

Sticks and Tissue No 124 – March 2017

If you can contribute any articles, wish to make your point of view known etc please send to or phone 01202 625825 JamesIParry@talktalk.net The content does not follow any logical order or set out, it's "as I put it in and receive".

Thanks to Mark Venter back issues are available for download from <http://sticksandtissue.yolasite.com/>

Writings and opinions expressed are the opinion of the writer but not necessarily the compiler/publisher of Sticks and Tissue.



John Myers' KK Chief on its way up a couple of weeks ago at DMFG site

From Jud Bock

James, I enjoyed reading about the Fox 35 and it's history in the last newsletter. Of course, I was there when that history was taking place.

I grew up in a small town in Nebraska, in the dead middle of the country. The towns population if I remember it right, was about 2000. My folks had a Gamble store where I worked, and a couple of doors down there was a furniture store, owned by one of my best pals parents. We built and flew control line models together and were about the only ones in town that did it successfully.

We started out with O. and R. .29's, which were really lousy engines for control line. Any time you tried a loop, they quit. Well, reading one of the model magazines at the time, "Flying Models" I believe, it talked about a new engine that just came out that was very powerful, and if set up correctly would run in any configuration you could put it in at the end of the lines. We had some doubt, but talked our parents into buying us one of them, and were we pleasantly surprised. They were a great engine that never quit in the air and had twice as much power as the O. and R.s did.

They were pretty ugly I thought, but boy did they run. This story about them brought back great memories from 1950 through 1953, when we flew them, when I was 18 years old.



Thought you might like the picture of my Fox 35 taken in almost the same angle as the one shown in the Test report. Bill Wells

From Dick Twomey

Thanks from this small corner of the Southern Hemi, where another nostalgic 52 pages of S&T have just landed .For fun I attach pics of my layest creation, a twin electric RC which hasn't left the billiard table yet...awaiting a battery!

"3B" is of course the Mauritian registration, and magpies ... in my youth ... always came in pairs.

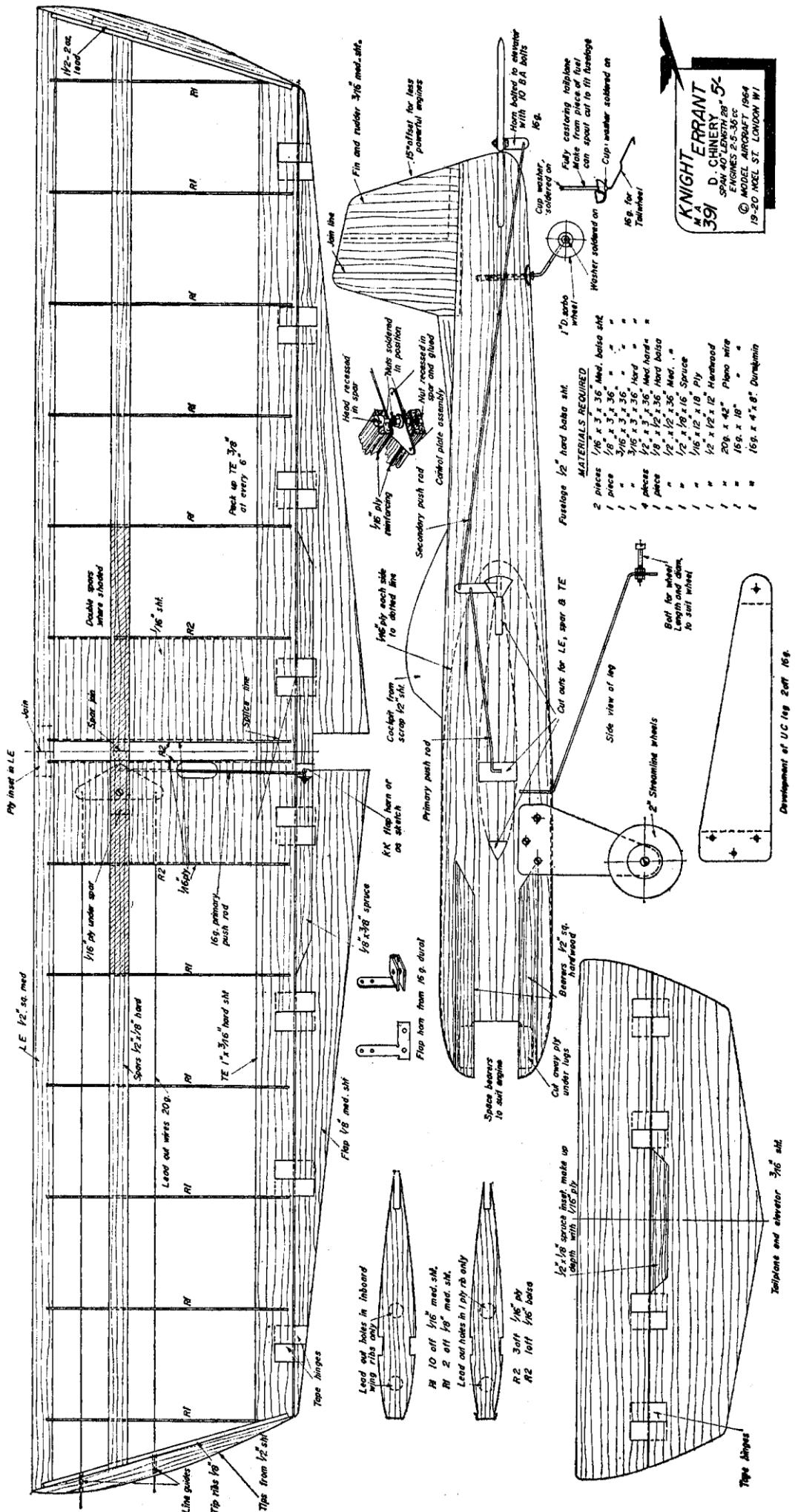


From Graham Crawshaw

Enlarged Frog Widgeon . Attached pictures of the enlarged free plan from I think Model World. I increased span to 56 inches and instead of electric as plan installed a PAW diesel thought it might be of interest







Knight Errant an easily built profile stunter for 2.5 – 3.5 cc engines by D Chinnery from Model Aircraft May 1964



Knight Errant has been developed as an easy-to-build stunter, for 2.5 c.c. engines which, although fully stuntable, yet remains sufficiently docile for a beginner. For the real novice the flaps should be fixed and disconnected, when the model makes a very stable trainer.

Construction

Wing—Cut out all ribs and components, splice the T.E. and join the spars with doublers over the centre 12in. Drill the hole for the bellcrank pivot in both spars and pin bottom spar down on plan. Pin the T.E. down on top of 3/8 in. packing at alternate ribs, then glue the ribs to the spar and T.E.

Fix lead-outs to the bellcrank using the soldered loop method detailed on the plan. Cut primary push rod to approx. length and

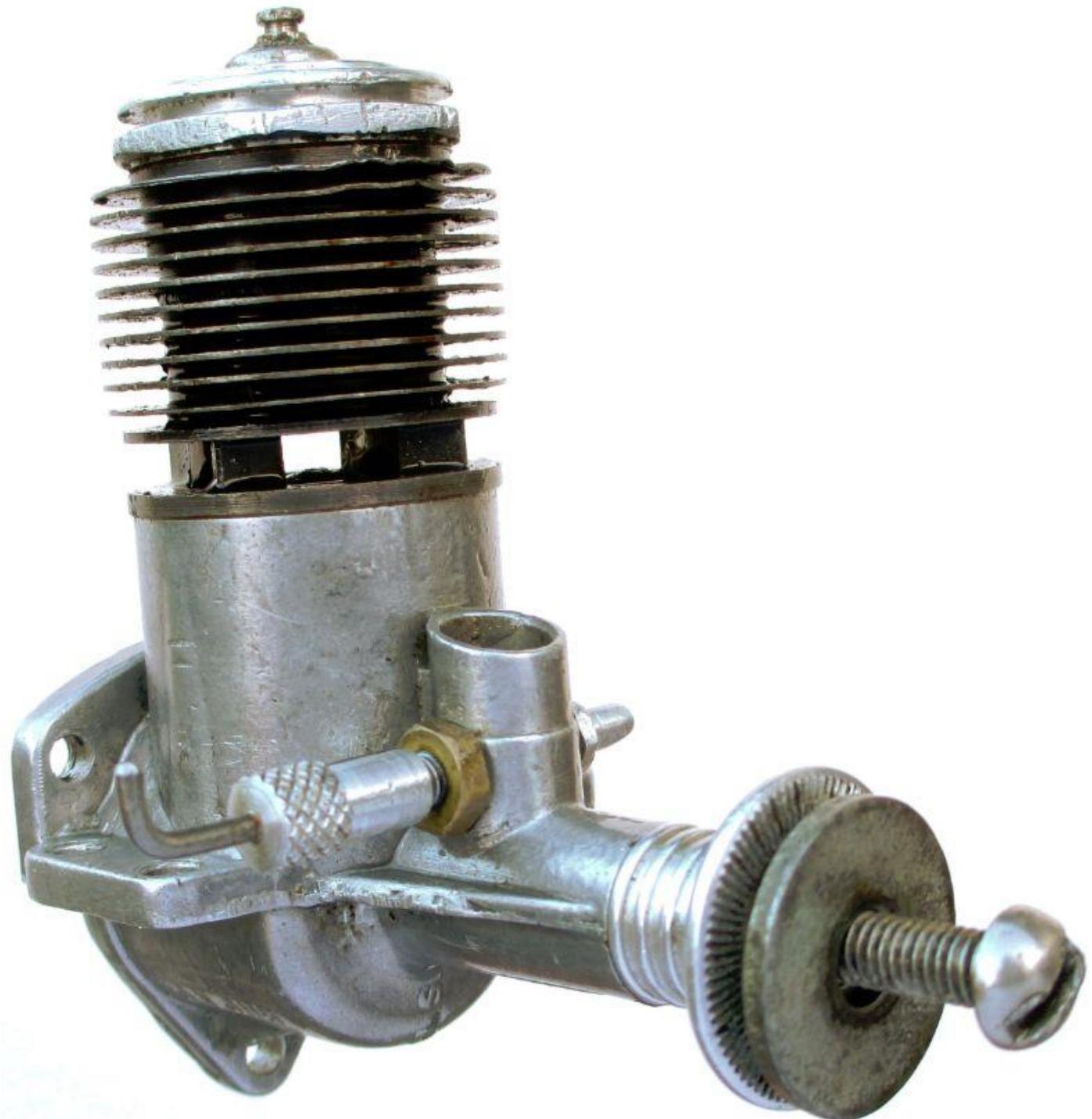
locate forward end in the bellcrank, using a soldered cup washer. Fix the bellcrank pivot bolt in top spar, recessing the head and fit the bellcrank, spacing it along the bolt with soldered on nuts as shown in the diagram. Holding the bellcrank on the bolt, pass the lead outs through the holes in the inboard ribs, until the bottom end of the bolt drops into the hole in the bottom spar and glue spar in rib slots.

Carve L.E. to section, slot rear face to fit ribs and glue in position, using the small piece of ply to key the halves together. When all the joints are set, remove the wing from the plan and screw the nut on the lower end of the bellcrank bolt, recessing as for the bolt head. Fill both recesses with balsa cement to stop rotation. Bolt flap horn to flap joiner and glue latter well to inboard flap. Cut tips from scrap 1/2 in. sheet and carve to shape, recessing the outboard one to take the wingtip weight. Drill lead-out holes in the inboard tip. Glue tips on well and glue short lengths of spring curtain rod in the holes in the inboard tip. Sand wing framework and give one coat of sanding sealer to all surfaces in contact with the covering. Cover wing with heavy Modelspar or lightweight silk and give two coats of clear dope.

Fuselage and Tail—Cut out all components, checking bearer spacing against the engine to be used. Glue bearers in with P.V.A. or Araldite. Slip top and bottom halves of fuselage over wing spars, gluing well to centre ribs and along the joint. After checking for line up of fuselage, give a thin coat of P.V.A. or contact adhesive on the insides of the ply plates, slide them over the wing and clamp up tight and leave to dry for at least six hours. While glue is drying, sand flaps, fin and tail parts smooth. Pass the outboard end of the flap joiner through the cut-out in the fuselage and hinge the inboard flap, using the tape method.

Bend primary push-rod to length and cut off surplus. Locate in lower hole of flap horn with a soldered cup washer. Glue fin in slot and hinge elevator after letting in spacer reinforcement and glue and bolt the horn in place with 10 B.A. bolts. Cut and bend secondary push rod to length, fix ends in horns and adjust tail and elevator position in slot to give neutral flap and elevator positions.

Glue the tail in place and solder washers on push rod ends. Give all bare wood surfaces two coats of sanding sealer, sanding after each Coat. Give two even coats of clear dope over entire model before adding final colour and fuel proofing.



From Bill Wells

I found this engine interesting it's an OK Cub 19. A powerful 19 but only weighing 3.05 ozs.

The picture comes directly from my collection of engine pictures. Engine buffs will notice there is something wrong with the engine. I bought the engine 'New in Box' but there was no 'needle'. So I made a needle. Unfortunately I was so concerned on getting the thread to work I got the spindle between the knurls slightly larger diameter than it should be. At the time I didn't have an original needle to copy. I wondered if the buffs out there will notice!!!

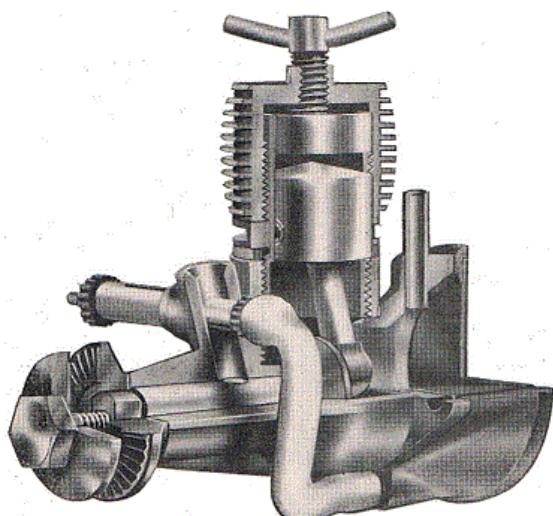
Bill Wells

From Martin Briggs.

Thank you for including the pictures of my Mercury Matador in issue 122. I have now flown it and the long wait for a fine, settled Winter day was well worthwhile, because she flew straight off the board with no problems at all. We must never forget how good those model aircraft designers were back in the day because, although I had the luxury of a very reliable, single function, proportional control system it soon became obvious that my Matador would make an excellent and easy to trim free-flight model – though I'm not yet ready to put that to the test. I've since built another vintage classic, a Sharkface, from the Eric Clutton plan I've had since it was given away as a freeby in my 1965 Aeromodeller. I built the airframe exactly to plan but installed a single servo, instead of an escapement and substituted the Cox .049 with a small brushless motor, 18A ESC and 2S 850 Li-Po. Amazingly, it came out at only 250 grams all up and, like my Matador, it flew straight off the board. Flight times are a good 8 minutes with ample capacity in reserve and, although I've only seen them on You-Tube, I don't think I'm down on power from Cox .049 powered examples. Rolls are easy and I'm sure that I'll get some decent loops when my technique improves. It's a real fun model and I don't know why it took me so long to get round to it. My thanks go to Mr Garrity and his recent, excellent RCM&E article which finally kicked off my build and my monthly dose of Sticks and Tissue which got me back into single channel flying.



Gee-Bee Sabre 150 from Model Aircraft July 1953



The 1.5 C.C. class engine, the first models of which were introduced following the S.M.A.E.'s institution, some years ago, of a C/L speed class of this capacity, has now become popular, both inside and outside Britain, for many other types of models.

One of the most interesting examples of this class is the Australian "Gee-Bee" Sabre 150 model.

This is, perhaps, the best looking 1.5 C.C. engine yet introduced. Its appearance is neat and functional and is aided by a good finish. The neat conical tank-mount, which also forms the rear cover of the crankcase, resembles the layout now becoming increasingly popular among American "Half-A" class motors and, with the fuel pipe leading forward from

the bottom, results in a particularly neat installation, without the large and unsightly loops of fuel tubing encircling the engine that are often seen on more conventional designs. This layout is particularly pleasing for power-duration applications. So far as general design is concerned, the Sabre 150 uses the Arden system of circumferential porting and, in this respect, resembles the English made Elfin 1.5 c.c., although the exhaust belt is divided into three segments with, correspondingly, three transfer passages instead of the Elfin's four. It is, of course, a shaft rotary-valve motor but, like the Sabre 250 model (M.A. Engine Tests, No. 43), the shaft is kept short and the airscrew is secured by means of a separate hexagon-head stud which screws into the front end.

Two long machine screws are used for mounting the engine and, since the crankcase cover is integral with the tank-mount, a satisfactory seal is obtained by employing these two screws to hold these two stiff castings together.

Messrs. "Gee-Bee" Products, of Grange, South Australia, under the direction of designer Gordon Burford, who build and now distribute, the "Gee-Bee" engines, are them selves die casters and, as we would therefore expect, the die castings which comprise the tank and crankcase of the Sabre 150, are of excellent finish. On the Sabre 250 model, DTD. 424 alloy was employed, but the 1.50 uses a 12 per cent. silicon alloy instead.

Specifications

Type: Single-cylinder, air-cooled, two-cycle, compression-ignition. Induction via shaft type rotary-valve with sub-piston supplementary air induction. Radial exhaust and transfer porting with conical piston crown.

Swept volume: 1.517 c.c.

Bore: 0.503 in. Stroke: 0.466 in.

Compression-ratio: Variable.

Stroke/Bore ratio: 0.926: 1.

Weight: 2.8 OZ. including tank.

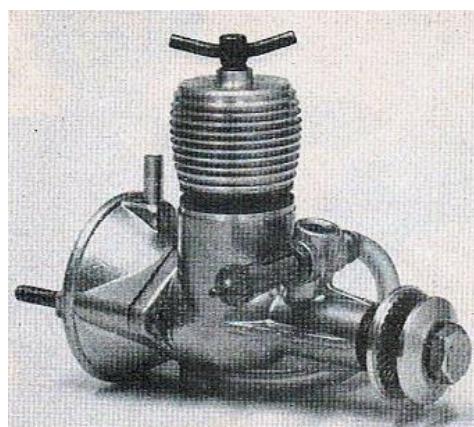
General Structural Data: Crankcase and fuel-tank die-cast in 12 percent, silicon-aluminium alloy. Hardened steel cylinder-liner screw threaded to crankcase casting. Crankshaft of 3 per cent. nickel-steel, hardened, with separate airscrew stud and running direct in crankcase material. Machined duralumin cylinder barrel, screw-threaded to cylinder-liner. Connecting-rod machined from duralumin. Hardened steel piston with pressed in gudgeon-pin. Spray-bar type needle-valve assembly with brass body and polished steel needle. Two point bulkhead type mounting.

Test Engine Data

Running time logged prior to test: One hour.

Fuel used: "R.M." Diesel.

Performance

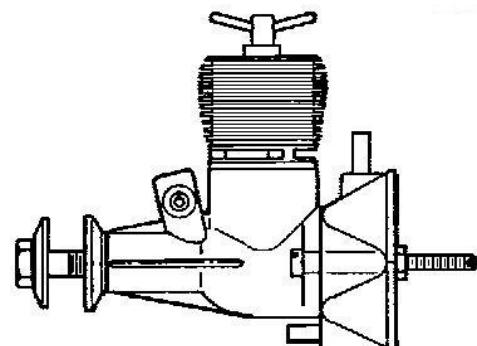


In starting, the Sabre 150 responds readily to standard procedure and one is not conscious of any special requirements in this direction. It does, perhaps, like to be a little "wetter" than some, but starting remains good, with the engine hot or cold.

When the engine is hot and loaded for the most popular operational speed range (i.e., around 8,000-10,000 r.p.m.) we found it best to slacken off the compression lever about one-sixth of a complete

revolution, choking the intake for several turns but not disturbing the needle-valve from its running setting. The running setting on our test engine, incidentally, was two turns open. So far as other handling characteristics are concerned, the compression control is good; being

responsive and holding its setting firmly without being too stiff or uncomfortable to adjust. The needle-valve, as on most engines of this type and size, is rather near to the prop disc, but this is no great disadvantage since readjustments to the mixture strength are seldom required while the engine is running once the initial settings are known. The needle-valve assembly, incidentally, is much the same as that fitted on the larger 250 model, a good solid design which provides positive control without any tendency to get out of adjustment with vibration.



General running qualities are good. As with most modern small diesels, the crankshaft is not balanced, but provided that the engine is mounted firmly, vibration is not excessive. The engine runs well at high speeds yet shows considerable flexibility and will operate satisfactorily on an 11 in. dia. propeller holding revs down to less than 4,000. At these low speeds there is a noticeable power loss as the engine warms up, but this tendency is not repeated at the high speeds obtainable with small props.

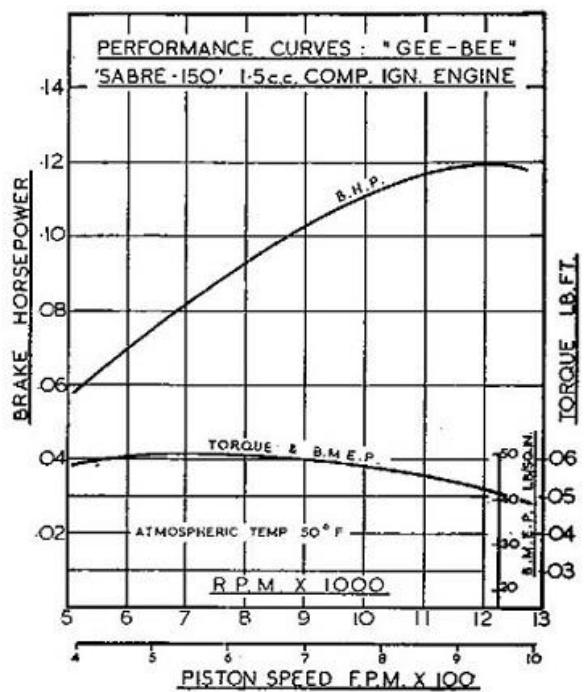
The torque readings obtained with the Sabre were well up to expected levels for a 1.5 c.c. engine, the best figure being realised at between 6,000 and 8,000 r.p.m., beyond which there was a gradual decline, resulting in a smooth power curve levelling off at approximately 12,000 r.p.m. Relative b.m.e.p. reached was 50lb./sq. in., a good figure, while piston velocity, due to a moderate stroke/bore ratio, remains at under 1,000 f.p.m. at the peak of the power curve.

We experienced no troubles of any description with the Sabre 150, either during the test or running-in period.

The manufacturer's recommended propeller sizes are: C/L: 7 x 6, free-flight: 7 X 4. On these sizes, the 150 should be getting quite close to its peak output in the air.

Power/Weight ratio: (as tested): 0.684 b.h.p./lb.

Specific Output (as tested): 79 b.h.p./litre.



Editorial comment

That sounds grand doesn't it. I'm on my high horse and wonder if anyone else has considered what I feel is misleading, outrageous and misses the whole point. What's he going on about well it's all to do with reviews. I don't often read magazines but was loaned a handful covering parts of 2015 and 2016.

I saw a review on a rubber model kit and thought this looks interesting and settled down to read, first thing was how good the box was and wrapped in plastic protection, my thought was so what I doubt that will make the model fly any better and then the unspeakable the reviewer negated the whole process and purpose of a review by substituting kit contents with wood that he felt to be preferable well what's the point of a review if the kit contents are changed, you are no longer reviewing the kit. Why can't a reviewer just make the model as per using the kit contents and built to instructions and plan. If there is a problem then explain what after. By changing the kits contents or altering the plan for mods is counter to the process of a review in fact it is no longer a review. I was however heartened by a review in Aero Modeler of a CS Navo Mini Tiger by Adrian Duncan who wrote "I left well alone, since this was to be a test of the engine supplied". Brilliant that's what I want as a review.

Other thing is I read another review which gave an excellent result of the product. As I obviously live on a different planet I could not come to terms with it. The product which I have seen a few of was completely awful. OK My limit is about 4 of these but not one worked anything like properly, was that just my bad luck wrong place wrong time? I had to laugh as someone else I know claimed to have a product which turned out to be awful so he nailed it to his workshop wall. Such reviews are a waste of space and time they are meaningless..

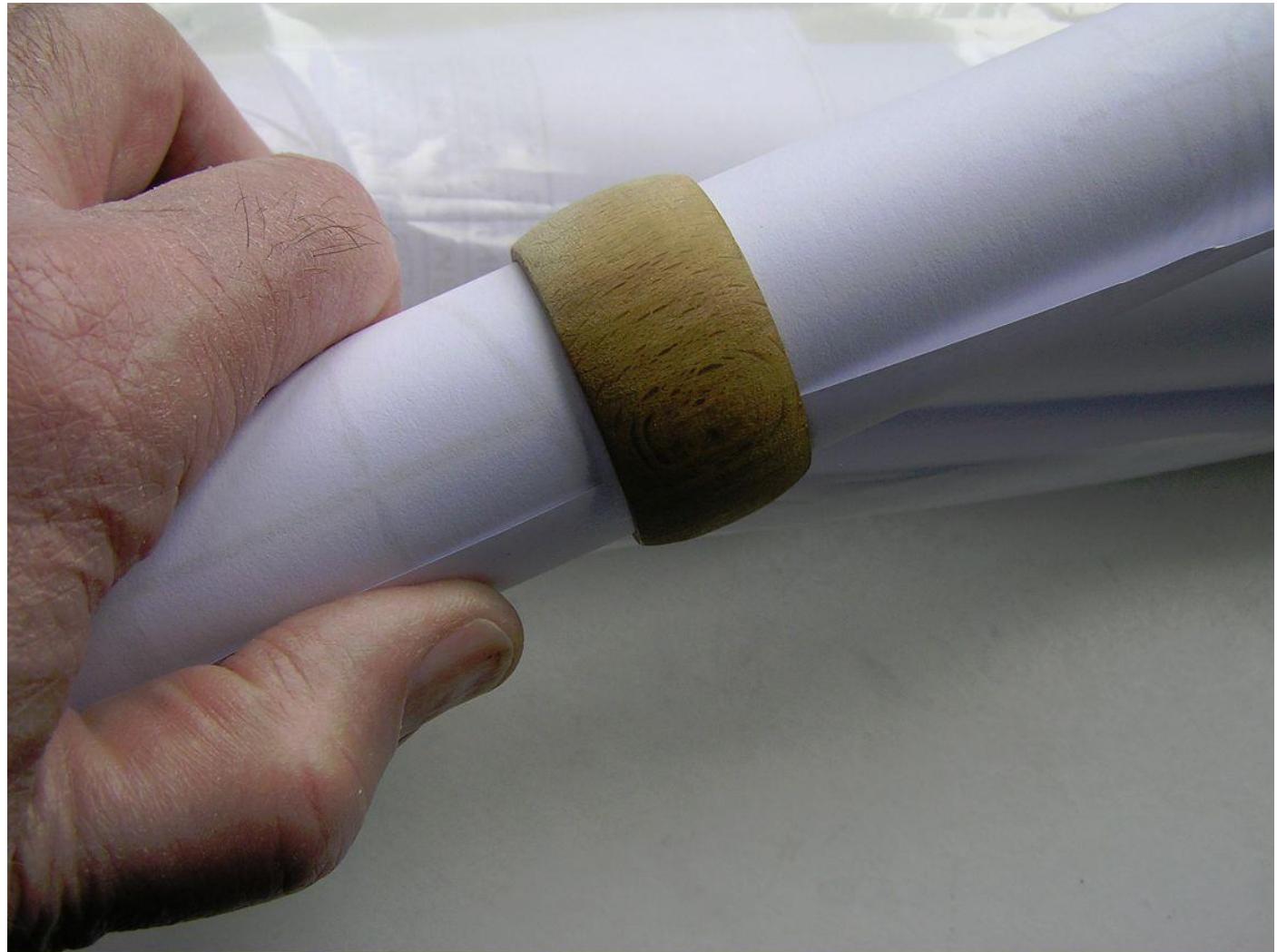
I await the hate mail.

From Peter Scott

Here's an idea for organising/storing rolled plans.

Rubber bands eventually perish and either the rolled plan springs open, or the perished band stays stuck to the plan.

So raid your local charity shops for some sets of wood or plastic napkin rings of an appropriate size to slip over rolled plans.





SHRIMP.

DESIGNED BY
G. D. PIKE.

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THE AERODROME, STANBRIDGE,
BEDS.

This technical drawing illustrates the construction of the tailplane main spar taper. The spar is built from 1/16 hard balsa taper from 5/16 base to 1/8 at tip. It features 1/8 x 1/4 med balsa webs and 3/32 hard stock capping strips. The leading edge is made of 1/8 sheet balsa, while the trailing edge uses soft balsa blocks with 3/32 sheet hinging. A soft block is used to firmly cement the spar to the fuselage. The drawing also shows a drain hole and a 12 SWG wire in alloy or brass tubing. A callout provides a top view of the soft balsa block. Labels include: 1/8 sheet balsa, 1/8 x 1/4 med balsa, Spar 1/16 hard balsa taper from 5/16 base to 1/8 at tip, Capping strips 1/16 sheet straight grained hard stock, Soft balsa block (see top view), Firmly cement, 1/2" Dia tail wheel, Tailplane main spar taper as shown 1/16 hard balsa, All longitudinal & cross struts, 3/32 hard balsa, Dowel, CROSS STRUTS., Dowel, Dowel, 3/32 hard balsa sheet, Drain hole, 12 SWG wire in alloy or brass tubing, Soft block centre section only, Callidoid sheet here to completely enclose tank, Alloy amounts see template, and ① ② ③.

**Sketch on left shows starting Jig as used by designer
shape from hardwood to fit over engine mounts & form
the two locating pins from 16 swg piano wire to fit in
suitable holes drilled in the sides of engine mount**

U/C actual size

Front leg 2 off

Rear leg 2 off

This portion bent upwards see sketch

Spring tallwheel details

Front leg 2 off

Rear leg 2 off

This portion bent upwards see sketch

Spring tallwheel details

The diagram illustrates the engine mount assembly. It features two main legs: a front leg and a rear leg. The front leg is labeled "Front leg 2 off" and the rear leg is labeled "Rear leg 2 off". A vertical line labeled "U/C actual size" extends from the top of the front leg. A horizontal line labeled "This portion bent upwards see sketch" extends from the top of the rear leg. The sketch shows the front leg as a single piece, while the rear leg is shown with a bend upwards. The entire assembly is labeled "Sketch on left shows starting leg as used by designer shape from hardwood to fit over engine mounts & form the two locating pins from 16 swg piano wire to fit in suitable holes drilled in the sides of engine mount".

A technical line drawing of a harpoon head. It features a central vertical shank with a flared base. Two long, thin, triangular blades are attached to the shank, one on each side, pointing downwards and slightly outwards at the top. The drawing uses fine lines to show the internal structure and the attachment points.

The diagram shows a vertical wooden platform. A horizontal line near the top is labeled "1/8 hardwood dowels for wing bands". A horizontal line near the bottom is labeled "1/12 sheet white platform". The platform has a triangular cutout at the bottom.

This technical drawing illustrates the construction of a model aircraft's tail section. It features a vertical stabilizer (tailfin) on the left and a horizontal stabilizer (elevator) on the right. The tailfin is built from balsa wood, with a longitudinal register and a bevel at the bottom. A scoop-out is shown for a retaining hook. The elevator is also made of balsa wood, with a main spar and leading edge. Alloy foil hinges are used for the elevator's trailing edge. Dimensions provided include 3/32 x 3/16 for the hinge material and 3/32 med soft sheet for the elevator's skin.

Tailplane main spar taper as shown 1/16 hard balsa

Bevel tail block underneath to register with longerons

Scoop out as shown for front retaining hook

1/16 spar hard balsa

3/16 balsa

3/32 med soft sheet elevator

Alloy foil hinge

3/32 x 3/16

The drawing shows a Gothic-style window frame with an arched top. The left side of the frame has a vertical label:
1/8 sheet balsa tips sand
carefully to shape

Below the frame, there is a vertical column of text:
I.E. 3/32 hard balsa

At the bottom center of the frame, there is a vertical label:
2.4 - 1' 32
RIBS MED
SOFT

A diagram of a rectangular window divided into six panes by a grid of five horizontal and four vertical lines. The top two panes are taller than the bottom four, which are of equal height. The leftmost pane is also wider than the others.

Centre section spars (shown shaded) fitted as dihedral keepers Dihedral 2" at each tip

Shrimp 25 ½" span FF model by G D Pike from Aeromodeller September 1948. A good looking cabin design for .2 cc diesels

The Shrimp was designed around the -2 c.c. Kemp diesel, and while combining both pocket size dimensions and trim lines, she has the realistic flight characteristic of a model many times her size. Although the Shrimp

is quite capable of holding her own against some of the larger models on the competition field, she is really "in her element" when it comes to precision flying from a restricted space on a calm evening. The Shrimp will take off unassisted with clockwork regularity after a run of about five or six feet, and is a joy to behold as she fairly buzzes overhead. As the model is very easy to build and the plan is self explanatory, only a few notes will be given on the construction and flying of the Shrimp.

Build the two fuselage sides together using straight grain hard balsa for the longerons, testing them for equal strength beforehand. Note that a door is provided on the starboard side only, this allows access to the carburettor which protrudes through

the firewall into the fuselage. The tail platform is carved from soft balsa. Note that the tail unit retaining rubber hand hook is recessed into the top of the fuselage, this allows an unobstructed path through which the tailplane may shoot forward in the event of a collision. The wing is constructed directly over the plan in the usual way, the 1/16 in. medium soft leading edge sheet covering cum upper mainspar should be lightly cemented to the ribs along its rear edge first, then the sheet may be cemented along the leading edge of the ribs and to the leading edge itself where it may be held in place with pins until dry. Note that the dihedral is one inch only under each tip. The tailplane and fin are built on the "cap-strip" principle, which apart from its high strength/weight ratio qualities, also possesses an unusually high resistance to warping. The outlines are first constructed over the plan, and the spar positions are notched, they are then lifted from the plan and the spars are inserted. Cut the capstrip front 1/64 in. hard sheet balsa slightly longer than their correct length, then, starting in the middle and working to the tips,

cement all the strips to the trailing edge and mainspar only, when dry, trim off the leading edge of each strip to form a butt joint at the leading edge. The elevators and rudder are sanded to a streamlined shape and fitted into position before covering.

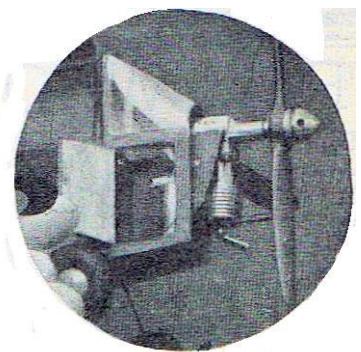
The entire framework should now be carefully sanded smooth, using a sandpaper block. The original model was covered with salmon coloured Japanese tissue and given three coats of full strength clear dope, the trim on the fuselage was dark blue tissue doped into place. Mount the engine in position and push the carburettor in place through the door. Note, the needle valve extension was shortened on the original model, in order that it may be adjusted from the carburettor compartment, this adjustment, however, is only required occasionally on the flying field.

Choose a calm day when test flying the Shrimp. Have your model balance on the mainspar, and hand glide until a long flat descent is obtained, small adjustments may be made as required using the elevators and rudder. The author flies his model in both left and right hand circles of various diameters, this is easily accomplished thanks to the model's spiral stability.

The author prefers to use the starting jig shown on the plan, using a length of rubber-covered flex as a starting cord. A hypodermic syringe with the needle slightly bent towards the

end is most useful for filling and emptying the tank, and may also be used for sucking excess fuel from the cylinder in the event of hydraulicing.

Start up the engine and launch the model into wind, or, if a smooth surface is available, let your Shrimp take off on her own, then—cast your eyes skyward and observe the prettiest little model that ever took the air.



From Adam Chambers

Some winter build pictures for you .

Scram 108 inch with rotating nose section so I can access the lipos . Remote arming switch prevents the lose of fingers etc . Flies on a wisp of power . 6 cell set up , 11 lbs



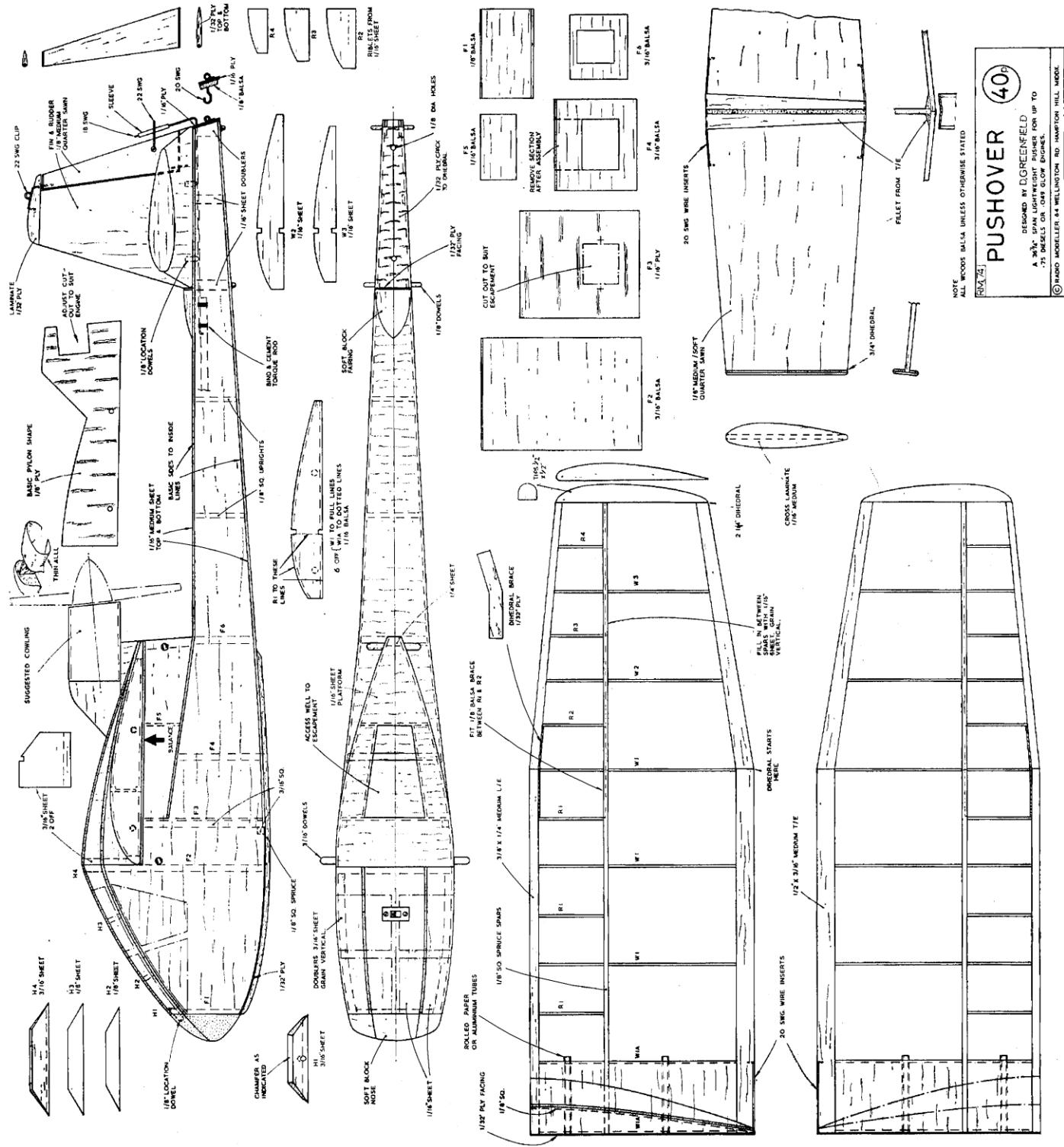


Sunspot 121 - 6lbs converted to electric . 3 cell set up and about 450 watts give a spirited climb out . Glides forever . Cg on 50% at the moment . Not the most enjoyable build given the designers obsession with weight . Very fragile building.

Look at this on eBay [Majestic Major Vintage Model Rtf electric](#)

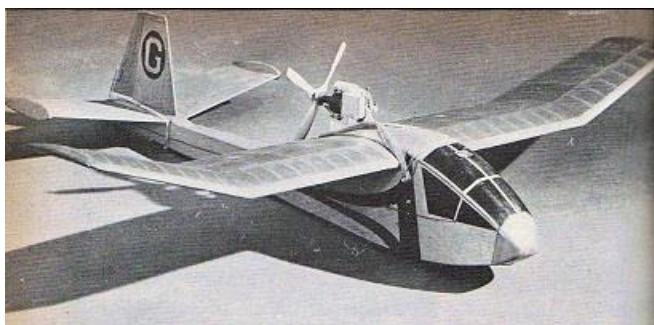






Pushover by D Greenfield an interesting little single-channel pusher for happy hours of small-field flying 36 ¾" span for .75cc from Radio Modeller May 1971

The layout of this model is a little unorthodox, but it has been developed in this way to meet certain desirable design requirements. Basically I wanted a fairly attractive "park flier," that would serve as a test model for a flying-boat development programme. Well, we don't all have ponds or lakes handy, but I have found that this version has been good fun, and it has fulfilled its requirements. With this layout one can legitimately dispense with the under carriage and, of course, over grass this is a good thing. Undercarts are for tarmac—skids are for grass ! A brief word on undercarts—this is the first time I have not used one as, in the past, I have relied on the drag caused by the u/c to reduce the thrust drag couple. With this layout you have the thrust drag force arrangement of the low winger, with the stability of the high-winger.



the engine exhaust is swept clear of the model. With the engine where it is, the slipstream is clear of the wing, which means that the wing is moving through clean air. Make sure that whatever way you choose to rig your model, the slipstream does not play directly on to the tailplane. On the other hand, the slipstream playing directly onto the rudder has its advantages, one being that the model will twitch its tail either way, on right or left signal, whilst stationary on the ground.

(This, I hope, will eliminate the need for a water rudder in the flying boat version).

Take any engine up to .049. Give preference to an engine that will turn a prop in either direction. If your engine turns in one direction only, get hold of a prop that will push. (A good range of small diameter Tornado nylon pusher props is available through Ripmax dealers.)

—Eds.) In the model in the photo, I have used a Beech four-bladed prop, which I made from two double bladed props halved at the centre and metal bushed.

Ply discs have been added, one each side. Balsa cement is a satisfactory adhesive if the finished prop is doped well.

CONSTRUCTION

Just as someone giving you directions concludes by saying "you can't miss it," someone describing construction techniques says "It's quite straight forward." Well, it is.

Fuselage

Because this is simple enough to build without detailed instructions some space can be given to techniques.

Use 1/16in. or 3/32m. sheet balsa for the sides. Cut to shape and make sure that 1/16in. slot is allowed to accommodate top decking under wing mount pylon. Add 1/16in., 1/8in. and 3/116,in. uprights and 3/16in. doublers at the nose (grain vertical). Use contact adhesive for the doublers, as this remains flexible. Make up a former to take your escapement bearing plate. Hold the tail end of fuselage together, and glue the escapement former in position. Make temporary cardboard spacers to hold the fuselage sides to their correct curvature rearward of the escapement former. These spacers are made by cutting parallel slots 1/16in. and 3/32m. wide, the correct distance apart, and then sliding them over fuselage sides. Cover the fuselage top and bottom rearward of the escapement former with 1/16in. balsa. The tailplane platform is 1/32in. ply, drilled to take 1/8in. locating dowels from the tailplane, and scored underneath. The angle of this platform can be slightly greater than the dihedral angle of the tailplane. Fit the 1/32in. ply fuselage end plate, drilled to take the 18 swg control rod extension, and with rectangle cut out to take the tailplug rubber hook.

Soak the nose of the fuselage in hot water, and bend it inwards towards the nose. Hold until dry, with rubber bands, possibly fitting a temporary spacer at this stage.

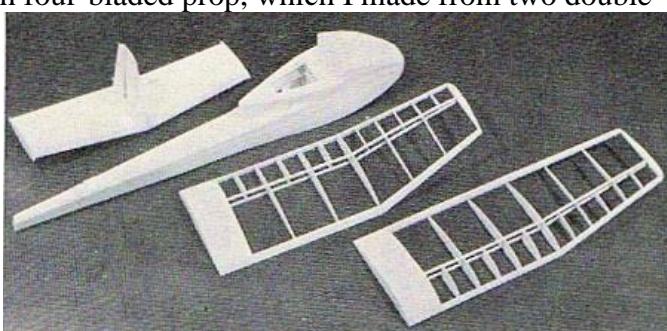
Meanwhile make the wing pylon by inserting the formers, which become more trapezium shaped towards the rear. It is best to glue these in place on the fuselage top decking, constructing the escapement inspection well at the same time, which entails cutting away some of the top decking. Allow this assembly to dry before bending the pylon sides in to the "streamlined" shape.

Tie the fuselage sides together at the nose with the 1/8in. balsa former. It may be necessary to insert a temporary spacer between the sides in order to maintain the curvature.

Do not remove it until the 1/32 ply fuselage bottom has been fixed. Fit the noseblock and shape it roughly. (The skid, which is made from 1/8in. spruce, is fitted after the fuselage is paper covered.)

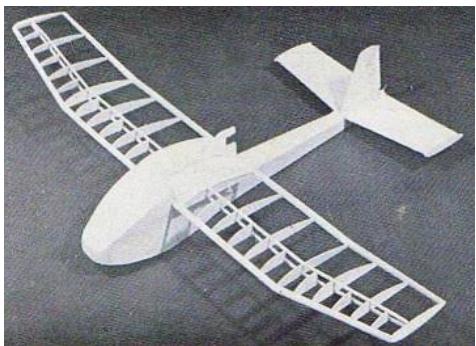
Of course, an u/c could be fitted but, as it is not needed, you have the bonus of reduced overall weight. Thus, the wing loading is lower, the airspeed is less and consequently the model is quite docile. Talking of wing loading, it should be between 10oz. sq. ft. and 12 oz. sq. ft. Aim at 11oz.sq.ft. which is 16 1/2oz. all-up weight, for 1 1/2q.ft. of wing.

Prop and engine are well out of the way, safe from damage and dirt and, of course, most of the sludge from



The top of the cabin, which is really a hatch to cover the radio compartment, is built up of balsa with provision made for the switch. One tip here is to cut the two curved backbone pieces (i.e. do not bend them from straight) oversize to begin with. Use contact adhesive for fixing in place as, if properly used, no pins are needed while the glue dries.

Wing



Normal techniques are used for the general construction. It is made in two halves and held together by aluminium dowels through the paper tubes. No. 8 knitting needles (about 5/32in.) are fine. The engine mount is sandwiched between the two wing halves and is also "threaded" onto the metal dowels.

Tailplane, fin and rudder

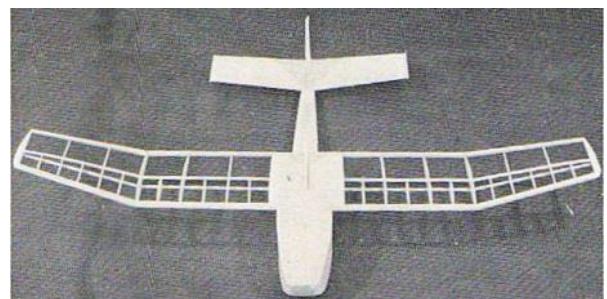
Make fin from 1/8in. sheet balsa with tip from three laminations of 1/32 in. ply, arranged in such a way as to allow the 22 swg rudder bearing pivot to plug in. The rudder is in 1/8in. balsa, capped top and bottom with 1/32in. ply which has a hole for the pivot (hinge).

This rudder hinge system is very simple, clean and efficient. Make sure that the bottom of the rudder is kept clear of the tailplane retaining bands by slipping a short length of plastic sleeving on to the lower pivot first. The advantage of this system is that different rudders can be used (i.e. rudders of different size and throw) which are easily interchangeable on the flying field.

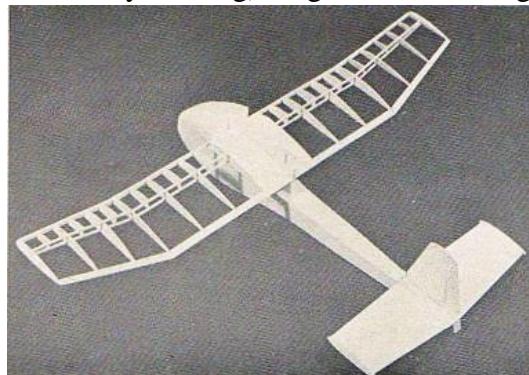
The tip plates on the tailplane are purely for structural reasons (as far as I know). They keep the sheet balsa from curling. Make the tailplane in two pieces. Fit centre fillets from 1/4in. T.E. section. Form the dihedral angle and then glue to either side of the fin. The gap between the tailplane halves, rearward of the fin, takes a piece of balsa in which the lower first wire is embedded. Either sandwich this wire swg 20-22 in between two pieces of 1/16., or slot a piece of 1/8in. with a fine saw.

Engine mount

This is made from 1/8in. ply. I prefer to make my own "ply" from two laminates of 1/16in, or three of 1/32in. (this is "thick" 1/32in. and the extra glue brings it up to a "thin" eighth!). The mount sandwiches between the wing halves, and threads on the metal dowels. A practical point here is to tack the mount to one wing half until you are sure that the thrust angles suit you (or, rather the model), and finally glue it permanently when satisfied. I found



that I made several different engine mounts for the prototype, using different thrust lines. That was when I found out that the slipstream should never play on the tailplane! The side thrust for beam-type mountings is cut into the mount itself. If radial mounted engines are to be used, I would suggest bolting (and perhaps eventually riveting) 20 g. aluminium angle plates, one each side, to the engine mount, and drilling them to take the engine bolts. I even suggest sidewinding a radially mounted engine. The engine could be cowled with a thin aluminium bonnet type cowl, bent oval in end elevation and bolted to the mount. A locating pin can be embedded in the top of the mount to engage in a hole in the top of the cowl. Cut your pattern from card and fit it by the trial-and-error method.



Conclusion

No one can claim this to be a contest model, although it can "perform" in its own way, but it is a sweet little flier, that can be used to teach the neighbours to fly (if you have that kind of neighbour) and can give lots of trouble-free fun.

More photos taken at our DMFG site



Ready to launch



My Dizzy and part of the excellent Novice E



John Taylors Thunder



John Bainbridge again demonstrating how a FF model should be chucked, the tongue helps him keep balance



Symmetry of the arms is all important. Bolshoi next?





John Taylor's Southerner with side door open



Brian Beacham's Dizzy



Brian admiring Dizzy on its way

The following photos were taken a couple of hours ago at a pre-season 600RES practice





Peter Rose's own design 600RES



All together now 1, 2, 3.



Mike Sims' 600



Chris Hague's 600

SHOWSCENE by Dave Bishop of DB Sound.

In this month's Sticks & Tissue I can report on two excellent meetings I have been to with the first being invited by the Caterham clubs chairman James Gordon on Monday March 20 to an Indoor event where you were asked to build and fly your own designed model in a competition with all materials being supplied. What a cracking evening it was too with the friendly hosts forming us into teams and each allocated a table. The object given to each team was to gather together supplied materials that included two lengths of one eighth square balsa wood, plus one more piece at half an inch by three sixteenth balsa and as many plastic drinking straws as you wanted for your own particular design. With those things was one of those dear little red propellers, a length of rubber for the motor, some pins, super glue and cling film. And that was it really with the simple rules that we all had a set time to design and build whatever duration winner that would later win the fly off contest. All finished models had to fly the length of the hall and go between two doors before landing. What fun it was with some really cracking designs going every which way at times. Thank you to the whole warm welcoming committee and members of the Caterham club and also a further thank you for the excellent raffle with some very nice prizes.

The second Indoor event I attended was run by the Sevenoaks club on Saturday afternoon March 25 at a local (to me) large Charles Darwin school hall neat to Biggin Hill aerodrome and again that one was a "show" where everyone was warmly greeted by the genial chairman David Addison and by committee members Lesley and David Green. That pair of people are the nicest, talented, married couple that you could ever wish to meet. There was a static scale completion with some beautifully built and finished radio models and how superb they all were and such a high standard of modelling as well. Pity the poor judge who had his work cut out to score them. The chairman later presented some very nice trophies for the winners greeted with some warm applause from a nice crowd of club people. To go with the afternoon's event was some nice refreshments and hot tea, so well done (once again) Lesley and David. Another "happening" there was a number of bring and buy tables with some very good bargains going as well. One fine smiling chap John Caruana was selling so many items priced at just 50p with all of the cash going to the Red Nose Day charity. John later emailed me to say that he had sent "them" £15 and well done him.

For many years (over 65 actually) I have presented to thousands of people some of the most gifted pilots, both with models and full size aeroplanes doing their stuff to the whole of the United Kingdom and in many countries abroad. Back home here in the little Village of Tatsfield that shares its border with Surrey and Kent, with my house just one mile away from the Battle of Britain RAF Station at Biggin Hill. It was last year that I had the pleasure of "getting" my BMFA "A" certificate flying my "Big Boy" (designed by Mike Reynolds,) at the Sevenoaks clubs flying field. In my mind was the idea that one day I would really work hard and go for the next step of a "B" certificate. With the help of David Ashby, editor of R.C.M.&E. (The brother is Grahame and their father is Maurice all of them aeromodellers) I was shown the very model to do it. So with a visit to Robert Newman at my model shop of some 60 years, Avicraft of Bromley I gathered some of the things I would need for the model that would complete my dreams. The power that would be required was calculated to be around 8cc and I had bought a seized up OS 48 Surpass 4 stroke engine for a tenner at the Long Marston show from a boot seller. After consulting Neil Tidy about how to get it to work, I bolted the OS onto a nylon engine bearer and stuck the whole caboose into my neighbour's super polished shed where it was screwed up tight in his massive 6 inch vice. A four ounce tank was filled with Dave Watts purple Southern Modelcraft fuel, and the glow clip pushed home onto the plug. The electric starter was engaged onto the spinner of the 12 x 6 propeller and after a few turns of the prop, the surpass burst into life with a gorgeous four stroke roar and the shed soon filled with a lovely smelly heady smoke. I was thrilled to bits and my neighbour standing beside me was partially observed nodding up and down in assent. After a full minute I thought I would tweak the throttle just a tad and leaned towards this Japanese delight to adjust the clicky needle valve thing. The next bit is a bit a blur as suddenly I saw that the back of my hand was being chopped unmercilessly by the propeller and it was like an Alfred Hitchcock film without the screaming violins. I immediately had a horrible thought that it was going to hurt like hell. The engine was now stopped and my neighbour was peed off huffing about the blood all over his newly cleaned shed floor. So it was off for the seven miles to the (what my kids call,) the Horse Kettle which translates to hospital. My Jan was soon doing a Stirling Moss in the driving seat and me, sitting alongside with my good hand clamped tight onto a pad over the leaking wound.

Now I haven't been to hospital for a long time and I didn't know that nowadays it's like going into an Argos store where you report at the reception and you are given a ticket with a number on it and told to sit down with a whole lot of other people. Some of them looked like they might have been sitting there for some days. There was no telling how long it would take before I was seen by a doctor because nobody spoke at all only kept on looking a big red sign that occasionally changed the number that was being displayed. I was 27 and the sign said 21 so I knew that I had some time to wait. I was eventually patched up and bandaged and came home with instructions not to get it wet.

So everyone, I have a right hand that kinder stings like heck especially when I am doing my best to sleep at night and it was during a long awake session that it suddenly occurred to me that I won't be playing with my engine for some time. I found myself doing a whole lot of catching up with my reading and it was one Aeromodeller magazine dated October 1949 that brought back some wonderful memories of when I was 17 years old and a member of the West Sussex Model flying club at Littlehampton. The front cover showed a large cup that had just been won back from the Americans by a successful British team, after a break of ten years due to the war. There had been a Wakefield free flight rubber powered model competition and the British team featured a Wakefield model aeroplane called the Jaguar designed by the legend EW Evans and flown by a Roy Chesterton of Northampton. Not only was there the full story in that historic October edition of the Aeromodeller but a scaled down plan showing this wonderful thoroughbred winner. It was straight to my model shop David O Jones in the town centre the moment I had finished work and the whole list of materials bought that I would need to build this wonderbird, with its pregnant belly. Not many people had a television in those days and by burning the midnight oil and working from the Friday evening and every following evening thereafter I finished doping my Jaguar by 5am on the Saturday morning. I made the 16 strands of three sixteenth flat lubricated rubber into a skein and took the whole shebang off to our local flying field. With there being hardly a breath of wind I wound just 300 turns on the huge nineteen inch diameter propeller. With a pounding heart I gently hand launched my Jaguar and after hugging close to the ground, she slowly did a graceful left hand turn and climbed easily away as if she was showing off just how a true piece of British scientific engineering should fly. The following day the club had a competition for free flight rubber models and we were privileged to have the use of Ford aerodrome (it is now an open prison) just a couple of miles away, which was biking distance for most of the members. The weather had changed to a slight drizzle and a strong wind when I took my new Jaguar to give it its proper first time competition outing. The clever and much older members of the club calculated that I could "easily" wind on over 1,000 turns but I declined and gave it about 500 for its first flight. Despite the wind my Jaguar flew for just under 2 minutes and as it was a 3 round contest I wound the same amount of turns for the second flight. This time it flew for just over 2 minutes. I was leading the field of around a dozen entrants and all I had to do was to repeat my performance to win. It was then that I did something stupid and thought that I would show everyone just what my Jaguar was really made of. I put a slither of one sixteenth balsa under the trailing edge of the tailplane just to give it a bit more elevated lift. I then wound on 800 turns and hand launched it once again for its final flight. Up she went in a terrific climb to about 100 feet. Suddenly she dropped her nose and stalled all the way down the ground in just 17 seconds. I was devastated especially when I was confronted by a fellow club member who thought that he was going to come second behind me. I had been taught a lesson that has stayed with me for all of my modelling life which is never ever touch the trim in a competition of a model that has already been successfully test flown. The thing is, that the following week my Jaguar was flown in perfect weather at Ford aerodrome when I wound on 1,000 turns and she disappeared from sight still climbing and although it had my name and address written on it, I never saw it again. So I built a second one and that did exactly the same thing and I realise that Mr Evans was about the best ever designer in the whole Universe, well he was to me anyway.

Forward to 2017.

So due to my being unable to even think about my pop bang model for a while I thought I would mention when writing in the March edition of Sticks & Tissue the thoughts of building another Jaguar Wakefield model. This I did and thank you readers for the kind replies. I asked if anyone had any ideas on how to fit a dethermaliser onto the tailplane and reader Phil Coupe emailed to show me the dethermaliser he had drawn from memory. Phil also said that way back he had been a member of the Northampton flying club and he suggested that I ring that model shop in that town to make enquiries about dethermalising my Jaguar. So I did that with the question to the gentleman that answered my dialling "did he happen to know the Wakefield

model aeroplane that had been designed by Mr EW Evans?" "Yes" was the reply "he was my father". You could have knocked me down with a ten pound note and I must give grateful thanks to Nick Evans, the son of a famous legend Ted, for his help and kindness. Would you believe it, Nick has kindly sent me pictures of his father's models showing how the dethermaliser works, which is brilliant by the way. Not only that but he has supplied me with a super full size plan of Jaguar and so it's off to Avicraft and Robert once again for the necessary bits I need. I am so chuffed and it just goes to say how grateful I am to be able to read Sticks & Tissue. It makes me feel a whole lot younger and what's wrong with that for Goodness sake. Mind you in future for some time to come I will be boasting that I'll bet that "mine is bigger than yours" will be an honest statement as I will be referring to my latest propeller scar, of course.

Avicraft model shop at Bromley.

I have been lucky to have a super local model shop with a cracking managerial setup under the auspices of Robert Newman. Robert has a British National champion brother in helicopters named Allister who sadly isn't so well at the moment. Everyone around this area will remember the father of these brothers named "Bunny" who is another National Champion (way back) in scale. Robert has just informed me that he has designed yet another 40" wingspan model with the title "No Name" that simply clicks together. It's made for simple quick assembly and it will fly on a Mills .75 or a small electric out runner. Building time is about 6 hours and this 3 channel beginners R/C model comes at a price of £60 all up.

Show Scene events for 2017 go as follows; the three Modelair "do's" held at Old Warden run annually by Ken and Sheila Shepard with help from a team of model flyers. It has everything there from R/C to free flight, control line flying in all sorts of disciplines that are catered for. There is an excellent line of traders there as well and you will certainly have a chance for a personal chat to the great Aeromodeller editor Andrew Boddington. There is a terrific bookshop there and the restaurant as well along with some 50 full size beautiful aeroplanes and vehicles to see inside the quality hangers, The three dates to diary for Old Warden are May 13 – 14, July 22 – 23 and September 23 – 24 and full camping is available with some R/C electric flying in the evenings if the full size aeroplane activity allows.

Long Marston International follows on June 3 – 4 with loads of flying allowed in the evenings. Now I haven't heard anything from Traplet publications for some months now since I announced my retirement from presenting shows with my DB Sound system. It was due to my back accident that happened when I fell off a ten tread pair of steps whilst cleaning the top of my caravan. But this next show I note is a "must go to" event was going to be run by the son of Jane Stephenson, Tom, and I presume that still applies and he will be running the Wings & Wheels show at North Weald aerodrome June 24 – 25. Jane Stephenson (with her family) ran that show for 30 years and made a cracking job of it as well. Tom's M.D father Tony, kindly telephoned me on my 86th birthday recently and we had a good catch-up chat as us two we go back a long way. Finally there is the Weston Park show on June 16 – 17 – 18 run by Steve Bishop and Peter Whitehead. This show boasts the most traders of the lot so the shopping for bargains can be wonderful fun and you can meet some cracking people there. If anyone wishes to email the address is davedbsoud@gmail.com

See you next month and all the best from Dave Bishop of DB Sound.

Pictures as follows;



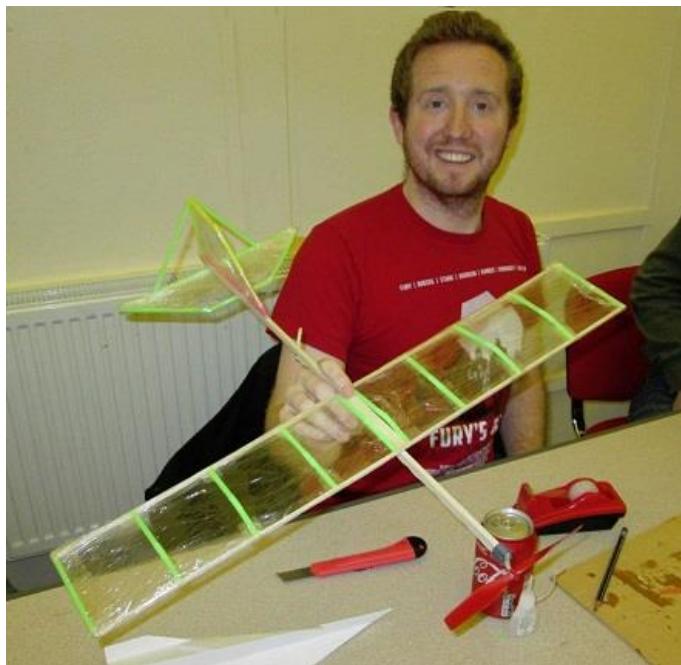
Popular Hanger Rat Mass Launch winner is Ken Taylor receiving his award. Crawley indoor.



Another popular winner at the Crawley K2 indoor event in February was Terry Adams.



The Caterham Indoor build and fly competition showing the Croydon Clubs team. We kinder came somewhere in the competition!



Ben Dean - 1st place of the Caterham club with his winner.



Glyn Walker, Richard Coles again the Caterham clubs lads



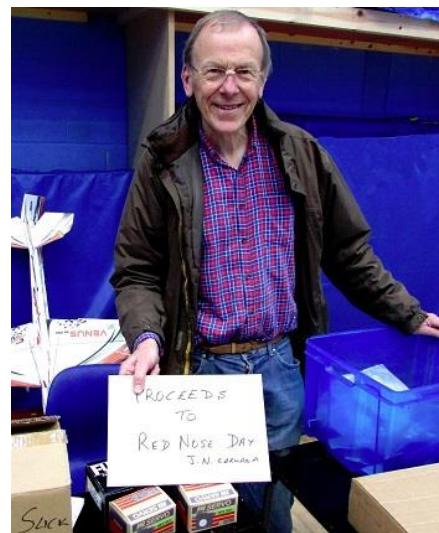
Richard Pidduck, Andy Kenning of Caterham.



Nick Fellah, Tom Cutler – Caterham.



Alan Boswell, John Byrnes, Malcolm Thomas who took 2nd place at the Caterham clubs Indoor build and fly evening.



The Sevenoaks Indoor meeting and here is John Caruana who raised £15 for the Red nose charity.



Lesley Green's beautiful Sopwith Camel at the Sevenoaks Indoor meeting. Her and husband David, fly two identical models together, side by side.



Any Sticks & Tissue readers wanting a bargain can buy either or both of these kits at half price by emailing me. They are a Crescent Bullet and a Slec Sky 40 Trainer both are £60.



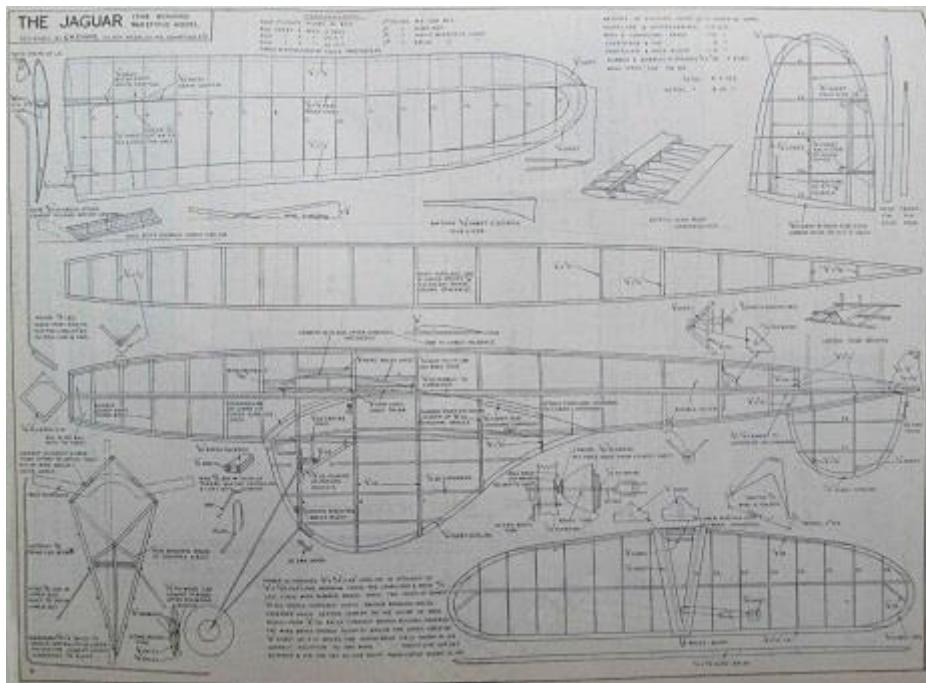
British Aircraft Eagle model built by Phil Coupe with a pumped 4 stroke that flies like a dream.



A superb piece of modelling is this Eurofighter built over some 3 years by Will Simpson almost finished and ready to fly.



Shades of Neil Tidy and here is a 72" wingspan Spook this time built by Phil Coupe with a Saito 56 four stroke.



The Jaguar plan that gives me a nice “funny” feeling every time I look at it.



1948's LEADING MODEL AND MODELLER—Purposing the "Jaguar," flown in victory by R. S. Chesterton in the First Post-war Wakefield Contest at Akron Field, Ohio, U.S.A.

Here is Roy Chesterton in 1948 holding the Jaguar Wakefield model of 4 ounces weight of the model and 4 ounces of rubber for the power.



The wonderful aeromodeller that sold some 62,000 copies every month in 1948 showing the artistry of Rupert Moore and the Wakefield British winners' cup.



A dear pal Dave Toyer with his Wakefield Jaguar some years ago.



3 channel R/C model "No Name" by Avicraft

HOT NEWS! SAM 35 DATES FOR YOUR DIARY

We're delighted to announce that SAM 35 has been granted permission to hold two Vintage Model flying events this Summer and Autumn at Middle Wallop - Europe's biggest grass airfield!

The dates are June 11 and October 8, both Sundays, and everyone - SAM 35 members and non-members alike - is welcome, subject to the conditions set out below.

The emphasis will be on fly-for-fun and, in addition to RC ,we plan to have control-line flying - full details will follow in SAM Speaks. Brian Lever intends to CD a BeeBug Bash (details and rules on the Home page at sam35.org). More classes may be added.

Entry to the airfield* is from 9.30 am and there will be a Pilots' Briefing at 10 am.

Throughout the discussions, it has been clear that the MOD's H&S regime is now far tighter than ever before, hence we need to take particular care to ensure safe flying. Please therefore take note of the following conditions:

- NO BMFA "A" OR "B" CERTIFICATES ARE NEEDED. HOWEVER, ALL FLYERS WILL BE REQUIRED TO REGISTER THEIR TRANSMITTERS AND MODELS AND SHOW A CURRENT BMFA MEMBERSHIP CARD - NO CARD, NO FLY!
- 2.4GHZ RADIO EQUIPMENT IS TO BE USED EXCLUSIVELY
- THERE WILL BE RANDOM SPOT-CHECKS TO VERIFY CORRECT FAILSAFE OPERATION. PLEASE ENSURE THAT YOU AND YOUR MODELS ARE READY FOR THIS!
- THE MAXIMUM NUMBER OF MODELS AIRBORNE AT ANY ONE TIME WILL BE RESTRICTED TO FIVE

The Museum of Army Flying will levy their usual charge at the gate* (probably £5 PER PERSON - TBC) for entrance to the airfield. *Note also that when you reach our site on the airfield, there will be a further charge of £5 per person. This is to help defray the cost of our Licence. The only exceptions will be wives and partners.*

* DIRECTIONS TO THE ENTRANCE GATE:

We should now enter the airfield from the usual place, i.e., the Museum Car Park.

That's all. If you have any questions, please ring David Lovegrove on 01491 200558 or email dflovegrove@hotmail.com"

"Under the terms of our Licence, freeflight is not permitted and please also note that the airfield authorities do not allow dogs on the site". Pop it in under the section starting "The emphasis will be on Fly-for-fun . . ."

23 April Sunday Control line sport flying day

Wimborne MAC site at Cashmoor which is located on the A354 between Blandford Forum and Salisbury near to Gussage St Andrew

There will be six grass circles. There is a portaloo. Bacon butties and tea / coffee will be available.

Further information from Chris Hague christopher.hague@ntlworld.com

Or James Parry jamesiparry@talktalk.net 01202625825

BMFA insurance is required.

25th Annual World Wide Postal Contest Announcement

Hello Free Flighters,

Just a reminder, the contest ends in June. You still have time to log some flights and enter times.

The announcement for the 25th Annual World Wide Postal Contest may be found at this link:

<http://www.endlesslift.com/25th-annual-world-wide-postal-competition-2016-2017-including-sky-bunny/>

There are 25 events in which you may post times any time during the contest year, whenever you have an opportunity to make flights.

Please publicize it to any clubs, internet groups or periodicals which cater to fans of free flight model airplanes.

The results for the 24th World Wide Postal 2015-2016 have also been posted on EndlessLift.

Gary Hinze

North Cotswold MAC – August event from Gray

The North Cotswold MAC have set the dates for our 2017 Fly For Fun show for August the 12th and 13th. We'd like to extend an invitation to all our regular guests and new visitors to join us at our site at Far Heath Farm near Moreton-in-Marsh, Glos.

We will be running all our regular attractions, including off-the-peg sport R/C flying, control line and small field freeflight.

Our Designers' Events this time are going to be:

On the Saturday, any model designed by the great Ray Malmström, in any form and any size + R/C conversion. Then on the Sunday, Chris Foss's legendary Wot4 design in any version and any form including ARTF's and foamies. Informal judging and prizes in both events.

Ray Malmstrom's Model'n Tip A low wing tip



Low wing "scale" and "sports" models (F/F rubber and power) can fly well. They do, however, tend sometimes to drop a wing sharply on the glide. This can often be cured by adding weight to the undercart unit. Ways of doing this are: heavier gauge wire legs; fairings; heavier wheels and wheel covers (spats). So if your low winger is a bit unstable—take a tip—try a heavier undercart. One of the aims of "Model 'n Tip" is to include models that are "different." Such a mold is Miss Flighty. The full size plans (except for tailplane, measurements of which are given)

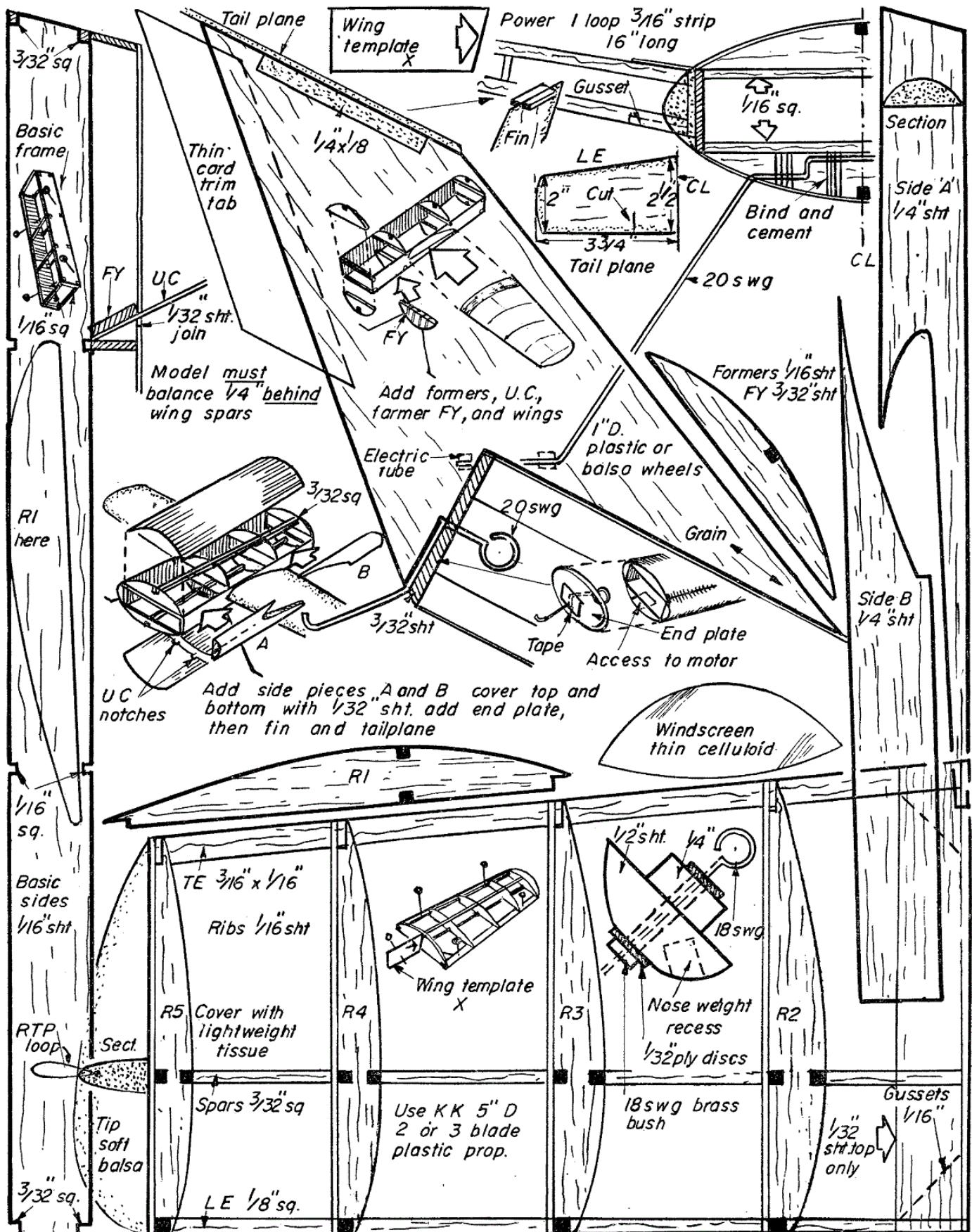
provide all constructional details for speedy building of this eye-catching little two-seater.

Give all the parts, preferably before assembly. one coat of clear dope. Balance model carefully. Some noseweight will be required. Finally check alignment of wing and tailplane before test gliding. Glide over

long grass. If model stalls add a little noseweight. If it dives bend trim tabs on tailplane up slightly. Keep glide path straight, using fin trim tabs if necessary. Before flying with power add 3/32 in. offset to noseblock. Best flight path is a gentle climbing turn to the left. Increase or reduce offset to achieve this. Lubricate rubber well—maximum turns on 3/16 in. two strands is 6C0. Power can be increased by using four strands of 1/8 in. strip 16 in. long. This little job is a good per former round-the-pole indoors. Use two-bladed K.K. 5 in. dia. Plastic propeller for outdoor flying. Passengers (optional!) can be carved from 1 in. sq. blocks of soft balsa.

Pilot and girl friend certainly perk appearances!

Plan on next page



Miss Mighty by Ral Malmstrom from Model Aircraft May 1964



Belair Kits are very pleased to have been appointed BRODAK dealers for the UK and Europe. Modellers can now purchase all their control accessories, including flying lines, handles, bell cranks, metal fuel tanks and many other items required to finish off their models. The Brodak range will also complement the

ever increasing range of Vintage/Classic CL models Belair Kits produce as parts sets, such as the Humongous, Peacemaker and Rascal shown.

Call Belair on 01362 668658 or visit their online shop at www.belairkits.com Our free Vintage catalogue is available, just call for your copy.

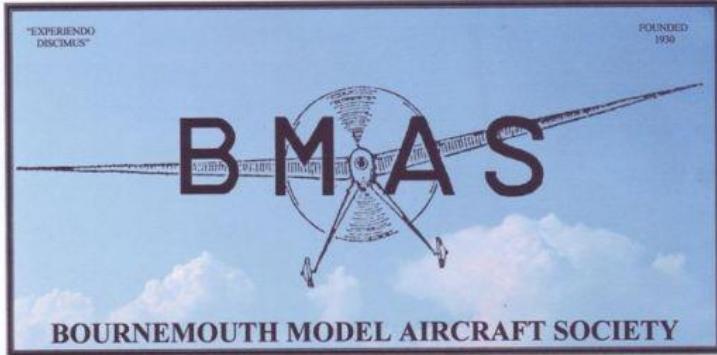




Regards,

Leon Cole
Belair Kits
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Adult Flyers £5 Spectators £1.50

CONTACTS: JOHN TAYLOR 01202 232206

All dates are Tuesdays

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TUESDAY 23RD MAY

TUESDAY 27TH JUNE

TUESDAY 25th JULY

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SO40 8WU

Café on Site

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E-mail flitehook@talktalk.net
Tel. No. 02380 861541

Flyers £6, Spectators £2

Sundays 10.00a.m. to 4.00p.m.

2nd October 2016

6th November 2016

4th December 2016

Tuesday 27th December 2016
10.00a.m. to 3.00p.m.

CANCELLED

2017

Sundays

8th January 2017 9.00a.m. to 1.00p.m.

12th February 2017 10.00a.m. to 4.00p.m.

12th March 2017 10.00a.m. to 4.00p.m.

9th April 2017 10.00a.m. to 4.00p.m.

Dens Model Supplies

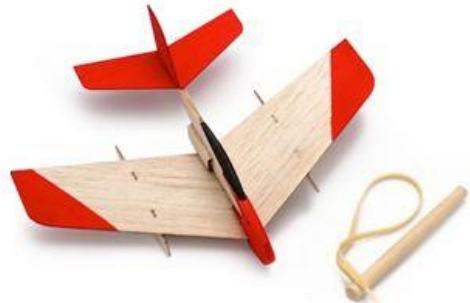
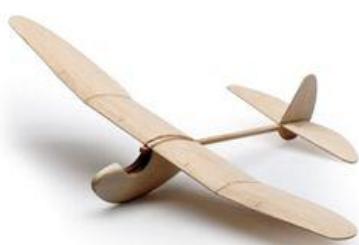
Traditional and Electric Control Line kits and accessories for the Sports Flyer

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For Control Line – Electric Powered FF – Servo DT Only*



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