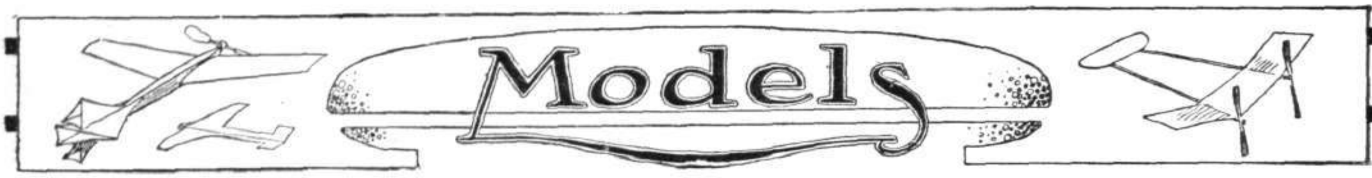


Models

Edited by V. E. JOHNSON, M.A.

Models Driven by Compressed Air.

(*Continued from page* 1240.)

Copper and Brass Foil Containers.

As already stated, the steel, of which the container shown in last week's issue was constructed, cannot be obtained commercially, but copper foil of the same weight and $\frac{1}{1000}$th of an inch in thickness can be purchased at the rate of 2*s.* 8*d.* per lb. from Messrs. Stanton Bros., Blackfriars, and the writer has constructed two such containers exactly similar to the steel one, save that the steel wire is more closely wound round it, about twice the quantity being used; such a container, with closed hemispherical brass ends, but without fittings such as valves, taps, &c., comes out at just 3 oz. They are quite rigid, and stand the pressure all right.

The thinnest brass foil that I could obtain had a thickness of $\frac{2}{1000}$th of an inch: its cost is at the rate of 1*s.* 4*d.* a lb., or half that of the copper; the width of both these foils is 6 ins. Of the two the thicker brass foil appears to be the more serviceable, and I am constructing a double or twin container of this 3 ft. 9 ins. in length and 2·5 ins. in diameter; the capacity of this container is about 2·5 times the one shown on the Bragg-Smith model, the weight of which (see Mr. Boniface's letter below) is 10·5 ozs. In the twin container the four brass hemispherical ends weigh 2 ozs. The weight of the cylindrical cylinders is not yet known, but a strip of the brass foil 7 ft. 6 ins. long, 6 ins. wide, weighs 4 ozs. 1 gramme. Allowing for wiring, solder, &c., it appears that the container should not weigh more than 12 ozs. As to the cost, the four brass knobs from which the brass ends are taken cost 1*s.* 3*d.*, the brass foil 1*s.* 4*d.*, to which we have to add the steel wire between 6*d.* and a 1*s.* possibly, and 3*d.* for a cycle valve and 1*s.* 3*d.* upwards for a tap, and a certain amount of solder, call it 5*s.* altogether, quite a small amount taking into account the capacity of such a container.

The reason why a larger diameter single container is not being made, is because a 2·5-in. light brass knob is so far the largest that I can obtain ready made, and it is desired in this case to construct a container from materials which can be obtained ready to hand.

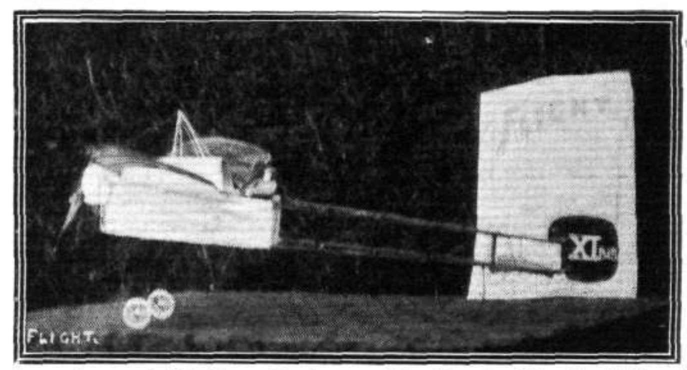
In addition to the above a tractor container, cone-shaped with hemispherical ends, will also be made, the larger hemisphere will have a diameter of 3·75 and the smaller of $1\frac{11}{16}$ ins. The full length of this reservoir is about 4 ft. and its capacity 1·5 times the "Autoplan" one. The diameter of the larger hemisphere could of course be greater, up to at any rate 5 if not 6 ins., if more capacity were desired. The 3·75 hemisphere is being spun for the writer by Messrs. J. Bonn & Co., from 28 gauge brass. Messrs. Bonn & Co. are prepared to spin such domes up to practically any size at prices ranging from about 1*s.* 6*d.* upwards according to size. Technically such a container as the above is known as a truncated cone with hemispherical ends. The capacity of such containers can be calculated from the following formula, where V = volume, h = height or length, and R and r = radii of large and small ends respectively, $V = \frac{1}{3} \cdot \frac{22}{7} \cdot h. (R^2 + Rr + r^2)$.

Such a container does not possess a theoretically correct streamline form, but many years ago the writer carried out a series of experiments, on a large whirling machine of some 20 ft. rad. on the air resistance experienced by such bodies, when the above shape was balanced against a similar one of "mackerel" or fish-shaped form, it was found to offer practically the same resistance at low velocities, *i.e.*, up to about 20 miles an hour.

Leakage.

Having successfully designed and constructed a container for our model, there next arises the question of the motor, and this at once brings us up against the question of leakage.

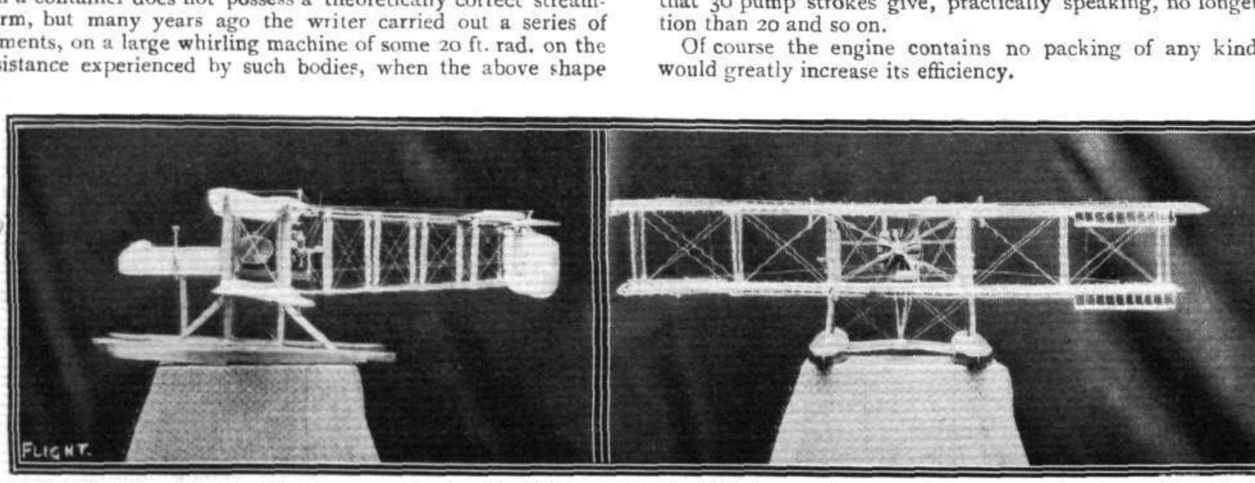
There is no difficulty whatever in making the container and valve airtight, once this is done leakage may occur at three places, viz., the tap, the motor valve, whether slide, rotary, &c., and between the piston and inner cylinder walls; the tap presents no especial difficulty, and has, in fact, already been dealt with. With respect to piston leakage, one's thoughts naturally turn to the instrument which *fills* the container, viz., the pump; what forces air in can obviously keep air from coming out. Now, on examining any good air-pump we find beneath and attached to the lower side of the piston a cup-shaped leather washer well soaked in oil. If we adapt such a device to our motor piston leakage can be successfully overcome, and with but a trifling increase of friction, a very important point.



A scale model Blériot built by Mr. O. A. Wood, of South Dunedin, New Zealand.

With regard to motor valve leakage, the matter is not quite such a simple one, but with well-ground valves, valve walls and wall chest with suitable springs, much can be done. To show how all-important this question of leakage is (far more important even than in the case of a flash steam plant where fresh gas, and therefore fresh pressure, is continually being created), let us take a concrete case. When the little engine shown on the 10 oz. model is running freely under a good pressure, it appears to be working quite well and satisfactorily, but having again pumped up the reservoir, place the engine at its dead centre and turn on the tap, and so great is the leakage that the container empties itself nearly as quickly as when the engine is running; under such circumstances it is not surprising that 30 pump strokes give, practically speaking, no longer a duration than 20 and so on.

Of course the engine contains no packing of any kind, which would greatly increase its efficiency.



Scale model by Eric L. Wright, one-sixteenth full size of the Wight seaplane, exhibited at the last Royal Aero Show at Olympia on Messrs. J. Samuel White and Co.'s stand.