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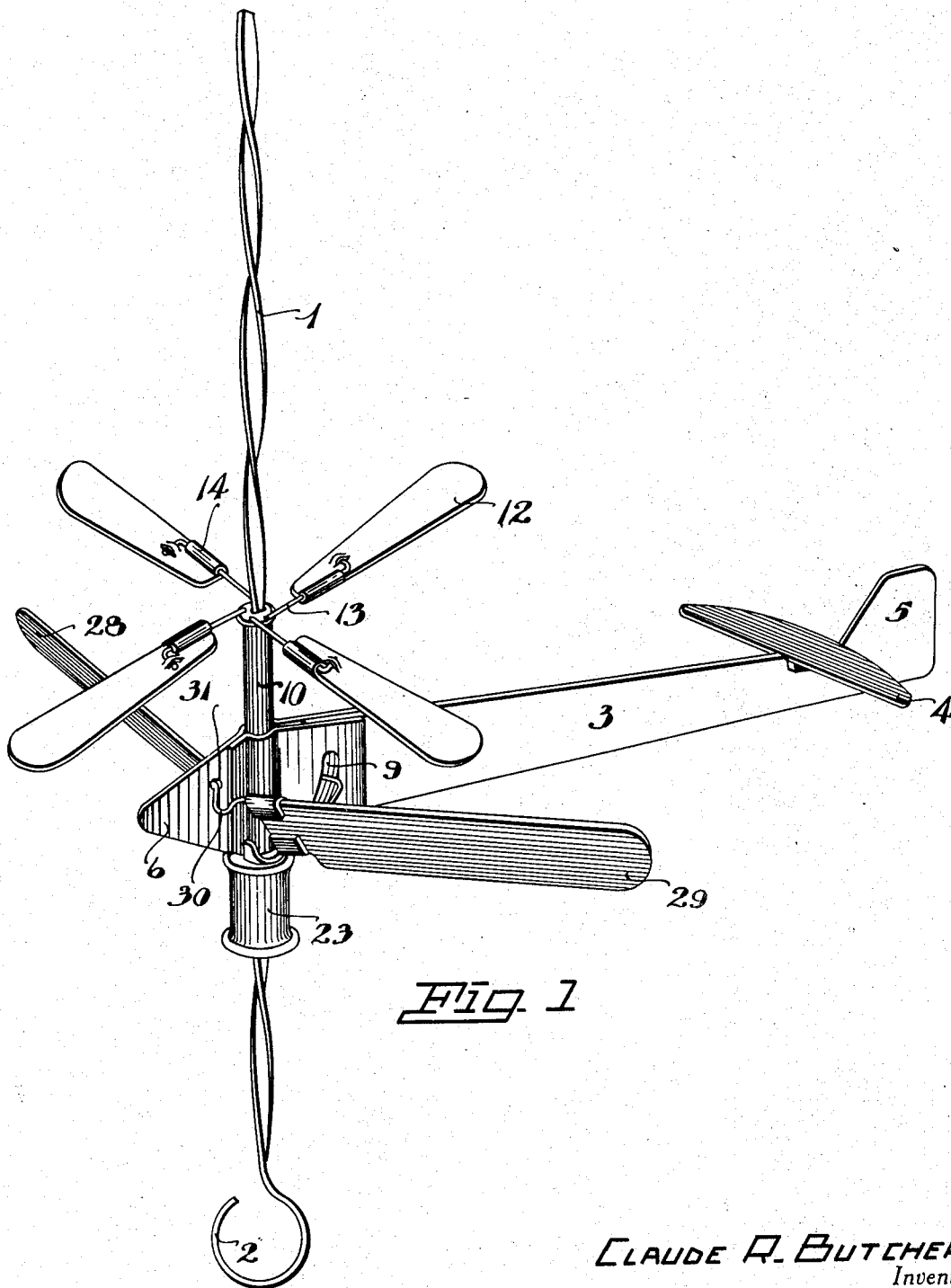
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2,035,531

TOY AEROPLANE

Filed April 15, 1935

3 Sheets-Sheet 1



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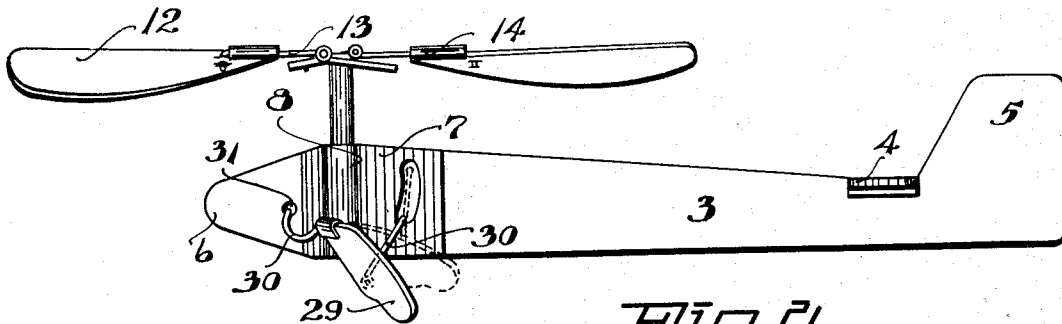


Fig. 2

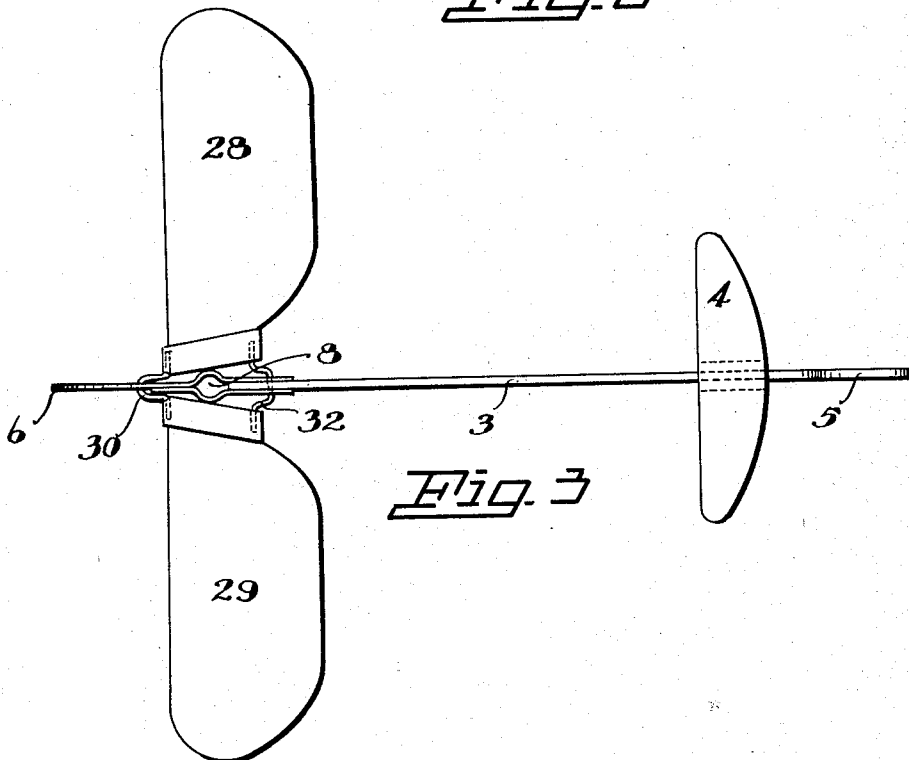


Fig. 3

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3 Sheets-Sheet 3

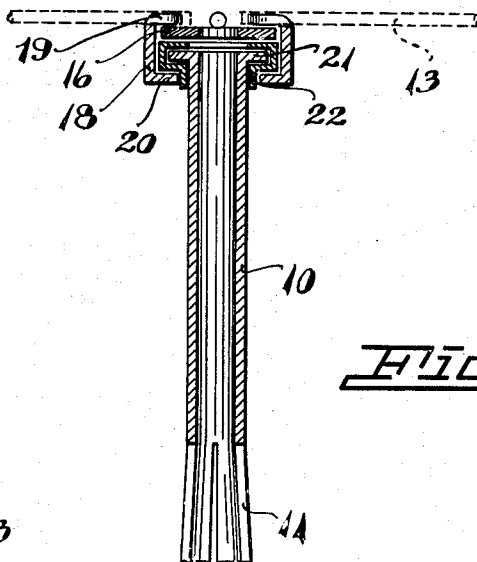


Fig. 4

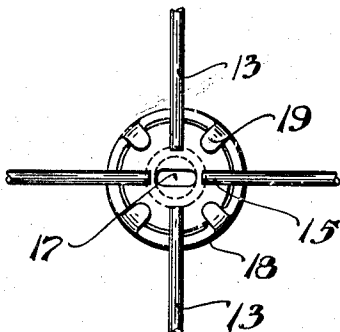


Fig. 5

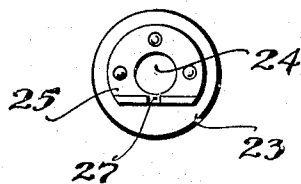


Fig. 6

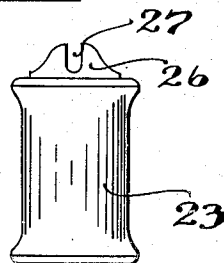


Fig. 7

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UNITED STATES PATENT OFFICE

2,035,531

TOY AEROPLANE

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Application April 15, 1935, Serial No. 16,451

5 Claims. (Cl. 46—75)

My present invention relates to improvements in toy aeroplanes, of the type adapted to be projected vertically into the air and impelled or lifted by action of a propeller of the gyrocopter type to a suitable height, after which the toy glides to the ground to complete its flight. In operating the toy, a spiral screw or threaded stem is held in one hand, and the rotation of the propeller and ascension of the aeroplane are caused by co-action of the propeller device with the spiral stem. A slide-projector is grasped in the other hand and slid up the stem to cause revolutions of the propeller and at the same time cause the aeroplane to be lifted or projected vertically from the stem for the initial or ascending movement of its flight.

Automatically adjustable gliding-wings or planes are mounted on the aeroplane, which become effective, after the ascension, to act as gliders and permit the aeroplane to glide to the ground to complete its flight.

The invention consists in certain novel combinations and arrangements of parts in the construction and for the operation of the toy as will hereinafter be more fully set forth and claimed. In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined and arranged according to the best mode I have thus far devised for the practical application of the principles of my invention.

Figure 1 is a perspective view of the toy aeroplane ready for operation.

Figure 2 is a side view of the aeroplane separated from its stem, and in its ascending position.

Figure 3 is a top plan view of the toy, in gliding position, but with the propeller omitted for convenience of illustration.

Figure 4 is a sectional view, enlarged of the tubular post or mast separated from the body of the plane, with the hub of the propeller thereon, and showing by dotted lines two of the vane-arms of the propeller, as at line 4—4 of Figure 5.

Figure 5 is a top plan view of the hub portion of the propeller.

Figure 6 is a top plan view of the slide-projector for the toy, and Figure 7 is a side view, or rather a front view of the slide-projector.

In the preferred form of my invention I employ a spiral stem 1, which is fashioned from a flat metal strip that is twisted in suitable manner to form the spiral or screw stem, and at its lower end the stem is fashioned with a handle or ring 2 that is grasped in the left hand and held or retained, as the aeroplane is projected, upwardly,

from the stem, and of course the toy is slipped down over the upper end of the stem, to its lower end before the toy is projected from the stem.

The toy approximates the shape and form of an aeroplane, and comprises a flat, vertically arranged blade 3, which may be made from balsa wood, or the blade may be fashioned on a skeleton frame, with a covering, if desired, or the blade may be fashioned in other suitable manner.

Near the rear end of the longitudinal flat blade or body, a transversely disposed plane 4 is fixed in horizontal position, and the blade terminates in a rudder 5 that is integral with the blade.

At its front end the blade is provided with a pointed nose 6, of metal, as aluminum, and a complementary nose-plate 7 is used with the rear end of the nose to form a head in which a sleeve 8 is fashioned. The rear ends of the nose and the nose plate are spaced slightly apart and they are fastened together, through the front end of the blade in order that the plates and blade may form a rigid structure, with the vertically extending sleeve 8 just forward of the front end of the blade. At the rear of the sleeve an arcuate slot 9 is formed which extends through the two plates 6 and 7 and the front end of the blade, for a purpose to be described.

Within the sleeve is rigidly mounted a tubular mast or post 10, of light metal as aluminum, and the lower end 11 of this tubular post is split, as indicated in Figure 4, in order that the post may be rigidly secured in the lower end of the sleeve.

The tubular post or mast slips down from the upper end of the stem to near its lower end, and the mast acts as a guide for the aeroplane as the latter is being projected upwardly from the stem. On the upper end of the tubular post is rotatably mounted a propeller which is provided with a number of vanes 12, here shown as four in number, and slightly turned to provide the required pitch that will enable the propeller, as it revolves, to lift the aeroplane, similar to the ascension of a gyrocopter.

Each of the vanes has an arm 13 secured thereto at 14 and these arms are preferably fashioned of spring or resilient wire, in order that the arm may "give" should the vane strike an obstruction, and thus prevent damage or destruction to the propeller.

The arms, at their inner ends, are soldered to a circular disk 16 which is fashioned with a central, oblong slot 17 of a size corresponding to the cross area of the spiral stem, and this slotted disk slips down over the stem as the aeroplane is lowered to position on the stem prepar-

tory to flight. As the toy is projected upwardly along the stem the slotted disk is turned by its co-action with the stem, and the propeller is thereby revolved for the ascending movement of the toy.

The disk is retained on the upper end of the post by means of a cap 18, having a plurality of inwardly bent lugs 19 that project over the circular edge of the disk for retaining it in position, and the under side of the cap is provided with an annular flange 20 that fits up and under the annular flange 21 formed integral with the upper end of the post. As the post is preferably fashioned from aluminum, a bearing head 22 of hard metal is provided within the cap and secured on the flange of the tube for frictional engagement as the disk rotates or revolves, and it will be apparent that the disk may revolve freely within the cap while it is resting between the retaining lugs and the bearing head.

The aeroplane is projected from its spiral stem by the use of a slide-projector 23, of spool shape and provided with a cylindrical bore 24 of sufficient size to freely slide over or along the spiral stem, but with a fit sufficiently close to prevent wobbling of the spool as it is slid up or down on the stem. On the upper end of the spool a ring or open circular plate 25 is fixed, and the ring is fashioned with a turned-up flange 26 having a central notch 27 therein of a size and shape to fit over the lower edge of the nose 6 of the blade adjacent the sleeve 8. The guide notch on the projector is employed to "point" the aeroplane in the direction it is desired the plane shall glide, and of course the projector is turned with its notch toward that direction.

With the left hand holding the handle 2 and the slide projector grasped by the right hand, it will be seen that as the projector is slid upwardly, away from the handle in Figure 1, and with a quick motion, the aeroplane is discharged from the stem, or projected, and the co-action of the disk 16 with the stem revolves the propeller. Both the aeroplane and the slide-projector leave the stem, but of course the projector is retained in the right hand and the aeroplane is freed therefrom. The action of the projector, of course, causes the aeroplane to ascend, and in addition, the rotation of the propeller, in the nature of a gyrocopter, also lifts the aeroplane, to its utmost height. After the toy has reached its utmost height, it glides forwardly and to the ground with the assistance of a pair of glider-wings 28 and 29.

These glider-wings 28 and 29 as shown in Figures 1 and 2 are tilted automatically to the full angular position of Figures 1 and 2 as the aeroplane ascends, and to the dotted position of Figure 2 and the full position of Figure 3, as the toy glides to the ground.

The glider-wings extend transversely of the toy at its front end, and they are joined by a bowed or crank-shaped pin 30 that passes through and has a bearing in the pivot hole 31 of the nose 6. The pin 30 joins the glider-wings at their leading edges, and the pin is bowed to prevent lateral displacement of the wings with relation to the nose or blade of the toy. The rear or following edges of the two wings are connected by a U-shaped yoke 32 that passes freely through the slot 9 of the body of the aeroplane. Thus it will be appar-

ent that the two glider-wings will fall by gravity and the downward force of the air from the propeller to the retracted position of Figure 1 and the full line position of Figure 2, and these wings are also retained in this position as the aeroplane ascends thus imparting a forward motion at an approximate angle to the plane surface of the transverse wings.

At the end of the upward flight of the aeroplane, and when the aeroplane starts on the downward leg of its flight, it will be apparent that the glider wings will be turned upwardly to dotted line position of Figure 2 and full line position of Figure 3, by the pressure of air beneath the wings. In this position, and with the aid of the rear, fixed horizontal plane 4, the aeroplane is caused to glide for a considerable distance before falling to the ground.

The several parts of the aeroplane are arranged to insure symmetry and proper equilibrium in order that the toy may be projected upwardly in a horizontal position for its ascension flight, and these properly arranged parts also insure the proper position for a gliding-descent of the aeroplane.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In an aerial toy of the slide projected type, the combination with a spiral stem, of a tubular post on the toy, a horizontally disposed propeller rotatably mounted on the post, means on the propeller for co-action with the spiral stem for rotating the propeller, and a slide projector on the stem for projecting the toy.

2. In an aerial toy of the slide-projected type, the combination with a spiral stem, of a horizontally disposed propeller rotatably mounted on the toy, co-acting means on the propeller engaging the spiral stem for rotating the propeller, a slide-projector on the stem for projecting the toy, and a pair of adjustable glide-wings on the toy for the purpose described.

3. In an aerial toy of the slide-projected type and means for projecting the toy from the stem, of a horizontally disposed propeller rotatably mounted on the toy and means co-acting with the stem for rotating the propeller as the toy is projected, a pair of transversely disposed glide-wings, a pivot pin connecting said wings and supported in the toy, and guide means for said wings.

4. In an aerial toy of the slide projector type, the combination with a spiral stem, of a tubular post on the toy, a horizontally disposed propeller rotatably mounted on the post, means on the propeller for coaction with the spiral stem for rotating the propeller, a slide projector on the stem for projecting the toy, and a pair of adjustable glide wings on the toy for the purpose described.

5. In an aerial toy of the slide projector type, the combination with a spiral stem, of a tubular post on the toy, a horizontally disposed propeller rotatably mounted on the post, means on the propeller for coaction with the spiral stem for rotating the propeller, a notched, slide projector on the stem for projecting the toy, and a pair of adjustable glide wings on the toy for the purpose described.

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