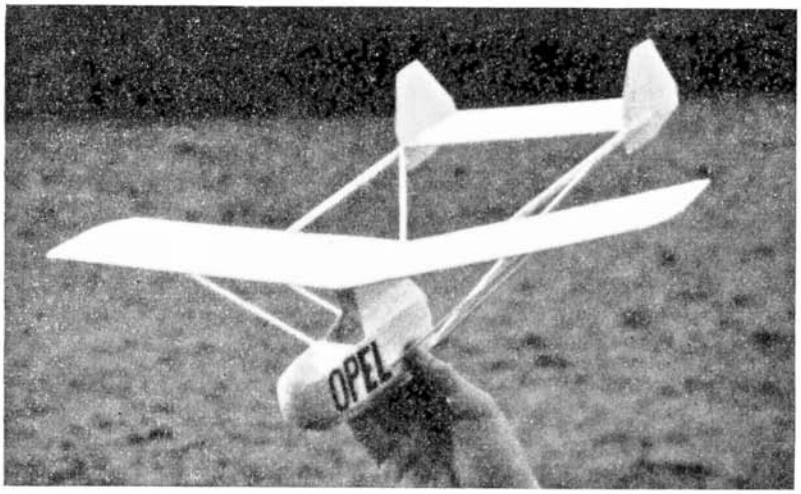
Build a model of the world's first jet

the OPEL HATRY



The Opel Hatry is an ideal Jetex model for beginners, with a good performance.

ON September 30th, 1929, at Frankfort-on-Main, observers had the unique experience of watching what appeared to be a secondary glider, mounted on a launching ramp, belching smoke from the end of its nacelle and slowly gathering speed—just airborne at the end of the ramp, then accelerating rapidly to reach a final height of 50 ft. They had, in fact, witnessed the first piloted jet aircraft to fly, with Fritz von Opel at the controls.

The aircraft was a special design—not a converted glider—built by Ernest Hatry. Professor Sander designed and made the rocket motor, consisting of five separate units fired one after the other. Flight duration was short but the machine flew, even if Opel did have difficulty in keeping it under control as speed built up to a maximum of 90 m.p.h.

Construction of this authentic scale model is extremely straightforward. Use light wood throughout, except for the booms. These were hard quarter-grain stock on the originial. If your prefer you can use larger material (e.g. 3/16 × 3/32), but keep the total weight of the model down as much as you can.

First job is to scale up the plan, using the ½ in. grid for reference. The wing is built flat over the plan, cracked at the centre and cemented to the correct dihedral. The tailplane is flat, without dihedral.

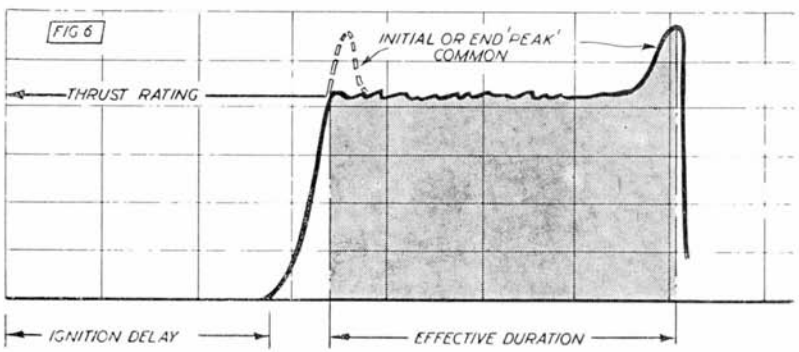
The fuselage nacelle is assembled by cutting two sides from light 1/32 in. sheet and cementing to the formers. Then complete the top and bottom sheeting, also the sides of the cabane. The noseblock is carved from solid balsa.

Mount the Jetex unit on a 1/16 in. sheet carrier which engages in rails cemented inside the open end of the nacelle. Be prepared to cut these out later as you may have to tilt the Jetex for trim, e.g. raising the rear of the unit to stop the model from looping under power.

Tissue cover the tailplane on the top surface only. Cement on the two top booms. With the wing flat on the table, prop up the leading edge of the tailplane 5/16 in. and cement the booms to the two 1/16 sheet wing ribs. This packing will ensure the correct difference in rigging between the wing and tail. Now cover the wings with tissue, top and bottom, waterspray, and dope. Cement to the fuselage cabane and then add the bottom tail booms and wing spars.

Balance the model just behind the wing spar with an unloaded Jetex unit in place. Glide should be fast and flat, and straight. Climb should be straight at first, developing into an upward spiral. Provided you keep the model light, good durations should be possible.

To increase the thrust, at the expense of decreasing the duration, the charge must be encouraged to burn more rapidly. This can be done by cutting notches along its length—Fig. 8. Any free air path down the side of the charge is conducive to more rapid burning. To promote the fastest possible rate of burning, the notched areas can be ignited simultaneously by wrapping with fuse. It is claimed that this treatment will result in up to 5 oz. thrust being produced by a Jetex 50 unit, exhausting through an augmenter tube. With a normal charge a figure of .75 oz. thrust can be obtained with a "50" unit and augmenter, giving a thrust-charge performance of about 10. The corresponding duration with a 5 oz. thrust could therefore not be sustained for any longer than 2 seconds.



The same is largely true of the "hotter" rocket motor fuels made,

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even better thrust being possible at the expense of reduced duration. In fact, in the light of experience to date, guanidine nitrate appears to be the most satisfactory fuel for solid fuel model rocket motors. It is not, however, a perfectly consistent fuel in that its performance may vary somewhat from batch to batch. Also it is hygroscopic, meaning that it readily absorbs moisture. Unless protected, charges readily get damp and, in this state, may fail to ignite or give a reduced performance. Warm Jetex charges definitely give a better performance than cold, damp ones. But the Jetex has reduced the solid fuel rocket to a practical, safe form for model work. It has the same overall characteristics as other model items, however, in that the smaller you make it the lower the efficiency. The Scorpion, for example, is some three times as efficient as the Atom 35 with the same fuel, expressing overall efficiency as thrust × duration divided by the weight of charge.

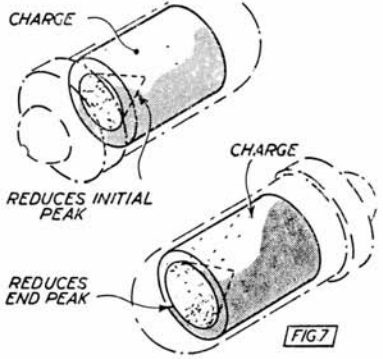

FIG 7

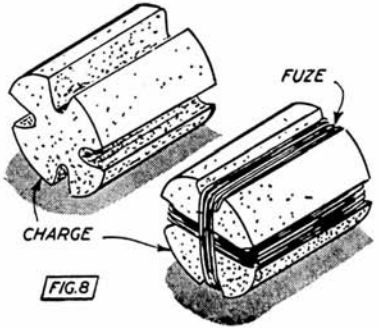

FIG.8