April 2, 1929. H. FORD 1,707,463

METHOD OF FORMING FANS

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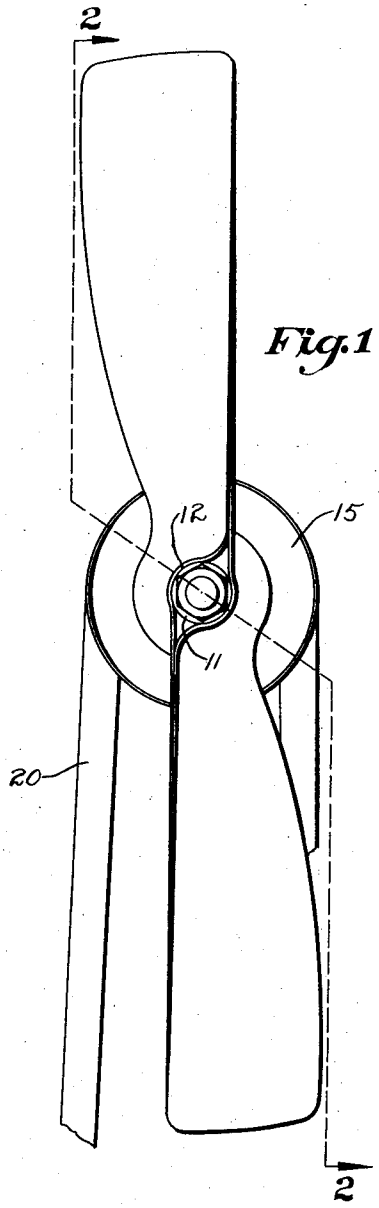


Fig. 1

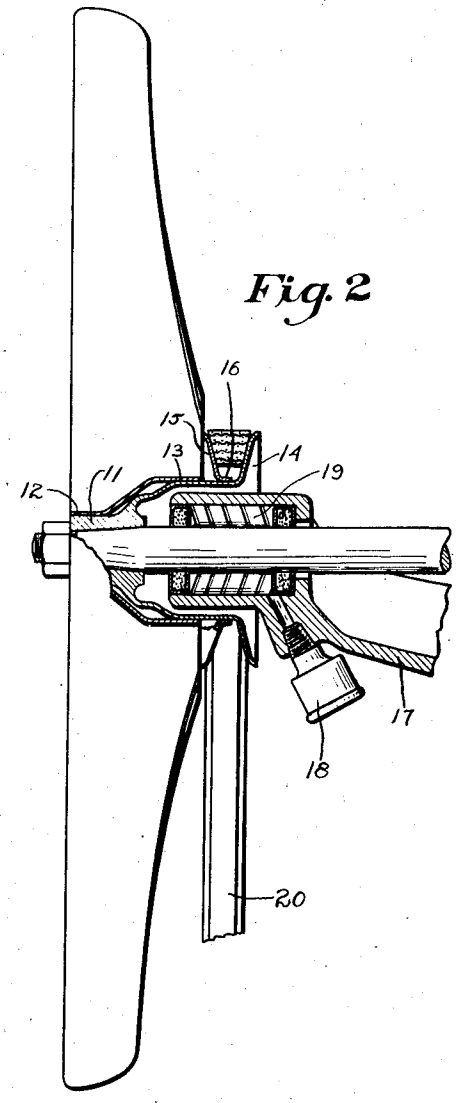


Fig. 2

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Fig. 9.

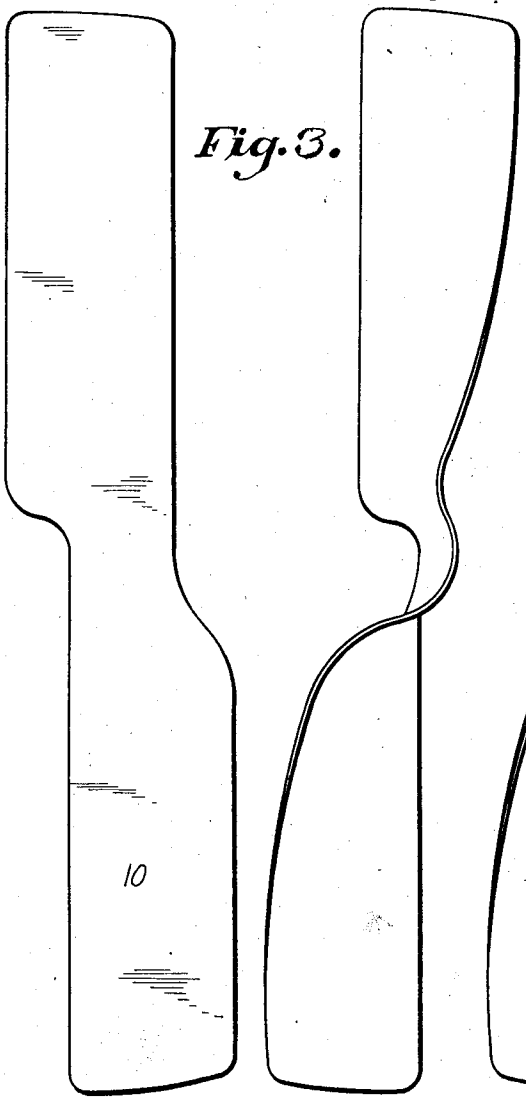


Fig. 4



Fig. 3.

Fig. 5



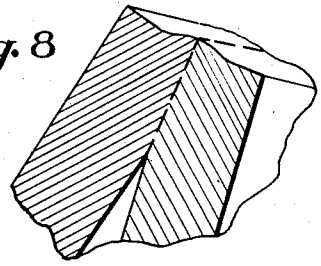
Fig. 6



Fig. 7



Fig. 8



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Patented Apr. 2, 1929. 1,707,463

UNITED STATES PATENT OFFICE.

HENRY FORD, OF DEARBORN, MICHIGAN.

METHOD OF FORMING FANS.

Application filed October 5, 1927. Serial No. 224,097.

The object of my invention is to provide a fan of simple, durable and inexpensive construction.

Still a further object of my invention is to provide a fan especially adapted for an automotive vehicle.

Still a further object of my invention is to provide a fan which may be made from sheet metal and still may approach a theoretically perfect air screw in configuration.

Still a further object of my invention is to manufacture a fan which may be made from two like sheet metal blanks which, however, when formed and properly put together are complemental to each other to form an almost perfect air screw.

Still a further object of my invention is to provide such complemental sheet metal blanks forming a fan and to provide a hub and pulley member which may be suitably secured to such fan proper.

Still a further object of my invention is to provide a fan which may be composed of two complemental blank members which together form an air screw and which may be welded together to form a very rigid structure and which is so shaped that a hub member may be welded to the central portion of the fan members to form a complete fan assembly.

With these and other objects in view, my invention consists of the arrangement, combination, and construction of the various parts of my improved device, as described in the specification, claimed in the claim, and illustrated in the accompanying drawings, in which:

Figure 1 shows a front elevation of a fan constructed in accordance with my invention.

Figure 2 show a view taken on the line 2—2 of Figure 1.

Figure 3 shows a plan view of the sheet metal blank from which my fan members are initially formed.

Figure 9 shows an elevation of the fan shown in Figure 3 after the fan has been shaped by means of a punch press or other suitable machine.

Figure 4 shows an elevation of the two fan blade members after they have been assembled together.

Figure 5 shows a section taken on the line 5—5 of Figure 4.

Figure 6 shows a section taken on the line 6—6 of Figure 4.

Figure 7 shows a section taken on the line 7—7 of Figure 4, and

Figure 8 shows an enlarged sectional view illustrating the manner of securing together the ends of the edges of the members forming my improved fan.

This fan is formed by first blanking out from flat sheet metal a flat blank 10 which is shown in Figure 3. This blank is then placed in a punch press having suitable dies and is struck up to the form shown in Figure 9.

A pair of blanks so formed, are turned end for end and put together and then welded as is illustrated in Figures 4 and 8 along their meeting surfaces. These two blanks when so welded together form the air screw or fan which it is my object to secure.

One end of each blank is shaped to form a proper front or pushing surface for a fan blade, the central portion is formed so that a hub and pulley member may be secured therein, and the other end is shaped to form a back or pulling surface for a fan blade. When the two exactly alike blanks are turned end for end relative to each other and then brought together, it will be seen that one end of each blank will form a front or pushing surface for that end of the fan and the adjacent end of the other blank will form a proper back or pulling surface for that end of the fan so that each of the blades of the fan will have proper pushing and pulling surfaces. The central portions are complementary to form a properly shaped conical hub portion to which a hub member proper may be suitably secured. The shaping of the blanks forming this fan is quite clearly illustrated in Figures 5, 6, and 7. In these figures it will be noted that the upper half of the blade in each case is relatively flat so that it has the necessary driving power to push the air away from the fan. That is, the upper half of the blade in these figures is the front or pushing side of the blade. The lower half of the blade, however, has the curvature or camber necessary to create the maximum suction to draw air across the fan blade. In other words, the blades are shaped to give them as nearly as possible the correct configuration for a theoretically perfect air screw.

The edges of these blanks forming my improved fan are secured together by welding the edges thereof as is illustrated in detail in Figure 8. This method of securing the blanks together gives the fan the necessary rigidity and makes it a substantially integral structure so that it will be serviceable as long as the material thereof lasts. It will be

noted that the central portion of this improved fan forms a recess having the general shape of a truncated cone. A hub member 11 of similar shape is welded into this recess. This hub member is welded at 12 and 13 so that these two members may be secured together at the inner and outer ends of the hub respectively whereby the connection may be strong enough to resist the torque and other stresses of the fan.

This hub member 11 has at its large end an outwardly inclined annular flange 14, which is designed to form one half of the pulley wheel by means of which the fan may be driven. An oppositely inclined ring 15 is provided with an annular flange 16 which is designed to be welded as by a weld to the outer surface of the hub 11 adjacent to the flange 14 so that this flange 14 and ring 15 may together form the pulley wheel by means of which the fan may be driven.

This fan may, if desired, be mounted on any suitable support as is illustrated by the member 17 which may carry a grease cup 18 designed to lubricate a roller bearing 19 which is mounted in the support 17. A belt 20 is designed to co-act with the pulley wheel formed by the flange 14 and ring 15 to drive the fan.

It will be understood that this fan is primarily designed for use in connection with the cooling system of an automotive vehicle, so that it is highly important that it should be very strong to resist vibration, easy to manufacture, and simple to install. Its efficiency must also be relatively high as the space in which it may be installed is limited. In view of these requirements for such a fan it will be seen that a number of advantages result from the use of my improved device. In the first place I am able to secure a substantially perfect air screw for a fan which is formed from sheet metal so that it is relatively cheap and readily constructed. In the second place the fan is very rigid and readily adapted to be placed in an automotive or other vehicle. The machinery and operations required for the manufacture of this improved fan are relatively few.

Some changes may be made in the arrangement, construction and combination of the various parts of my improved device without departing from the spirit of my invention and it is my intention to cover by my claim such changes as may reasonably be included within the scope thereof.

I claim as my invention:

The method of forming a fan, consisting of welding together sheet metal blanks to form the blades and the hub section, then welding a ring to the hub member to form a combined pulley and hub member and then welding the fan member to the hub member to form a complete unitary fan and pulley structure.

HENRY FORD.