

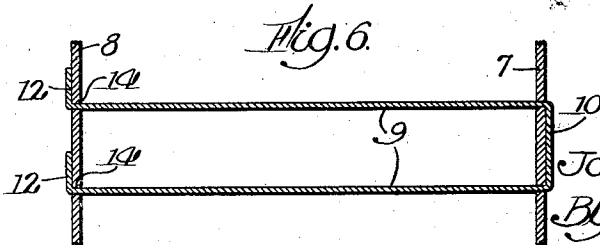
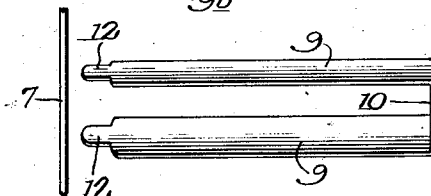
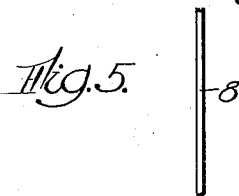
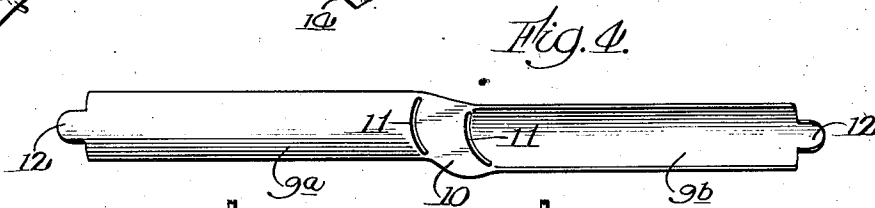
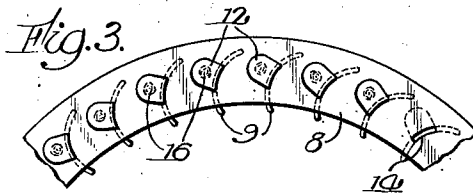
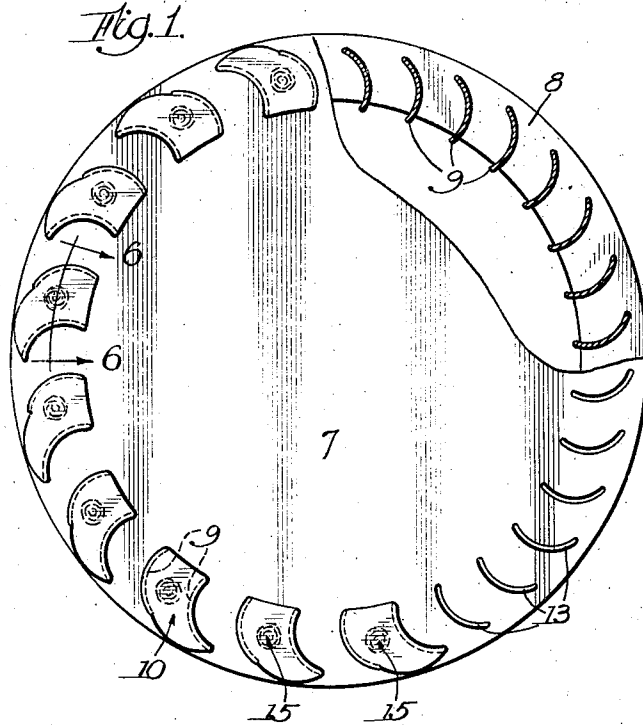
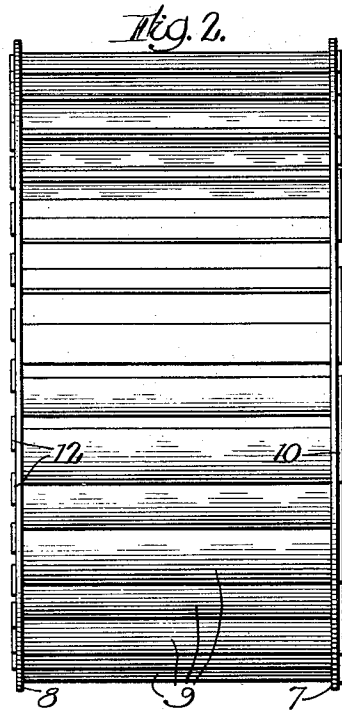
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ROTOR CONSTRUCTION FOR FANS OR THE LIKE

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1,996,155

ROTOR CONSTRUCTION FOR FANS
OR THE LIKE

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Application September 23, 1931, Serial No. 564,642

7 Claims. (Cl. 230—134)

This invention relates to the construction of rotors or impellers for fans, blowers, or the like, and particularly to such devices made of sheet metal. The desirability of making such rotors light is well recognized but it has been found difficult to form them of sheet metal in an economical manner and make them sufficiently strong and rigid for commercial purposes.

The objects of this invention are to provide an improved rotor or impeller for fans or the like, which will be particularly light in construction and strong and durable in operation; to provide a rotor for fans formed of sheet metal with the blades joined in pairs for convenience in manufacture and for rigidity in the completed device; to provide novel blades for a fan rotor or impeller; and to provide such other advantages and novel features as will appear from the following description.

In the accompanying drawing illustrating this invention;

Figure 1 is an end view of my improved rotor with parts broken away and shown in section;

Figure 2 is a side view of the same;

Figure 3 is a detail showing a portion of the rotor viewed from the end opposite from Figure 1;

Figure 4 is a detail of one of the blanks or partially formed blades;

Figure 5 is a view showing a pair of completely formed blades in position to be inserted in the end members; and

Figure 6 is a sectional view taken on the line 6—6 of Figure 1.

As shown in this drawing, the rotor comprises an end plate or disc 7 and an end ring or annular plate 8 of the form more or less commonly used in fan wheels or rotors of this type. The blades 9 are made in pairs which are connected at one end by a cross piece or connector 10 as shown particularly in Figures 5 and 6. Each pair of blades is preferably made from a blank of the form shown in Figure 4, one end of the blank 9a being convex or curved to give the desired curvature and the other end 9b being curved in the opposite direction so that when the two ends are brought into parallelism both will be curved alike or in the proper direction. The connecting portion 10 which is formed integrally with the blades is preferably defined at either end by transverse grooves or slots 11, as shown in Figure 4, for convenience in bending the ends to form a U-shaped member as shown in Figure 5. Such bending is preferably done by means of suitable dies so that the slots are

substantially closed when the pair is finished. Each blade has a tang or projection 12 at its free end for fastening the same to the ring 8.

The disc or end plate 7 which may be attached to any suitable driving means (not shown) has a series of slots or openings 13 which are suitably shaped and spaced for receiving the blades 9. The ring or opposite end member 8 has a corresponding series of holes or slots 14 for receiving the projections 12.

When the parts have been formed in the manner described, the rotor is completed by inserting the pairs of blades 9 through the slots 13, as indicated in Figure 5, and bringing the ends or cross pieces 10 closely against the outer face of the disc. These ends or cross pieces are then preferably spot-welded, brazed or otherwise secured to the disc as indicated at 15, so that the blades will be held rigidly in position and securely attached to the head or end member 7. The tongues or projections 12 are passed through the holes 14 in the ring 8 and preferably fit closely therein with the ends of the blades or adjacent shoulders abutting against the inner face of the ring. The projections are then bent over as shown in Figures 3 and 6, and are preferably spot-welded or otherwise secured to the ring as indicated at 16.

As shown in these figures, each projection is concavo-convex in cross section, being in fact an extension of the central portion of the blade, and is preferably bent in a direction toward the convex side of the blade. This tends to draw or stretch the sides of the projection as it is flattened out against the adjacent surface and also tends to draw the shoulders of the blade closely against the ring so that the parts will be drawn tightly together. I have found that this provides a more satisfactory union than when such projections are bent toward the concave sides of the blades as has heretofore been suggested.

While I have shown the blades of uniform size and curvature it will be apparent that the blades may be formed of any desired cross section. When the parts have been assembled and spot-welded or fastened in the manner indicated, it will be seen that the heads or end pieces and the blades will be securely and rigidly fastened together so that there will be little possibility of the parts becoming loose or weakened and therefore the rotor may be made of relatively light sheet metal throughout. From this description it will be seen that the pairs of blades with their connected ends form a series of arches which are rigidly attached at their bases, or the free

ends of the blades, to one blade carrying member and their crowns are tied together by the other blade carrying member in such a manner that they serve to strengthen and reinforce such member, thus affording a particularly rigid structure as a whole.

It will also be noted that changes may be made in the arrangement of the parts or in the construction of the same in order to adapt the invention to different forms of rotors or for different sizes and therefore I do not wish to be limited to the exact structure herein shown and described, or to the method of making the same except as set forth in the following claims, in which I claim:

1. An impeller of the character set forth, comprising a circular end member having a plurality of curved slots therein for receiving blades, pairs of parallel blades adapted to engage with the slots, each pair being connected at one end and having projections at the opposite end, a ring having holes for receiving said projections, said projections being bent over against the adjacent surface of the ring and said connections and projections being welded or otherwise secured to the adjacent surfaces.

2. A blank for a pair of impeller blades having transversely curved end sections curved in opposite directions comprising the blade members and an integrally formed connection between the end sections, said connection having transverse curved slots at the points of junction with the blades to facilitate the forming operation.

3. A fan or blower including an end member, a second end member in the form of a ring, vanes formed in pairs and disposed between said end members, said vanes having lugs at one end extending through slots in said ring, said blades passing through openings in the first named end member and the blades of each pair having integrally formed connections positioned against the exterior surface thereof and welded thereto.

4. An impeller of the character set forth, comprising a circular end member having a plurality of curved slots therein for receiving blades, pairs of U-shaped blades engaging with said slots, each blade being curved in cross section and having a similarly curved tongue at its free end, the curva-

ture of the blades and tongues being on a relatively short radius and corresponding to the curved slots in the end member a ring having holes for receiving said tongues, said tongues being bent over the adjacent surface of the ring, each tongue being bent in a direction toward its convex side and the convex side of its respective blade the curvature of the blades and tongues being such that the bending of the tongues in the direction specified will tend to force the ring against the ends of the blades as described.

5. A wheel or impeller of the character set forth, including an annular end member having circumferentially spaced holes therethrough, longitudinal blades of concavo-convex cross section having concavo-convex projections at the ends thereof and shoulders adjacent to the projections, said shoulders fitting against the end member and the projections extending through said holes, each projection being bent over against the end member, and being bent over in a direction toward the convex side of the blade and the projection, the curvature of the blades and projections being such that the bending of the projections will draw the end member closely against the ends of the blades.

6. An impeller of the character set forth, comprising a circular end plate having a plurality of slots therein for receiving blades, pairs of blades substantially U-shaped in form engaging with said slots, the end member of each pair fitting closely against the plate and being welded thereto, each blade having a projection at the end thereof and a ring having holes for receiving said projections, said projections being bent over against the adjacent surface of the ring.

7. A blank for a pair of impeller blades having transversely curved end portions curved in opposite directions, said portions comprising the blade members and an integrally formed end portion joining the adjacent ends of said blade members, said joining portion being arranged diagonally to the end portions whereby the blade portions will be properly spaced and positioned when bent at right angles to the end portion.

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