

MODELS AND TECHNICAL SECTION

Model Flying Machines

By F. J. Camm, M.Ae.S.

Where a lathe is obtainable the construction of wheels is reduced to a simple matter indeed, for by turning a pair of dies (or, more correctly, press tools) it is possible to press blanks of metal to a much neater shape than is obtainable by other methods. Withal, the one pair of dies will turn out thousands of blanks of exactly similar shape, whereas by other methods each wheel requires careful shaping and pairing.

However, where only one pair is required of a given diameter, it would scarcely pay to go to the trouble of turning a special pair of dies. The disc wheel drawn in Fig. 1 is constructed from either sheet tin or copper and a brass curtain ring. The latter are obtainable in various diameters, from 2 inches upwards, and are quite light. The discs for the sides are cut to the radius a (Fig. 2), and round the periphery of each the circumference of the wheel, of radius b , is measured off. Connecting up the two points thus located to the origin or centre of the circle, the sector of metal that will require to be cut away is determined. An eighth of an inch should be allowed to form the seam. By bringing the two edges together the blank assumes the shape of a cone. The seam should be neatly soldered; the edges could, of course, be butted, and solder "run" down the joint to close it, and perhaps this latter method will be found the neatest. Now carefully place the disc upon the brass ring, locating it quite centrally, so that the finished wheel will run concentric, and scribe its position upon the brass. With a hot iron solder should be "run" round until it flows evenly through the space between the disc and the ring. Before the second disc can be similarly fixed the boss or hub must be made, as this is inserted to form a distance piece to keep the sides from crushing in (see Fig. 2). A suitable length of brass tube is cut, and the inside collars (of the same material) which must telescope over them, soldered into place. Passing this bush

through the disc already fitted, and pushing the disengaged end of it through the second disc, this latter can be located and sweated on. Two collars pass over the bush ends, are tapped home over the jaws of a vice, so that the discs are gripped between the inside and outside collars and soldered. A coat of transparent varnish should be given to obviate rust. A pair of such wheels of 4 in. diameter should weigh about $3\frac{1}{2}$ oz. The difficult part in their construction is to fix the position of the disc in relation to the ring to secure concentricity.

Fig. 3 shows a wheel cut from three-ply. The strength of wheels so built is quite surprising. The cross-section of the sheet from which they are cut is decided by the weight of the model for which they are intended. For models of from 4 to 8 oz. in weight, $\frac{1}{8}$ in. three-ply will be quite suitable. Lightening holes are cut or drilled in them as shown, and this should be done *before* the outside is cut. It will be found convenient from the point of view of exactitude, to clamp both pieces together, drilling and cutting two wheels in the one operation. A piece of brass-tube forms the boss, and this is secured by two cupped washers, which are soldered to it, one on each side of the wheel. A piece of silk should be glued over each side to increase the strength and lessen head resistance. A suitable chassis attachment is also shown in this figure. The wire chassis members are soldered to a thin plate of the shape shown, a hole in the plate engaging with the axle.

Another exceedingly light wheel suitable for record-breaking models is that shown in Fig. 4. A disc of celluloid is cut (this can be truly executed by a washer cutter secured in an ordinary band brace), and the boss locked through the centre; this is effected by threading the tube constituting the hub and tapping the collars, screwing both these home tightly, without cutting through the material.

If a lathe is available it will be possible to

undertake the construction of the wheel sketched in the following figure. A pair of dies (negative and positive) are turned so that when a blank of metal is inserted between them and pressure applied, the metal bedding home

requisitioned; two strips of tin are affixed at right angles to one another one on each side of the wheel. A plain piece of tube only is necessary here to form the boss; it is soldered to the transverse strips.

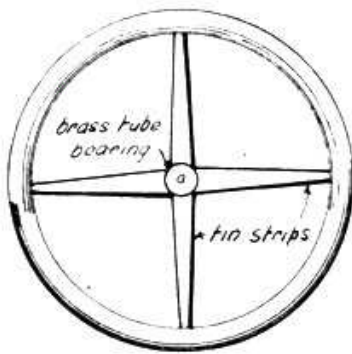


Fig. 5.

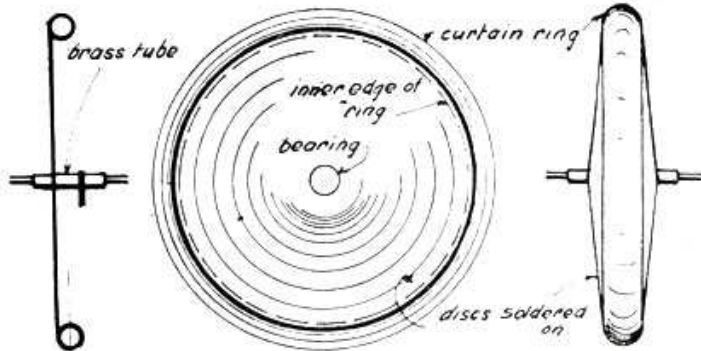


Fig. 4

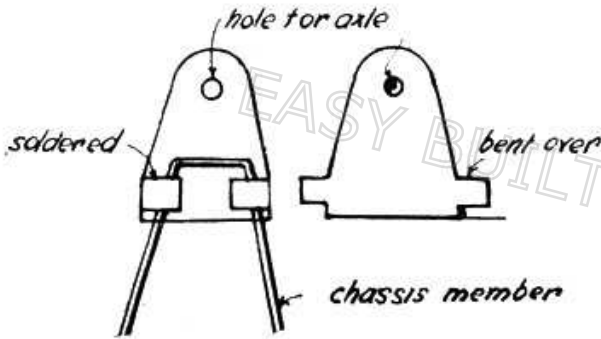


Fig. 3.

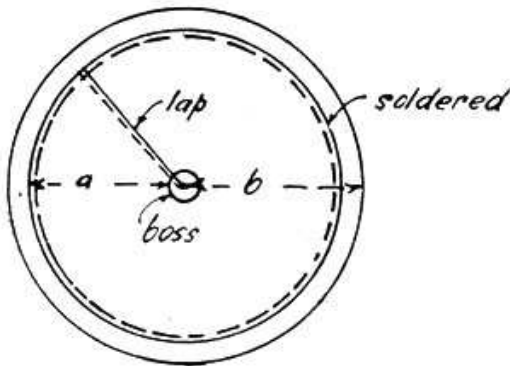


Fig. 1.

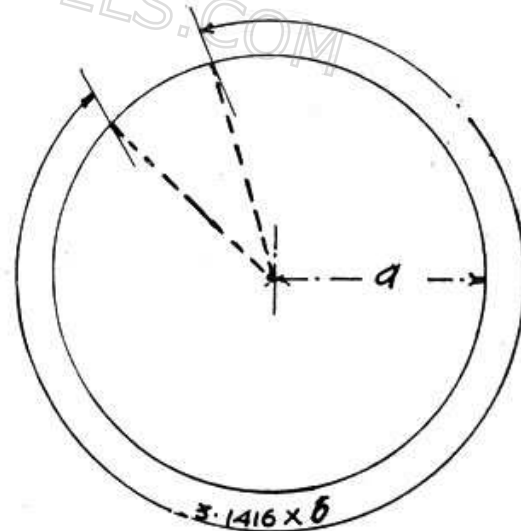


Fig. 2.

Construction of wheels (further illustrations next month).

in the recesses of the die assumes the shape shown in the front (or rear) elevation of Fig. 5. The boss could be turned also, turning the outer and middle portions down to leave two collars. The two blanks are secured together by the outside collars, which are soldered to the boss. Suitable rubber tyres are sprung over the periphery and cemented in with seccotine.

Another simple form of wheel is shown in the drawing. Here, again, curtain rings are

success. As usual, a few were keen at first, but soon tired of it and the projects failed. Hence I have developed entirely on my own. My early attempts were all flying sticks, and I managed to get 300 yards with two machines, but their ungraceful appearance soon led me to scale work, and most of my models have been in the latter class. I find the pages of *Flight* the greatest of help, and particularly valuable to me are the "Milestones" series.

My last half-dozen models were all built from these to a scale of $\frac{3}{8}$ in. to the foot, and look very well indeed. The fuselage is shaped from a solid piece of grained wood, and then fretted out horizontally and vertically so as to leave as light a framework as possible. This is covered with paper stuck on with "Croid". "Seccotine" is useless, as it comes undone in the humid summer weather. The wings are all



Members of the Illinois (U.S.A.) Model Aero Club.

Correspondence

To the Aeronautical Editor

SIR,—I am writing on the assumption that a little news from a part of the Empire as yet little interested generally in model aeroplanes as a hobby, will interest you, and as your time is certainly more valuable than mine I will be as brief as I can.

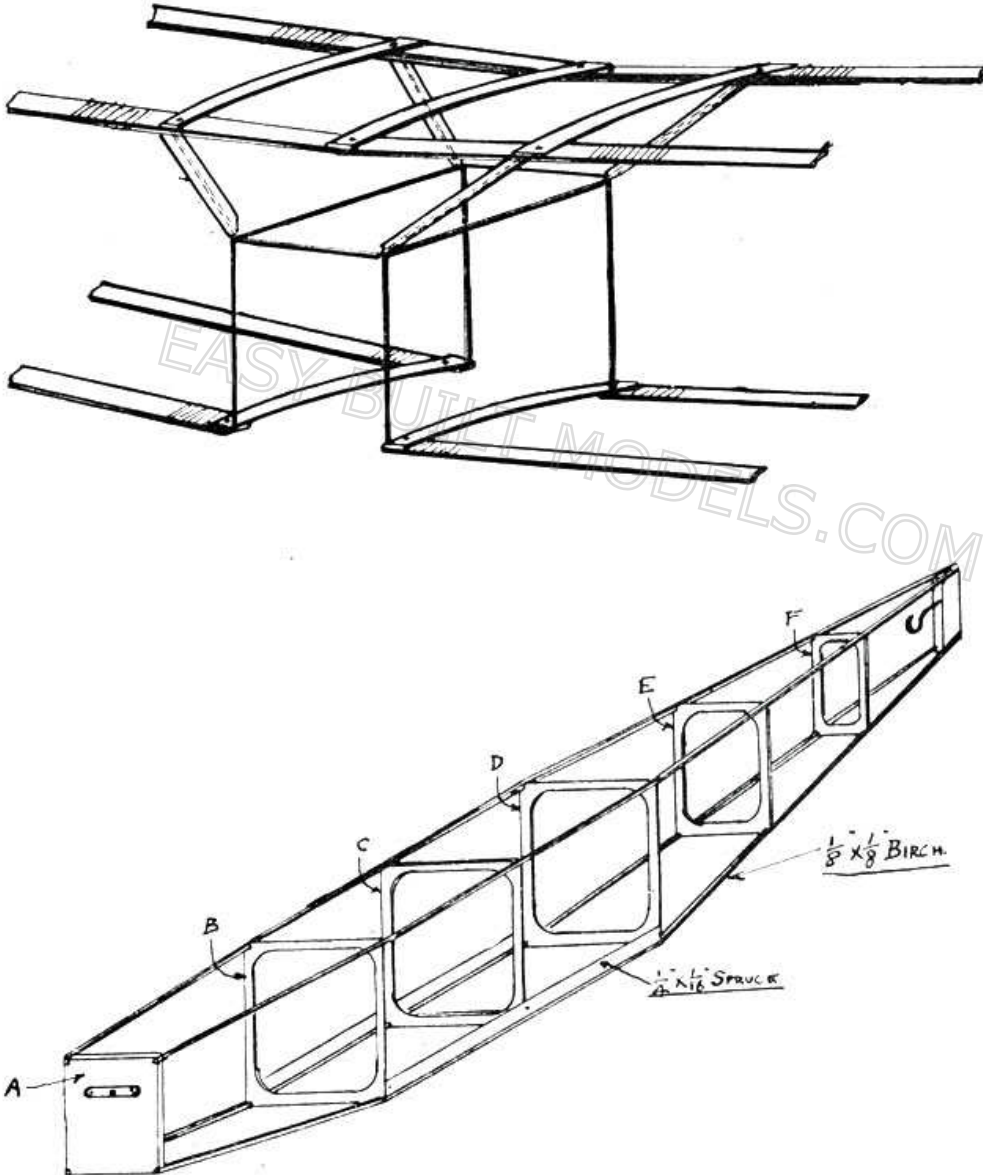
I have been an ardent modellist for the last ten years, and both at Johannesburg and here I have tried to form flying clubs, but with little

double-surfaced. Two spars of very thin cane, $\frac{1}{8}$ in. deep and $\frac{1}{32}$ in. thick, widened to $\frac{1}{16}$ in. where the struts occur, are stuck on to paper. Ribs cut from visiting cards (I have a special punch for making these) are now stuck on to the paper and spars. When properly set the paper is bent over from the leading edge backwards and stuck all over the top. The ends are finished by raising the bottom surface to meet the top and not as in actual practice. Struts are secured by pins (steel dressmaking variety do

very well) as shown. Though this construction sounds heavy it is not really so, and all the models when properly weighted forward glide at 1 in 6 to 7. One of them, the "Nieuport" scout, with V interplane struts, I fitted with an outsize (very!) propeller, and a geared rubber motor. Despite the shortness of the rubber it would R.O.G. and fly about 45 to 50 feet. The appearance in flight, even for so short a time, amply repays any trouble taken.

I have lately been experimenting with "Junker" wing sections, but I find all the gliders I have made are very unstable laterally. The same glider with ordinary section is quite stable. Is there any reason for this?

In conclusion, I must express my pleasure at seeing the model section going strong again. I should like to ask if there is any way by which I can purchase sundries through *Everyday Science* (rubber bearings, etc.). The firms send



Further details of Mr. G. P. Appleby's Olympia model.

The biggest difficulty is that to get the C.G. right without moving the wings out of scale means adding weight and gives rather a heavy model. The machines built up to this scale were Nieuport Scout, Camel, Pup, Triplane and Snipe Sopwiths, Martinsyde F. 4 (a rather heavy one), and the German Pfalz single-seater.

awful rubbish if one deals direct, and such things are unobtainable out here.

I hope my verbosity has not prevented your reaching this far!

Yours, etc.,
F. B. COLAM.

PIETERMARITZBURG, NATAL.