Jan. 29, 1924. 1,481,827

L. W. BROWN

TOY HELICOPTER

Filed Feb. 16, 1923

Fig. 1.

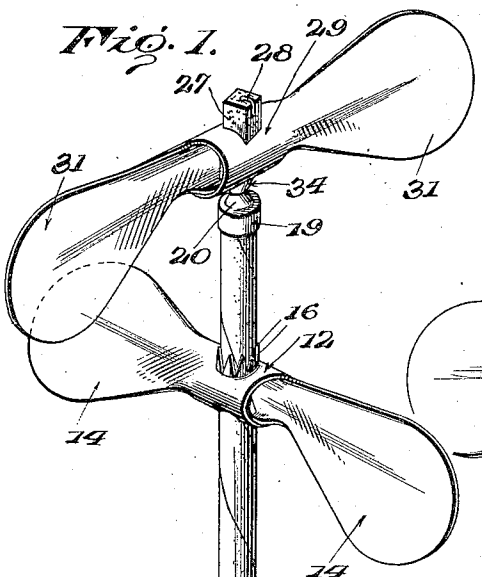



Fig. 2.

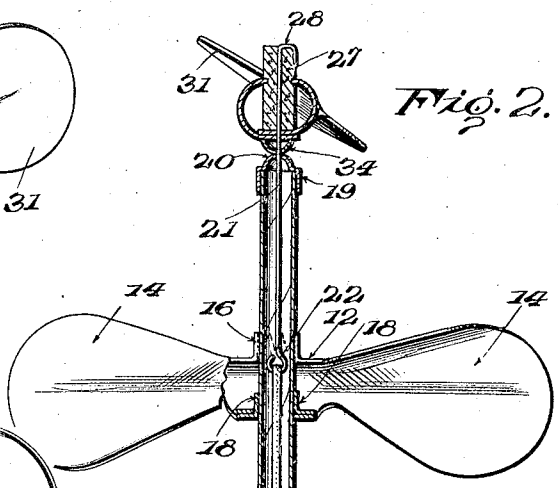



Fig. 3

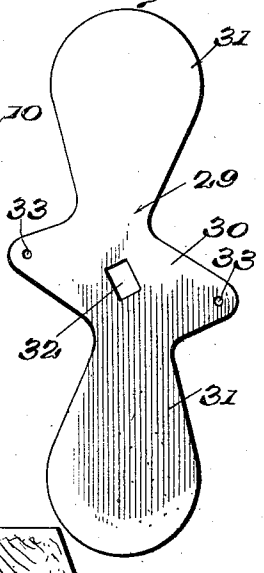
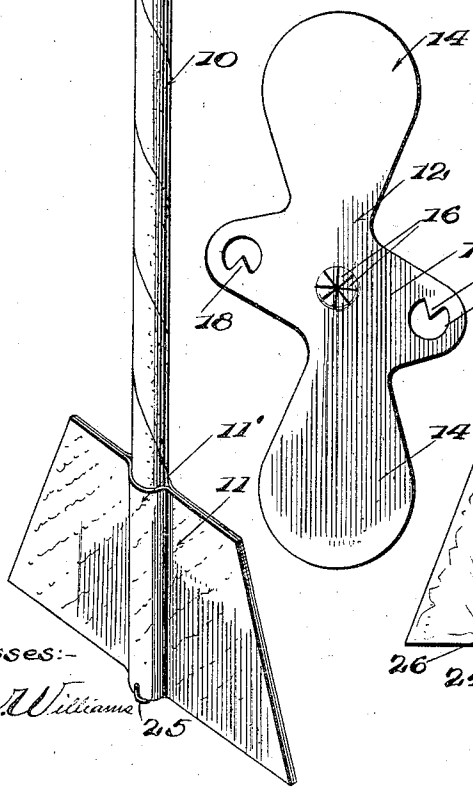



Fig. 4.







Witnesses:-

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# UNITED STATES PATENT OFFICE.

LAWRENCE W. BROWN, OF CLINTON, MISSOURI.

## TOY HELICOPTER.

Application filed February 16, 1923. Serial No. 619,457.

*To all whom it may concern:*

Be it known that I, LAWRENCE W. BROWN, a citizen of the United States, and resident of Clinton, in the county of Henry and State of Missouri, have invented certain new and useful Improvements in Toy Helicopters, of which the following is a specification.

This invention relates to a toy helicopter.

The present invention is a continuation in part of my pending application Serial No. 589,229, filed Sept. 19, 1922.

Among the objects of the present invention is to provide a toy of the character above referred to which comprises few operative parts, which is exceedingly inexpensive to manufacture, and which will sustain itself in flight for a relatively long period.

It is also an object of the invention that the construction of the toy renders the same light and durable.

A further object of the invention is that the propellers employed be exceedingly light but well braced so that the same may properly withstand the strains imposed thereon.

It is also an important object of the invention that the friction of rotating parts be reduced to a minimum.

A still further and important object of the invention is that the helicopter be provided with a resilient bumper and thereby avoid breaking objects with which the same may collide while in flight.

Other objects and objects relating to details of construction, combination and arrangement of parts, will hereinafter appear.

The invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a perspective view of a toy constructed in accordance with the present invention,

Figure 2 is a longitudinal sectional view of the same,

Figure 3 is a plan view of the blank constituting the foremost propeller employed in the present device, and

Figure 4 is a view similar to Figure 3 but showing the blank constituting the rearmost propeller employed.

Like reference numerals refer to similar parts throughout the different views in the drawing.

Referring to the drawings in detail, 10 designates generally the body of the device which as shown may be a tubular member preferably of paper, celluloid or other light and inexpensive material, and of spiral formation as likewise shown in order to give the same the proper strength and resiliency. At one end of this tube there is secured a vane 11, said vane being of two-ply construction as shown and said plies being adhesively secured to each other and encircle the body member 10, as at 11'.

Adjacent the other end of the tubular member there is fixed a propeller generally indicated by the reference character 12. This propeller is specifically shown in Figure 4, and comprises an intermediate portion 13 which has extending from each side thereof a propeller blade 14. It should be noted that each propeller blade is positioned adjacent one end of the intermediate portion 13, and that the longitudinal axes of these blades are in alignment. The intermediate portion 13 is centrally provided with a plurality of tangs 16, said tangs when bent outwardly with respect to the portion 13 being adapted to form an opening for receiving the tubular member 10. Also the intermediate portion 13 of the propeller 12 is formed adjacent each end with an opening 17 and from the periphery of each opening 17 there extends a tang 18. Each opening 17 is also adapted to receive the tubular member 10.

In positioning the propeller 12 the ends of the interemediate portion 13 are bent inwardly and toward each other and brought to an overlapping position so that the openings 17 are in register with each other and also in register with the opening afforded by the tangs 16. The body member 10 is now extended through the openings 17 and the opening 16 and the tangs 18 are arranged as shown in Fig. 2 and then adhesively secured to the tubular member 10. As shown in Fig. 2 the tang 18 occurring upon one end of the intermediate portion 13 is extended through the opening 17 occurring at the other end of the portion 13. In this manner the ends of the intermediate portion 13 are secured to the tubular member 10 and by curving this portion in the manner described the same serves to brace the propeller blades. Furthermore, it is important to note that by forming the blades 14 in the manner shown in Fig. 4 and also in positioning the openings 17 as shown and then mounting the propeller as de-

scribed, each blade 14 is brought to assume a certain pitch or angle with respect to the longitudinal axis of the tubular member 10. It should also be here noted that the pitch or angle of each blade 14 may be adjusted by changing the angle of the blades 14 with respect to the intermediate portion 13; that is, by bringing the longitudinal axes of the blades 14 closer to right angles with respect to the longitudinal axis of the intermediate portion 13 the pitch or angle of each blade will be lessened when the same is mounted on the member 10. This also may be accomplished by changing the position of the openings 17 as is apparent.

Upon the forward end of the tubular member 10 there is mounted a cap 19 which is formed with a bulge 20 by which there is journaled a stem 21, said stem being preferably formed with an eye 22 upon its inner end to which there is connected a loop of elastic 23. This loop of elastic 23 extends longitudinally of the member 10 and is secured to the rear end of the body member by a clip 24. The clip 24 comprises two hooks 25 which may be engaged with the rear end of the tubular member 10 and said hooks having their shank portions integrally connected and bent to form a loop 26 to which the elastic may be connected. The forward end of the stem 21 carries a combined propeller hub and bumper 27 which preferably is of cork and of the dimensions shown. The stem 14 extends through this cork longitudinally thereof and is bent at its free end, as at 28, and preferably embedded in the cork so that this end of the stem will not interfere with the bumper function of the cork. The member 27 supports the forward propeller, generally indicated by the numeral 29, and this propeller as shown in Fig. 3 of the drawings, comprises an intermediate portion 30 and the two blades 31. The blades 31 extend from the intermediate portion 30 the same as in the case of propeller 12, shown in Fig. 4, and in this instance the intermediate portion is formed with a central opening 32 which is adapted to receive the member 27 and adjacent each end of the intermediate portion 30 there is provided an aperture 33 through which the stem 21 may be extended. Also there is provided a conical shaped washer 34 which abuts the protrusion 20 of the cap 19 in such a manner that with the rotation of the stem 21 the friction between the members 34 and 19 is reduced to a minimum.

In positioning the propeller 29, assuming that the member 27 has not been secured to the stem 21 then the ends of the intermediate portions 30 of propeller 29 should be bent inwardly upon themselves to an overlapping position so that the apertures 33 are brought into register and these apertures into register with the opening 32. The free end of the stem 21 may now be extended through the apertures 33 and opening 32 and the member 27 may now be positioned upon the free end of the stem and secured as heretofore described. The member 27 should now be extended through the opening 32 in the propeller 29, substantially the distance shown in Fig. 2. The assembling of this portion of the device is now complete and as shown in Fig. 2, the overlapping ends of the propeller intermediate portion 30 are disposed between the washer 34 and inner end of the combined hub and bumper 27. The propeller is in this way secured against longitudinal movement upon the member 27, the propeller is braced and also each blade 31 has been brought the desired pitch or angle with respect to the longitudinal axis of the tubular member 10. It should be noted that the construction of the propeller shown in Fig. 3 may be changed in order to adjust or change this pitch of the blades 31 when said propeller is mounted and that this may be accomplished in the same manner as described for the propeller shown in Fig. 4. The two propellers 29 and 12 are so arranged that when rotated in opposite directions the same will unite in urging the device forwardly. The vane 11 is secured to the tubular member 10 and, of course, must rotate with the propeller 12 and the rotation of this vane will balance the device and also guide the same during flight thereof.

In operating the present toy the tubular member 10 may be grasped in one hand and with the index finger of the other hand the propeller 29 may be rotated to twist the elastic 23 and tension the same. After this has been accomplished the propeller blade 29 may be released to go with the body member 10 and upon this happening the tubular member 10 will rotate in one direction while the propeller 29 will rotate in the opposite direction and thus sustain the device in flight. The direction in which this device will proceed may be controlled by the operator as is obvious. It is to be particularly noted that the relation of the propellers 12 and 29 and the vane 11 enables the device to obtain a balance and equilibrium and also enables the same to sustain itself in flight a considerable period from the power given from the elastic 23.

While I have shown and described a particular form of device I wish it to be understood that minor changes may be made in the general arrangement and combination of parts without departing from the spirit of my invention as indicated by the appended claims.

I claim:

1. A propeller comprising an elongated

flexible central portion, a blade extending from each side of the central portion and adjacent opposite ends thereof and the longitudinal axes of said blades being in alignment for the purpose described.

2. A propeller made of flexible sheeting and comprising a central elongated portion with a blade integrally formed upon each side thereof, said blades extending from points adjacent the opposite ends of said central portion and having their longitudinal axes in alignment for the purpose described.

3. In an apparatus of the character described, a body member, a propeller having a central portion provided with an opening adapted to receive said body member, a pair of extensions formed upon the central portion of the propeller, said extensions being adapted to be bent inwardly and overlap each other and each extension being provided with an opening in its overlapping portion adapted to receive said body member for the purpose described.

4. In an apparatus of the character described, a body member, a propeller having a central portion provided with an opening axially thereof to receive said body member, a pair of extensions formed upon the central portion, said extensions being adapted to be bent inwardly in overlapping relation and each provided with an opening in its overlapping portion adapted to receive said body member, and said opening being arranged with respect to the blades of the propeller whereby a predetermined pitch or angle of said blades with relation to the body member may be obtained.

5. In an apparatus of the character described, a body member, a propeller having a central portion provided with an opening adapted to receive said body member, and tangs extending from said central portion of said propeller whereby said propeller may be secured to said body member.

6. In an apparatus of the character described, a body member, a propeller having a central portion provided with an opening adapted to receive said body member, and tangs extending from said central portion of the propeller adapted to encircle the body member and thereby provide means for securing said propeller to the body member.

7. In an apparatus of the character described, an elongated body member, a propeller made of flexible sheet material and having a central portion provided with an opening adapted to receive said body member, extensions formed upon the central portion of the propeller, said extensions being bent to overlap each other and each provided with an opening in its overlapped portion adapted to receive said body member, and tangs extending from said extensions whereby the same may be rigidly secured to said body member.

8. In a device of the character described, a propeller having a central portion formed with flexible sheeting, extensions formed with said central portion, a hub for said propeller having an annular groove intermediate its end, said hub being extended through an opening in the central portion of the propeller and said propeller encircling the hub and disposed within said groove of the hub, and said extensions being bent and secured to one end of the hub and thereby to hold the propeller upon said hub.

9. In a device of the character described, a propeller made of flexible sheeting, said propeller having a central opening, a hub for said propeller, said hub being square in cross section and extended through the opening in the propeller and adapted to hold the propeller against rotative movement thereon, extensions formed upon the central portion of the hub, and means whereby said extensions may be secured to one end of the hub and thereby to brace said propeller and further secure the propeller upon said hub.

10. In a device of the character described, a body member, a stem journaled in the one end of said body member and extending from said end of the body member, a propeller hub carried by the extended end of said stem, a propeller comprising a flexible sheeting through which said hub extends, extensions formed upon the central portion of said propeller and adapted to be brought in overlapping relation upon the inner end of the hub, said extensions having openings adapted to accommodate said stem, and a washer interposed between the hub and the body member and thereby to hold the extensions in their applied positions.

11. In combination, a body member or hub, a propeller having an opening through the central portion thereof with respect to its length, and tangs extending from said propeller and disposed about said central opening, said tangs being adapted to be employed for securing the propeller to the hub.

12. In combination, a body member or hub, a propeller made of flexible sheeting and having its central portion provided with an opening adapted to receive said body member or hub, tangs extending from the propeller and arranged about said opening, said tangs being adapted to be utilized for securing the propeller to the hub or body member, extensions formed upon the central portion of the propeller and each extension having an opening adapted to receive the body member, and tangs extending from said extensions and encircling the associated opening whereby the propeller may be further secured to said body member or hub.

LAWRENCE W. BROWN.