T. A. DICKS AND J. B. LUTTRELL.

PROPELLER.

APPLICATION FILED JAN. 22, 1918.

1,365,159. Patented Jan. 11, 1921.

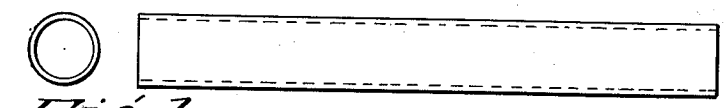


Fig. 1.



Fig. 2.

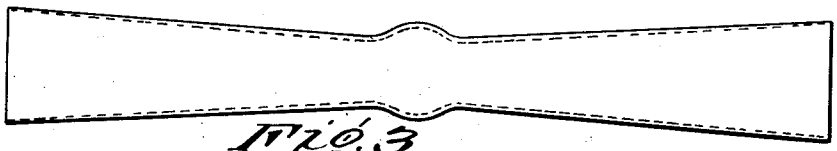


Fig. 3.

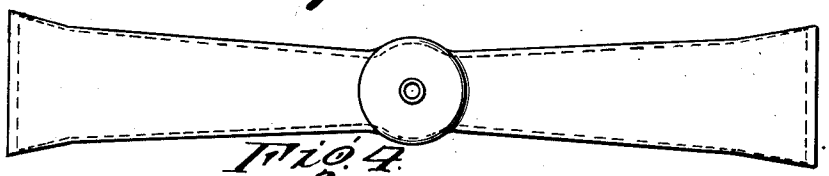


Fig. 4.

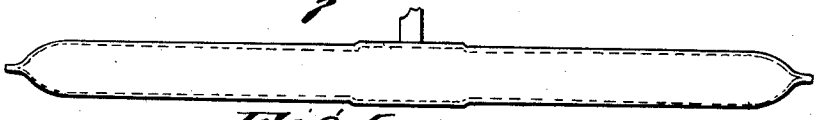


Fig. 5.

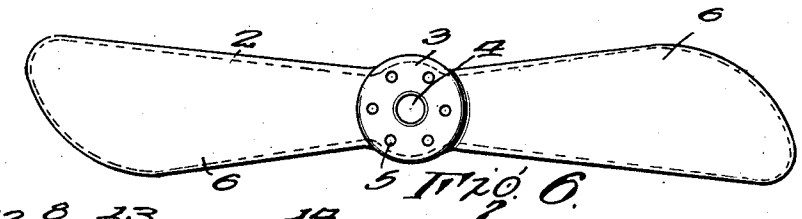



Fig. 6.

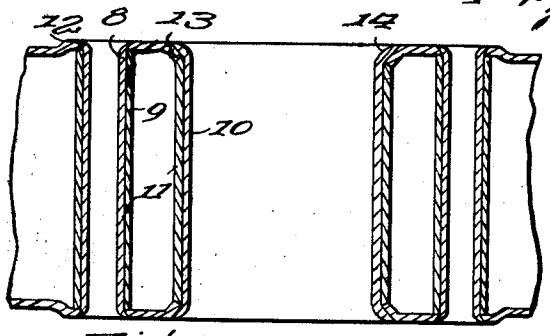



Fig. 7.

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# UNITED STATES PATENT OFFICE.

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## PROPELLER.

1,365,159. Specification of Letters Patent. Patented Jan. 11, 1921.

Application filed January 22, 1918. Serial No. 213,260.

*To all whom it may concern:*

Be it known that we, THOMAS A. DICKS, a subject of the King of England, and JAMES B. LUTTRELL, a citizen of the United States, residing at Wilkinsburg and Pittsburgh, respectively, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Propellers, of which the following is a specification.

This invention relates to new and useful improvements in propeller construction, and the primary object of the invention is to provide a propeller that is formed of a single piece of metal tubing, so shaped and formed by dies, that a two-blade propeller is made thereby, which is complete in itself, hence increasing the strength and durability of a propeller of this type.

Another object of the invention is to provide a new and improved method of forming a two-bladed propeller from a continuous piece of metal or tubing, said method including various steps necessary in shaping and cutting the metal or tubing which terminate in the formation of a two-bladed propeller of the class described.

Another object of the invention is to provide a device of this character which is very easily and simply constructed, inexpensive to manufacture, and one which will be very efficient in operation.

With these and numerous objects in view our invention consists of the novel features of construction, combination, and arrangement of parts which will be herein referred to and more particularly pointed out in the specification and claims.

In the accompanying drawings:

Figures 1 to 5 inclusive show the propeller shape during the various steps in the method of forming the same,

Fig. 6 is a front elevation of the completed article, and

Fig. 7 is a detail section through the hub of the propeller.

In describing our invention, we shall refer to the drawings in which similar reference characters designate corresponding parts throughout the several views.

Our new and improved propeller, is of the two-blade type, and is formed from a single piece of metal tubing, said tubing being so formed and cut by a method to be hereinafter more fully described, that the finished article which is designated by the numeral 2, is formed with an enlarged hub portion 3, having a central opening 4 therethrough, and a plurality of regularly spaced small openings 5 surrounding the same. The end portions or blades 6, project from the opposite sides thereof and are tapered, being provided with rounded tips 7. The hub portion of the propeller is reinforced by short length tubes 8 which are positioned through the opposite faces of the hub, and which are disposed in reinforcing tubes 9, said tubes 8 and 9 being positioned in alinement with the smaller openings 5 in said hub portion. The center is likewise provided with a tube 10 positioned in the reinforcing tube 11 in the central opening 4.

The method of forming a propeller from a continuous piece of metal or tubing consists in taking the piece of seamless tubing, as shown in Fig. 1 of a diameter and thickness suitable when formed into shape, to produce the propeller required, and placing the same in suitable dies which upset and form the enlarged hub at the center of the tube as in Fig. 2. This upsetting is to insure a full thickness at the hub. The next step is subjecting the opposite portions of the tubing to pressure by passing the same between pressure rolls the action of which flattens and lengthens said portions in addition to tapering and flaring the same, thus providing effectual resistance engaging surfaces, as clearly shown in Fig. 3 of the drawings. The thin flaring ends, are then flattened and welded as in Fig. 4, and a hole is made in the center of the hub, to receive a short piece of pipe, which is welded thereto as clearly shown in Figs. 4 and 5 of the drawings.

The partly completed article is then placed in a suitable die, pressure being applied, at the same time fluid pressure is applied to the interior of the tube, by means of the pipe at the hub, and this with a proper die, forms the tube to the proper shape, as clearly shown in Fig. 6 of the drawings. The ends of the tubing, are trimmed off, by a die or other suitable means, and are closed by welding the same. The center hole 4 is then cut through both faces of the hub, and also the small holes 5 are drilled around the same.

At this step, reinforcing pieces of tubing 9 are inserted between the faces of the hub, and the smaller tubes 8 are inserted from the outside, through one face of the hub, and both ends are expanded as clearly shown at 12 into the countersink in the hub face. In the center hole 4 in the hub, the tube 11 is inserted, and the faces of the hub turned down to meet it as shown at 13. The tube 10 is then inserted through the hole 4, and both ends expanded as shown at 14 and finished to the faces of the hub. Both sides of the hub portion are by this means tied together and braced to resist strain.

This method of forming a propeller of a single piece of metal tubing, forms a very efficient and durable device of this character, as the same is seamless, and consequently its strength is correspondingly increased. The method of forming the same is very simple, as has been herein before fully described, and the strengthening and reinforcing means for the hub portion are very easily applied.

From the above description taken in connection with the accompanying drawings, it is thought that a clear and comprehensive understanding of the construction, method of forming, and advantages of our invention may be had, and while we have shown and described the device as embodying a specific structure, and method of operation, we desire that it be understood that such changes may be made in said structure and method, as do not depart from the spirit and scope of the invention as claimed.

Having fully described our invention, what we claim is new, and desire to secure by Letters Patent, is:

1. A hollow propeller made in a single piece and comprising blades and a central hub portion, said hub portion being flattened and having a plurality of transverse reinforcing tubes connecting the sides of said hub portion around the center of the latter.

2. A hollow propeller made in a single piece and comprising blades and a central hub portion, said hub portion being flattened and having a plurality of transverse reinforcing tubes connecting the sides of the hub portion around the center of the latter, a central transverse tube located in said hub portion, and inner tubes extending through the several first mentioned tubes and riveted or upset at their ends.

3. The method of making a hollow propeller having two blades and a hub portion, said method comprising applying endwise pressure to the ends of a tube in a die and forming a central enlargement on said tube, shaping the portions at respective sides of the central enlarged portion for forming blades, shaping said central enlarged portion to form a hub, closing the outer ends of the blade portions, introducing fluid pressure into the device, and shaping the blade portions by external pressure while the interior is subjected to fluid pressure.

In testimony whereof, we affix our signatures hereto.

THOMAS A. DICKS.
JAMES B. LUTTRELL