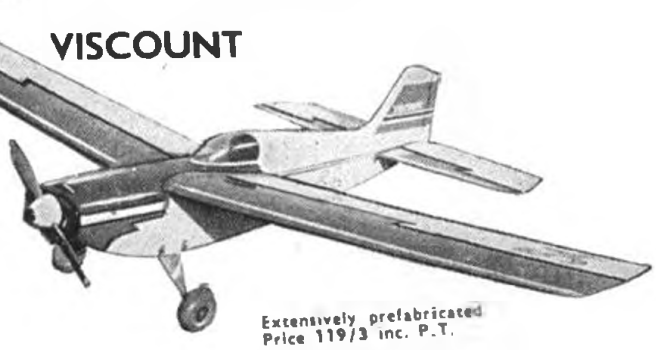

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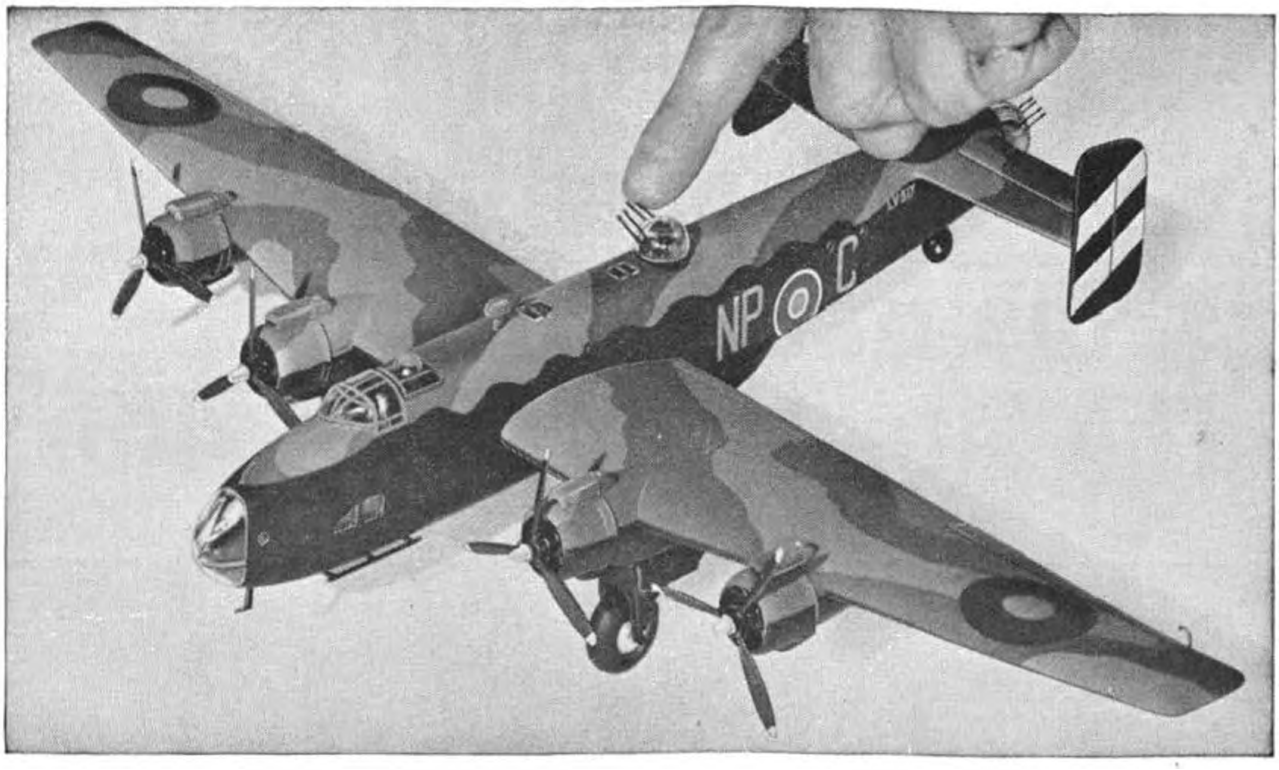

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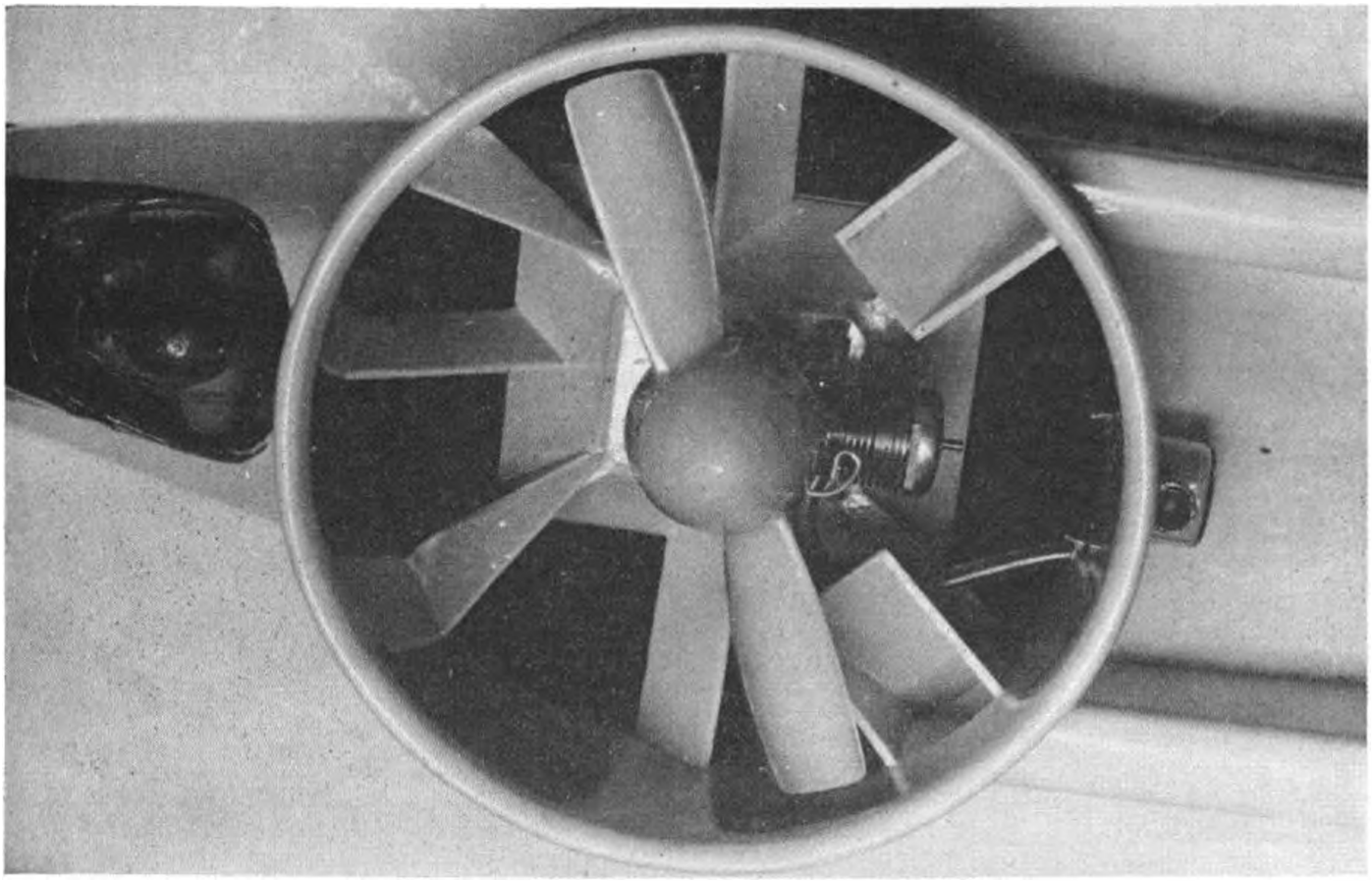

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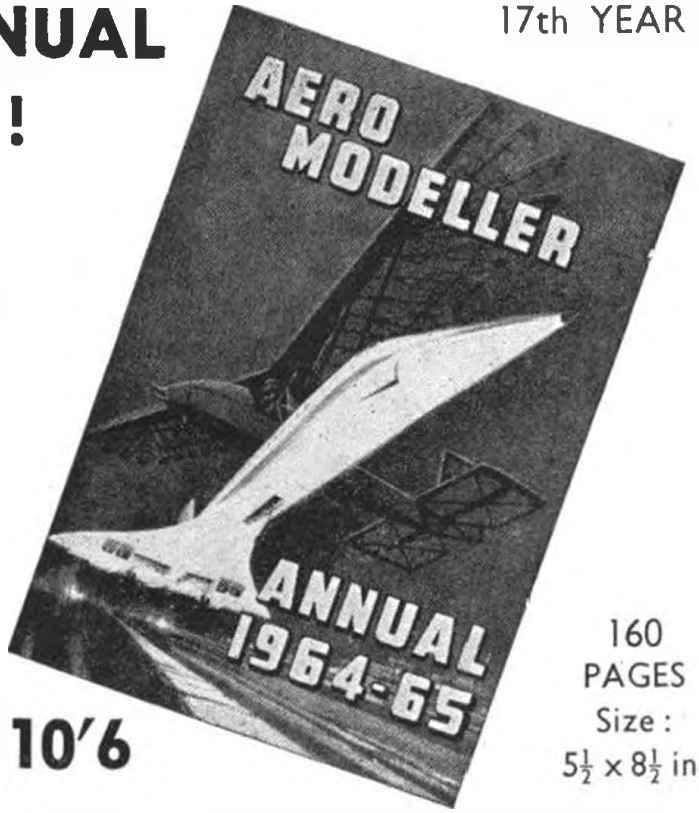

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WE have retained all those features which have helped to make it the "old faithful" that it is — there has been a completely new and different Annual every year since 1948! — but have expanded the plans section, so that this year we are offering even more drawings than usual — with contributions from most of the aeromodelling countries of the world. We are strong in radio controlled models, with a generous helping from Japan, whose modelling activities seem especially vigorous, plus items from most countries in Europe, the Commonwealth, and the United States . . . these are all dimensioned and complete with vital statistics so that a fair to medium skilled reader should be able to build any model described . . . every modelling interest is covered indoor, outdoor, rubber, glider, power, control line stunt, scale, racing combat, jet. . . . Not always the famous model, we have sought the odd slant even an occasional weirdie . . . we hope you like the mixture. Articles include a useful feature on Building from Foam Plastic Kits, a wonderful Flapping Wing Model article (probably the finest in English!) more on Muscle Power Flying, articles on scaling up plans, model adhesives, and so on. . . . Engine Analysis in brief covering 1964 engines, National and International contest results.

SOME OF OUR TITLES

AEROMODELLER POCKET DATA BOOK—64 pages, 7¼ x 4¼ in. pocket version of "Flying Models'" famous Reference Handbook. Nearly everything about all aspects of aeromodelling in clear sketch form. Card cover, stout paper. Price 5s.
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Heard at the HANGAR DOORS

Highlight of S.B.A.C. display at Farnborough was undoubtedly the combined aerobatic programme by the Jet Provost and Gnat Trainers in their distinctive flame red and bright yellow finishes. This attractive formation photograph symbolises the perfection of their performance.

New World Duration Record

President of the Academy of Model Aeronautics, governing body for modelling in the U.S.A., Maynard L. Hill established a new world duration record on September 18th.

He was Flying a specially prepared 84 in. model powered by Merco 49 and equipped with Sampey 404 proportional radio control. The record flight started at 7.56 a.m. and terminated 8 hrs. 52 min. 25 secs. later at 4.49 p.m. During that time the model was maintained at cruise altitude by throttling the Merco to approximately 6,000 r.p.m. where the 14 x 6 in. Top Flite wooden prop held cruise altitude. Weighing at take-off, just under the maximum permissible 11 lbs., the flight used approximately 80 oz. of fuel. This was Maynard's third attempt on the duration record, the first suffering damage during the launch and the second, on September 16th terminating at 6 hrs. 28 mins. The previous record, held by the U.S.S.R. was 6 hrs. 13 mins.

Maynard Hill also estabished a world altitude record of 13,320 ft. on July 5th, 1963. Those who have had any connection whatsoever with record attempts will have an immediate appreciation of the effort required and join us in congratulating Maynard Hill on his tremendous achievements.

Meanwhile, attempts on the distance record are being made in Australia, where straight road facilities give them an enviable advantage.

Past Champions

Success of the British team at Budaors in the World Championships for team racing has met with tremendous acclaim not only among modellers in this country, but also overseas. Dick Place and Don Haworth fully deserve their honours but there remains a mistaken impression that they are the first ever to have achieved such status for Great Britain.

Looking through the results over the last 10 years of World Championships and European Criteriums in the team racing category alone we find the following: 1954 1st P. Smith, 3rd R. Edmonds. 1958 1st R. Edmonds. 1960 3rd G. Yeldham, 4th Davy/Long. 1962 8th Davy/Long.

Thus it is more true to say we are regaining the ascendency in team racing after a lapse in which we were temporarily overtaken by improving techniques of other nations.

Rotary Doubles

Through use of third hand information, a reference to F. Boler's remarkable scale Gnome Rotary engine on page 508 last month has since been proved to be inaccurate. Mr. Boler, is, in fact, in full possession

Mighty model! The Scott Furlong "Predator" is a hypothetical tactical V.T.O. Fighter/Bomber. It features in the Associated Television series, "The Plane Makers" beginning October 20th and is the result of 2,150 man hours in design and construction. Thus it could qualify as one of the most expensive life-size models yet made! Theoretically powered by four pairs of 'Akron' lift engines and a 'Pulitzer' thrust jet, the Predator is actually fitted with a 500 c.c. motor cycle engine for forward motion.

Nine scale Gnats finished in bright yellow were presented to the No. 4 Flying Training School Aerobatic team following their display at Farnborough by Sir Richard Atcherley on behalf of Airfix Products Ltd. Incidentally, may we take this opportunity of correcting an error in last month's tips on aerobatic Gnat modification. The rear ejector seat is retained in position. Our notes were confused over alterations to the Jet Provost where the second seat is removed to make way for a second colour smoke tank.

Dick Stouffer in United Air Lines uniform at left and Gordon Madison in his Aeromodeller identity shirt at right, were photographers working on our behalf at Dallas Naval Air Station for the 1964 U.S. National Championships. Photo coverage will be found on the next three pages. Their camera equipment was a Mamiya C.3 as used by Dick Stouffer and Yashica-Mat by Gordon Madison. Both photographers used fill-in flash in the very strong sunlight and many of their pictures are from colour negatives, the originals of which are quite spectacular to see.

of his engine which he tells us took between 2,800 and 3,000 hours to make not 3,700 as stated and runs at speeds between 300 and 1,100 r.p.m. The *other* rotary engine which *is* in the possession of a well known aviator in the south is *also* a working model to slightly larger scale, being about 12 in. diameter and equally detailed. No doubt we shall now continue to hear of yet more scale rotary engines in store in other parts of the country to further confuse us! At the time of editing Stuart Tucker's report on Mr. Boler's engine we could hardly credit that anyone else should ever have had the industry and patience to produce so notable a replica.

Our Men in Dallas

The three pages which follow, offer a pictorial coverage of outstanding models, the like of which are rarely seen outside the U.S.A. It must be the goal of almost every modeller in this world to visit the fabulous United States National Championships and the best we can do is to present this selection from many negatives taken by our special correspondents Gordon Madison and Dick Stouffer. Because we feel they have done such a grand job of illustrating these models so well for our enjoyment we feel that you the reader should know a little more about their personalities.

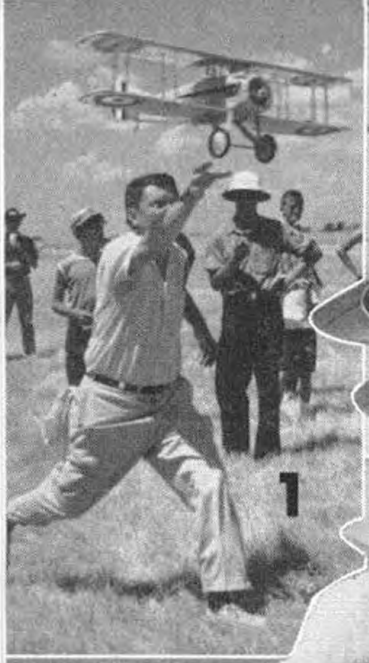
Richard Stouffer, who is already well known to our readers for his "Simpleton" and "Simplex" full-size plans, plus other editorial features, has been with United Air Lines since 1952 and is at present flying the Boeing 720 and DC-8. Married, with three sons, his modelling interests are extensive but concentrate nowadays on multi channel radio control. Also has a keenness for the home built aircraft movement and is official photographer to the Experimental Aircraft Association having exposed over 1,500 negatives at their recent convention. Dick's 41 years have been very closely associated with aviation right from Christmas 1938 when he was given a Brown Junior model D engine, still one of his most prized possessions. Trained as a pilot for U.S.A.A.C. he flew B-17 Fortresses during the war. One of his pleasant memories is the distinction of being in charge of the last D.C.3 flight in United Air Lines colours. He can tell an amusing tail of frustration and endeavour in rebuilding a Waco Biplane and maintains an enthusiasm for his work which makes him one of our most valued contributors.

Gordon Madison is a flight test engineer with the Norair Division of Northrop Corp. and also the proprietor of Hobby House Plans Service at Los Alamitos, California, with a speciality for radio control designs and a thriving agency for Aeromodeller Plans Service. Aged 39 and married, with a son and daughter, Gordon failed his U.S.A.A.C. Air Cadet Training in '42 because of an infected ear but persisted and earned a private pilot's licence. During army service in Italy as a code expert he took the opportunity of flying types ranging from the Beech D-17 and AT-11 to the Vultee L-5. Discharged from Service in Germany in 1946 he opened a Hobby Shop and then started the Falcon Model Company. Meanwhile he purchased a war surplus Cessna Bobcat which he flew for 18 months before trading it in for a PT-17 Kaydet. He was then recalled to active duty in Korea during 1950 with the B-26 and North American T-6. Discharged once more in '51 he joined Northrop and soon found a demand among his friends for overseas model plans. Thus he quickly became involved in providing a first class plans service now nationally advertised in the U.S. model magazines.

AIRCRAFT QUIZ — Number 3

What is it? When was it built? Answer on page 545

Don't cheat on this one, have a real guess before checking the answer. This push-pull tandem engined aircraft would make an unorthodox scale subject for aeromodelling. Here is a clue—it came from America but was designed by an Italian



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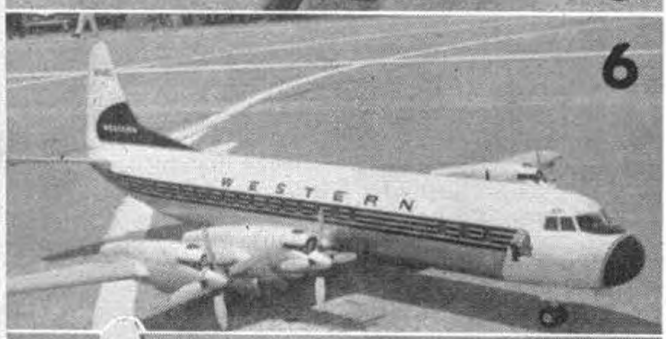
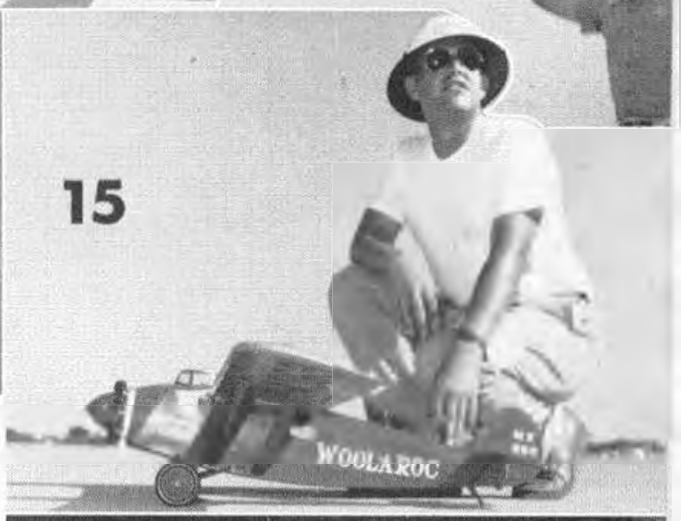


1 Launch of a free flight SPAD by T. D. Houghton of Arlington, Texas, in the scale event. 2 Biplanes were popular, Bob Carlisle of Norfolk, Nebraska, made this de Havilland 2 for a Kyowa 45. Weighs 7¼ lbs. with Orbit 10 radio; enlarged from Aeromodeller plans. 3 Another angle of Bob Carlisle's D.H.2 shows six rockets which are actually fired in flight for scale effect! 4 Darryl Usher of Oregon placed 5th in multi radio with his "F-10" design using Super Tigre .59 and an unusual all-moving tailplane with Kraft proportional R/C. 5 This Douglas JD-1 scale control line entry has two Super Tigre .35s, was made by Robert Kleinfelder of Hamilton, Ohio. Fitted with droppable tanks, working lights, swinging radar, opening bomb-bay and tow-target winch plus throttle controls, placed 5th. 6 Biggest of the meeting was the Lockheed Electra by Earl Carpenter of Sepulveda, California, weighing 25 lbs. with four Super Tigre .40s. Made first flights at Nats, has complete interior detail from nose to tail, made to 1/15th scale with span of 7 ft., takes two to fly it. 7 A rival to the Electra for impression was the B-25 by William Ogden of Saint Louis, Illinois, to 1/12th scale, 67½ in. span, weighing 12½ lbs. Has two throttled K & B 45s and electrically operated lights, undercarriage flaps, cowl gills, bomb-bay, droppable bombs, moving turrets and complete interior. Placed 3rd on points but slack lines brought sad destruction. 8 Dr. Lee Taylor of Lake Wood, Colorado, adjusting the vanes on his original helicopter, using Cox Tee Dee .051. 24 in. rotor vanes, total weight 9¼ oz. model won its class. 9 Harry English of Oklahoma City entered this 1911 Caudron monoplane to gain 2nd place in free flight scale. Weighs 16 oz, 1/8th scale, Cox .049 power. 10 Ambitious twin engined radio control project was this Cessna 326 Skymaster by J. Thompson with push-pull engines, unfortunately collided with field kit and broke its tail booms so did not qualify. Made to 1/24th scale it is 76 in. span for twin Veco 45s and Orbit radio control, operating throttles, elevator, rudders, brakes, aileron and flaps.

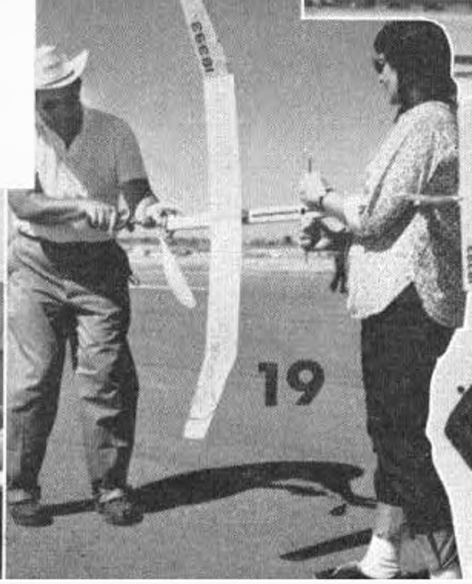
Photographed specially for 'AERO and Gordon

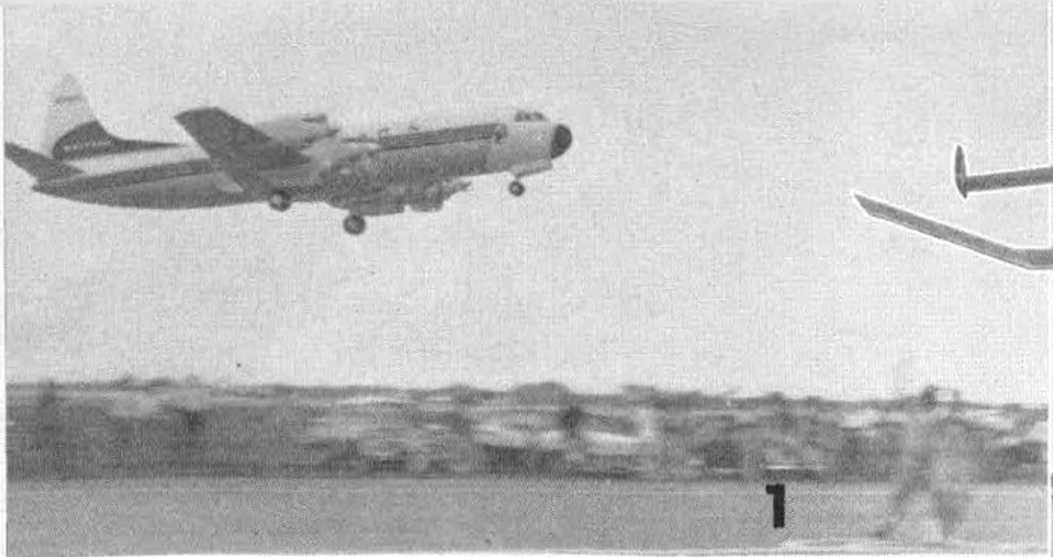
of the U.S.A. hamp's Texas

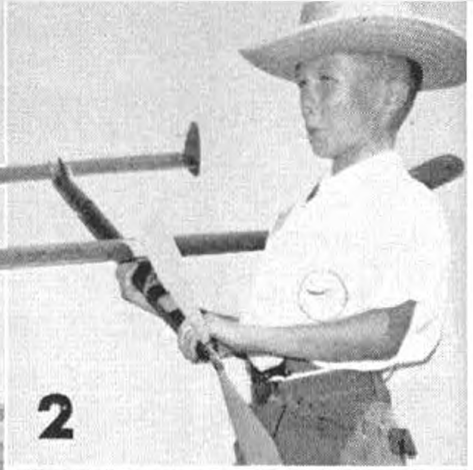


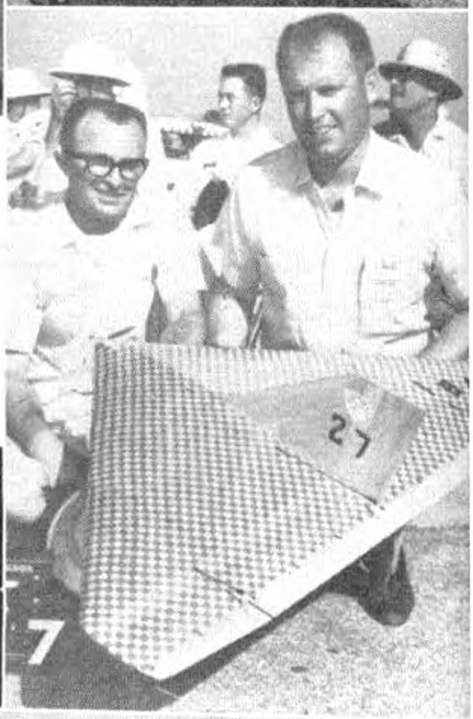
11 Tommy Meyer's fine Loening OL-8 from Aeromodeller Plans won free flight again, also won in 1960 and six other first placings to its credit in the meantime. Has Webra 2.5 weighs 3 lbs., 47 in. span. Tom's Dad is designer of "Little Toot". 12 Ouch for Comper Swift fans! Willard Kehr of Tulsa made this one for a Pegco .09 but seems to have mixed his marks for 'BUS is Pobjoy powered. 13 Another Bipe pusher by Bob Carlisle is this FE 2b scaled up from Aeromodeller plans to 1/12th for a Cox .051 engine. 14 Jack Butler's very sleek multi channel entry from Salt Lake City called "Expresso" with Lee .45 and Orbit proportional control. Is 66 in. span, weighs 6 lbs. and totally covered in sheet balsa. 15 From Sparta, New Jersey, Chuck O'Donnell brought his Travelaire 5,000 "Woolaroc". Has Webra 2.5 diesel and pendulum elevator. Made from Bill Fleming's drawings it is 55 in. span. 16 Ralph Burnstine of Oxford Ohio entered 52½ in. Grumman YAO-1 Mohawk to place 2nd in C/L scale. Powered by Veco and K & B 35s has throttles, flaps, droppable tanks and working lights. 17 World R/C Champion Dr. Ralph Brooke's latest model is based on the Crusader jet fighter. Has a Super Tigre .60 and Orbit proportional gear. Is 69 in. span and tied for third place. 18 Jerry Welborne of Oklahoma City entered this large scale Grumman F/F-1 Tigercat with two Fox .59s. Weighing 14.1 lbs. it was heaviest of the R/C models and used F & M Hercules/Midas R/C gear. 19 Wakefield entry by Floyd T. Miller from Columbus, Ohio, being wound up, one of many that disappeared in the blue. 20 Claude McCullough of Ottumwa, Iowa, always arrives with a scale spectacular. This time the Douglas XTB2D-1 Skypirate was his subject for full house controls via Min-X gear. Weighs 9.8 lbs. and is powered by Fox .59. Has operating lights as well as droppable stores which Claude is seen fitting. Had a rough first flight but came back into 5th place in R/C scale. Is 84 in. span with 864 sq. in. of wing area. Claude says it flies like a charm.

MODELLER' by Richard Stouffer
Madison



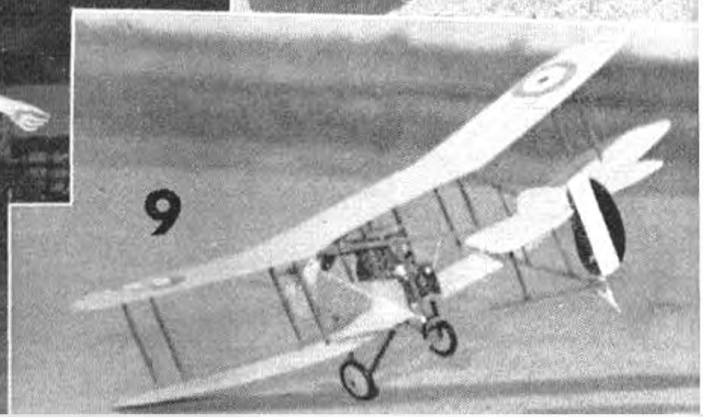






1 Earl Carpenter's giant Electra in flight. Weight 25 lbs. it was first tested at the Nats and introduced a new fashion in pilot technique. Earl has a leather arm sheath on his right arm, to which the lines are attached. The handle is held by both hands and around his waist is a bridle to the lines as a further safety factor. A rope was also connected to a helper "just in case". Though flights were spectacular, it did not get into the winners circle. 2 Russel Hartill from Los Angeles is only 8½ years old but flew in Wakefield Jnr. class with one of Dad's designs to win with a 9:14 total. 3 Dan J. Livich of Edmonton, Alberta, Canada, refuels his 10 lb. Fokker D VIII with Merco 49 and Orbit gear. Had detailed cockpit and authentic camouflage painstakingly applied. 4 Winner of Multi channel Cliff Weirick of Los Angeles and his "Candy" using a Super Tigre .60 and Bonner Proportional radio control. Fuselage is glass fibre. 5 Winner of scale radio control was once more Maxie Hester from Des Moines with re-worked Bell P-63 painted bright orange as a flying "Pin Ball" target. Features flaps, brakes, and a pilot that bales out when engine stops (Fox .59) Uses Min-X 12 channel. 6 Winner of indoor paper covered models in Junior class Eric Vogel of Dallas set a new U.S. record of 13:01 with this model. 7 Pylon record setter was Dale Nutter and his Veco .19BB delta with F & M radio. Prop is an 8 x 6 and design called the "Sidewinder". Jerry Krause is helper at left. 8 Warren Maczura of Granite City, Illinois placed fourth in control line scale with his 1/12th Grumman Gulfhawk powered by K & B 35. Has sliding canopy, operating cowl flaps and wing flaps, droppable tank and throttle from third line. 9 Yet another Biplane pusher scale entry was R. C. Breckur's de Havilland 1A here making an attempt in free flight for a take-off.

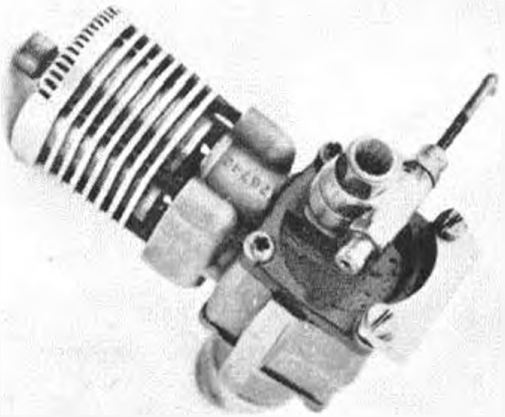
Photographed at 1964 U.S. Champs by R. Stouffer and G. Madison



WORLD CHAMPS TOPICS

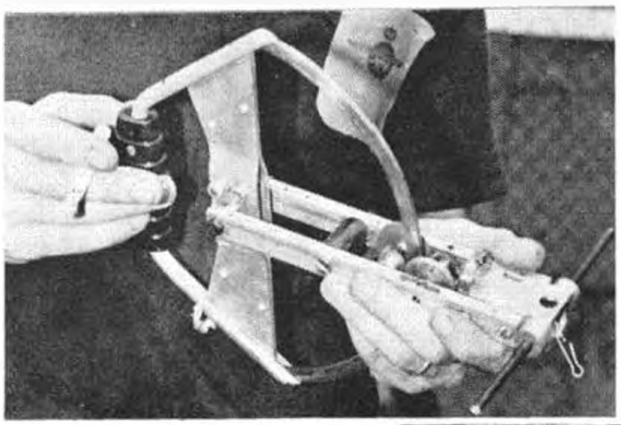
SPEED.—Ultra simplified single line control system was used by the U.S.S.R. team. A single length of approximately 18 s.w.g. wire extended from the outboard wing tip through the wing to a large type connector button and at the centre point a horn was fixed to the wire to actuate the elevator pushrod, thus all control was effected by application of a twist on this loose wire fixed only at the outboard tip.

STUNT.—Surprisingly few tricycle landing gear arrangements were used. Kondratenko (U.S.S.R.) employed two wheels on a single leg like the Lockheed U2, Gialdini had unusual swept legs on the neatest spatted undercarriage yet seen and Sirotkin camouflaged his wheels on the reserve model by hiding them in jet pods (see photo) with a third wheel in the inboard pod to stabilise it on landing.



TEAM RACE.—Further information on Italian head pans confirms that specially beaten brass containers, close fitted to Super Tigre cylinders contain oil. This absorbs engine heat and in theory this heat maintains engine temperature during pit stops . . . however, oil is notoriously capable of absorbing a lot of heat, and not dissipating same. Only cooling surface is smooth pan exterior. 3rd place Fontana/Amodio team used this system and also an extended, small venturi throat carburettor.

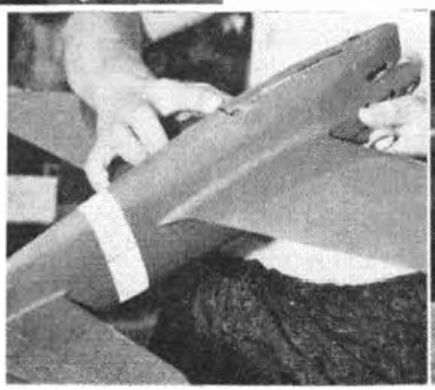
SPEED.—Chicken hopper tank was used by winner Bill Wisniewski with working capacity approximately 15 c.c. giving never less than 40 laps at over 140 m.p.h. team race possibilities here!

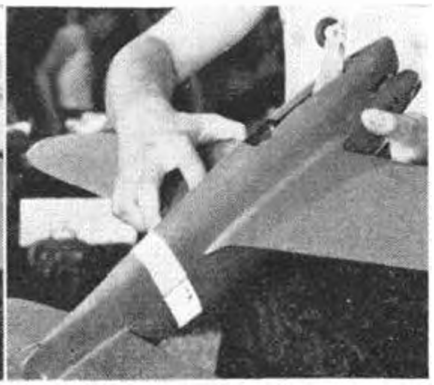


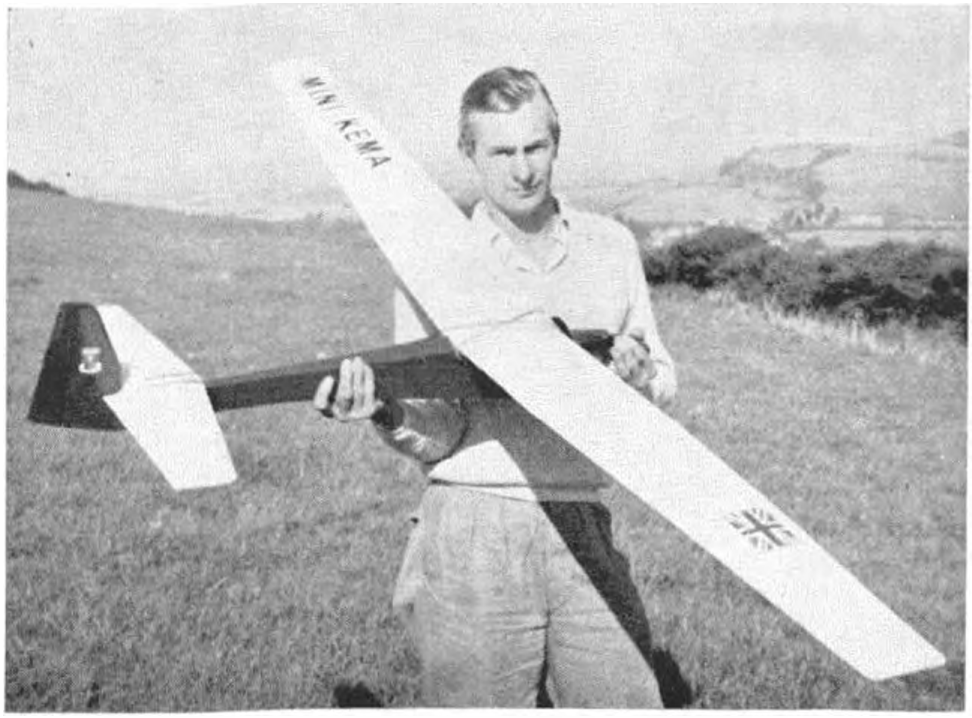
STUNT.—Foreign reports have spoken of "pre-determined winner" and "judge appeal" influencing the results. Certainly not in the case of this editor who was on the stunt panel and still maintains Gieseke produced second best individual flight, since supported to some extent by release of U.S. team elimination scores, where he was leader on points. However, the smart appearance of a white uniformed figure or sun-bronzed athletic stance of a skilled pilot like Sirotkin can indeed impart an impression on judges.

TEAM RACE.—The quick air catches by some mechanics contrasted with the extraordinary smart and fast landings of the U.S.A., Burke/Jones team. Suggestions are being made that racers should be on the ground when stopped by the mechanic: Considerable emphasis will continue to be played upon the duration of the pit stop. Zolotoverch (7th) informed us that he would never try for a single stop but would prefer to reach an average speed of 2 secs. per lap. In order to do this he will continue with lightweight, fast accelerating models which stand up to being snatched out of the air at high speed for 6-9 secs. refuelling stops.

Heading shows Bob Gieseke with his Fox 35 standard "Nobler" which performed particularly well in all the circular shaped manoeuvres. To the right is Sirotkin's Merco 49 "Jet" resting on three submerged wheels in pods, showing its detailed rivet lines. Race winning Eta 15 used by Place/Haworth shows the fins cut in head, trimmed cylinder fins and other non-standard modification, the special multi jet carburettor with small intake throat. Immediately above is the handle used by Harry Heinsius. Drive ratio is 120:1 giving 43 line turns. At right are "in" and "out" views of Louis Fabre's lightly loaded single retracting leg on 4th place team racer. Note how the leg carries its own airbrake fairing.







K. G. HUMBER provides the answer to many requests for a semi-scale slope soaring R/C glider

MINI-KEMA

84 in. wingspan for 4 channel controls

THIS ELEGANT GLIDER is the smallest of a long line of multi-channel slope soarers which have been developed in the Isle of Wight. Purchase of a transistorised relayless receiver brought the realisation that nine foot soarers are no longer necessary provided that an 84 in. model could cope with weather conditions. The only way to prove such a point is to try, so K. G. Humber designed a model as small as he could for the gear concerned. As it happened, performance was excellent right from the start.

Mini Kema turns very well without being dangerous and its looping radius is very tight (estimated at only 15 ft.). It has been flown successfully in winds ranging 0-20 m.p.h. Due to the size, no trim servo is fitted. Minor trim adjustments are taken up by small packing pieces between fin and fin fairing which moves the elevator a small amount. $\frac{3}{32}$ in. of packing copes with the difference between a 20 m.p.h. wind and a light breeze.

Constructionally the model is quite straightforward and should present few problems to anyone who has built a couple of models or so. The designer always starts with wing ribs first and then builds the pair of wing panels. Secret of the wing construction is the light but strong full depth spruce spar. This is cut from $\frac{1}{8}$ in. sheet spruce notched with a hacksaw blade for ribs. The wing boxes are made of $\frac{1}{16}$ in. ply sides and $\frac{1}{4}$ x $\frac{1}{16}$ in. spruce top and bottoms bound with thread and well cemented to the spar at the root. This is most important as the box takes quite a hefty knock in a heavy landing. Leading and trailing edges are also notched with a hacksaw (just the right thickness for ribs). The top of the leading edge is sheeted with $\frac{3}{32}$ in. flexible stock (not quarter grain), also those first two rib bays on the top side and underneath. The rest of the ribs are capped with scrap $\frac{3}{32}$ x $\frac{1}{4}$ in. soft balsa, this is important as a wide rib spacing is employed.

Tailplane structure is straightforward. Leading and trailing edges are cut out of soft $\frac{1}{4}$ in. sheet. Ribs are cut as simple rough rectangles glued up and then shaped with a "Razor plane" and glasspaper to a symmetrical section. The elevator halves are joined with $\frac{3}{16}$ in. dowel and sanded to section then hinged with tape to the tailplane. Fin is cut out of $\frac{1}{4}$ in. medium balsa and rectangular rib of $\frac{1}{16}$ in. thickness are sanded to section. The rudder must be freely hinged with tape. It should be stressed that the fin is built in to the fuselage construction (i.e., ply sides lap over fin base).

Fuselage construction is perhaps the most difficult owing to the ply and spruce. A Stanley "Trimming knife" which cuts ply easily will be found most useful. The $\frac{1}{16}$ in. ply is cut to fuselage outline and the $\frac{1}{4}$ x $\frac{1}{4}$ in. stringers are built up on these fuselage sides using "Cascamite" remembering to allow the overlap on the bottom for the balsa under pan which is shaped next, leaving the bottom of the pan square for the moment. Hollow out for the receiver. The basic sides are framed up on the $\frac{1}{8}$ in. ply formers and the underpan firmly glued in. Fix the rest of the spacers and sheet fuselage top and bottom. Rough shape nose block then glue it in place leaving to dry well for 24 hours if possible then commence to shape the vee bottom, etc., with a "Razor plane", knife and sandpaper, etc. These ply fuselages are tremendously strong and quite light. They are well worth the slightly extra effort in building time. The ply bay

is further strengthened by ⅛ in. sheet spruce doublers and glass fibre fillets. All this may seem a trifle over strong but a slope soarer really "goes-in" if a radio fault develops or the pilot makes a serious error of judgment. Wings are covered in nylon or silk well doped and the tailplane is covered in heavy-weight tissue. The fuselage, etc., is lightweight grain filled with talc and dope. About three coats of sealer is usually sufficient.

Radio installation will of course vary according to the choice of gear but in the original case the servos are R.C.S. S.N. which are bolted to an ⅛ in. ply plate which is in turn screwed through the fuselage side stringers with ½ in. x 4 countersunk screws. This is quite unobtrusive in practice and one can remove them quite easily. The receiver is mounted upright. Servos are soldered direct to Rx. reed connections. That is to say there are *no* plugs. 500 DKZ DEACS for servo supply are connected with press studs removed from PP3 9 volt batteries.

Before flying, check the gear is working faultlessly. A slope soarer without radio signal does not soar but it can travel a long way! Also test glide on flat ground first. Aim for a fast, slightly nose down test glide then when launched from the ridge into the stronger wind, Mini Kema should hold her own in the breeze. A nose heavy soarer is comparatively easy to get back, whereas a tail heavy model which is stalling becomes a trifle hectic. After the first couple of flights the average R/C flier will be so bitten with this soaring bug that he will wonder why he did not try it before.

Gull Wing adds realism to a fine model design.

Could you identify the 'plane on page 539?

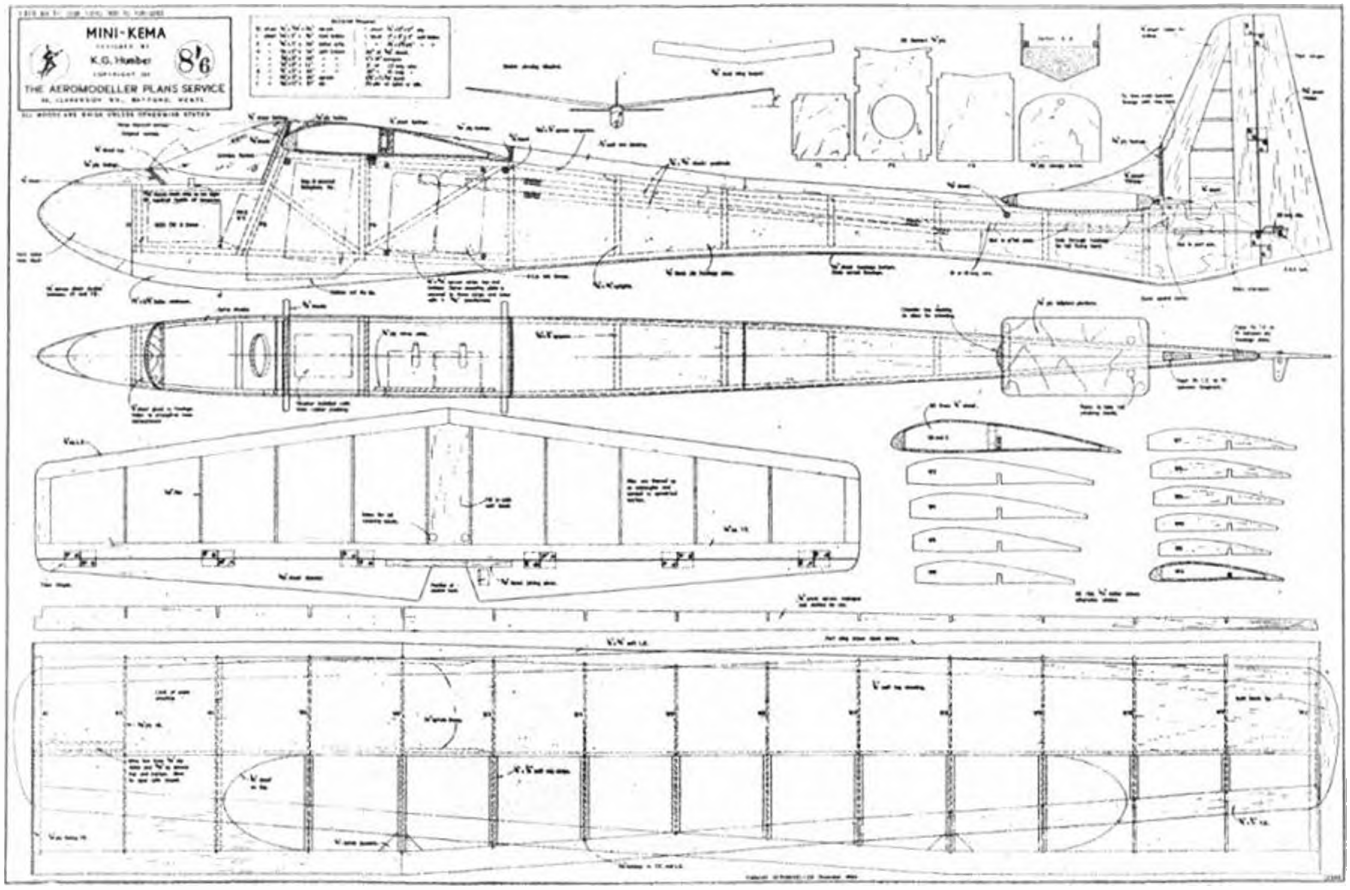
AIRCRAFT QUIZ — Answer

The Bellanca Tandem, powered by two Pratt and Whitney "Wasp" engines of 425 h.p., was manufactured in 1929. Although it had the appearance of a monoplane it was in reality a sequiplane, the lower wing having an acute dihedral angle to form a strut for the upper wing. Both were constructed of wood and fabric covered with a full span aileron fitted to the top one only.

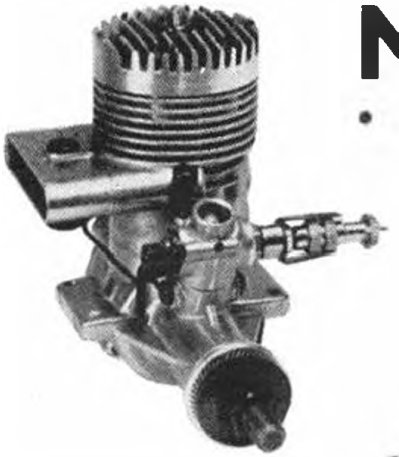
The "fuselage" accommodated a crew of two seated side-by-side and the two engines. It was built of steel with six longerons and fabric covering. The front engine drove the forward propeller in the conventional way but the rear engine drove the aft propeller at the back of the fuselage pod through a 4 in. diameter tube ¼ in. thick running in self-aligning, self-lubricating bearings.

The wooden tail unit was carried on four tubular booms attached to the top and bottom wings. The undercarriage was rigidly mounted to the lower wing and the absorption of taxying shocks was reliant upon the low-pressure tyres. No performance figures are available. Span 83 ft. 2 in., Length 44 ft. 2 in., wing area 912 sq. ft., weight empty 7,000 lb., all-up weight 21,000 lb.

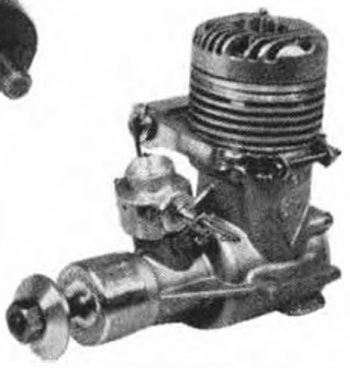
FULL SIZE COPIES OF THIS 1/7th SCALE REPRODUCTION ARE AVAILABLE AS PLAN G868, PRICE 8/6d. PLUS 6d. POST FROM AEROMODELLER PLANS SERVICE



MOTOR MART



At left the O.S. S30 R/C displays its robust proportions and small crankcase dimensions. Large exhaust stack extension takes O.S. type L silencer.



Latest release by Super Tigre is the Super Tigre .51 R/C shown at right. The large proportions of the cylinder head and tall post on the idle bar glow plug are clearly visible, also the one needle throttle. Note the clean crankcase casting.

Super Tigre .51 B.B. R/C

This imposing title heralds the introduction of a completely new Super Tigre radio control engine to replace the plain bearing .51 withdrawn from production last year. Most of the new features are aimed at prolonging the working life, which is of course a major consideration with radio engines. The large and robust crankshaft has the capacity stamped on the crankweb and a large dia. hollow crankpin to take a heavy duty connecting rod, supported on two large ballraces with brass cages, that are press fitted into the one piece die cast crankcase. Construction wise the crankcase is clean and rugged with a large web supporting the stub venturi into which the throttle unit is bolted. The transfer passage although very wide is surprisingly shallow for such a large capacity engine. The piston has two rings and a flat top with a thin baffle. A chrome plated cylinder liner is used to give a long life and it is ground around the top flange to give a metal to metal fit with the cylinder head. On first sight the cylinder head seems a massive affair weighing almost 1 oz. (the engine weighs 12¼ oz.), but as emphasised in the instructions, good cooling is a must in large engines. The ¼ in. deep fins dwarf the glow plug which has a special long extension post, one unusual point is the idle bar on the glow plug being an integral part of the body, so the method of inserting the coil remains a mystery. The exhaust restrictor body is a solid aluminium alloy bar, machined out to take an internally rotating, waisted brass rod, with a $\frac{1}{32}$ in. dia. hole for slow running exhaust release. The linked throttle has a substantial alloy body with a fixed position spray bar and rotating alloy barrel. To hold the spray bar in position whilst the alloy barrel rotates inside the main body, a large flange nut is locked to it and seats in a slot machined on the throttle body. One extremely good point is the method of attachment for the exhaust restrictor. By holding it on with two plated brass straps locked with a bolt at the back, the whole assembly can be removed and a silencer fixed to the clean exhaust stub. The G.B. distributor for Super Tigre engines tells us one will be available for each engine he imports, and the price of the engine is provisionally £13/17/6d. excluding silencer.

O.S. S30 R/C

Yet another new engine has been added to the ever expanding O.S. range, in the form of the O.S. S30 R/C, a 5 c.c. glow engine for radio models. The crankcase is a re-numbered version of the new Max S35 stunt engine with its small outside dimensions and internal volume for good crankcase depression. Of robust proportions where it counts it takes the standard O.S. L type silencer. Instead of the usual O.S. practice of a finned cylinder liner and a small crankcase terminating above the exhaust port the S30 has a one piece case with a conventional slip in cylinder liner. Cylinder head has a hemispherical internal contour instead of the previous wedge shape, and with a central positioned idle bar glow plug. The cylinder head is held down by six screws and seats on a soft shaped aluminium gasket on the liner flange. The piston is relieved on both the lower and upper edges and is a very good fit in the liner. The crankshaft is of generous proportions with hefty counterbalancing and a hollow integral crankpin to take the machined alloy connecting rod. Exhaust restriction is by a vertically pivoted butterfly valve in an extension to the exhaust stack, coupled to a throttle with a rotating brass barrel and tee junction needle valve screwing into one side of the main body. With an all up weight of 7¼ oz. the O.S. S30 R/C should be very popular for medium sized multi models such as the A.P.S. Tauri, etc.

Trophy Veco .45 R/C

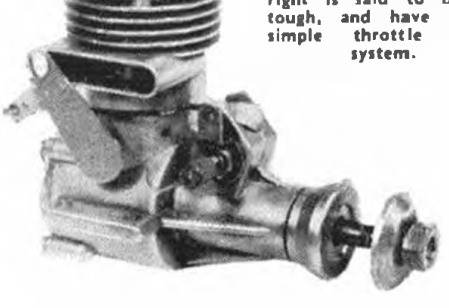
The Jekel Competition Products reworked Veco .45 R/C, with Trophy added to the standard Veco name, is available in the U.S.A. They claim all parts are hand selected, 10 additional machining steps are made, the liner is relieved below the exhaust port, and every engine is fully run in, and checked for top contest standard. This may seem expensive for a cleaned up engine to some people, but the cost of running the engine in may well amount to several pounds, hence the note explaining that the engine is ready to be flown in a contest straight out of the box. Cost in the U.S.A. is $45.

Modified Fox

Just announced is the 1965 Fox 36X. This is a development of the well known low price 35X that has proved a remarkable engine, capable of being re-worked to obtain terrific power. The 36X has a stronger shaft, wider exhaust port and the glow plug angled at 45 deg. The glow plug mounting is reported to make plug changing in a combat model with a side winder engine much easier, and to improve the power output.

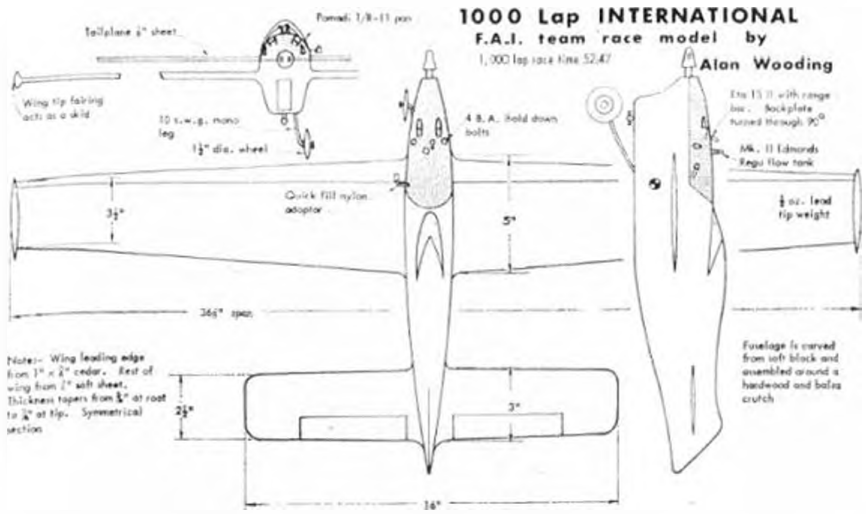
Latest U.S. News

From the very comprehensive Exportations bulletin (Cliff Rausin U.S. Coast) we hear of the latest developments in U.S. engine field. The Aero .35 horizontal piston engine has been modified to produce more power and retain its good starting qualities, it has also been reduced in price. Bantam Products are about to release three new horizontally opposed twin cylinder engines of .09, .19 and .40 displacement. Dynamic Models have had to stop production of their Dynamic glow plugs due to the scarcity and high price of platinum wire used in the element. Fox are producing a new .15 R/C with an improved lightweight piston and redesigned carburettor, also their new shieldmaster R/C plugs are guaranteed for 25 flights and the Fox .049 F.A.I. special high performance contest engine is now available. K & B are perfecting their new large capacity hand made R/C engine and this will sell in the £30 price range, in the U.S.A.! Also a range of radial mounting plates for their .19 to .45 engines are now available. Clarence Lee that noted R/C engine designer has now reduced the price of his .45 R/C engine and is going to produce a Custom Lee .51 R/C an entirely new and hand made engine costing some £80, in the U.S.A. Even with this high price tag there is reported to be a waiting list. Veco have redesigned their No. 108 glow plug to give greater reliability and performance, but retaining the same price. Just as their .19 ball-bearing R/C engine is becoming available word comes that a standard .19 B.B. is being produced. The .45 R/C production system is being overhauled and better fits are expected to be one result with the running in time reduced from four hours to one hour.



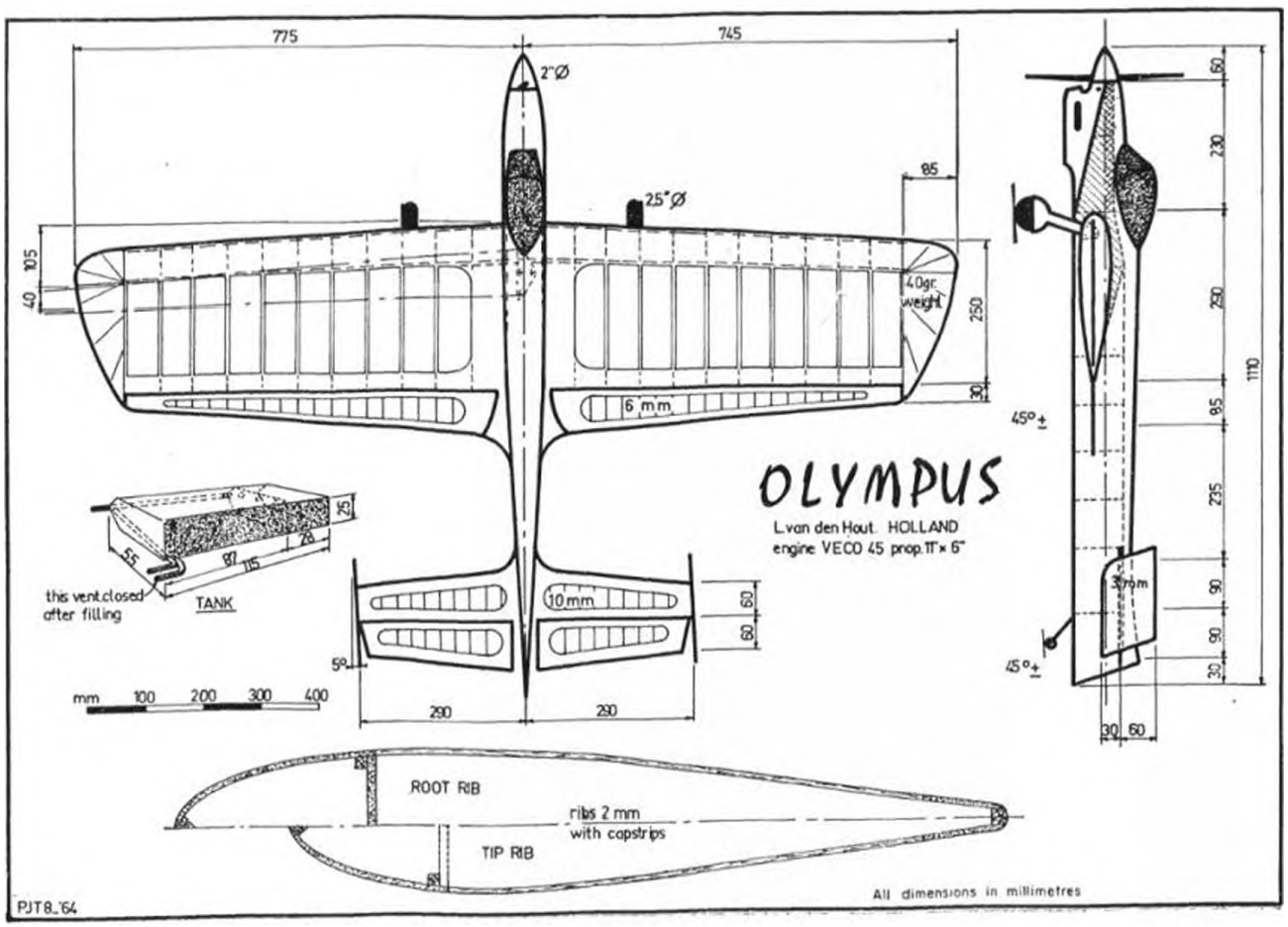
Described in September Motor Mart the DEW .56 radio engine shown at right is said to be very tough, and have a very simple throttle control system.

Two fine Control-Liners



THE MOST CREDITABLE TIME of 52 min. 47 secs. for covering 1,000 laps (100 Km. or 62.137 miles) was set up by New Zealander Alan Wooding with the **Team Racer** seen above. Alan comes from Christchurch in the South Island and holds the New Zealand record at 4.44. The model is an improved version from his previous South Island Championship winner and Alan claims no exceptions for either his engine or the design. A standard Edmonds Reguflow tank is fitted and his only particular insistence is that wooden propellers are best, those he favours being the 7 x 8 in. Tornado or Super Record. Credit for the fast time should be shared with Bill Long for quick pit work. By British standards the model is light, weighing a total of 19 oz.

Louis van den Hout of Utrecht in Holland created a most favourable impression at the World Championships for Control Line Acrobatics in Hungary and he finished in 7th position with one of the largest models used in the event. Increased and slightly modified from the original Bob Gialdini design, **Olympus** is powered by a Veco 45, weighs 53 oz. and has no less than 870 sq. in. of wing area. Finished in bright orange it made a spectacular sight in the stunt circle. Note the Palmer type tank, one ventilator of which is closed for the Mariotte bottle feed effect, a scheme which is now becoming widely adopted after very slow initial appreciation of Bob Angel's article on the subject in "Air Trails Model Annual" of 1960.



Let's go FLYING

—with John Barker

This Czechoslovakian power model design is the essence of simplicity for contest work. Using an M.V.V.S. 1 c.c. diesel driving a 7 x 4 in. prop, "Tlapka" is 43½ in. span, 31 in. long and 14 oz. weight. The airfoil section is NACA 4407. We regret that we do not have similar specification information on the other model in the photograph.

Part 7

Free Flight Power Models

A FREE FLIGHT power model is in many ways the ideal beginner's model apart from the initial cost. They are quite cheap to operate, strong, easy to trim, can be flown alone and need no towline technique as is required with gliders.

When considering cost remember that if your model has anything like competition performance a timer is almost a necessity. A timer does give much more pleasurable flying and will probably soon repay its cost by preventing loss of the model and engine.

Motors

The difficulties of operating and starting miniature aero motors have often been over-emphasised. All that we need really say is: buy from a good model shop where you can get proper advice, buy the correct fuel, the correct propeller, and follow the makers instructions. It is often recommended that the motor is mounted on a bench to practice starting and for running-in. This is certainly desirable but is by no means essential. I never run my own engines at home out of consideration for the neighbours. The motor is fitted straight into the model and taken to the flying field. These remarks of course apply to the average flyer, the expert's approach must be somewhat different.

The choice between diesel or glow plug is chiefly a matter of personal preference. Both will give good service. The glow plug is perhaps fractionally easier to start when everything is just right but of course is impossible to start with a dud plug or a flat battery. Disadvantages of the glow plug are that a battery must be carried and that the model must be proofed for protection against the fuel.

It is important that the motor is mounted firmly on a good bulkhead or bearers. Weak mountings give a distinct power loss as well as being potentially dangerous. Another highly dangerous practice is running a motor with an unsound propeller.

It is a matter of little concern whether a motor is sold complete with a tank or not. In fact the usual integral tank is not really suitable for most models. A model with a timer is usually better and neater with a separate metal tank. A model without a timer is safer with a smaller tank or one which can be more readily seen. And of course control line and radio models almost always demand a special tank. However, there is one important point to note when changing from the tank supplied by the motor manufacturer; do not mount your tank a long way behind the engine otherwise, in a climb, the tank will be a long way **below** the engine. This can cause fuel starvation and stopping of the engine.

Power Model Design Features

These cannot be generalized as with gliders. Gliders are usually competition models and follow well defined lines but motors can be applied to almost any type of model; competition, sport, scale, experimental, etcetera. For this reason we will confine our remarks to the normal type of free flight model. Of necessity the remarks apply most strongly to the competition type of model because of its high power. As power is decreased particular design features assume less and less importance.

If a model has high power it will fly at high speed and, unless certain trim forces are applied, this high speed will cause the wing to generate excessive lift. The stable flight pattern of a model with excessive lift will be a series of loops. If the C.G. is well forward the model will be highly stable and therefore the trim forces required to deflect it from its stable flight path (in this case the loop), will be high. If the C.G. is moved backwards the stability will be reduced and hence the trim forces to prevent the loop will also be lessened. For this reason then, in general, the higher the power the further back the C.G. is placed.

The corrective trim forces mentioned must be such as to give a nose down force on the aeroplane thus reducing wing angle of attack and therefore lift. One method of altering trim is to make the thrust line pass above (or at least less far below) the C.G. With the usual type of model this is achieved by giving "down thrust", i.e., inclining the propeller axis downwards. Some models are deliberately designed with

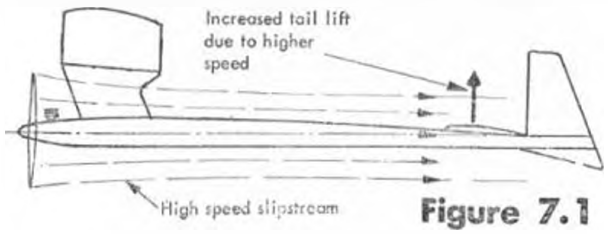


Figure 7.1

the thrust line in a very high position. These layouts were illustrated earlier in the series in *Figure* 4.4. On most models downthrust is a safe but not very powerful method of trimming unless very high angles are used. This is because of the short distance between the motor and C.G.

Another method of trimming is to make use of the high velocity of the slipsteam behind the propeller. If the tailplane is arranged at a positive angle of attack to the slipsteam it will generate higher lift for the duration of the power run. *Figure* 7.1. As the tailplane is a long way from the C.G. this extra lift will give a strong nose down force. It is easily

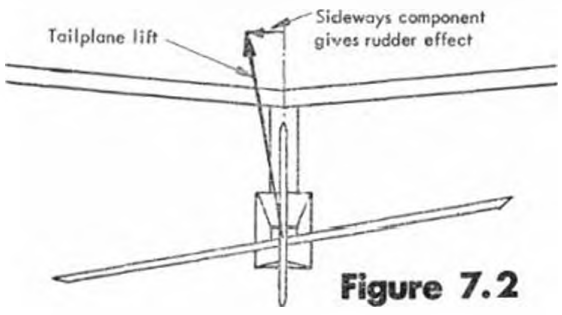


Figure 7.2

possible to overdo this effect and trimming must be done with care. You will notice a difference here between power models and gliders. On a glider as long as the longitudinal dihedral is correct its relationship to the fuselage datum is of little significance but on a power model not only must the longitudinal dihedral be correct but the actual angle of attack of the tailplane relative to the thrust line is important.

The extra speed under power also makes the model sensitive to any rudder adjustments which may have been applied to make the model turn on the glide. This is not really serious with low powered models but with high powered competition models special methods must be used. The most straightforward of these is to link the rudder tab with the engine timer such that the tab is held straight for the powered portion of the flight and released by the timer to give a turn on the glide. Another method is to tilt the tailplane to give the glide turn. This is illustrated in *Figure* 7.2. It will be seen that tilting the tailplane inclines the tailplane lift thus giving a sideways component which acts similarly to rudder force. To show why this method is useful we must recall a matter that has been mentioned several times previously. This is the fact that when a model is flying fast it will be at a low angle of attack and when flying slowly it will be at a high angle of attack. Therefore, when the model is on the climb the tailplane will be at a low angle giving little lift and therefore little side force. When the model is gliding it will assume a greater angle of attack and the tailplane lift and side force will increase.

On the question of turn, it is well established practically but not too well understood theoretically that a pylon model has a naturally safe turn to the right under power whereas a non pylon model will usually be safer in a left turn. The natural turn of a pylon model to the right may seem strange in that the torque reaction of the propeller will tend to roll the model to the left. It is generally believed however that the twisting slipstream leaving the propeller works on the pylon as if it were a forward fin giving a force pushing the nose to the right. *Figure* 7.3.

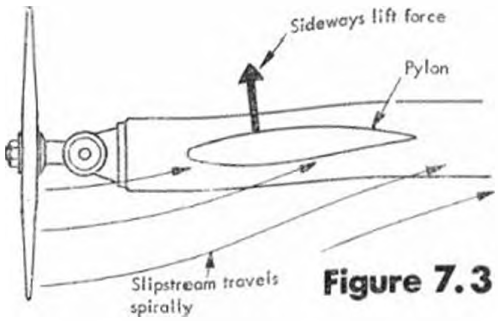


Figure 7.3

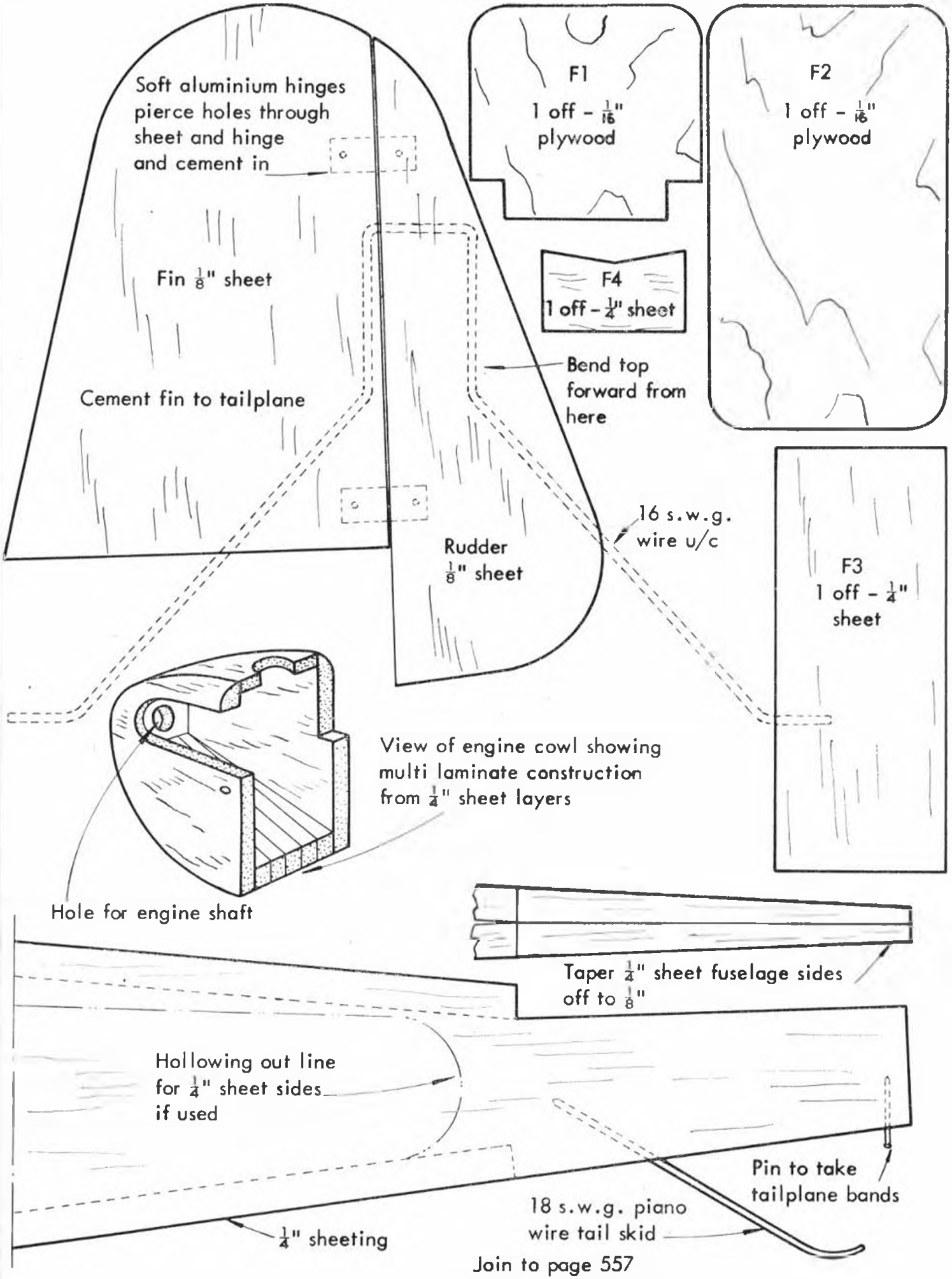
Further forces of less importance are generated because the propeller acts as a gyroscope. These forces are such that, with normal direction of propeller rotation, a right turn gives a nose down force and a left turn a nose up force.

The differential effects of wash-in under the different speeds of power and glide have already been dealt with theoretically in Part 4. We will mention again here the effect on the powered part of the flight because of the importance of this method of adjustment for handling high power. When a model without wash-in enters a turn it will often drop the wing on the inside of the turn lower and lower until a spiral dive ensues. If however wash-in is used on the inside wing the extra lift on that wing panel will prevent it dropping and instead of a spiral dive we shall get a spiral climb.

Aerodynamic forces of lift and drag vary as the square of the speed. In other words, if the speed is doubled the aerodynamic forces will be four times bigger and if the speed is trebled the forces will be nine times bigger. This is mentioned to emphasize the importance of proper seatings that ensure the wing and tailplane are always assembled in the same place relative to the fuselage. Once trimmed all packing should be cemented in place. The fin should either be attached to the fuselage or, if fixed to the tailplane, the tailplane should be keyed in place so that the fin offset cannot change.

NEXT MONTH: A simple power model design.

"Watch out for the bunts Fanshawe !"



Join to page 557

A 24 in. wingspan all-sheet balsa free flight biplane sportster to suit .5 c.c. to .8 c.c. engines. Designed by S. REDFERN

FULL SIZE PLAN OF THE MONTH... GRASSHOPPER

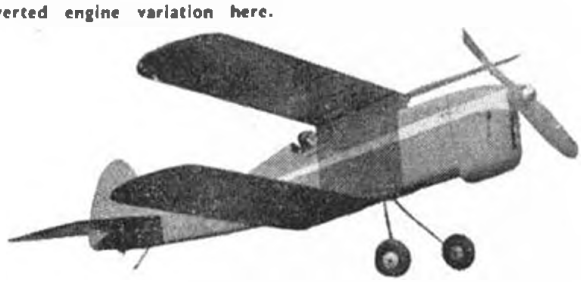
GRASSHOPPER was designed to make use of a very ancient Frog 100 Mk. I engine and the flight characteristics were initially very lively, but glide non-existent! Eventually, it was modified and a Wen-Mac Hustler fitted. With this power, a more sedate performance with flatter glide made it suitable for small field flying. When trimmed to fly in circles of 70 to 80 ft. diameter, Grasshopper gains only 25 ft. altitude after four circuits.

Construction is possible from just one sheet of ¼ in. and two sheets of ⅛ in. balsa plus a few scraps of ⅛ in. and 1/16 in. ply, if one is careful with the lay-out of parts on the sheet to be cut. The fuselage sides are cut from ¼ in. sheet, hollowed out on the inside to the chain dot line on plan or from two sheets of ⅛ in. cut away as shown in section B-B. Flute the sides forward of the cockpit for the wind-screens and taper off the inside faces of the sides in the tailplane platform area. Commence assembly of the fuselage by cementing the two sides together at the tail end and former F3 at the front, then clamp with bulldog clips until set. Add F5. If a beam mount engine is to be fitted add the additional ¼ in. former to take the rear end of the bearer.

Cut out the ¼ in. fuselage top and bottom sheets and cement between sides as shown. Before cementing the bottom forward sheet into the fuselage bend the 16 s.w.g. piano wire u/c to shape then bolt and cement to ¼ in. block. When dry, bend u/c legs to 5½ in. wheel track and cement into fuselage to ¼ in. sheet bottom and 1/16 in. plywood former F2. Cut former F1 and vary the thickness of F2 to suit the engine installed, a Cox Babe Bee is shown on plan. Then screw motor on to fuselage with ½ in. wood screws. Cut sheet for cowling and cement together around the engine, making sure it does not stick to the fuselage and the hole in the front of the cowl is big enough for the prop driver to pass through. Remove the cowl and engine and spot cement the cowl back on. Sand the fuselage and cowl to shape, rounding off all corners and the front of the wing pylon. Cut away the fuselage bottom for the lower wing seat. Do not make a vee seating as a flat base gives a more stable fitting than a vee seating that is not perfect. Fit tail skid, drill fuselage sides, and fit ⅛ in. dowels for wing retaining bands, then make up and fit 20 s.w.g. cowl retaining clips. If the cowl is a good fit, two clips, one each side should be enough, though more can be used if necessary.

The wings, fin and tailplane are sheet surfaces cut to shape and sanded to section. Reinforce the dihedral joint with a 1½ in. wide strip of nylon, and cement celluloid around the leading and trailing edges to prevent the rubber bands cutting in.

Side mounted version is seen in title picture and an inverted engine variation here.



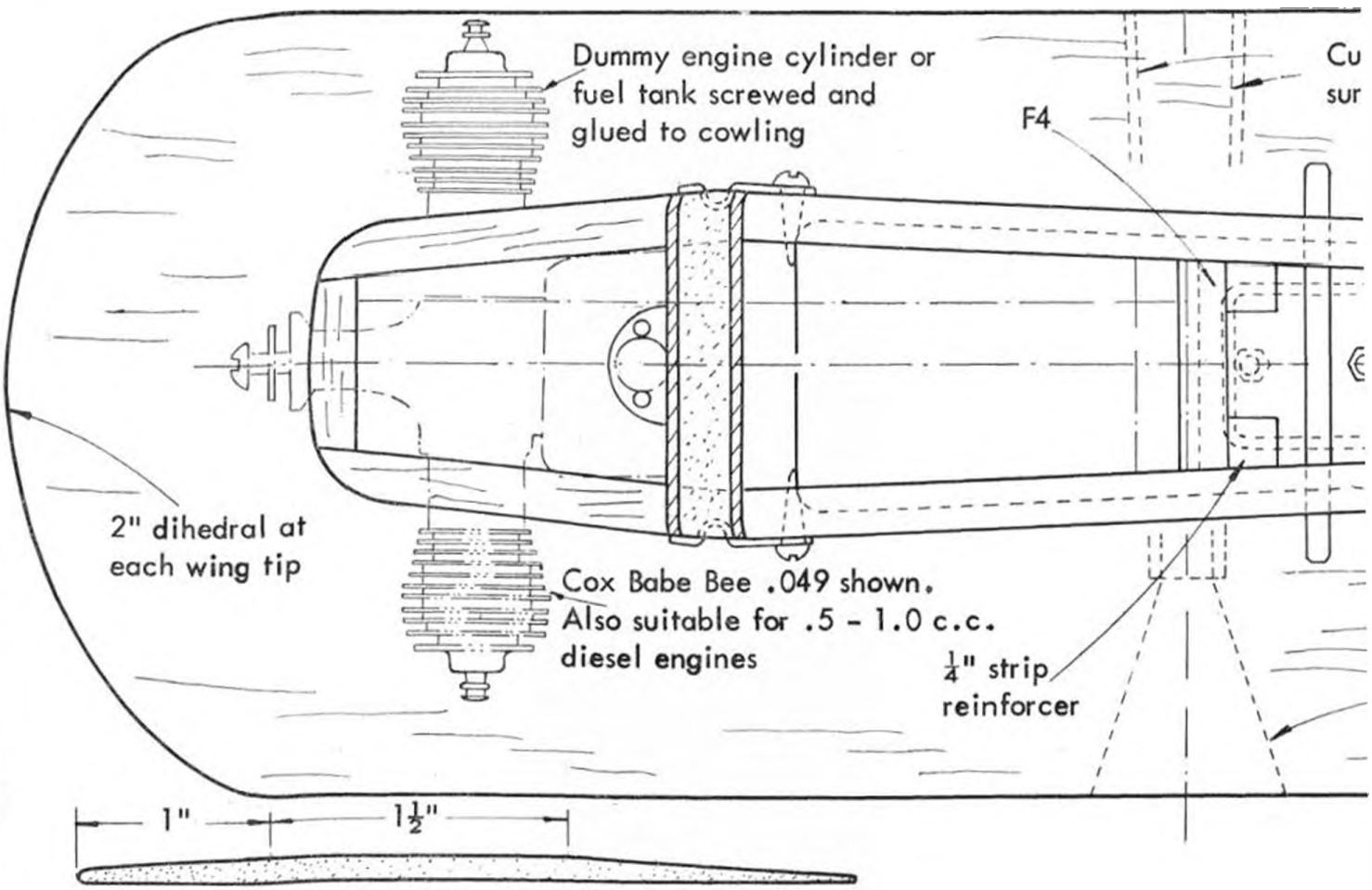
Finishing

Give the whole model three or four coats, of sanding sealer, rubbing down between each and cover with heavyweight tissue, followed by two more coats of sealer. Finish off with coloured dope or enamel, and a coat of fuel proofer.

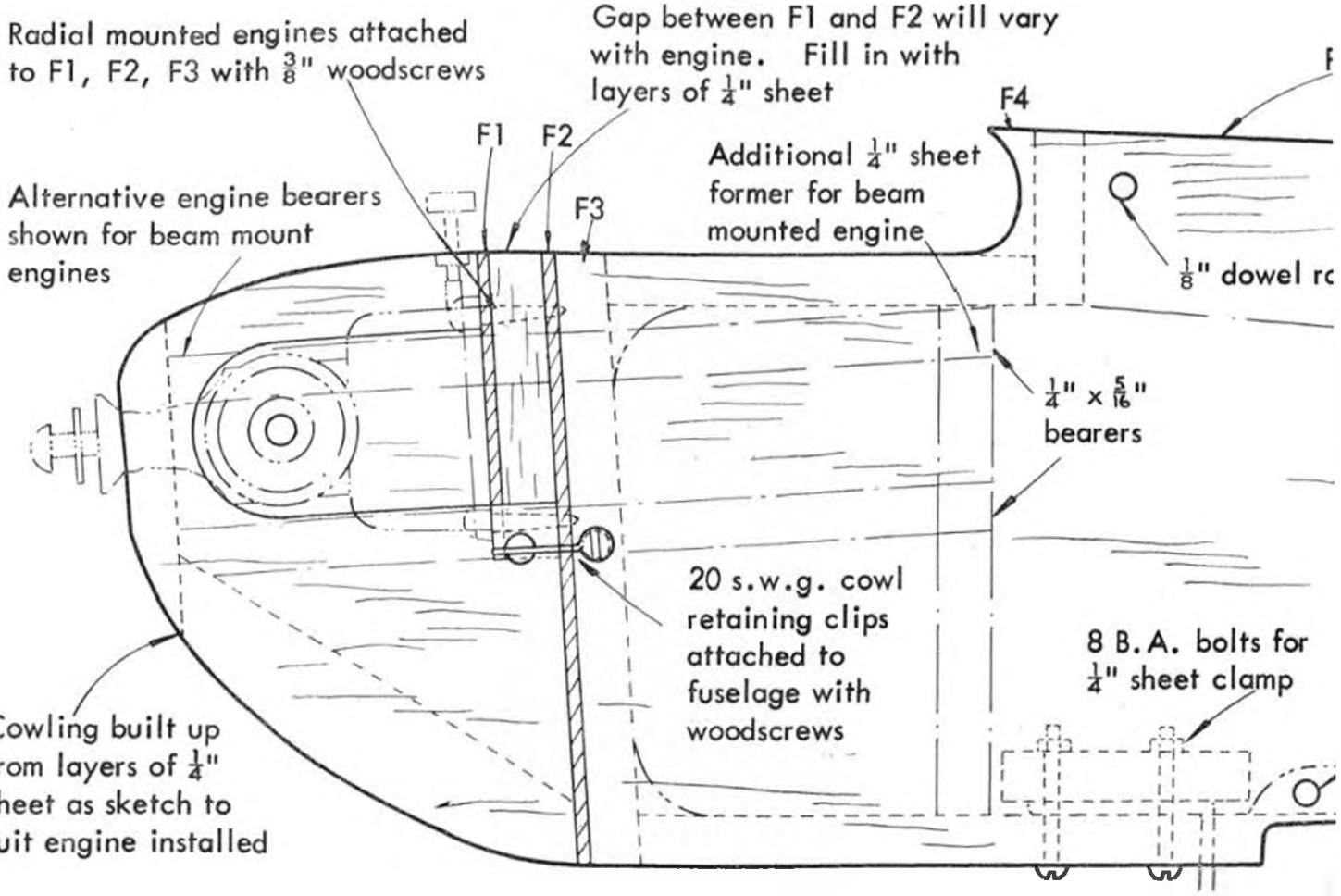
Re-fit the engine to the fuselage after dipping the woodscrews in fuel proofer. Fit pilot and wind-screens, assemble the model, check C of G and ballast with Plasticine in the fuselage to correct if necessary.

Trim the glide by packing the tailplane. The prototype did not require any side thrust, just a piece of 1/32 in. sheet slipped between the top of the engine and the bulkhead to cure a slight mushing under power. Fix the rudder with a spot of cement each side when directional trim is satisfactory.

The prototype has been flown for several hours on the local cricket field, and though it has scored a few "sixes" it has not suffered a smash hit!



Section for wing and tailplane from ⅛" medium sheet



AIRCRAFT DESCRIBED No. 137

British Aircraft Corp.

LIGHTNING

Drawn by D. H. COOKSEY

THIS TWIN ENGINED, high speed, interceptor has been very much a long term project since its initial conception almost 15 years ago. It is a matter of more than 10 years since August 4th, 1954, when the first P.1A research aircraft WG760 was flown from Boscombe Down. Sapphire turbo jets were changed to Rolls-Royce Avons for the P.1B prototypes, three of which were constructed and the first flown in April 1957. Then followed no less than 20 development aircraft, each intended to investigate one particular sphere of research prior to production of the Lightning for Squadron Service. It was not until the end of October 1959 that the first production aircraft was rolled out and then in July 1960, 74 Squadron received the initial Mark 1 and Mark 1A aircraft, followed by numbers 56 and 111 Squadrons. Changes during the development from the original P1 brought a complete alteration of the fuselage side profile and the vertical tail surfaces. There were also developments in the wing plan form, some of which have subsequently been adopted in the latest version to reach Service, the Mark 3.

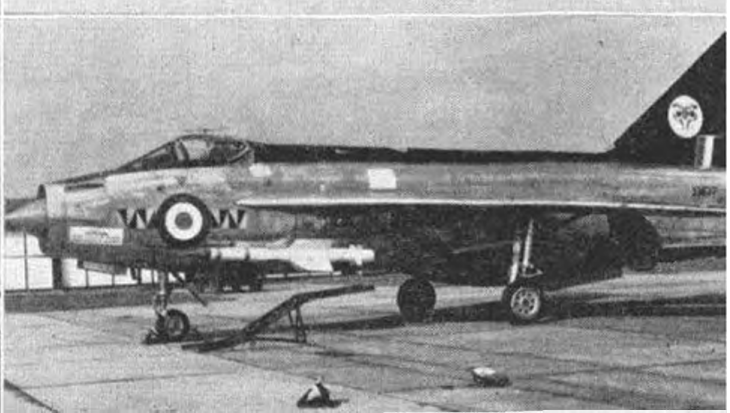
It is doubtful whether there is any other aircraft existent in the world today with such a packed interior. The engineering detail is quite extraordinary and it is very much to the credit of the designers and engineers that the Lightning enjoys such a wonderful reputation with pilots and ground crew of the Royal Air Force Squadrons.

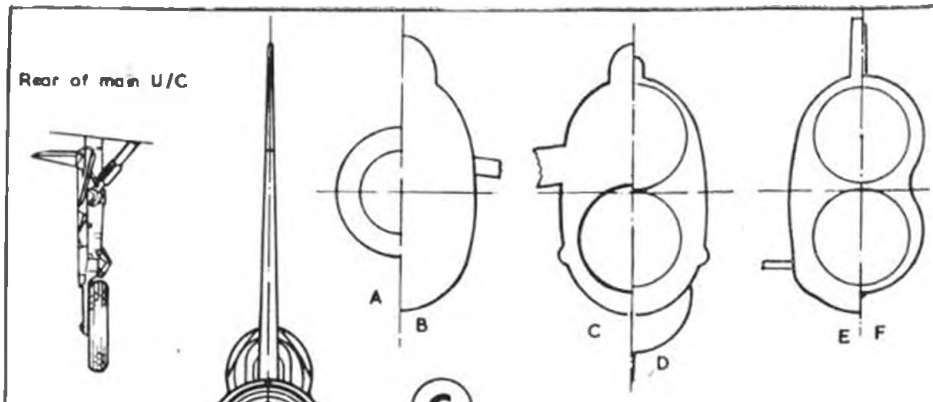
The Lightning is also remarkably aerobatic, having an excellent performance throughout its tremendous range of altitude capability and the displays by 74 and 56 Squadron in particular at the S.B.A.C. Shows at Farnborough have brought it considerable fame. Most spectacular performance is undoubtedly the capability of rotating from rapid acceleration take-off into a near vertical climb and rocketing upwards at a tremendous speed, constantly accelerating away from a red glow in the two after-burning jet exhausts amid a holocaust of noise.

Squadrons have been quick to use its flanks and fins for colourful display of insignia, four typical examples of which are shown below. The Lightning will remain in Service for some time to come, Mark 1As being eventually replaced by the F2 which is externally identical, and the Mark 3, already with No. 74 Squadron, having the broad square topped fin and different missiles.

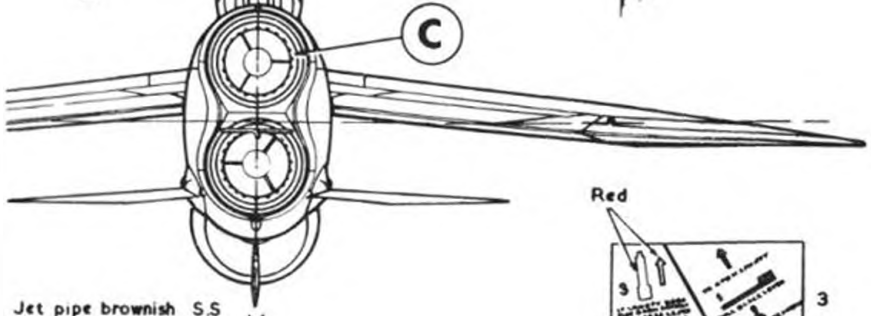
Span : 34 ft. 10 in.
Length : 55 ft. 3 in.
Height : 19 ft. 7 in.
Armament : 30 mm. Aden Mark 4 guns and two De Havilland Firestreak missiles.

Heading shows 92 Sqdn. two seat T. Mk. 4 XM995 letter T scrambling at Farnborough. Below are Mk. 1A, XM179 of 56 Sqdn. with red/white chequers, take-off view of 92 Sqdn. Mk. 2 ; Mk. 1A of 111 Sqdn., XM192 letter K with black/yellow markings, and bottom right, Mk. 1 of 74 Sqdn. with black/yellow markings as on cover. Firestreak missiles are carried in all cases.





Rear of main U/C



Red and white outlined in pale blue

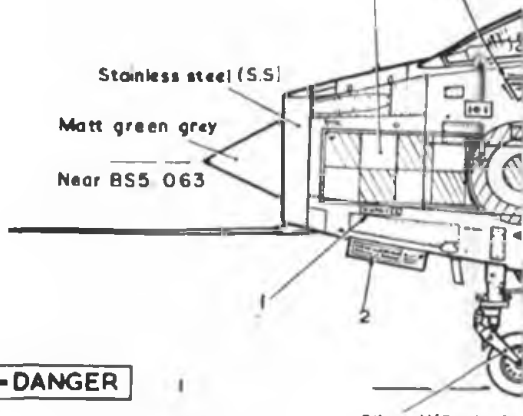
A

Red ejection seat marking

Stainless steel (S.S)

Matt green grey

Near BS5 063



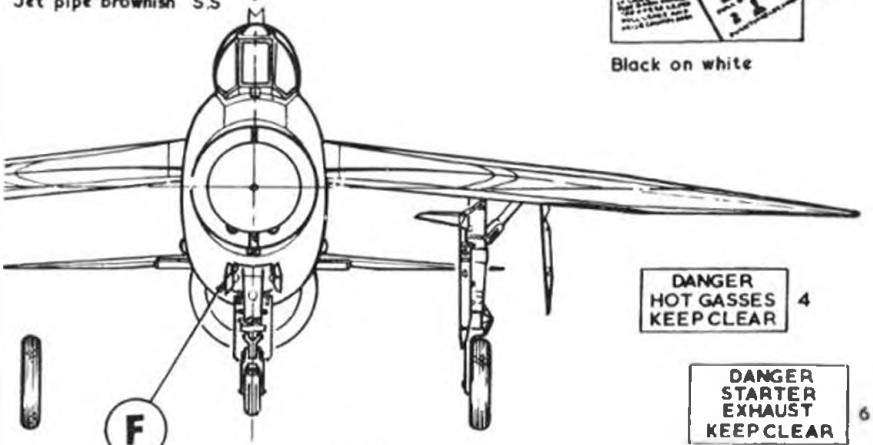
Silver U/C and whe

Red

3

Black on white

Jet pipe brownish S.S



← DANGER 1

KEEP CLEAR WHEN ENGINE IS RUNNING 2

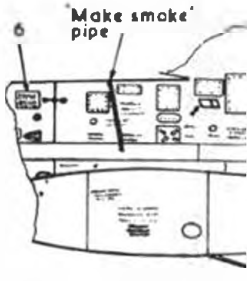
DANGER HOT GASSES KEEP CLEAR 4

DANGER KEEP CLEAR OF INTAKES WHEN ENGINE IS RUNNING 5

1,5 Red 1 3/4" lettering on white field

2 1 1/4" lettering

6 'Make smoke' pipe



Area obscured by wing a

DANGER STARTER EXHAUST KEEP CLEAR 6

Red 3/4" lettering on white field

Dockers Silver D.T.D 899

Red

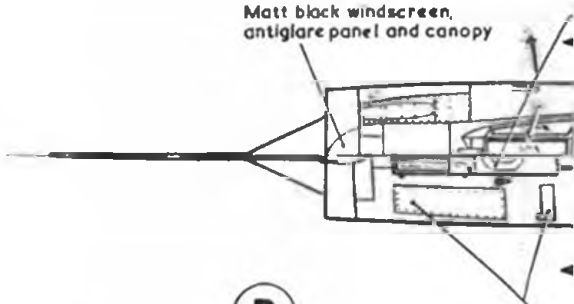
Blue (roundels)

Aircraft is polished aluminium except where stated

Large stencilling 3/4"

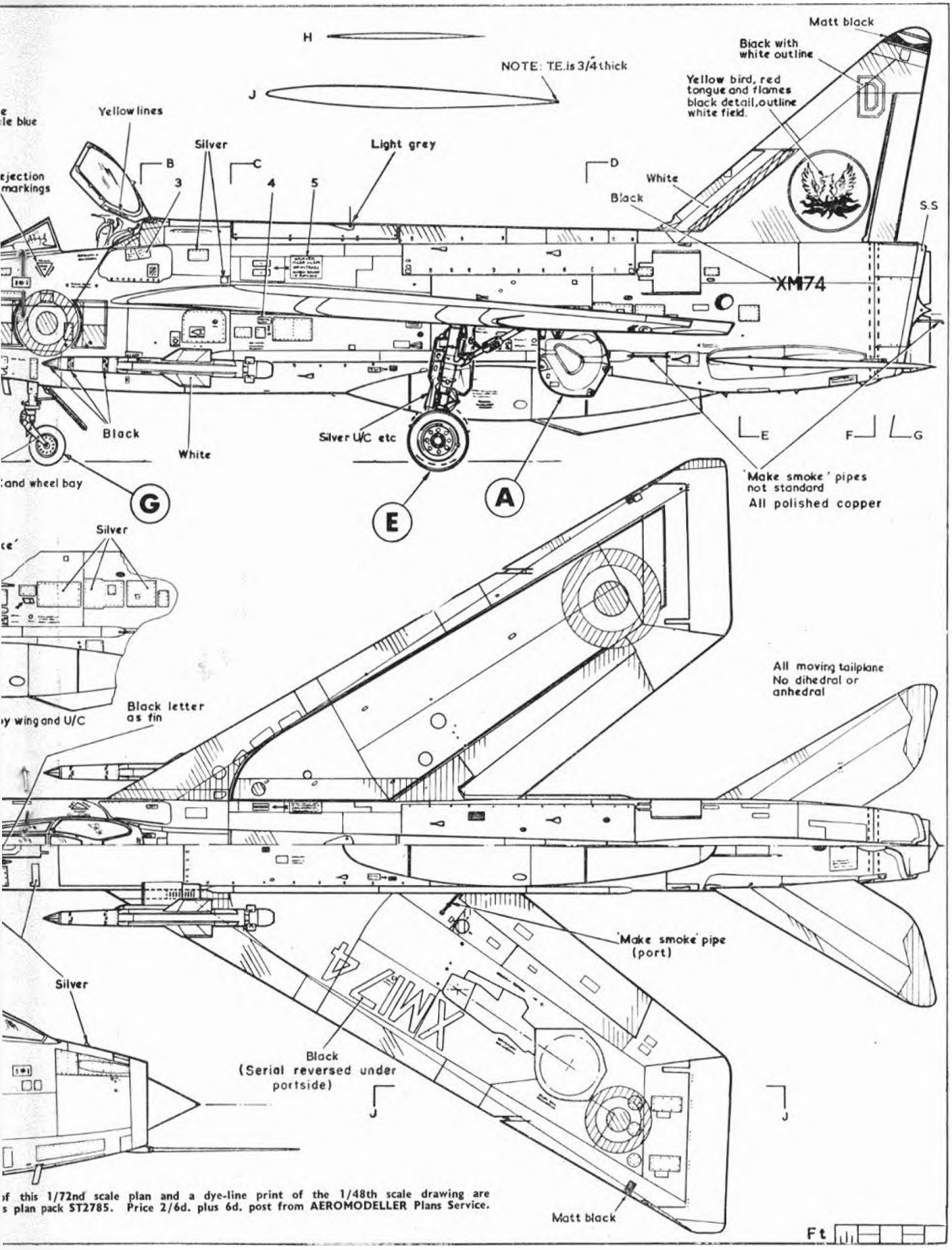
Small " 1/2

Matt black windscreen, antiglare panel and canopy



Reprints of this
available as plan pa

BRITISH AIRCRAFT CORPORATION LIGHTNING F. Mk IA

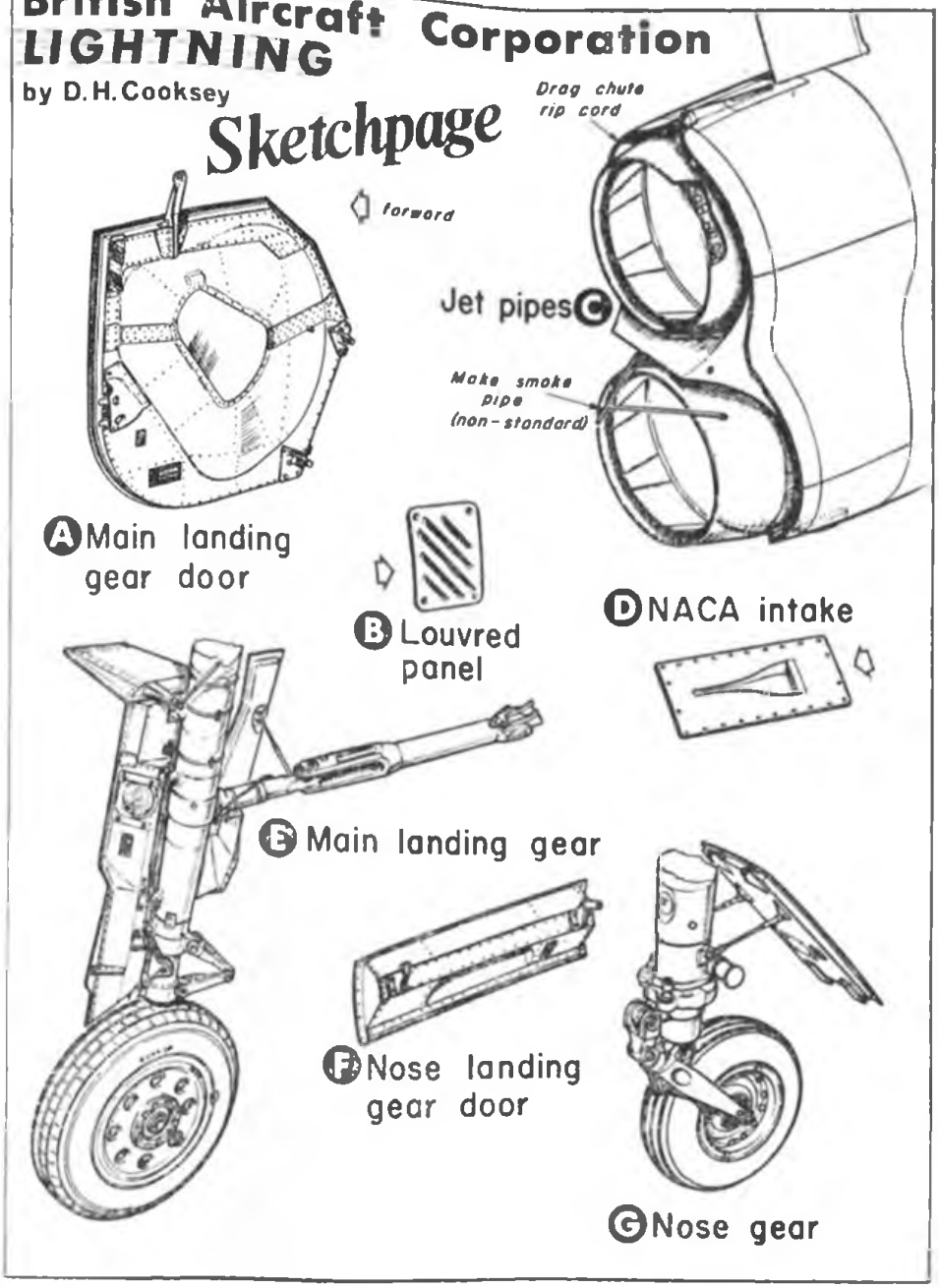


of this 1/72nd scale plan and a dye-line print of the 1/48th scale drawing are s plan pack ST2785. Price 2/6d. plus 6d. post from AEROMODELLER Plans Service.

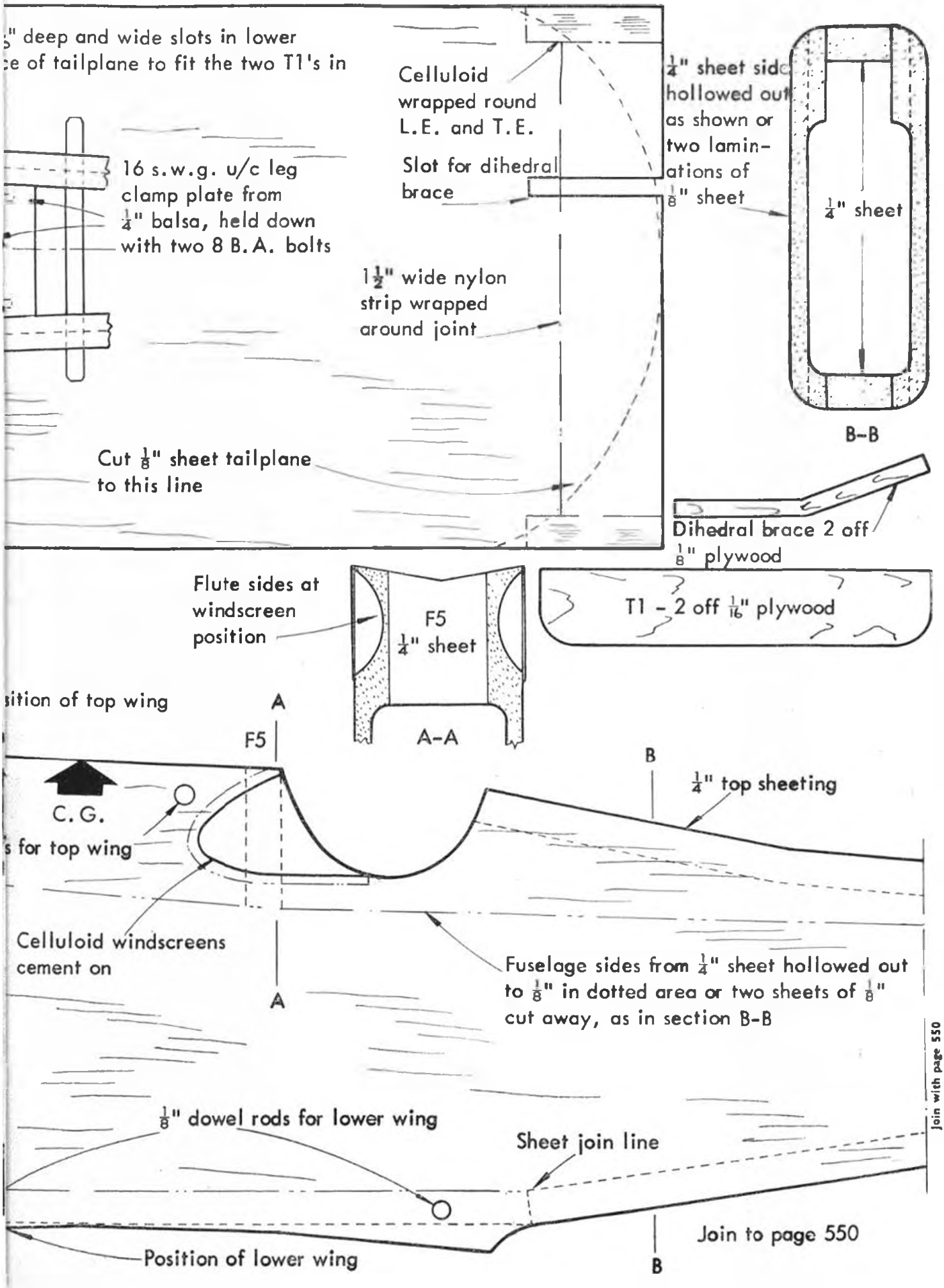
British Aircraft Corporation LIGHTNING

by D. H. Cooksey

Sketchpage



Nasal comparisons of Mk. 1 at left and T.4 two seater above show fuselage differences. Note twin access ladders on the trainer. Below, the vertical tail surfaces of the Mk. 1 and Mk. 3 are compared to show the latest square topped fin.

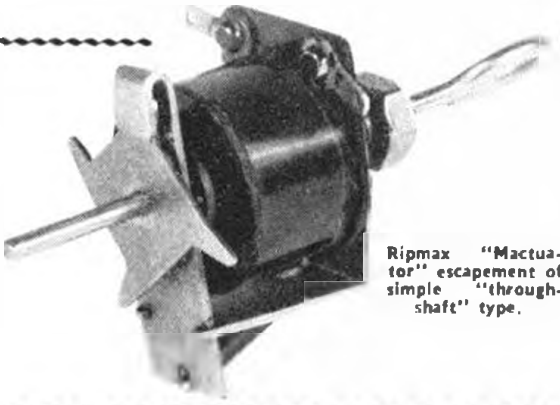

" deep and wide slots in lower
e of tailplane to fit the two T1's in
Celluloid wrapped round L.E. and T.E.
Slot for dihedral brace
¼" sheet sides hollowed out as shown or two laminations of ⅛" sheet
¼" sheet
B–B
16 s.w.g. u/c leg clamp plate from ¼" balsa, held down with two 8 B.A. bolts
1½" wide nylon strip wrapped around joint
Cut ⅛" sheet tailplane to this line
Dihedral brace 2 off ⅛" plywood
T1 – 2 off 1/16" plywood
Flute sides at windscreen position
F5 ¼" sheet
A–A
sition of top wing
A
F5
B
¼" top sheeting
C. G.
s for top wing
Celluloid windscreens cement on
Fuselage sides from ¼" sheet hollowed out to ⅛" in dotted area or two sheets of ⅛" cut away, as in section B-B
A
⅛" dowel rods for lower wing
Sheet join line
Join with page 550
Join to page 550
Position of lower wing
B

Getting started in

Radio Control

Part Five of a series for the R/C Novice

by **E. F. BRYANT**



Ripmax "Mactuator" escapement of simple "through-shaft" type.

HANDLING THE SIMPLE TYPES OF ACTUATOR

HAVING SATISFACTORILY BUILT, bought, or been given the receiver, the thoughts of the embryo radio flyer logically turn to the escapement or actuator which will supply movement to his control surface. There are quite a few types of actuator on the market, but there is no doubt that the simplest, and almost certainly the easiest and cheapest of these, is the rubber-driven, two claw escapement. This little component is eminently suitable for the beginner, simple to install and, in the normal way, can be 'fitted and forgotten'.

It consists of a magnetic coil, a movable armature which is hinged, and some sort of claw or escapement. When current from the battery is switched to the electro-magnet, the armature is moved by the magnetic force, and the claw is allowed to 'escape' so revolving under the power of a wound rubber motor. The claws and armature are arranged in such a way that the spindle on which the claw is mounted is only allowed to rotate 90 deg., where it is stopped by the pawl on the other side.

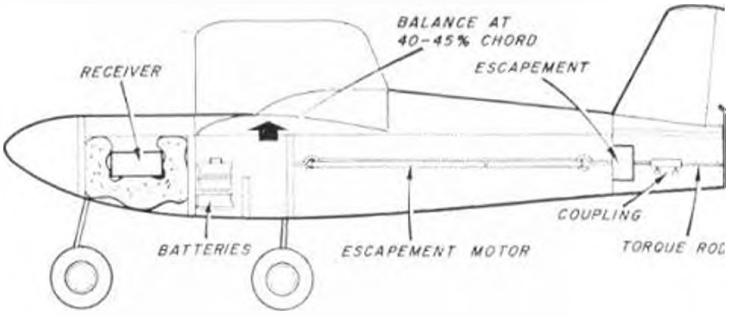
When the current from the battery is switched off again (i.e., when the transmitter button is released), the armature, under pressure from a light spring, moves away from the magnet, thereby releasing the claw, which is again allowed to escape through 90 deg. Thus it can be seen that, with each signal from the transmitter, the spindle from the escapement is made to rotate a quarter of a revolution, and with each cessation of the signal, it rotates a further quarter of a revolution. This rotary movement is the one which can be simply harnessed to drive the rudder, and it will readily be seen that, in this case, it is the power from the wound-up rubber which actually moves the rudder, and *not* escapement power.

The methods of converting the rotation of the escapement spindle into useful movement of the rudder vary according to manufacturer and country of origin. First escapements were of the 'through shaft' type as now exemplified by the Ripmax "Mactuator". The rubber motor is ahead of the unit, driving the shaft which connects to the surface.

When installing this type of escapement into the airframe, it is obvious that, even the comparatively light weight of the component, placed, as it must be, near the tail, will have a considerable effect on the balance of the model, and this is to be borne in mind when considering the distribution of receiver and batteries. For this reason, it is good advice to fit the escapement first into the position it *must* occupy, and to install the batteries last, because they can be moved to positions which achieve correct balance of the model. *See diagram below.*

The most often used position for this type of escapement is in the vertical centre of the fuselage, immediately forward of the tailplane leading edge. This position is normally governed by the fact that the fuselage behind this point is not large enough to accommodate the component. Added to this is the degree of accessability and the convenience of installing where there is usually some sort of former in the airframe.

The actual installation is simplicity itself, provided, as always, that sufficient care is taken. The escapement is bolted on to a thin ply former of suitable size and shape, with the hook for the rubber motor facing forwards. The ply former can either be fixed into the fuselage with glue, or far better, it can be made to slide into slots built on to existing formers or spacers. An effort must be made here to avoid adding too much extra weight, but certainly not at the expense of sufficient support for the escapement. It must be made a firm and definite fit in the airframe, as any movement during flight will almost certainly result in a stuck rudder. Before final fixing, and it is here that the slot idea proves best, the escapement must be properly aligned so that the hook for the rudder is pointing *directly* at the point, further forward in the fuselage, where the other end of the rubber motor will be fixed, and the rear end of the escapement spindle is pointing *directly* at the lateral centre of the stern post or former. Having achieved this, a length of piano wire of suitable thickness (usually about 16 s.w.g.) is cut to the correct size so that, when coupled to the escapement spindle it projects about $1\frac{1}{4}$ in. from the rear of the fuselage. The rear end of this wire is then bent into a crank, as shown in the diagram, and it must be remembered at this point that it is the length of the 'throw' of this crank which determines the amount the rudder will be moved. It is suggested that the beginner should not make the throw more than about



¼ in. to start with. Later, when experience has been gained, the wire crank can be replaced by one with a greater throw if it is felt necessary, by the simple expedient of undoing the coupling to the escapement and withdrawing the wire. When considering the rudder movement, it must be appreciated that much will depend upon the design of the model being used, and upon the relative area of movable rudder on that model, but, as a general rule, a movement of between ⅛ in. and ¼ in. from the centre would not be excessive.

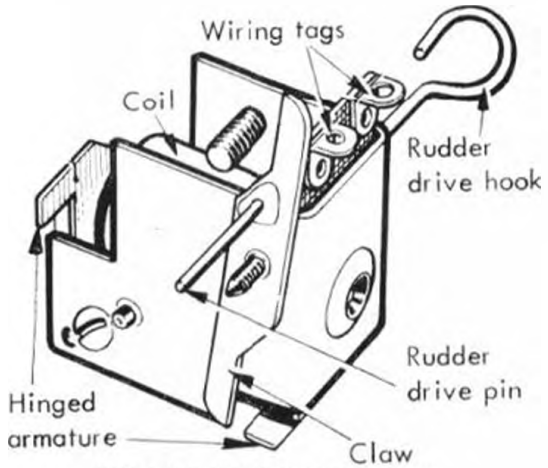
Where the wire crank passes through the stern post or rear former, a proper bearing must be provided, and, in order to reduce any binding to a minimum, this can very easily be nothing more complicated than a piece of nylon, drilled to the appropriate size for the wire, and fixed to the fuselage with a good contact adhesive. Here again, correct alignment is absolutely essential, and the bearing must not be finally fixed until this has been achieved.

So far as the escapement is concerned, all that is now needed is the rubber to make it rotate, and the electricity to actuate the magnet. As regards the former, all new escapements are provided with instructions, for the size of rubber to be used, and these instructions should be followed wherever possible. Generally, however, a single loop of ⅛ in. flat rubber will give good results, and the loop should be made about 25 per cent longer than the distance between the two end hooks, so that, when wound, there is not too much linear pull on the escapement spindle.

The appropriate wires from the receiver can now be attached to the escapement. In most cases, extensions will have to be made to these wires for them to stretch right down the fuselage, and great care must be taken to do this correctly. All joints must be properly soldered, and insulated, preferably with a piece of plastic tubing, and the wires adequately supported along the inside of the fuselage. This is perhaps best done by taking them through holes drilled in the sides of the formers, and fixing, at suitable points, by the insertion of tiny staples made from pins. At the escapement end, the wires must be carefully soldered to the lugs provided, using a good hot iron and being especially careful not to overheat the escapement itself. When the motor is running, there is inevitably a fair amount of vibration in this area of the fuselage, hence the necessity for special care in supporting the wires. All that now remains is a test of the escapement for correct operation, and this is best done using the receiver and transmitter as it will actually be used in flight, keying the transmitter to actuate the escapement.

In fact, there is little that can go wrong with this type of escapement, and, if it fails to operate correctly, nine times out of ten the fault lies either in the rubber drive, or in the electrical connections. If too thick a rubber is used, if the loop is stretched too tightly, or even if too many turns are put on the rubber, the escapement may either chatter, or fail to operate altogether. Fortunately, however, there is a great margin for error on most of these escapements, so that it is unlikely that any fault will be found here.

The final step in the installation, is to cover the hole in the bottom of the fuselage where the escapement has been installed. This may seem a superfluous thing to mention, but in so many cases this hole is simply left uncovered (supposedly to provide easy access if it becomes necessary), and in go all



Citizen-Ship PSN-2 escapement details.

the dust, bits of grass and sludge from the engine exhaust—a combination which may soon render any escapement inoperative. Some sort of sliding hatch is very handy in this area, although just a piece of tissue will answer the purpose, as it could easily be removed on the field if necessary. In any case, it must be remembered to provide access to the coupling behind the escapement, so that cranks with a different throw can be inserted if needed during a flying session.

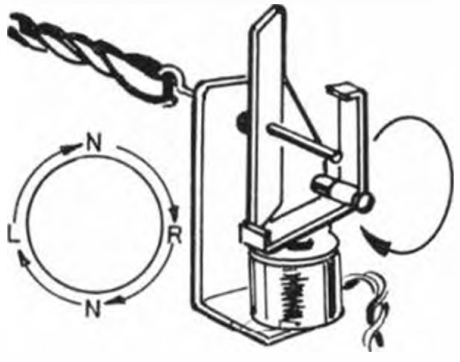
The simple "through-shaft" escapement has its disadvantages because of the length of the crank wire on the one hand, and the shortness of the rubber motor on the other. For the smaller models, where there is little room at the tail, or where the weight of the escapement would cause great difficulty, the more popular torque or push rod system is used with the escapement mounted under the wing.

The procedure for using the escapement in this forward position is a little different than the other, although the same in principal, since we shall still use the rotation of a crank to operate the rudder.

In this case, the escapement is reversed so that the rubber hook faces to the rear, and the spindle faces towards the nose. Again, the escapement is best bolted on to a ply former, but this time the former must be provided with a bearing hole above the escapement base plate. The crank is now fixed to the end of the escapement spindle, and again its throw will determine the amount of rudder movement. This time, however, the loop or slot for this crank is fixed to a rod, running the whole length of the fuselage back to the tail. The end of this rod is engaged to the rudder.

The rubber motor can now be accommodated in

Simple escapement on early Aerotrol and ED units.



the rear end of the fuselage, being held at that end by a suitable loop or hook. *See diagram at right.*

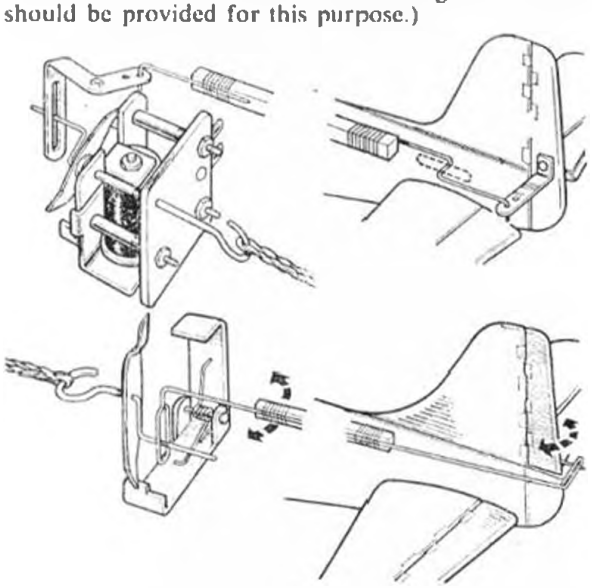
It can now be seen that, as the escapement spindle, and therefore the crank, rotates, the loop in which it is engaged is moved sideways, first to the left, then back to the middle, then right and back again to the middle. In other words, it is doing just what the rudder is required to do, and all that is necessary is to transfer the movement. This is done by means of the rod. Generally speaking, piano wire is not suitable for this rod because it allows too much free twist, and is of poor aerial effect so it is expedient to bind the wire to a length of wood strip, square in section, which will serve the purpose much better.

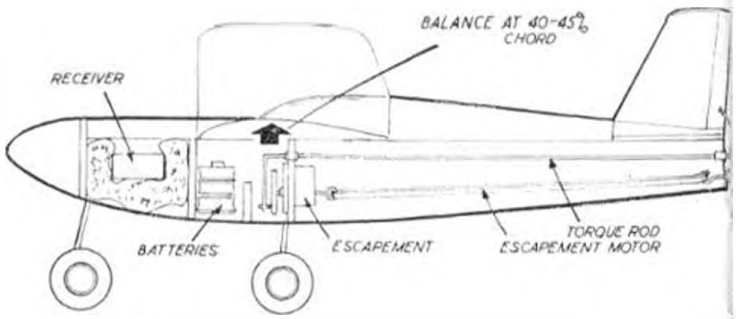
In effect, the movement of the rudder using this method is exactly the same as when the escapement was installed in the rear end of the airframe.

Next month...

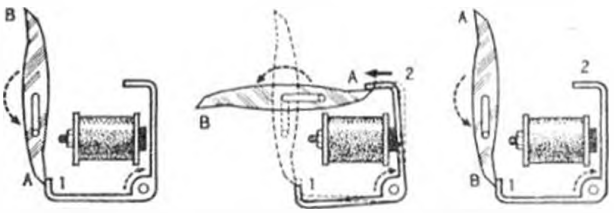
E. F. BRYANT takes the reader through those vital preparations for FIRST FLIGHTS with radio control as Part 6 of this popular series of articles.

The simplest method of connecting the wire crank or rod to the rudder itself is via a wire loop, arranged vertically and integral with the rudder. This can be fashioned from either 16 or 18 s.w.g. piano wire, and very firmly fixed to the rudder. Sewing the wire with a criss-cross stitch, cementing and finally covering with strong tissue or silk is as good a method as any, although small nuts and bolts could be used as an alternative. The elongated loop should be sufficiently long to accommodate twice the throw of the crank, and wide enough to prevent any binding at all. A touch of thin oil in this area will work wonders and facilitate smooth operation. Finally, the rudder must be absolutely central, when the crank is in either of the vertical positions. (Note: Rudder is not used for directional trimming, a trim tab should be provided for this purpose.)





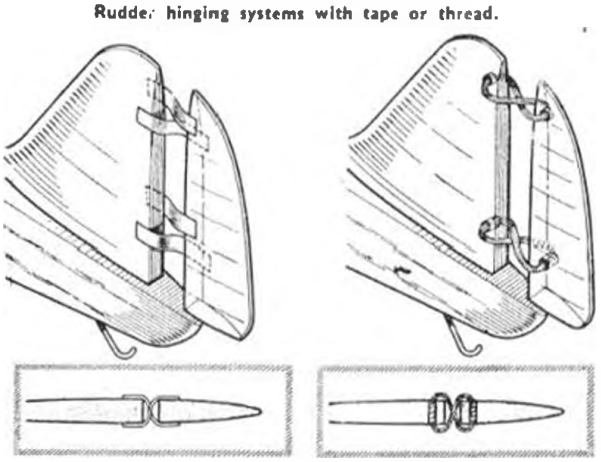
The escapement that has now been installed, will provide the flyer with control of the rudder in three positions, i.e., Full-right, full-left, and neutral, this being achieved by what is popularly known as the 'bang-bang' method. Because the rudder is moved by the rotation of the crank, these positions are reached in sequence. Thus, one press and hold on the transmitter button will give, say, right rudder. When the button is released the rudder returns to neutral, and a further press and hold will give left rudder, followed by neutral again when the button is released. Thus it can be seen that when the transmitter button is not operated, the rudder must always be in the neutral position, a fact invaluable to the beginner.



Sketches from Japanese Journal, "Radio Control Primer" show at left, linkages for rocking rod or push rod; above are the sequences of 2-panel or claw action and at bottom, the rudder fitting.

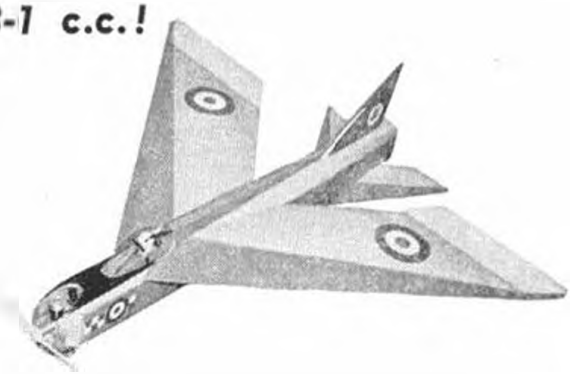
Here it is worthy of note that, although only very simple control of the rudder is possible with this method, this does not mean that only directional control of the model is possible. Far from it. A number of aerobatic manoeuvres are possible using rudder only control, utilising the wind and characteristics of the model, as will be seen when flight handling is discussed.

Rudder hinging systems with tape or thread.



TRY THIS EYE-CATCHER FOR .8-1 c.c.!

BLITZ



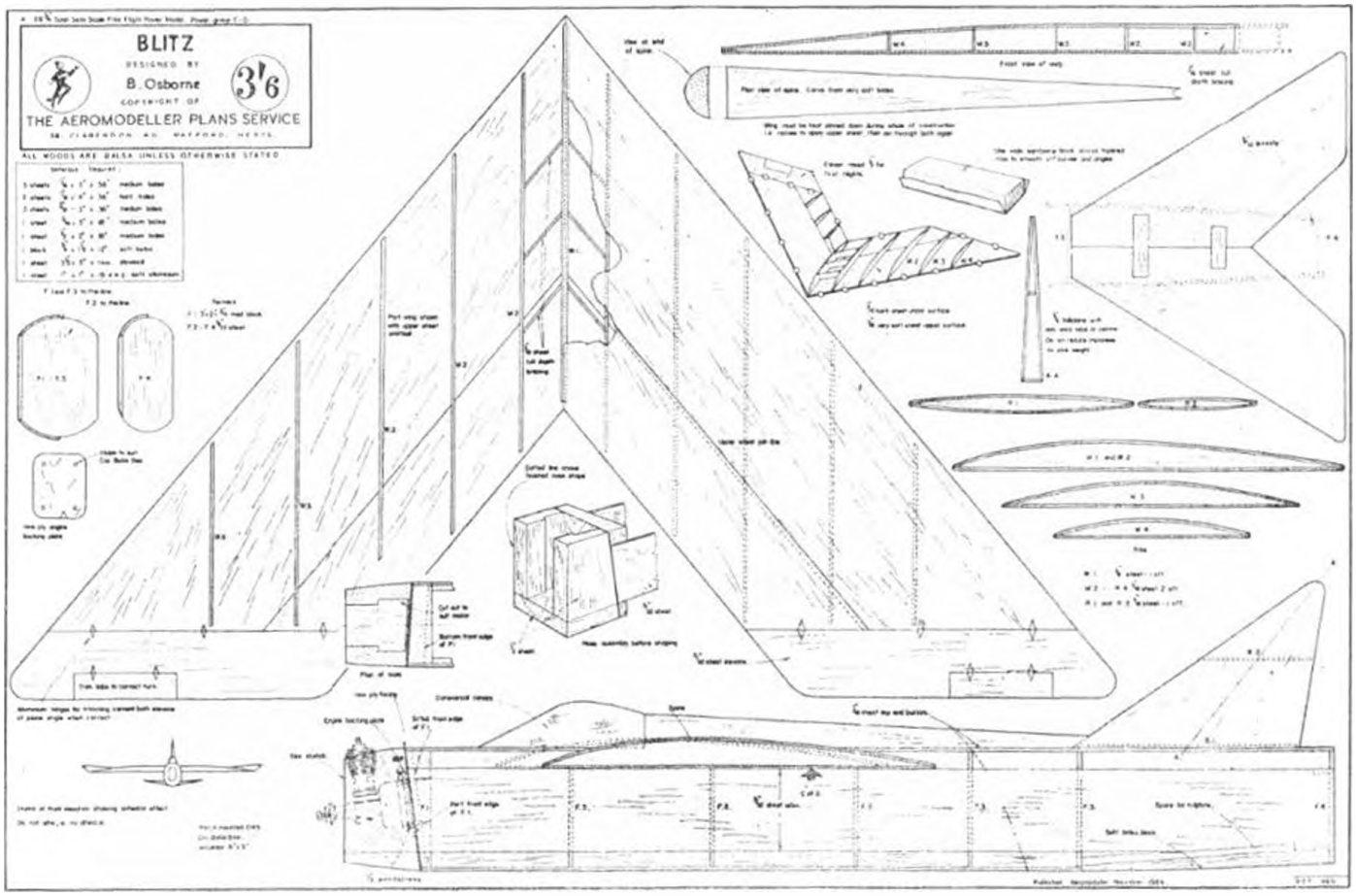
A 26¾ in. span semi-scale by Bruce Osborne

DEVELOPED FROM A PROFILE chuck glider to test the general configuration of the B.A.C. Lightning for semi-scale free flight work, *Blitz* has been a great success and has attracted considerable attention at many contests, including the Nationals. Of very solid construction *Blitz* was designed to spend more time on the flying field, than the building board.

The chuck glider version showed a marked tendency to dive sharply and roll at the same time when hand launched, so in this powered free flight version the poor glide performance was overcome by increasing the scale wing area. The elevons on the wing may look rather odd but they are essential, as they make up for the lack of tailplane area. The wing sweepback angle was decreased to aid the poor spiral stability, together with the elevons providing a wash-out effect to prevent tip stall in flight, the fin was also reduced in area to this end. Anhedral effect on the wing is intentional so do not be tempted to add any dihedral. Inconsistent performance of this type of model due to small changes in trim or wind gusts was overcome by using a tough all sheet structure and rugged fuselage so that even after a hard landing the trim always stays the same.

Commence construction by cutting the underside of the wings from hard $\frac{1}{16}$ in. sheet and cementing the butt joint, then pin the sheeting to the building board and cement all the ribs in place as well as the

FULL SIZE COPIES OF THIS 1/5th SCALE REPRODUCTION ARE AVAILABLE THROUGH A.P.S. AS PET869, PRICE 3/6d., PLUS 6d. POST.



BLITZ (continued)

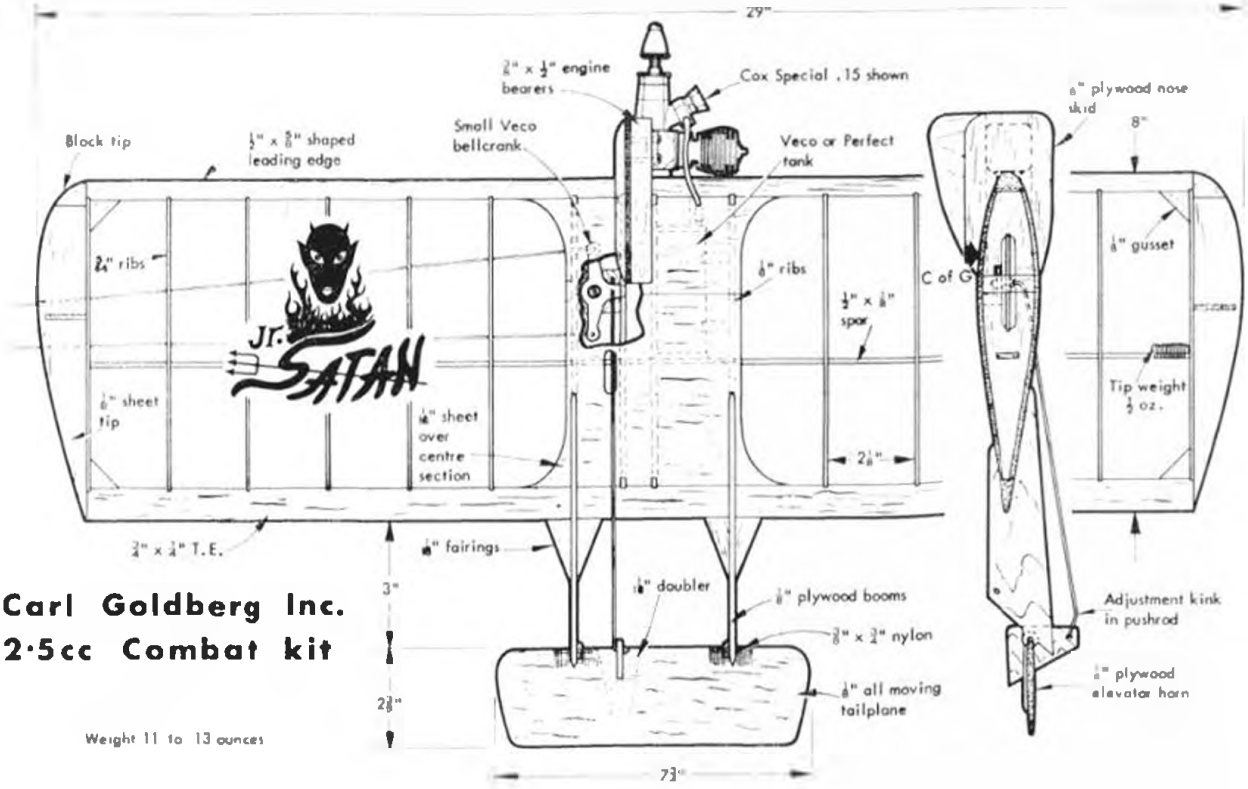
1/16 in. centre section stiffeners. When dry sand across the ribs with a sanding block to ensure they are all true and flat. The leading edge sheeting should now be cemented and pinned down as shown in the sketch, and when dry the trailing edge sheeting also. At this stage the elevons and trim tabs are fitted to the wing by pushing the soft aluminium hinges into the leading edge of the elevon and trailing edge of the wing, setting the elevon trailing edge up 1/8 in. at the same time. Do not cement this joint yet as the model still has to be trimmed. The fuselage construction comes next, so start by marking out the 1/8 in. nose former F1, taking great care to get true surfaces as these govern the down and side thrust angles. Next cut the 1/16 in. plywood bulk head to shape but do not cement to F1 yet. Cut the 3/32 in. fuselage sides and formers F2, F3, F4 to shape and cement together in a simple box structure hold with pins until dry. When dry cement the wing into position as shown and add top and bottom 1/16 in. sheeting. The tailplane parts are cut from 1/16 in. sheet and joined together with 1/16 in. keys and the whole assembly is cemented to fuselage with soft block packing. Fin ribs R1 and R2 are cut from 1/16 in. sheet and then the 1/16 in. sides are cemented on. Cement fin to fuselage, and 1/8 in. soft spine on, together with cockpit canopy. The 1 mm. plywood facing for F1 should now be cemented on, the engine screwed in, and the 1/8 in. soft sheet cowl cemented around the engine and carved to shape.

To finish, give the model a good sanding all over and brush on one coat of sanding sealer. When rubbed down apply one coat of Belco brushing cellulose or colour dope and apply any markings you wish. We advise you to consult the details given on the scale Lightning drawing in this issue for the best results. Give one coat of fuel proofer and screw an external fuel tank on to the cowling if extra long flights are wanted.

For the test flights set the elevons up 1/8 in. and hand glide into the wind. *Blitz* glides with its nose up, but do not allow it to "mush". When satisfied with the trim, cement elevon in place and use the small trim tabs for turn correction. With the engine running at half power trim for a wide left hand turn under power and a right hand glide. Power turn can be adjusted if desired by fixing a 3/8 in. x 1/4 in. aluminium tab at the base of the fin. With full power *Blitz* climbs at 75 deg. and levels out at 50 ft., into a left-hand power circle, so for the best small field performance only use three-quarters full engine power.

FIRST U.S. KIT FOR INTERNATIONAL COMBAT CLASS

MUCH TO THE CREDIT of that renowned veteran modeller Carl Goldberg, modellers in the U.S.A. can now enjoy the 2.5 c.c. combat class, as distinct from their traditional .35 classification (6 c.c.). Nationally accepted in the States as something more suited to the junior modeller and less likely to meet "sudden death" in the circle, we feel that the American modellers will very soon discover that the little ones are just as nimble as their bigger brothers and as thrilling to fly. The kit for the Junior Satan literally falls together and is very well produced. Salient points are indicated in this review drawing which is reproduced by courtesy of the manufacturers. Price for the kit in this country will be about 24/6d.



Above, elegant fish-like shapes of Italian vane steered slope soarers belong to Angelo Bonato (launching) and Giorgio Cobelli of Verona (waiting) on the slopes near Vienna. Below, scale Fokker DXXIII by Italico Gozzo placed 5th in first Italian scale contest. At bottom, Verbitki of U.S.S.R. prepares to launch on one of his successful flights which gave him victory in the East German International meeting, reported in text. Bottom right is Albertini Nudi's MC.72 scale entry in the Schneider Trophy event at Varese.

FRANCE. International Coupe d'Hiver event takes place on December 13th at Nice on the Cote d'Azur. Applications for entry in this enjoyable event should be sent to Pierre Andreis, 38 Chemin de l'Arbre Inferieur, Nice, France.

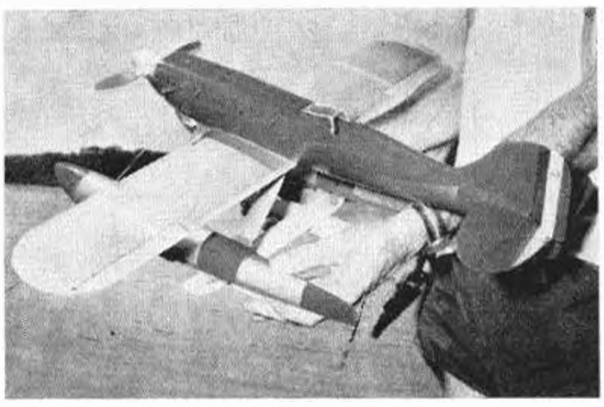
EAST GERMANY. International F.A.I. free flight event between East Germany, Austria, Poland and U.S.S.R. took place at Magdeburg 21st-23rd August. Russia sent powerful teams with past champions and dominated power with very high standard. Verbitki was the winner with full max. score, plus 123 seconds on sixth flight, followed by Kuda of East Germany who only made 55 seconds in fly-off. Russians were 1st, 3rd and 5th. Austrians led with Wagner and Martin 1st and 2nd in Wakefield, which also helped gain the team trophy and A/2 was another victory for U.S.S.R. with Roschin 1st. Conditions were such that leading four flyers went to seven flights and Roschin and Blacher (2nd for Austria) made their decisive 98 and 5 second flights at the 8th launch! Field services included motor cycle recovery squad and a Zlin Trainer for aerial spotting.

ITALY. Fourth Schneider Trophy event on August 2nd at Varese was won again by Silvio Taberna with magnificent Gloster IV racer. The fuselage and floats were carved from a special Italian wood used for making foundry patterns and wings from hard sheet balsa. Silvio uses a Webra Mach II diesel with fuel mixture 40 per cent paraffin, 30 per cent ether, 27 per cent oil and 3 per cent nitrite. Nineteen models were entered, of which five were Bipes, including the following Macchi types: three M.39, three M.52R, three MC.72 and one each M.67 and M.17. There were two Supermarine S6Bs, one Fiat C.29, two Curtiss CR3s and one each Savoia S13 and Gloster IV. Newcomers found water take-off somewhat different from rising off ground. Competitors travelled from as far away as Naples (500 miles).

WEST GERMANY. The 12th Walldorf International on September 6th attracted 169 participants from five nations—Denmark, Sweden, Switzerland, Austria and Germany. After weeks of hot dry weather, a cool gusty north-westerly brought rain and tough conditions. Only three rounds could be flown, but the reunion of international enthusiasts made the long journeys worthwhile. Winners were: Flying Wing, H. Jenne (Walldorf), 277 secs.; 1 c.c. A/2, W. Boy (Stuttgart), 407; Flying Wing Power, H. Kron (Mainz), 248; 1 c.c. F.A.I., H. Mildner (Augsburg), 503; A/1 Glider, K. Pichler (Backnang), 527; A/2 Glider, F. Kazcor (Landshut), 522; Wakefield, H. Wagner (Salzburg), 540; Power, V. Horcicka (Salzburg), 483.

AUSTRIA. Europa Cup for vane steered models on August 21st-23rd, held on the Spitzerberg, near Vienna and the Hungarian border, attracted 66 entries from five nations—Denmark, Germany, Austria, Italy and Switzerland. Weather for the first day was good, and many 5 minute maxes were scored from the 200 ft high slope, but on the second day stormy conditions with rain and wind up to 50 m.p.h. made the best flight only 82 secs. This was by Ludwig of Berlin, using the flat base Gö795 airfoil featured in February, 1962 AEROMODELLER as the suggested airfoil in the article "Is undercamber necessary?" The meeting became a perfect victory for Helmut Schuberth of Hof in Germany with a total of 947, and his daughter Renate who was placed 2nd with 938. Social events were particularly enjoyable and terminated in a sincere resolution that this class of model be internationally recognised by the C.I.A.M. in view of the 10 years of experience of competitions held in Germany, Italy and Austria

ITALY. First Italian flying scale championships brought 16 entries and success for Franco Reinero who flew a Bristol Britannia. Other multi-engined entries included a Viscount in 2nd place, Convair 440 and Constellation tying for 4th place, and a pair of Invaders at 9th and 11th, plus the Fokker DXXIII in picture at left. Most popular subject was the Cessna 180, with three entered.

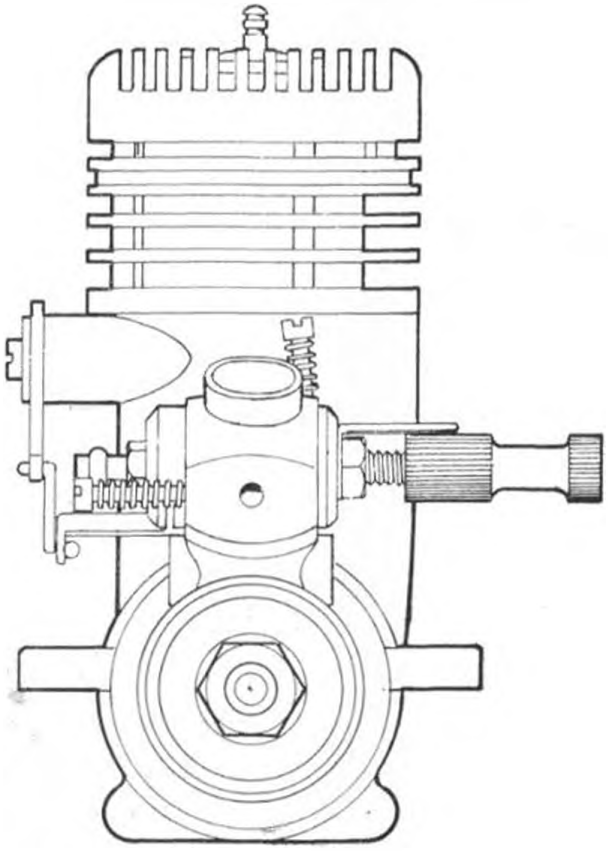


ENGINE ANALYSIS No. 127

MERCO ·61 R/C

Reviewed by R. H. Warring

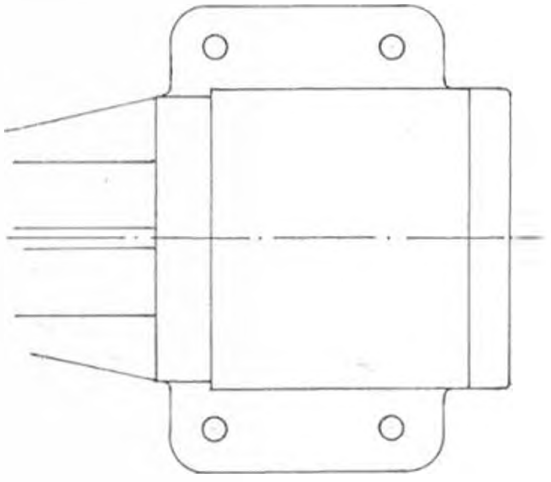
When the Merco 49 was developed to meet a need for what was then the top power requirement for R/C it was proportioned with the possibility of a larger version to follow (just as "29's" gave rise to "35's"). The Merco 61, therefore, has virtually identical overall dimensions to the "49" and uses the same crankcase. It is, however, very much more than a bored out "49" as both bore and stroke have been increased in raising the capacity and there are other subtle differences in transfer and exhaust port timing, etc., plus the addition of transfer ports in the skirt of the piston to improve transfer and promote bearing cooling. The "61", as it has come to be called, has been developed as a specific 10 c.c. design and has had the unusual distinction—for a British production engine, at least—that some half a dozen prototypes were extensively flight tested under competition conditions throughout 1963 by leading R/C flyers.



Easy to operate

Although a big (and noisy) engine, the Merco is extremely easy to handle. Starting is excellent, following a generous prime—or with just finger choking when warm. An identical carburettor unit to the "49" is fitted, giving fully flexible throttle response and a normal safe "low" setting of approximately 3,000 r.p.m. The air bleed control enables the low speed setting to be established at an optimum—neither too rich or too lean—although exact adjustment is a little difficult to establish until a fair amount of running-in time has been achieved. At least an hour's running in time is probably necessary to ensure complete consistency of throttle action, although this may be less (or more) with individual engines. Although employing a ringed piston and a

ACTUAL SIZE FRONT VIEW AND MOUNTING DIAGRAM



Merco .61 components showing their fine machined finish and in particular the piston and cylinder porting. Piston is used to provide additional gas transfer through two circular ports which align with similar holes in cylinder. This modification is now applied to production .49s, bringing an improvement in performance as well as better gudgeon pin lubrication. This idea was tried on original Merco engines but not found to be an advantage in the case of the .29 and .35. The Merco silencer should be available by the time this edition is printed and fits directly on to the exhaust stack, replacing butterfly throttle valve. It will not, however, be retained by a single screw as a result of extensive flight experience, it will be held in place by specially prepared "U" bolt.

ball race crankshaft which should minimise running-in requirements. Merco's are usually set up tight enough to be a little on the "sticky" side when absolutely new. But we are pretty sure that, as a consequence, they will outlast many a lighter and freer (as manufactured) glow engine.

"61" is not a high revving engine and seems quite happy starting and running on either straight or moderately nitrated fuel, with virtually no vices or peculiarities. It will also start readily at reduced throttle settings. Maximum power appears to be developed in the region of 11,500 to 12,000 r.p.m. with a fairly flat peak and outstanding lower speed torque. Best propeller size would probably be one giving 10,000 to 10,500 r.p.m. static, which means a generous diameter size. A 12 x 6 would probably be right for most R/C applications, although a 13 x 5 or a 14 x 4 might be a proposition on a slower flying or very heavy model. Anything under a 11 x 6 is likely to lead to over-revving in the air, with no advantage. In any case, the Merco is not all that happy trying to push the r.p.m. up past 12,000 with straight fuel.

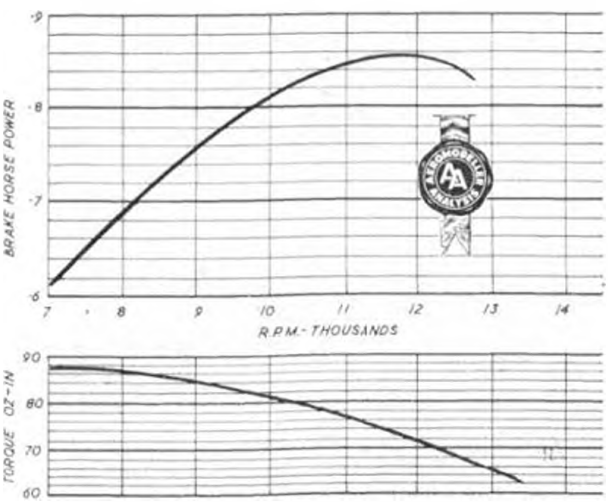
Internal details

Structurally, and as regards material specification, the "61" is virtually identical to the "49", with a number of detail changes. The crankcase unit is a beautifully smooth pressure die casting in L.33 alloy with a sand blast finish and embodies the lower cylinder housing and stub exhaust, and stub intake pipe. The liner is of leaded steel (EN.IA) case-hardened, ground and honed to finished size. Overall diameter is 1.0625 in. which, with a bore of .940 in., gives quite thin cylinder walls for a robust engine of this size, with an intricate pattern of ports cut through the walls. Exhaust ports consist of two pairs each approx. $\frac{3}{16}$ in. square, with four similar sized but equi-spaced transfer ports diametrically opposite and slightly lower giving some 60 per cent overlap. In addition, two circular holes $\frac{1}{4}$ in. dia. below the transfer ports connect with corresponding holes in the piston to provide skirt transfer. An orthodox transfer passage is retained in the crankcase unit outside the cylinder, thus transfer is effected in the normal way but with an additional flow path through the piston into the transfer passage.

The piston itself is turned from a low expansion light alloy and is fitted with a pair of cast iron rings (Wellworthy), conventionally arranged. The crown of the piston is flat with a well faired in rectangular deflector. The piston walls below the gudgeon pin boss are turned away to approximately $\frac{1}{32}$ in. thickness. The hollow hardened steel gudgeon pin of $\frac{1}{4}$ in. dia. is fully floating without retaining rings or end pads. The connecting rod is a light alloy forging in RR 56 with reamed plain bearings and each end generously slotted for lubrication.

All dural exterior

The cylinder is a loose plug fit into the crankcase unit and seals on a gasket. It is encircled by a turned dural jacket and the whole assembly is secured via three short and three long $\frac{1}{4}$ in whit. screws through the head—three extending into the crankcase and three bolting the head to the jacket. The head is machined from dural and generous in bulk, although the top is well finned. The plug-in portion is shaped to give a hemispherical combustion chamber and the glow plug is mounted in the centre. No gasket is used between the head and the top of the liner on which it sits, spacing between head and jacket being provided by a narrow flange on top of the liner. (*Continued overleaf*).



Merco .61 (continued)

The ¼ in. dia. crankshaft is of EN 1A steel, case hardened and ground between centres to finished size. Crank web is extremely generous in thickness, but machined away for counterbalance. The shaft is carried on a ¼ in. ballrace in the main crankcase unit and an 8 mm. ballrace at the front. Outside the front housing the shaft steps down to ⅜ in. dia. with a conventional threaded length for the prop. retaining nut and washer. The prop. driver is turned from dural and mounts on a split taper collet.

The carburettor unit is pure "Merco 49", with the body machined from dural housing a dural barrel valve and brass spraybar assembly. Barrel and spraybar are separate and mounted from opposite sides so that the throttle movement does not rotate the fuel entry pipe. The barrel movement is linked to an exhaust flap in the conventional glow-throttle manner, the exhaust flap closing completely some little time before the throttle is completely closed. A vertically mounted screw on the carburettor body provides adjustment for barrel throttle stop in the closed position. Open position stop is fixed and independent of this adjustment. A further (horizontally mounted) screw on the right hand side of the carburettor body controls bleed air entering the carburettor under the barrel for fine adjustment of mixture when the barrel is closed to the slow running position. This particular control is very near the propeller disc and rather easier to reach with a screwdriver than the fingers for precise adjustment.

Apart from the fact that the Merco "61" really *looks* an outstanding example of precision model engineering production—everything about it is quality plus. Workmanship throughout is outstanding, for example, and everything about it appears built to last, although it is quite compact for a 10 c.c. power unit. There is little doubt that for sheer B.H.P. output there will be other engines of similar size to beat it—but few, if any, will be able to beat it in the speed range for which it was developed—up to 12,000 r.p.m. This, after all, is the speed range which really counts for R/C flying.

Frankly for British R/C modellers who want the "top" size engine, there are few reasons for not automatically settling for a Merco "61".

One must remember that it is not a mass produced engine, so demand could well outstrip supply for some time to come—especially, as we are sure, there will be a pretty hefty export demand. To our mind, too, the "61" puts the hitherto attraction of the "49" in the shade. Here for virtually the same overall dimensions and only a negligible fraction of an ounce increase in weight is over 20 per cent more power. Any model which will take a "49" will equally well take the "61", with the benefit of swinging a slightly larger diameter propeller and that extra power available when wanted. You do not have to use maximum power all the time, and the throttle is one of those really effective types where the full speed range of the engine is available on command.

The Merco has also received Design Centre recognition, which to the best of our knowledge is the first time any model engine has received such distinction. Not that it needs any such label to promote it—and in any case we doubt that the Design Centre knows anything about model engines, anyway. The Merco "61" we venture to prophesy, will become one of those engine "classics" in the manner of the well loved McCoy "60" spark ignition of the late 1940's. It costs more money than other engines of similar size, but it is well worth saving up for. Our own order is going in at once.

Specifications

Displacement: 9.95 c.c. (.607 cu. in.)
Bore: .938 in.
Stroke: .875 in.
Weight: 12½ oz.
Max. Power: .86 B.H.P. at 11,800 r.p.m.
Max. torque: 88 oz.-in. at 7,200.
Power rating: .0865 B.H.P. per c.c.
Power/weight ratio: .068 B.H.P. per oz.

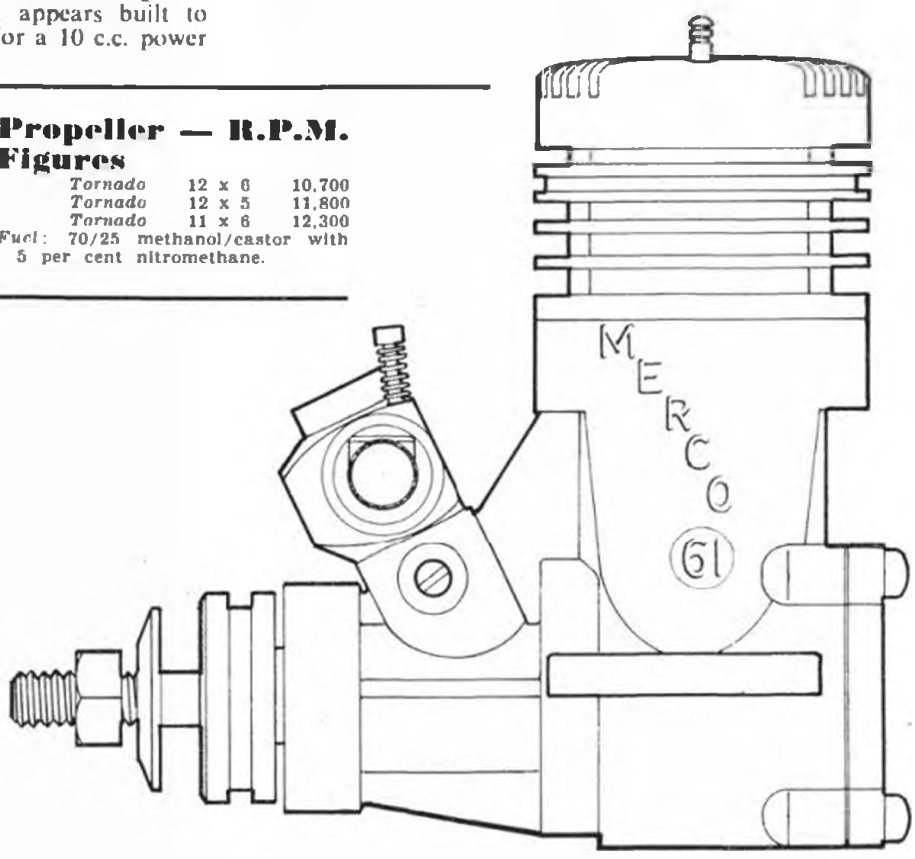
Material Specification

Crankcase: pressure die cast L.33 light alloy. Sand blast finish.
Cylinder liner: EN 1A steel, case hardened, ground and honed.
Cylinder jacket: turned dural.
Cylinder head: turned dural.
Piston: light alloy with two cast iron rings.
Connecting rod: light alloy RR 56 forging.
Crankshaft: EN 1A steel, case hardened and ground.
Main bearings: ¼ in. ballrace (rear), 8 mm. ballrace (front).
Crankcase back cover: pressure die cast L.33 alloy. Sand blast finish.
Gudgeon pin: EN.IA steel, hardened and ground.
Carburettor unit: turned dural body and barrel valve: brass spraybar.
Prop. driver: turned dural, split collet fitting.
Exhaust flap: throttle arm and link: black-finished steel.

Propeller — R.P.M. Figures

Tornado	12 x 6	10,700
Tornado	12 x 5	11,800
Tornado	11 x 6	12,300

Fuel: 70/25 methanol/castor with 5 per cent nitromethane.



SIGN POST

A MONTHLY ENQUIRY SERVICE

Each month, *Aeromodeller* and *Air-Britain* combine forces to answer interesting questions sent in by readers. Postcards, please, to "Sign Post" c/o Aeromodeller, 38 Clarendon Rd., Watford.

Tiger Colours

I am making your A.P.S. flying scale model of the 44 in. wingspan D.H.82 Tiger Moth from A.P.S. Plan FSP.555, what about some colour schemes for military Tiger Moths please?

(J.B., Birmingham.)

The long period during which Tiger Moths served with the R.A.F. saw many changes in colour schemes, and many Tiger Moths demobilised for civil use bore mute testimony to this by having considerable depths of coloured dope on their fabric! There is some difficulty in reconciling published photographs with the evidence of the official schedule of modifications, but the main changes can be identified.

Before the war, Tiger Moths shared the standard elementary trainer colour scheme: yellow overall, with black serial numbers on fuselage and below the wings. The De Havilland factory practice of introducing a hyphen into the serial number seems to have been followed later by Morris Motors Ltd., and most Tiger Moths carried these hyphens throughout their careers, in spite of numerous repaintings.

Dark green and dark earth camouflage on the top surfaces was introduced at the outbreak of the war, and normally extended down the fuselage sides as far as the stringer about 10 in. above the lower edge. Fins and rudders were initially left yellow. Fig. 1 shows 'N6938' of 46 E. & R.F.T.S. in this colour scheme at the end of 1939.

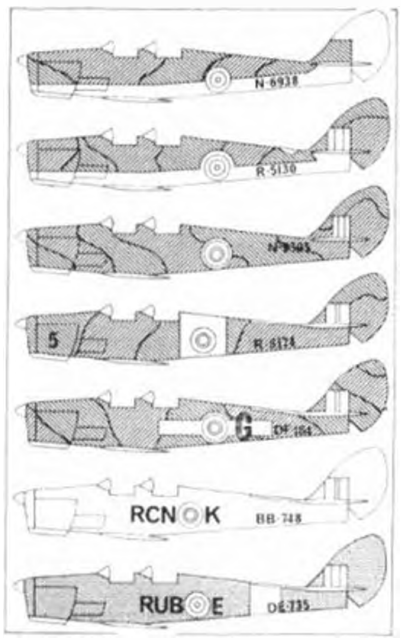
Mod 62, first seen on T5488 in April 1940, introduced a new scheme, including the extension of the camouflage pattern to the fin and rudder. A month later, Mod. 70 introduced a yellow outer ring to the roundels, and a fin flash of equal-width red, white and blue stripes, and 'R5130' is shown in Fig. 2 in these colours in the latter part of 1940. The square gas detection panel on the top of the rear fuselage should also be noted, it was yellow-green.

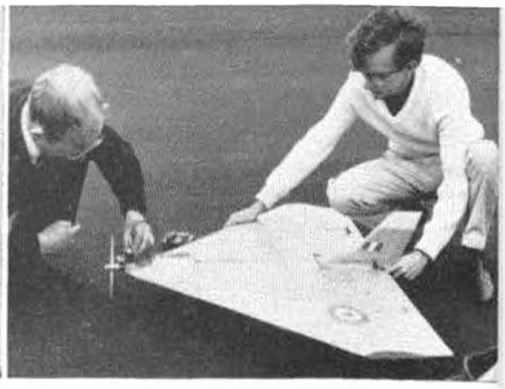
Mod. 76 was introduced in September 1940, and first applied to T7339 from the Morris production line at Cowley. The most significant change was to the roundels and fin stripes: in each case the white part was made much narrower than the red and blue. More fundamental changes were introduced by Mod. 93 in February 1941: the camouflage pattern was extended to cover the whole fuselage side, and at the same time the traditional requirement for alternate aircraft to be given right and left handed camouflage pattern on production was relaxed, doubtless at the insistence of Morris's production manager. The first machine to receive the new colours in the factory was T7887, but the extension of the camouflage pattern to cover the whole fuselage side was also carried out by R.A.F. units. Fig. 3 therefore shows 'N9205', circa 1941 with this scheme, but retaining the old equal-width fin stripes.

Camouflage patterns were of course introduced to reduce the chances of seeing the aircraft, but by the end of 1943 the risk of collisions around training aerodromes where anything up to 120 Tiger Moths might be based dictated the addition of yellow bands around the fuselage. These were normally applied vertically as shown on R5174 in Fig. 4, which has a 36 in. wide band behind the roundel, and yellow wing tips extending for 48 in. on the upper mainplanes. It also carries the individual number 5 in light blue, 12 in. high, on the engine cowling. Fig. 5 shows a variation on the theme: 'DF184' has a horizontal yellow band 18 in. by 36 in. on the fuselage side, with individual letter G in light blue outlined in black superimposed. Note also that after the end of 1941 the familiar anti-spin strakes were fitted to the rear fuselage, and the mass balance weights formerly fitted to the ailerons were removed. R5174 and DF184 both have the new pattern roundels and fin stripes.

After the war, the standard colour-scheme for Tiger Moths reverted to the pre-war all-yellow, and Fig. 6 shows 'BB748', coded RCN-K of 4 R.F.S. at Brough in August 1947. The final standard scheme was that shown in Fig. 7 (DE735, RUB-E of Birmingham University Air Squadron and Castle Bromwich in February 1949): silver overall with 18 in. wide yellow bands around the rear fuselage and the inner part of the upper wings, equal width fin stripes, and a roundel with wide white stripe and small central spot.

Three of the many different forms of colour scheme employed on Tiger Moths are shown in these photographs. Top all yellow, centre, part camouflaged, bottom totally camouflaged. Note that each possesses the unusual hyphen between the letters and numerals of the serial number.



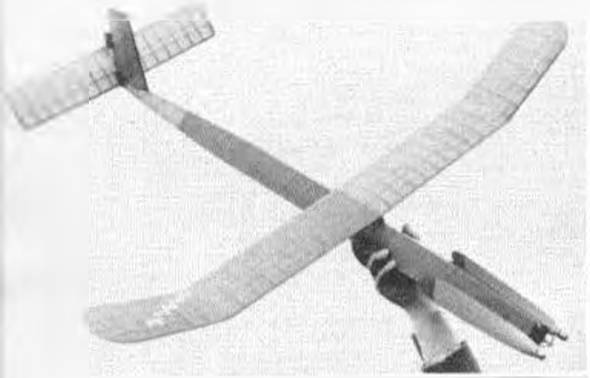


ROUND THE RALLIES

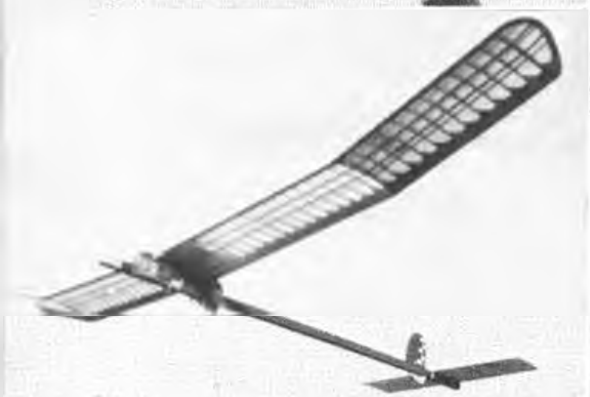
AT CHURCH FENTON OUSTON AND HALTON

Northern Gala

Held on September 6th at R.A.F. Church Fenton, near Leeds, the Northern Gala was well supported with 266 entries. Free flight conditions were almost ideal, with 13 in the rubber fly off as compared to three in power and five in glider. In Pay Load, Dave Hipperson from Croydon made history with a perfect score (see pic.). C.M.A. Cup for open glider went to Colin Morris of St. Albans flying his 18 month old 76 in. 'Suki Yaki' glass fibre fuselage model. Multi R/C was slow to start and only attracted seven entries, which seems strange when one reflects on the large entry elsewhere at rallies. Most notable happening was Pete Russell's fourth place flying a delta shared pylon racer. In sixth place D. Hammond of Grimsby flew "miniature multi" with a modified "Mercury Galahad" using E & M 10 gear on engine, rudder and elevator with a Cox Medallion 15. Of all the control line events we must first mention F.A.I. team race, as this was well organised and run entirely by one person, namely John Horsen of Wharfedale who checked each racer in the semi finals and organised the previous competitors to time and lap count the next race, as well as sorting out the entries times, etc. The Placer Haworth team made a resounding 4:20.8 in the heats and then the Long Davy team answered with a 4:25.7. In the final it was Ken Long taking first place from the World Champions. Les Davy's flying tactics were questionable. Several shouts of "disqualify him" were heard. ¼A team race attracted 25 entries. In the final, Alan Cooper's pit stops were very fast and contributed in no small part to Dave Balch winning in 8:42.4 with a modified

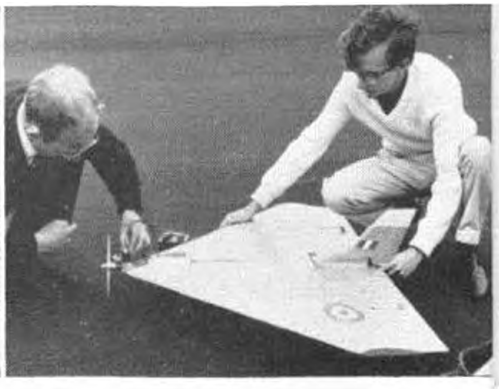


At top left to right, NORTHERN GALA, John Jackson (16) and Steve Smith (13) had tough luck with their ¼A team racer (Oliver Cub) when they bent the undercarriage during the first heat. Members of Feltham/Hayes, they made 4:42 at London Area Championships. Tom Jolley of Kidderminster uses Thunderbird wing on his "Mockin' Bird" with Merco 35 adapted to Fox silencer. Weighs 49 oz., has detailed cockpit, finished red, white and blue. Peter Russell (Worksop) had Cox Tee Dee 15 cut out during inverted pass when he entered his 4-channel R/C pylon racer in multi channel.



A left, NORTHERN GALA. John Shaw's 45 in. open rubber design which used 23 x 24 prop after downwind recovery. This junior Sheffield S.A. member placed 4th in rubber fly-off with 5:48. Next, Miss Leicester holding Dave Hipperson's payload winner. 46 in. span, 5" in. chord. Cox Tee Dee 049 engine, weight 11 oz., full maximum score of 9 minutes.

RUSH TROPHY GALA. Left, Dave White's increasingly successful A/2 which won for the designer, this one is actually Ron Firth's entry. Bottom left is Tom Stoker launching for 2nd place in rubber fly-off and at right, Jim McCann with sheet covered H.T.L. model (Cox Tee Dee 15), which has since made an impression in F.A.I. Trials, being watched by Station Commander "Bill" Drinkell.



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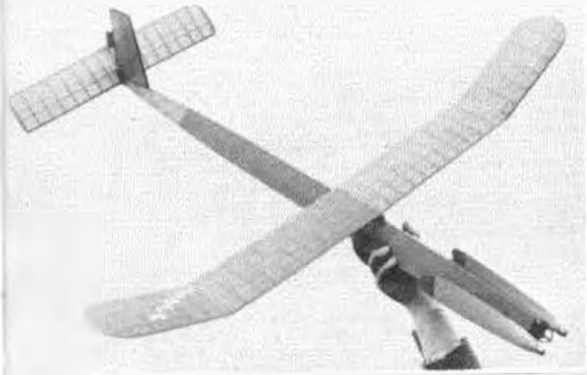

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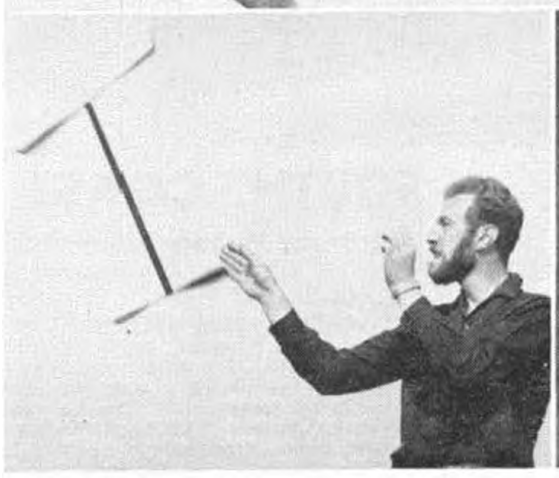
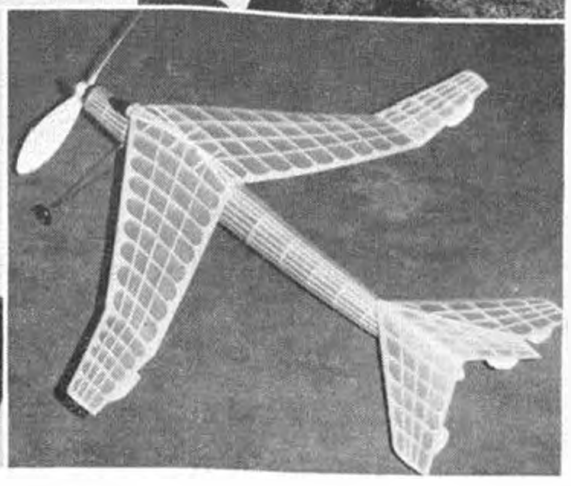




NORTHERN HEIGHTS. Top left, Concours d'Elegance winning Tipsy Nipper prototype by J. R. Campbell, finished in green and white. Photo disguises diminutive size. This R/C model is Cox .020 powered, using single surface sheet wing and whole rudder operated by swinging bar action from single channel receiver. Below it is equally ambitious twin 20 rotor autogyro by Roger Dudley of Weston Controliners, uses Cox Pee Wee. Also unconventional is S.M.A.E. secretary Peter Freebrey's entry in helicopter, using six strands ¼ in. rubber in 20 oz. steamed balsa tube to drive counter rotating 20 in. diameter screws. Top right is Ken Stokes' Cox Tee Dee 049 glass fibre fuselage ducted fan R/C entry, only 26 in. span, using Minimac receiver. Bottom right, an unusual shape by W. J. Evered of Slough in Concours d'Elegance, beautifully finished and covered in pink tissue, bought sighs of admiration from old timers who appreciate such shapes.

"Voodoo" kit. In second place Alan Dell made 9:28.2 after a slow run and in third place the Davy Long team cooked their motor and made 9:43.6. Alan Dell and Les Davy got their handles tied together, and this produced some antics. Class B racing was slow to start but fast and hectic in the final, the winning Dugmore/Bell team were whipping so hard at times that they only had marginal control over the model and it nearly hit the ground. Yates/Hampson were hard on their heels and finished 28.7 secs. behind. Combat was fast and lively and it was mainly a battle between the Wharfedale, Tynemouth and Feltham/Hayes clubs. In the semi finals L. Scurfield of Tynemouth beat D. Fry from Feltham with two cuts. The final brought together Dave Balch and L. Scurfield with a mid air collision. Balch won by virtue of still being able to fly, with both wings gradually falling apart. Stunt was won by Dave Day from Wolves flying a "Iroquois V" 53 in. span 39 oz., radial cowl model finished in dark blue and U.S. Navy markings, powered by his old faithful O.S. Max .35. In second place Tom Jolley of Kidderminster flew a much modified Thunderbird "Muckin' Bird". H. Dowbekin from Harwich flew a standard Ares to fourth place, using a home made silencer with large expansion chamber and long outlet pipe fitted to his Fox .35. Altogether a most enjoyable Gala, with the prizes presented to the winners by Group Captain D. R. Stubbs, O.B.E., D.S.O., D.F.C., Station Commander, R.A.F., Church Fenton, at the close of events. Well done Northern Area! Results. **Caton Trophy** (Rubber). 1 H. Tubbs (Baildon) 9:00 + 7:38. 2 B. Picken (Wigan) 9:00 + 6:11. 3 T. Stoker (Baildon) 9:00 + 6:00. **Hanley Trophy** (Power). 1 J. O'Donnell (Whitefield) 9:00 + 3:50. 2 T. Stoker (Baildon) 9:00 + 3:19. 3 Ilsley (Lincoln) 9:00 + 0:15. **C.M.A. Cup** (Open Glider). 1 C. Morris (St. Albans) 9:00 + 3:12. 2 A. Young (St. Albans) 9:00 + 3:10. 3 J. O'Donnell (Whitefield) 9.00 + 2:29. **Pay Load.** 1 D. Hipperson (Croydon), 9:00. 2 R. Stott (Baildon) 7:00. 3 J. Rowley (Tynemouth) 3:25. **Radio Control** 1 S. Foster (Lincoln) 3,870. 2 J. Bickerstaffe (Rugby) 3,120. 3 Stratford 2,815. **Budapest Trophy** (A 1/R). 1 Balch/Cooper (Feltham/Hayes) 8:42.4. 2 A. Dell (Feltham/Hayes) 9:28.2. 3 Long/Davy (Wharfedale) 9:43.6. **Wharfedale Trophy** (F.A.I. 1/R). 1 Long/Davy (Wharfedale) 9:49.9. 2 Place/Haworth (Wharfedale) 9:54.0. 3 Nixon/Ellis (Hinkley) 12:20. **Eta Trophy** (B 1/R). 1 Dugmore/Bell (Novocastria) 6:27.3. 2 Yates/Hampson (Leigh) 6:56.0. 3 Hardcastle/Stott (Wolves) 8:18.6. **Combat** 1 D. Balch (Feltham/Hayes). 2 L. Scurfield (Tynemouth). **Stunt.** 1 D. Day (Wolves) 1,141. 2 T. Jolley (Kidderminster) 1,129. 3 H. Dowbekin (Harwich) 1,029.

Rush Trophy Gala

Thanks to the kind help of Sqd. Ldr. Drinkell the 1964 Novocastrian Rush Trophy Gala was held at R.A.F. Ouston, some 12 miles from Newcastle upon Tyne. Facilities were first class and many modellers took advantage of the very reasonably charged 'bed and breakfast' service plus hot lunch (for under 10/-). Fine conditions prevailed for the meeting which was well attended, despite the Northern Heights and Scottish counter attractions. Unfortunately the southerly wind took the models across the narrow leg of the airfield, but even so three minute flights were possible within the airfield boundary during the calmer periods of the day. Dave Wiseman won the Rush Trophy plus excellent glassware prize by virtue of his 1st place in rubber, 2nd in power and 4th in glider. Tom Stoker was a close second, but did not compete in glider. Dave White put in over 26 minutes, the highest aggregate score. At one period during the day no contest flights were made for ½ hour because most of the modellers had gone to the mess for their lunch! All the modellers who stayed overnight were full of praise for the facilities put at their disposal by the modelling minded Commanding Officer. Results. **F.A.I. F/R.** 1 Place/Haworth (Wharfedale) 9:49.5. 2 Nixon/Ellis (Hinckley) 10:41. 3 Turner/Humphries (Wharfedale). **Class B T/R.** 1 Yates/Hampson (Leigh) 7:39. 2 J. Horton (Wharfedale) 8:30.9. 3 Place/Haworth (Wharfedale) 10:45. **Combat.** 1 L. Scurfield (Tynemouth). 2 T. Lee (Wharfedale). **Multi R/C.** 1 P. Wilson (Desmond). 2 P. Huntley. **Power.** 1 T. Stoker (Baildon) 9:00. 2 D. Wiseman (York) 8:53 + 3 D. White (York) 8:10. **Rubber.** 1 D. Wiseman (York) 9:00 + 4:05. 2 T. Stoker (Baildon) 9:00 + 3:48. 3 R. Pollard (Tynemouth) 9:00 + 3:23. **Glider.** 1 D. White (York) 8:14. 2 R. Swinden (Teeside) 6:44 + 2:40. 3 G. Abbott (York) 6:44 + 2:23.

Northern Heights Gala

Postponed from its traditional neat mid summer's day date, the popular gala which always attracts more sports flyers than actual competitors, still did not want for magnificent weather and flying conditions on September 13th. Sheltered by the attractive Chiltern Hills, Halton became a family picnic spot. Onlookers considerably outnumbered flyers and though the junior aspect remains disappointingly lacking in support, it was at least comforting to see so many old timers around looking in on the latest state of the art and in some cases encouraged to

(Continued on page 571)

Club and Contest News

At left, half-size S.E.5 made by Nuneaton aeromodellers for the town carnival and static displays, uses a Power-Pack engine for drive. At right, 4-channel radio control Fillon's Champion from A.P.S. Plans and multi channel Bucker Jungmeister by Roy Yates as seen at the North London S.M.E. Exhibition (see reports in text).

MODELS FOUND

R/C Veron Deacon, A.M.10 powered found at Molesworth, June 21st. Contact D. Miller, Whitewell Way, Coton, Cambs. Semi-Scale F/F power model in Chobham area. Contact J. F. Allen, 149 Rose Green Road, Aldwick, Bognor Regis, Sussex. Fox powered pylon model near Chobham. Contact J. O'Donnell, 5 Great North Road, Oaklands, Welwyn, Herts.

Fine Show

The North London Society of Model Engineers recently held a large exhibition, open for six days to the public at Southgate. The N.L.S.M.E. cater for all modelling interests and it is divided into sections, i.e., model cars, trains, aircraft, etc. Though not the major section aircraft models were much in evidence. Mostly radio control, there was an abundance of A.P.S. plans with such veteran favourites as the scale A.B.C. Robin converted to single channel and a 10 ft. span streamlined Fillon's Champion slope soarer with four channel radio gear. Most ambitious model was a 51 in. span scale Bucker Jungmeister at present uncovered to be powered by a Super Tigre .56. The model has scale type U/C suspension and will soon be fitted with F.A.M. 10 channel radio gear. Builder Roy Yates has plenty of scale gen, so a really good scale model should result for next years contests. Dell Welch had a very neat Cox T-D .02 single channel low wing model on show, it even had coil sprung trike U/C gear.

SOUTH COAST GALA

With 176 entries and 38 competitors in various fly offs the 1964 South Coast Gala held at Chobham Common on August 30th was a great success. Although the South Eastern Area regretted not being able to obtain the use of their coastal site, every effort was made to make the alternative venue at Cobham a success. It was a perfect day with hot sun, plenty of thermals and only slight drift. Most Rubber and Power fliers made easy max's but the Glider boys had to wait for the breeze to come up. The Power fly-off was notable with G. Head from Portsmouth making 14:46. (See last month's Club and Contest News.) Results. Fly-off times: Rubber, 1, F. Boxall (Brighton) 8.59; 2, W. Hubbarh (N.K. Nomads) 7:45; 3, R. Pavely (Hornchurch) 7:21. Glider, 1, C. Morris (St. Albans) 8:25; 2, J. O'Donnell (Whitefield) 8:05; 3, T. Williams (Portsmouth) 5:58. Power, 1, G. Head (Portsmouth) 14:46; 2, J. West (Brighton) 8:27; 3, P. Manville (Bournemouth) 3:53. 1A Power, 1, D. Hipperson (Croydon) 7:45; 2, G. French (Essex) 2:59; 3, D. Pepperill (Stevenage) 1:35. F.A.I. (All-in), 1, E. Drew (Bristol & West) 5:50 (Glider); 2, B. Nicholson (Canterbury) 4:35 (Power); 3, L. Sadden (Canterbury) 4:29 (Power). Tail-less Glider, 1, G. Gates (Brighton) 6:45; 2, P. Hedgeman (Hayes) 6:07; 3, D. Kinder (C.M.) 5:06. No fly-off in tail-less event.

King Size Models

Nuneaton Aeromodellers produced a ¼ full size S.E.5 for their Town Carnival and static displays. The S.E.5 is built as per full size with stringered fuselage and box section. The wings have normal ribs airfoil shape, etc., and the whole model was covered in muslin and finished in colour. Propeller carving was done by club members and a Power-Pack engine does the driving. There is talk of converting it to control line at a later date! They also constructed a 1/5th scale Spitfire and 1/7th B.A.C. Lightning, for the same carnival!

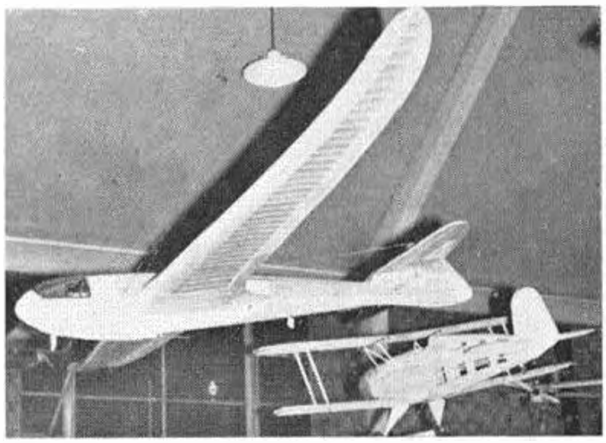
In Search of a Field

Twist to the old story of the lost pilot landing to find his whereabouts came when four Debdenairs M.F.C. members were endeavouring to locate R.A.F. Gravely for an area meeting. Having become lost in the wilds of Huntingdonshire they spotted a Piper Pawnee cropduster in a field and asked the pilot the way! Debdenairs have the facility of the Community Centre at Loughton Hall and meet every Friday in winter months, and alternate Fridays during the summer. They enjoy use of a flying field at Abridge in Essex and in one recent scramble the winner was D. Goodenough flying a Keilkraft "Pirate" with D. Swift 2nd using A.P.S. "Luton Minor" and in 3rd place something we can hardly credit, R. Harris flying a "Mercury". According to our records that is a mighty big aeroplane for scrambling!

Second Hayes Speed Rally

September Meeting

Plenty of action with the pylon in continual use for 8½ hours, and many close speeds giving rise to friendly battles ensured an enjoyable time for speed fans at the Hayes control line circuit on September 20th. When combining the good weather conditions with highly encouraging entry figures the Hayes club were most satisfied with the results of their efforts. Many Cox T-D .09 owners came along intent on beating Bill Bessent's record holding Cox T-D .09 flying wing, but although Bill never had a run absolutely on time, his 95.16 m.p.h. best was over 10 m.p.h. faster than his nearest rival. British team members Dick McGladdery and Brian Jackson both had misfortunes. A 10 c.c. model's dolly went through Dick's model as he was watting to fly, and when Brian had a good run both watches failed to start! Kevin Lindsey made 126.3 in F.A.I. (claimed as a new British record) with the same model and motor he used in Hungary. The venturi has since been modified and now has a multi-hole periphery jet, rectangular insert which helps get a shade more m.p.h. Many fliers were around the 117 m.p.h. mark in Open 2.5 but Kevin Lindsey managed a 124.3 m.p.h. run to take the lead. For much of the day John Hall and Ralph Gould were level at 139.8 m.p.h. in the 5 c.c. class until John managed an in setting for 142.5 m.p.h. with his much modified Dooling .29. The previous weekend Ivor Roffey had been doing 160 m.p.h. with his new McCoy .60 model, but in a contest flight he lost the front half of his cowl in a bad take off and this held his speed down to 149.1 m.p.h. John Taylor also made 149.1 m.p.h. and then things went wrong for both of them, the final 10 c.c. placing being decided on their second fastest times. Results: Class 1 (1.5 c.c.). 1, W. Bessant (Southampton) 95.16 m.p.h.; 2, G. Farmsnorth (N. Sheffield) 83.46 m.p.h.; 3, P. Ball (Wanstead Warhawks) 81.33 m.p.h. Class 2 (2.5 c.c.). 1, K. Lindsey (Hayes) 124.3 m.p.h.; 2, W. Furbank (N. Sheffield) 117.6 m.p.h.; 3, B. Jackson (Worksop) 117.1 m.p.h. Class 3 (F.A.I.). 1, K. Lindsey (Hayes) 126.3 m.p.h. Class 4 (5 c.c.). 1, J. Hall (West Essex) 142.5 m.p.h.; 2, R. Gould (F.A.S.T.E.) 139.8 m.p.h.; 3, I. Roffey (Brixton) 131.5 m.p.h. Class 5 (10 c.c.). 1, I. Roffey (Brixton) 149.1 m.p.h. + 144.3 m.p.h.; 2, J. Taylor (Hayes) 149.1 m.p.h. + 0 m.p.h. Beginners .049 Class. 1, A. Dell (Feltham) 72.4 m.p.h.



Contest Calendar

Oct. 25th	*Handsworth Combat Rally*, Hill Top Farm. Class A & B. Pre-entry in class A 2/- to G. Bryant, 61 The Broadway, Handsworth, Birmingham 2, by October 1st.
Oct. 25th	*Annual Northern Area All F.A.I. Contest*, R.A.F., Topcliff. F.A.I., R/G/P, T/R, Stunt and Combat. Pre-entry by 18.10.64 to: G. Stringwell, 111 Green Lane, Wickersley, Rotherham.
Oct. 25th	*Blackheath Gala, Chobham Common.* Open R/G/P ½A Power.
Nov. 1st	*Wharfedale* 1,000 *B T/R* (International Postal Event).
Nov. 1st	*St. Albans Gala*, Chobham Common. R/G/P and ½A Power. Entry 2/- on the day.
Nov. 1st	*East Anglian Area. National Decentralised all-in F.A.I. contest.* Results including, name, S.M.A.E. No., club, class of model, must be in by 8.11.64. Pre-entry to: M. Woodhouse, 33 William Street, Norwich, Norfolk.
Nov. 15th	*Southern Area Winter Rally*, Beaulieu Airfield, Nr. Southampton. R/G/P ½A Power. Enquiries to: D. E. Coffin, "Glenvale", Chinham Rd., Bartley, nr. Southampton, Hants.
Nov. 22nd	*S.M.A.E. C/L Contest*, Charville Lane Circuit, Hayes, Middx. S.M.A.E. Stunt, Combat, and all Speed classes. Entry on the day. Note, no T/R.
Dec. 6th	*Crawley Winter Rally*, Chobham Common. Coupe d'Hiver, A/1 glider, and ½A Power. Starts 10.30.
Dec. 6th	*Airtech R.T.P T/R Meeting*, Airtech Ltd., Haddenham, Bucks. Indoor rubber R.T.R. team racing. Starts 1.30 p.m.
Dec. 26th	*Farnborough Boxing Day Rally*, Chobham Common. R/G/P and all-in F.A.I. event.

Northern Heights Gala (continued from page 569)

return to the building board. A/2 gliders were this year's subject for the Queen Elizabeth Cup and with a flight duration of about 120 seconds to the boundary on the small airfield, this became very much a game of tactics and recoverability, so it was no surprise to find John O'Donnell leading the field, followed by two of the most successful glider flyers of the year, Al Wisher and Dave Tipper in close chase. Each of the seven other events plus Concours d'Elegance in the hangar were equally well supported and while perhaps there were fewer club camps around with those traditional Northern Heights display parks of ambitious unorthodox subjects, the character of the meeting remains happily undisturbed for the 32nd year since its inception. **Results: Radio** (Spot Landing) 1 N. Butcher (Croydon) 19.5 pts, 2 G. Saw, 21 pts, 3 B. Burt, 32 pts. **Helicopter.** 1 R. Ball (Aylesbury) 4:46, 2 R. Dudley (Weston) 2:27, 3 A. Cooper 2:23. **Open Power.** 1 V. Taylor 7:38, 2 A. Percival, 7:20, 3 J. Stevens, 7:14. **Open Glider.** 1 C. King (Cambridge) 9:00, 2 G. Head (Portsmouth) 8:25, 3 D. Trenchard (Oxford) 8.21. **Open Rubber.** 1 T. Payne (Northants) 9:00 + 9:01, 2 A. Wells (Hornchurch) 9:00 + 7:42, 3 J. Barr (Hayes) 9:00 + 7:00. **¼A Power.** 1 D. Hipperson (Croydon) 9:00 + 4:12, 2 G. Connell (Croydon) 9:00 + 2:00, 3 J. Boxall (Portsmouth) 7:34. **Combat.** 1 P. Tribe (Northwood), 2 M. Morris (Northwood). **Queen's Cup.** 1 J. O'Donnell (Whitefield) 9:00 + 1:55, 2 A. Wisher (Croydon) 9.00 + 1:47, 3 D. Tipper (St. Albans) 9:00 + 1:37. **Gala Champion.** G. Head (Portsmouth). **Concours d'Elegance. Flying Scale.** 1 R. Campbell (Fairey Nipper). **Power.** 1 Bickerstaffe (Taurus). **General Flying.** N. Noel (A/2). **Special Prize.** A. Clements, (non flying scale Bristol Scout).

NORWICH NEWS

Scores from the Norwich M.A.C. have taken a swing upwards since they first became interested in contest flying. Club members B. Halford, Oldfield, and M. Woodhouse all making 9:00 in the Thurston. Woodhouse also made second place in the East Anglian Area meeting held at R.A.F. Molesworth on June 21st flying the club designed A/2 "Wichita", also at this meeting Geof Lefever made 14:29 in the Wakefield A/2 combined event flying his Fevair design. Other high scores in the club are 13.57 by M. Woodhouse and 13:34 by B. Halford in the Weston Cup. The club F.A.I. glider contest was won by B. Halford at 13:24 and Wakefield by Andy Anderson at 12:10. The club's radio control group are also very active and practice on a local airfield most weekends.

Dick Edmonds made Maureen Smith his happy September bride at Little Marlow. Such a notable occasion accounts for Dick's temporary lapse of activity in the team race circles and we know that all our readers join us in wishing the new team every happiness in the future.

International 1000 Lap F.A.I. Results

Fought in five countries the Postal International 1000 lap F.A.I. team race gave a victory for Norway. Great Britain had the most entries and it is interesting to note all our entries used Eta 15's. The Brad'ey/King team had to change the engine because of a broken con. rod in their Eta, and finished with a Webra Mach II.

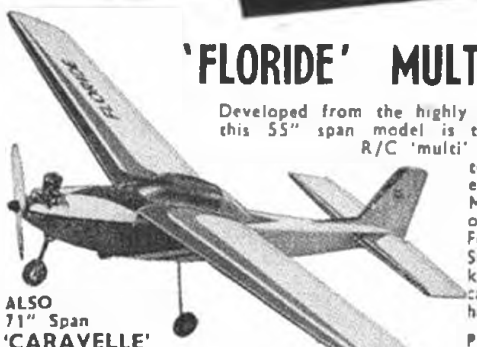
Position	Team	Country	Time	Pitstops	Motor
1.	H. Kolberg/V. Thorsdalen	Norway	51:55.8	29	Oliver Tiger
2.	Place/Haworth	G.B.	52:21.1	25	Eta 15
3.	Wooding/Stevens	N.Z.	52:46.7	19	Eta 15
4.	Long/Hillyard	G.B.	53:17.0	19	Eta 15
5	Ether/Roach	Australia	53:39.0	—	—
6.	Dell/Balch	G.B.	54:57.5	25	Eta 15
7.	Horton/Hughes	G.B.	57:18.5	17	Eta 15
8.	Gotheim/Jensen	Norway	58:49.4	34	Eta 15
9.	Ball/Malyon	G.B.	61:13.0	20	Eta 15
10.	Allen/Franklin	G.B.	61:30.0	29	Eta 15
11.	Duff/Lagan	N.Z.	62:30.0	35	Oliver Tiger
12.	Gilchrist/Carr	Canada	68:09.0	—	—
13.	W. Logan	Australia	73:02.1	—	—
14.	Bradley/King	G.B.	78:17.8	23	Eta & Mach II
15.	Easton/Patton	Canada	79:10.0	—	Oliver Tiger

Vintage Engines on T.V.

Leatherhead D.M.F.C. were once again exhibitors at the second model Railways and Engineering Exhibition held at the Dorking Halls, Dorking, from September 3rd-5th. Static display consisted of a widely varied selection of flying models of all types except control line speed. A 1914 compressed air engine, pulse Jet unit and a selection of home made silencers were all inspected by an interested public. The 1/5th scale working model of a Gnome Rotary engine was also on show. An enlarged flight area for electric R.T.P. and six motorised Keil Kraft and Veron models was the focal point of the clubs stand. B.B.C. T-V covered the whole show which was televised in the South-Eastern regional programme, "Town and Around". The club also had very good coverage in the local papers and deserve all the praise they have received after putting in so much effort.

1964 Graupner KITS

'FLORIDE' MULTI - TRAINER



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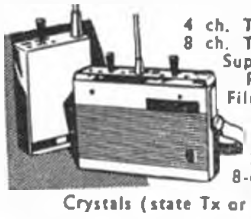

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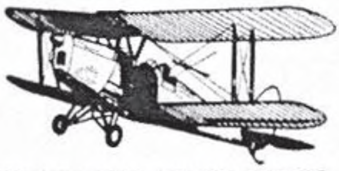

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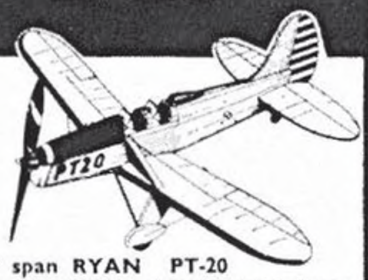

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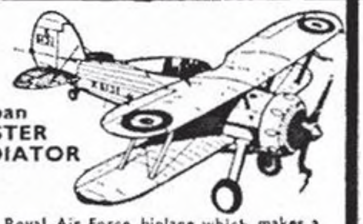

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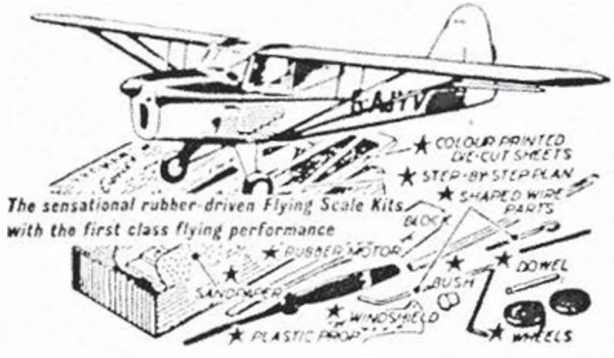

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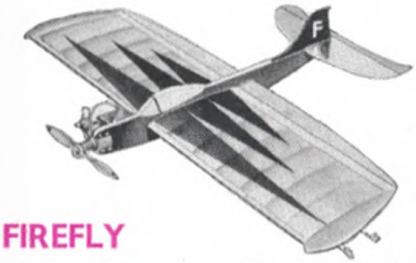

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18/2

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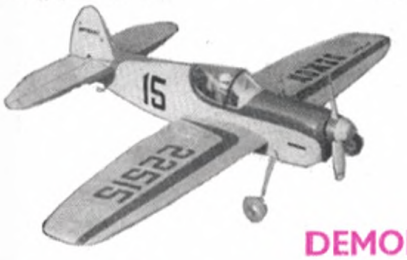
16/3



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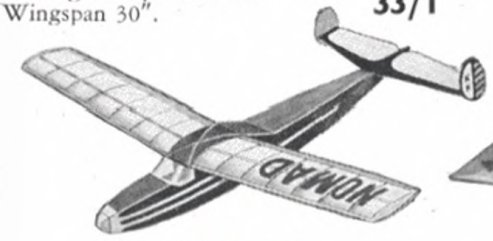
9/2



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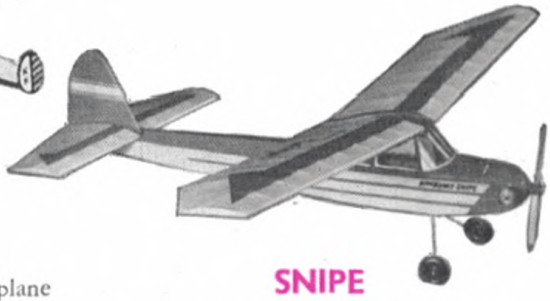
5/6



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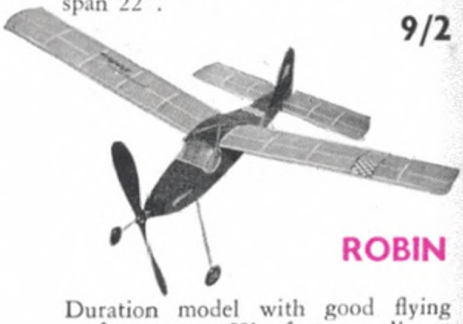
22/1



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9/8

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