A. J. STECKER.

FAN CONSTRUCTION.

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1,325,591.

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Fig. 1.

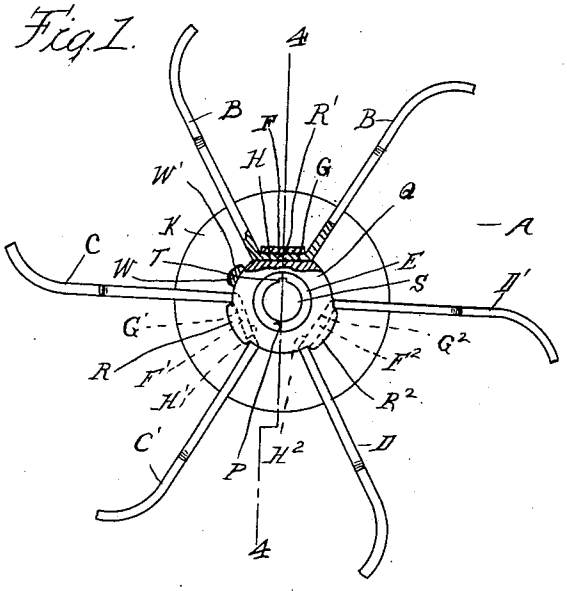


Fig. 4.

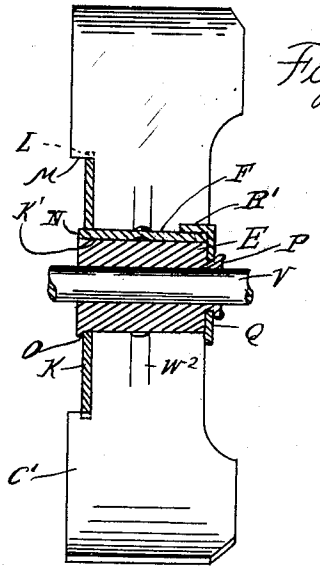


Fig. 3.

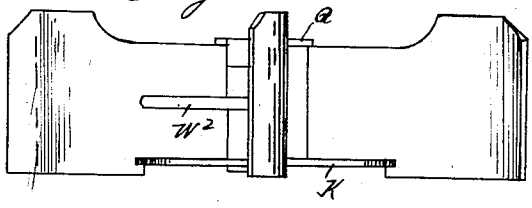


Fig. 2.

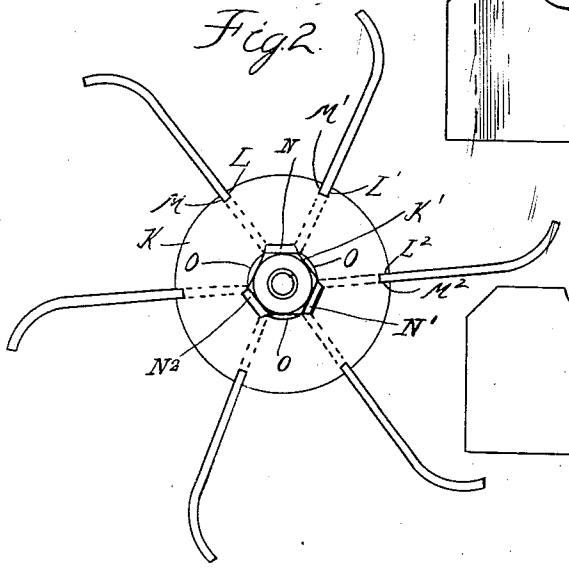
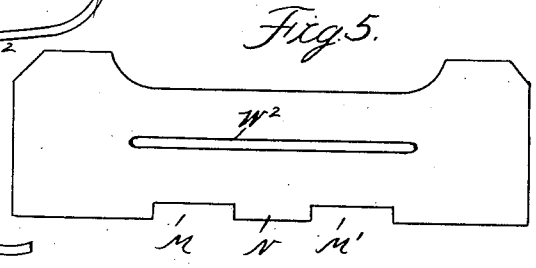


Fig. 5.



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FAN CONSTRUCTION.

1,325,591. Specification of Letters Patent. Patented Dec. 23, 1919.

Application filed May 21, 1917. Serial No. 169,856.

To all whom it may concern:

Be it known that I, ALFRED J. STECKER, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Fan Constructions, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to fan constructions and refers more particularly to a new and improved fan construction adapted for use in suction devices such as vacuum cleaners or the like, although the invention in its broader aspects is not limited to the particular use mentioned.

Among the objects of the invention are to provide a fan of the character above referred to which can be economically manufactured, preferably in general from stamped sheet-metal, the fan blades being formed from a material such as tempered spring metal which will spring back into place an equal amount so that the balance of the fan wheel will be maintained; to provide a construction which when assembled will have great rigidity and in which two or more of the fan blades are formed with an integral connecting web; to so construct and arrange the parts that the securing devices for holding the device in position also interlock with the blades to reinforce the fan construction as an entity; and in general to provide a new and improved construction which can be economically manufactured and assembled and in which the necessity of extraneous securing devices is generally avoided.

The invention also resides in such further details of construction and arrangements and combinations of parts as will more fully hereinafter appear.

In the drawings:

Figure 1 is a front elevational view of a fan embodying my invention;

Fig. 2 is a rear elevational view of a fan;

Fig. 3 is a side elevational view of a fan;

Fig. 4 is a cross-section on the line 4—4 of Fig. 3;

Fig. 5 is a plan view of the stamping which is bent to form a pair of fan blades.

Describing in detail the particular construction shown in the drawings, A designates the fan which comprises a plurality of blades B, B′, C, C′, D and D′ which are secured to a central bearing or hub member E. These blades are preferably formed from stamped metal and constructed in pairs such as B and B′ connected by an integral web portion F. These web portions F, F′ and F^2 are preferably formed with flat faces G, G′ and G^2 which bear against corresponding flat surfaces or faces H, H′ and H^2 formed on the outer surface of the hub member.

While the bearing or hub member E could be provided with any desired number of bearing faces according as a greater or lesser number of fan blades were desired, I have illustrated in the drawing a construction in which the hub member is hexagonal in shape so as to have faces forming spacers between the faces H, H′ and H^2. Thus when the fan blades B, B′, C, C′, D and D′ are secured in position they will each be spaced substantially the same distance apart.

The invention also resides in the novel manner of securing these blades in position with reference to the bearing or hub member E. In detail the securing means comprises a plate K which has its periphery notched at L, L′, L^2 etc. to receive in interlocking relation shoulders M, M′, M^2, etc., formed in the blade members B, B′, C, C′, D and D′. The web portions F, F′ and F^2 are also provided with lugs N, N′ and N^2 which extend through the hexagonal aperture K′ in the plate K and between the surfaces H, H′ and H^2 and the portion of the plate surrounding the opening or aperture K′. For locking the plate from movement off the end of the bearing or hub member E, the metal of the portion projecting through the aperture K′ is peened down intermediate the projecting lugs N, N′ and N^2. At the opposite end the hub member E is provided with a circular projection P over which there extends a cap Q. This cap is provided with a plurality of flanges R, R′ and R^2 which are bent down over the web portions F, F′ and F^2 after which the metal of the projecting portion P is turned down to lock the cap on to the hub. When the plate K and cap Q are secured in position as above described, the various blades B, B′, C, C′, D and D′ are locked in rigid relation to the bearing or hub member E. The latter is preferably provided with a circular bore S which slips over the driving shaft and also with a key-way T by means of which the bearing or hub member E can be secured

to the shaft V. Also if desired the fan may be provided with a set screw W which is screw-threaded into an opening W′ in the bearing or hub E, which set screw can be employed for locking the fan to the shaft.

Where the fans are driven at high speed, such as in suction devices, there is danger of the fans, when sprung, failing to return equally so that an unbalanced condition is produced.

In the present construction this objection is overcome by forming the fan blades of tempered spring metal. By this arrangement it is possible to obtain fan blades, each of which will maintain its position, whereas if cold rolled steel or the like were employed, the inequality in the ability of the metal to return to its original position would result in unequal balancing of the fan.

The present invention therefore contemplates an improved arrangement whereby the fan blades are so formed as to avoid the objections above referred to.

For strengthening the fan blades, they are preferably provided with a rib W^2 extending centrally of each pair of blades and across the web portion thereof. Various changes, however, in details of construction and arrangements and combinations of parts can be made within the scope of my invention.

What I claim as my invention is:

1. The combination with a hub member, of a plurality of fan blades, a plate having an inter-locking engagement with the fan blades and carried by said hub member, and means on the other end of the hub member for clamping the fan blades in position.

2. The combination with a hub member having a plurality of flat faces, of a plurality of pairs of fan blades, each pair having a web portion, and a common means for clamping the web portions of the blade members against the flat faces of the hub member.

3. The combination with a hub member having a plurality of flat faces, of a plurality of pairs of fan blades having web portions engaging the alternate faces of the hub member, means for clamping the web portions of the fan blades against the flat faces of the hub member, and means carried by the hub member and arranged upon opposite sides of the fan blades for locking the latter in position.

4. A fan comprising a hub member, a plurality of pairs of sheet-metal fan blades, the blades of each pair being connected by an integral web portion, a plate or disk sleeved over the hub member and having notches engaging the fan blades, said web portions of the fan blades having projections extending between the plate or disk and the hub member, and a cap member for locking the blades in position to the hub member.

5. A fan, comprising a hub member, a plurality of fan blades formed in pairs connected by integral web portions secured to said hub member, and a securing means for said blades comprising a plate mounted upon one end of the hub and bearing against the edges of the fan blades, and a cap mounted upon another end of the hub having lugs bent at right angles to embrace the webs of the blades.

6. A fan, comprising a hub member, a plurality of fan blades formed in pairs connected by integral web portions, and means for securing said blades to the hub member comprising a disk mounted upon one end of the hub and peripherally notched to engage shoulders of the blades, whereby a fixed angular relation between the blades is established, and a cap mounted upon the other end of the hub having lugs bent at right angles to embrace the webs of the hubs.

In testimony whereof I affix my signature.

ALFRED J. STECKER.