E. W. SMITH.

TOY AEROPLANE.

APPLICATION FILED JAN. 20, 1909.

962,172. Patented June 21, 1910.

FIG. 1.

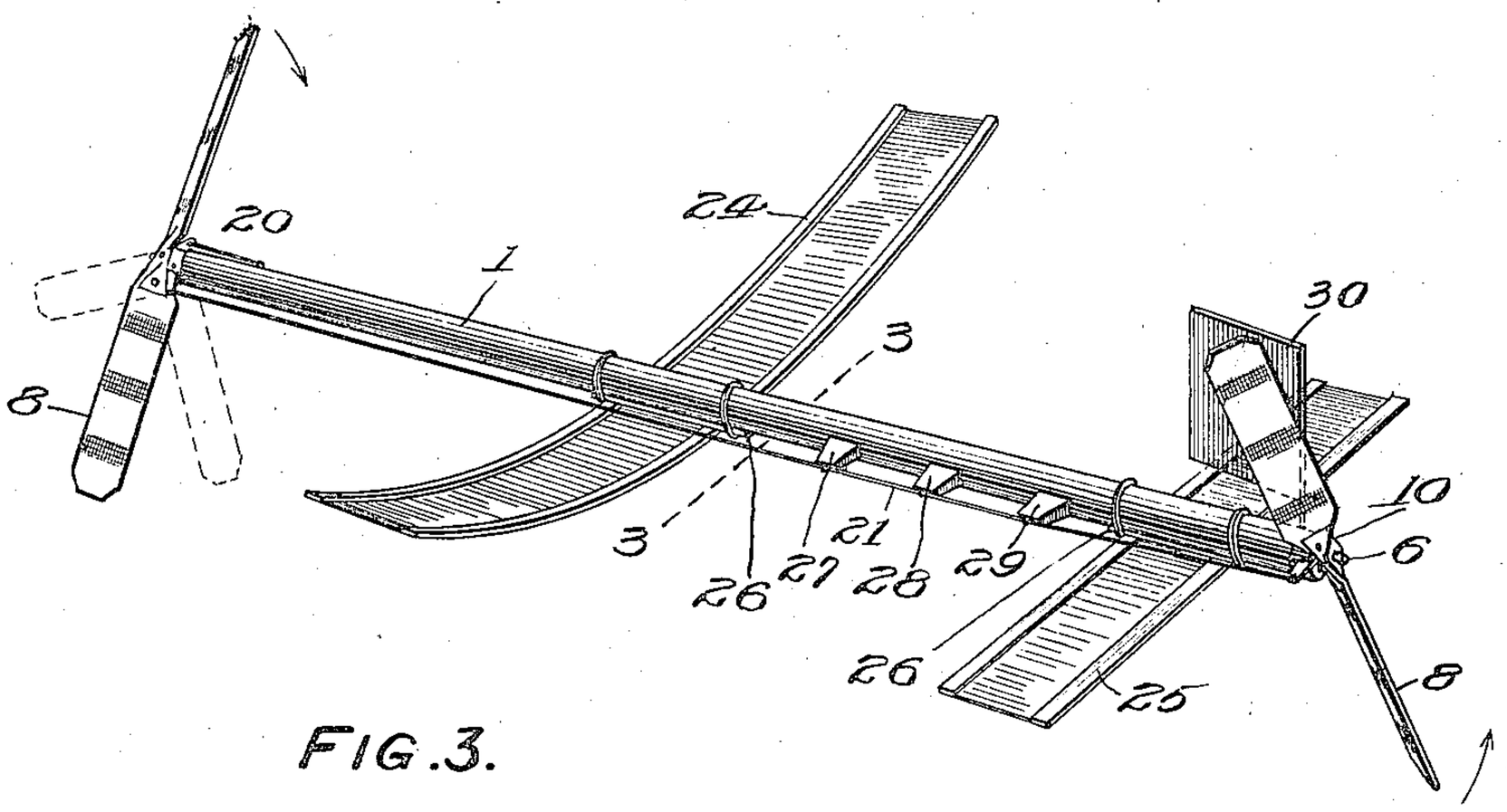


FIG. 3.

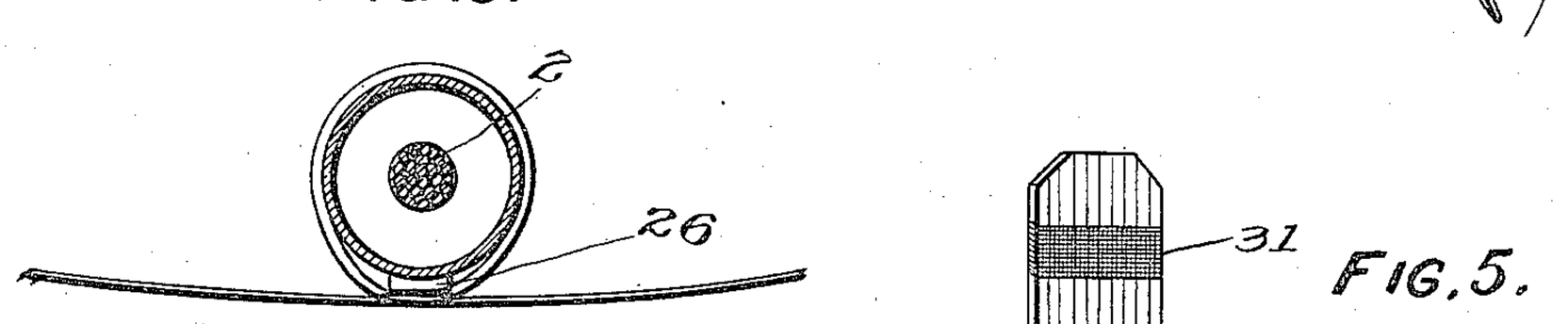


FIG. 2.

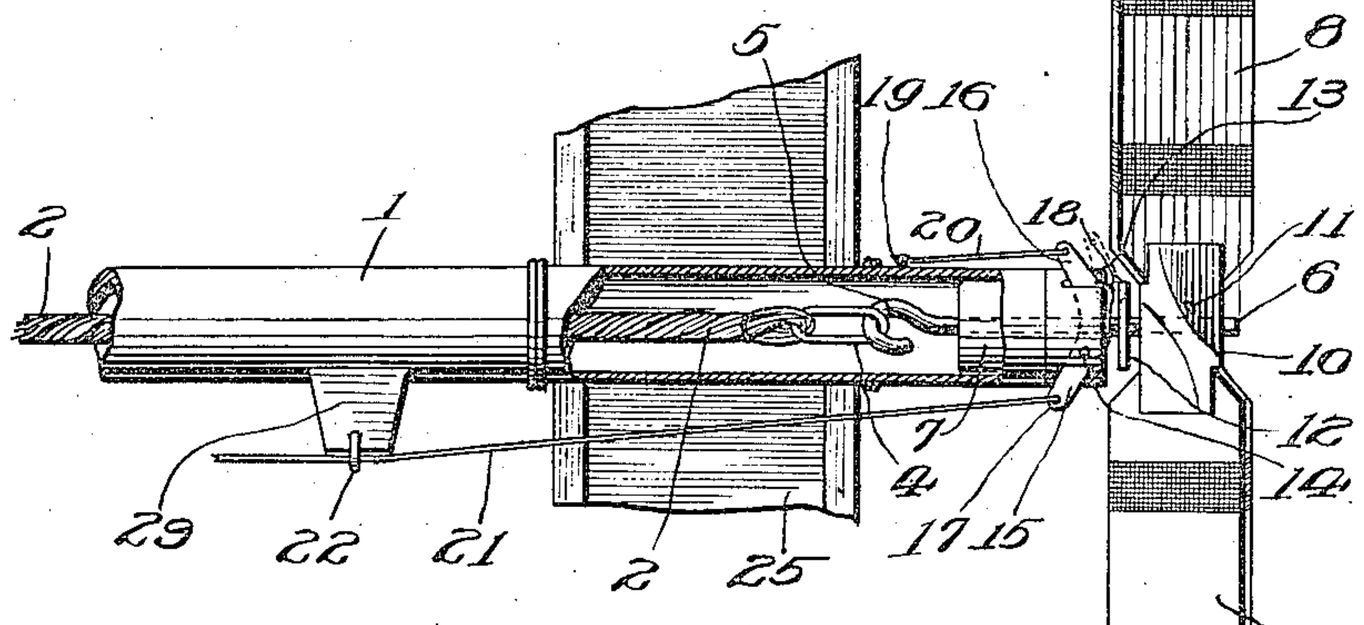


FIG. 5.

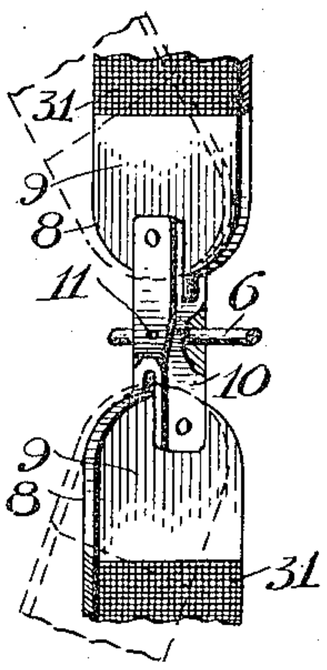
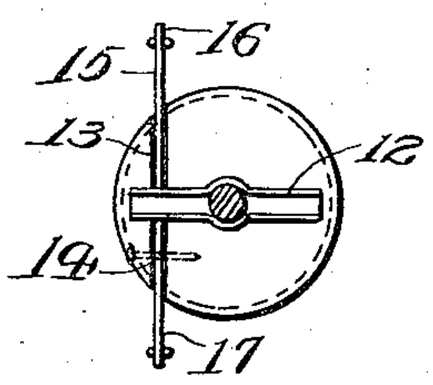


FIG. 4.



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TOY AEROPLANE.

962,172. Specification of Letters Patent. Patented June 21, 1910.

Application filed January 20, 1909. Serial No. 473,260.

To all whom it may concern:

Be it known that I, EDWARD WANTON SMITH, a citizen of the United States, and a resident of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Toy Aeroplanes, of which the following is a specification, reference being had to the accompanying drawings, forming a part of this specification.

Among the objects of my invention are to provide a toy aeroplane characterized by simplicity and cheapness of construction, and ease of handling and operation; in which is embodied adjustable means for determining the angle of flight of the aeroplane; in which the parts thereof may be readily taken apart and formed into a package convenient and suitable for transportation; in which means are provided for inclosing and protecting the means for driving the propeller; in which the elastic member is adapted to operate the rear and forward propellers; and to provide a toy aeroplane having means for strengthening and rendering less breakable the propellers and supporting surfaces or planes.

Other objects of my invention will appear from the following specification and accompanying drawings.

In the drawings Figure 1 is a perspective view of my improved toy aeroplane in flight; Fig. 2 a detail view, partly in section, of the rear end of the aeroplane; Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is a view of one end of the aeroplane with the propeller removed; and Fig. 5 is a detail view showing the pivotal mounting of the propeller blades.

Similar reference numerals indicate similar parts in the several figures.

In Fig. 1, 1 indicates a tube made preferably from paper or pasteboard or other suitable materials and in which is an elastic member 2, shown in the drawings as composed of a plurality of rubber bands or strands, extending substantially from end to end of the tube and held taut therein by being fastened to rings 4, which in turn are mounted upon hooks 5—5, in which the inner ends of the shafts 6 terminate.

Referring to Fig. 2, which also illustrates the detail construction of the front end of the aeroplane, the shaft 6 is journaled within a bearing block 7, preferably made of wood and adapted to fit snugly within the end of the tube 1. Near the outer end of the shaft 6 and mounted thereupon, is a propeller 8 which is made preferably of thin wooden blades 9 let into and glued fast to a central block 10, preferably made of wood and fixed to the shaft 6 by the pin 11 passing through the block 10 into a hole suitably provided in the shaft 6, or if preferred, the pin 11 may be passed through the central block and project therefrom so that its inner end will engage the cross bar 12. It will be seen that by this construction I have provided means whereby the propellers may be easily removed, replaced or changed, as desired. Rigidly fixed to the shaft 6 between the central block 10 and the outer end of the bearing block 7 is a cross-bar 12. I have shown this cross-bar as separated from the central block 10, but I desire it to be understood that this cross-bar may be fitted to the central block 10, or may be entirely dispensed with, if preferred, as will be apparent.

In the outer end of the bearing block 7, I have provided a saw-cut or slot 13, in which is pivoted at 14 a brake lever 15. This brake lever is preferably made with two arms 16 and 17, extending beyond the periphery of the bearing block and formed with a projecting portion or pawl 18. Upon the tube and adjacent its end is placed a pin 19. I connect the pin 19 and the arm 16 of the brake lever 15 with elastic means, preferably an elastic band 20 whereby the arm 16 may be moved about its pivotal support 14 and normally held in the position shown in full lines in Fig. 2 with the pawl 18, out of engagement with the cross bar 12. To the other end of the brake lever 15 is fastened a string or wire 21 or other suitable means which passes through eyelets 22, mounted upon the respective blocks 27, 28 and 29 which are fixed to the tube 1, and said string or wire is fastened to the corresponding end of the brake lever at the other end of the tube 1.

Mounted upon the tube 1, in any desired position is the supporting plane 24, which I term the wings of the aeroplane, the ends of which preferably are curved upwardly.

Near the rear end of the aeroplane is another supporting plane 25, which I term the tail of the aeroplane and the plane of which is substantially horizontal. I have shown a convenient and desirable means for fastening the supporting planes 24 and 25 upon the tube 1 as follows:—These supporting planes are preferably made of a frame work of strips of wood upon which is stretched oiled cloth or other suitable material forming the body portions of the planes. Substantially midway between the ends of these planes and upon the frame work, I fix bars or saddles 26, extending transversely of the planes and slightly beyond the edges of the frame work thereof. These supporting planes or the wings and tail of the aeroplane may be fastened to the tube by passing rubber bands or other suitable means around the tubes and the projecting ends of the bars 26. It will thus be seen that the supporting planes may be easily removed from the tube, and, furthermore, that by changing the position of the supporting plane upon the tube I may determine the angle of flight which the aeroplane will take when released or thrown.

The operation of my device may be described as follows: When it is desired to put the aeroplane in flight, the tube is grasped by one hand, if by a right-handed person, preferably with the left hand, with the thumb upon the string 21 preferably at a point between two of the blocks and pressure applied to this string to press it toward the tube 1. The tightening of the string caused by the thumb pressing upon it as just described, causes the ends 17 of the cross bars 15 to be drawn toward each other, thereby causing the opposite ends 16 of the brake levers to move outwardly and away from each other, resulting in the pawls 18 coming in engagement with the cross bars 12 and acting as brakes to retard their revolution. One of the propellers 8 is then turned about its axis, the pawls 18 by their engagement with the cross bars 12 while allowing the propeller to be revolved in the desired direction, yet acting as a brake to prevent either propeller from untwisting. As the propeller is revolved, the shaft 6 to which it is rigidly fastened, and rings 4 are also revolved, whereby the elastic member is twisted or wound up. When the desired torque in the elastic member has been obtained, the operator removes his left hand from the tube and the thumb from the string and simultaneously grasps the tube with the right hand, the thumb of the right hand being preferably placed upon the string between the blocks 28 and 29 and the slackness caused by removing the thumb of the left hand from the string between the blocks 27 and 28 is taken up by the thumb of the right hand pressing the string between the blocks 28 and 29, toward the tube. The pawls 18 are therefore constantly in engagement with the cross bars 12 at both ends of the device, as above described, while the aeroplane is being prepared for flight, and thus the unwinding of the elastic member prevented. The aeroplane is then thrown in like manner as a javelin, and pointing slightly upward. As the aeroplane is released by the hand, the pressure upon the string 21 is removed, the brake levers resume their normal positions out of engagement with the cross bars 12, and both propellers immediately begin to revolve in opposite directions, propelling the aeroplane through the air in the well known manner.

As hereinbefore described, the angle of flight of my improved aeroplane may be determined by the adjustment of the wings and tail and furthermore, I also provide means for steering the device by suitably mounting a rudder or vertical plane 30 shown in Fig. 1, upon an end of the aeroplane.

By virtue of having the two propellers revolving in opposite directions, it will be readily understood that during flight the propellers take up all the torque exerted by the elastic member; so that the resultant effect is a simple propulsive force.

I have found it desirable to reinforce and strengthen the blades of the propellers and, if desired, the wings and tail, by winding about and securely fastening to them, strips of cloth, or other suitable material, transversely of their length as shown at 31 whereby the chances of the same being broken are greatly lessened. As a further protection to the propellers and to prevent their breakage when the aeroplane is alighting, I may construct them as shown in Fig. 5 of the drawings.

The manner of construction of the propeller referred to, differs chiefly from that which I have hereinbefore described in that the blades of the propellers instead of being made fast within the central block 10 are pivotally mounted therein in suitable slots provided therefor so that the blades may move about their pivotal supports as shown in dotted lines. A spring may be provided to hold the blades in their desired extended positions, but such a spring is not necessary, as the blades when loosely supported, are kept in their extended positions while the aeroplane is in flight by the centrifugal force developed by their rotation. It will be apparent therefore, that when the aeroplane alights and the propellers strike the surface upon which the aeroplane is alighting, the blades of the propellers will turn upon their pivotal supports, thereby breaking the force of the descent and impact of the fall of the aeroplane. I may also accomplish this end by constructing the blades of the propellers of a flexible material such

as celluloid or rubber or other suitable material which possesses flexible qualities in a high degree.

While I have shown a strand of rubber fibers as the driving means for the propellers, I do not wish to be limited in any manner to this form of driving means, for it will be obvious that a single rubber band might serve equally as well, and furthermore, a steel spring or other torsional means could be utilized.

It will be obvious that many changes may be made in the details, form and construction of my invention from those which I have shown and described without, however, departing from the spirit and scope thereof.

Having thus fully described my invention, I claim and desire to protect by Letters Patent of the United States:

1. A toy aeroplane comprising a frame, propellers provided with shafts journaled in the ends of said frame, a torsional spring connecting the inner ends of said shafts, and means for temporarily preventing said propellers from rotating.

2. A toy aeroplane comprising a frame, propellers provided with shafts journaled in the ends of said frame, a torsional spring connecting the inner ends of said shafts, means for temporarily preventing said propellers from rotating, and means for automatically releasing said propellers.

3. A toy aeroplane comprising a frame, propellers rotatively mounted thereon, means for rotating said propellers in opposite directions, means for locking said propellers against movement, and means for normally holding said locking means in inoperative position.

4. A toy aeroplane comprising a frame, a propeller rotatively mounted thereon, means for rotating said propeller, a pivoted brake lever, means secured to one end of said lever for yieldingly holding said lever normally in inoperative position, and means at the other end of said lever for holding said lever in operative position.

5. A toy aeroplane comprising a frame, a pair of propellers rotatively mounted thereon, means for rotating said propellers, means for locking said propellers against movement, means for normally holding said locking means in inoperative position, and a single means for actuating said locking means to hold the same in operative position.

6. A toy aeroplane comprising a frame and a propeller rotatively mounted thereon, said propeller being provided with blades relatively pivoted at their inner ends, on axes transverse to the plane of said blades.

7. A toy aeroplane comprising a frame, a propeller rotatively mounted thereon, means for rotating said propeller, and means for locking said propeller against movement, comprising a lever pivoted to said frame arranged to engage a member of said propeller, means to maintain said lever in normal position out of engagement with the member on said propeller, and means arranged to shift said lever to prevent rotation of said propeller.

8. A toy aeroplane comprising a frame, propellers rotatively mounted thereon, means for rotating said propellers, means for preventing the rotation of said propellers comprising levers pivoted in said frame local to each of said propellers, means connected to contemporaneously shift said levers to lock said propellers and prevent their rotation, and means to automatically maintain said levers in inoperative position.

9. A toy aeroplane comprising a frame, propellers rotatively mounted thereon, means for rotating said propellers, means arranged to temporarily prevent the rotation of said propellers comprising levers pivoted in said frame and normally maintained in inoperative position, a cord connecting said levers, and means to maintain said cord normally extended from said frame, said cord being arranged to be pressed toward said frame to shift said levers into operative position, to prevent rotation of said propellers.

10. A toy aeroplane comprising a frame, propellers rotatively mounted on said frame, means for rotating said propellers, cross bars arranged to rotate with said propellers, levers pivoted in said frame and yieldingly maintained out of contact with said cross bars, and a cord connecting said levers and normally maintained extended from said frame, said cord being arranged to be shifted toward said frame to contemporaneously shift said levers, in opposition to said yielding means, into the path of said cross bar, to contemporaneously prevent the rotation of said propellers, said yielding means withdrawing said levers from engagement with said cross bars when said cord is released.

In witness whereof, I have hereunto set my hand this 16th day of January, 1909.

EDWARD WANTON SMITH.

Witnesses:

FREDERICK A. BLOUNT,

ALEXANDER PARK.