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ROTARY FAN.

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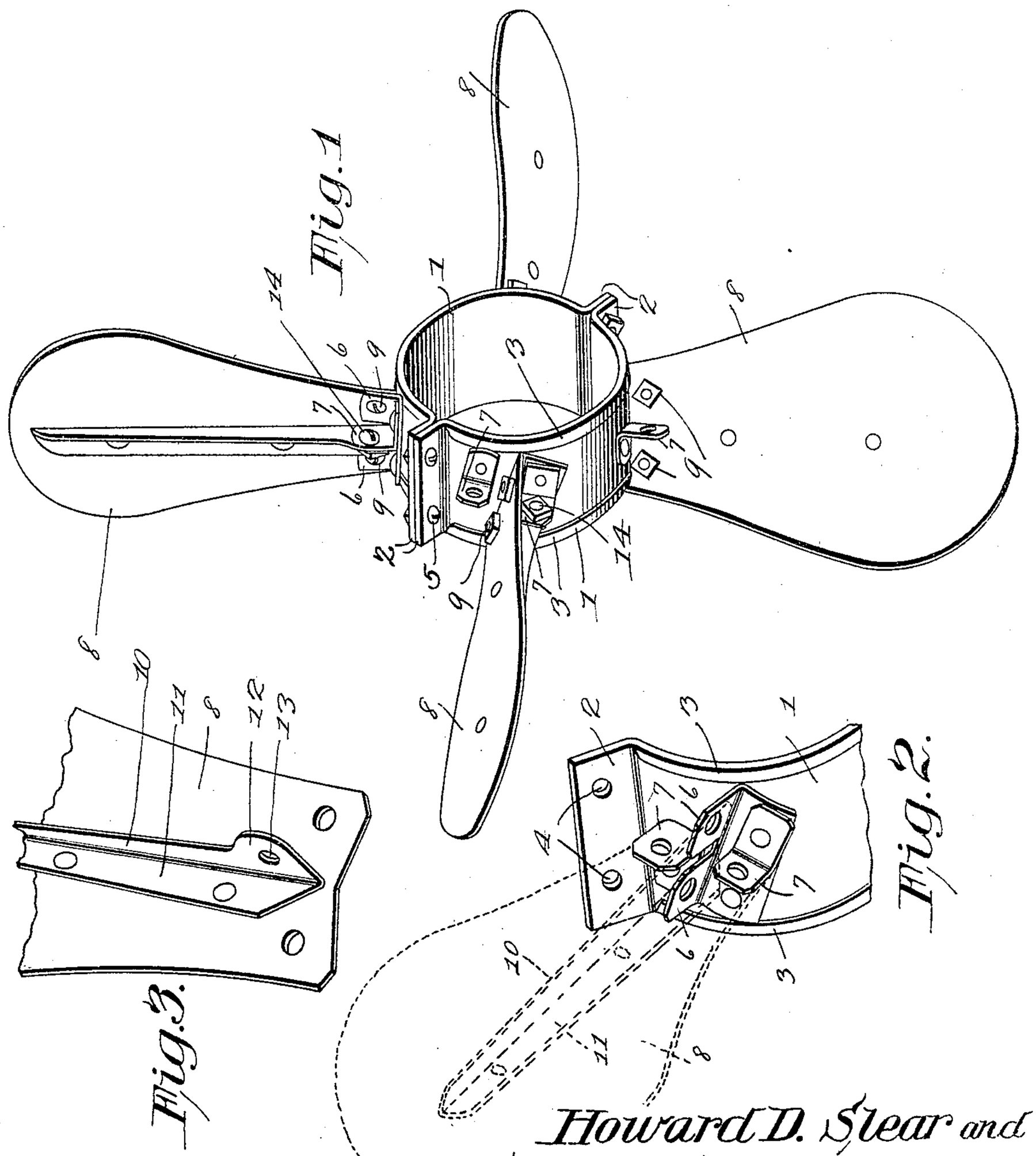

Fig. 1

Fig. 3.

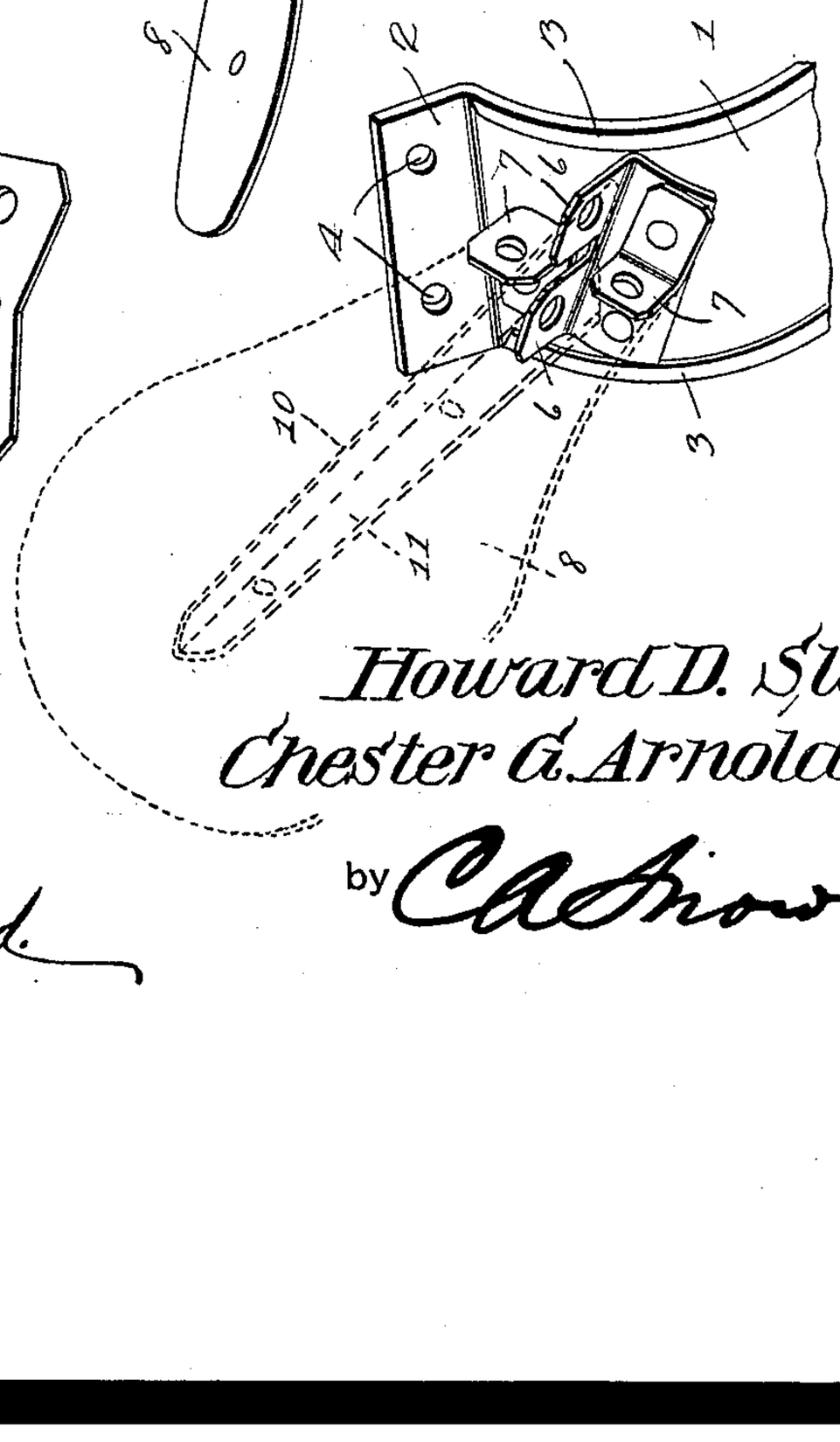

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

HOWARD DAVID SLEAR AND CHESTER GARFIELD ARNOLD, OF GRANGEVILLE, IDAHO.

ROTARY FAN.

No. 808,174. Specification of Letters Patent. Patented Dec. 26, 1905.

Application filed April 19, 1905. Serial No. 256,452.

To all whom it may concern:

Be it known that we, HOWARD DAVID SLEAR and CHESTER GARFIELD ARNOLD, citizens of the United States, residing at Grangeville, in the county of Idaho and State of Idaho, have invented a new and useful Rotary Fan, of which the following is a specification.

This invention relates to ventilating-fans, and has for its object to provide an improved built-up fan capable of being conveniently assembled and arranged to permit shifting of the blades, so as to direct the current of air at either side of the fan.

While the present invention is capable of general application, it has been particularly designed for application to the armature-shafts of dynamos and motors to direct a current of air against the magnet-coils, so as to maintain the same in a relatively cool condition.

Although the present invention is entitled and described as a "ventilating-fan," it is, in fact, a propeller for propelling air for ventilating purposes, for propelling liquids, for propelling vessels by actuation against the water, and also capable of being propelled by a stream of water or the like directed against the blades.

With these and other objects in view the present invention consists in the combination and arrangements of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a perspective view of a rotary fan constructed in accordance with the present invention. Fig. 2 is a fragmentary perspective view of one end of one of the hub-sections. Fig. 3 is a fragmentary perspective view of one of the blades, showing the combined stiffening and attaching rib thereon.

Like characters of reference designate corresponding parts in each and every figure of the drawings.

As embodied in the accompanying drawings the present invention includes a hub made up of complementary substantially semicircular hub band-sections 1, which have their ends turned outwardly, as at 2, to form terminal transverse flanges, each band being preferably formed of sheet metal. To stiffen each hub-section, its edges are turned back upon its exterior or beaded, as at 3. The flanges 2 are pierced by registering openings 4 for the reception of suitable fastenings 5, preferably bolts, to enable the convenient assemblage and removal of the hub-sections.

While any number of fan-blades may be employed, four blades are ordinarily sufficient, and therefore provision has been made for the attachment of two blades to each of the hub-sections. The blades and their attaching means being duplicates, a description of one blade and its manner of attachment is deemed sufficient. Adjacent each end of each hub-section and upon the exterior thereof there are two sets 6 and 7 of spaced perforate ears, one set of ears being alined with the space between the other set of ears, whereby said sets of ears are disposed in planes at substantially right angles to one another. The set of ears 6 are disposed transversely across the hub obliquely to the axis thereof, while the other set is disposed obliquely in the opposite direction. The fan-blade 8 has the usual shape, with its inner end fitted against the set of ears 6 between the latter and one of the ears 7, suitable fastenings 9, preferably bolts, being passed through the ears 6 and the blade. Upon one side of the blade is a longitudinal stiffening-rib 10, disposed midway between the longitudinal edges of the blade and provided with a longitudinal flange 11, which is riveted, soldered, or otherwise rigidly secured to the face of the blade. The inner end of this rib is provided with a lateral extension or ear 12, having a perforation 13, said ear being disposed to lie against one of the ears 7, to which it is connected by a bolt or other removable fastening 14, as shown in Fig. 1 of the drawings. It will now be understood that each blade is connected to the set of ears 6, while the bracing-rib 10 is connected to one of the ears 7, whereby the blade is rigidly connected to the hub and set at a proper angle for producing a current of air when the fan is rotated.

When it is desired to direct the current of air in the opposite direction from that produced by the arrangement shown in Fig. 1, each blade is removed and then connected to the set of ears 7 with its bracing-rib connected

to one of the ears 6, thereby disposing the blade in a position at substantially right angles to its original position, and therefore the rotation of the fan in the same direction will direct the current of air in the opposite direction.

A very important feature of the invention resides in the fact that the blades are independently connected to the hub and may therefore be individually applied, removed, and shifted, and by reason of the hub being formed in opposite sections it may be conveniently clamped upon the intermediate portion of the shaft without requiring that the latter be removed from its bearings to enable the mounting of the fan. This manner of mounting the fan upon the shaft is particularly useful in applying the present fan to the armature-shaft of a motor or dynamo, as it permits of the fan being conveniently mounted between the journal-bearing of the shaft and the magnet-coils without requiring any dismantling of the machine.

While the hub-sections and blades of the present fan may be cast, it is also proposed to have them formed of sheet metal in order that they may be as light as possible and at the same time strong and durable.

The connections between the parts of the fan are very simple and effective and the parts are not liable to work loose, and in the event of looseness all of the fastenings are conveniently accessible and may therefore be readily tightened to take up looseness.

Having thus described the invention, what is claimed is—

1. A rotary fan comprising a hub, blades, and sets of attaching devices for each of the blades, one set of attaching devices being disposed at a different angle across the hub with respect to that of the other set of attaching devices.

2. A rotary fan comprising a hub, blades, and individual attaching means for each blade, said means consisting of two sets of spaced ears and fastenings to connect the blade to the respective sets of ears, one set of ears being disposed at an angle with respect to the other set of ears.

3. A rotary fan comprising a hub, blades, and attaching means for each blade, said attaching means including a pair of ears carried by the hub and disposed at substantially right angles to one another, the inner end of the blade being adapted to engage one of the ears and provided with an ear to engage the other ear of the hub, and individual fastenings connecting the last-mentioned pair of ears and also the blade of the first-mentioned ear.

4. A rotary fan comprising a hub, two sets of spaced ears carried by the hub with one set of ears disposed at substantially right angles to the other set and opposite the interval therebetween, a blade having its inner end formed for engagement with either set of ears and provided with a laterally-projecting ear for engagement with either of the ears that is not engaged by the blade, and individual fastenings to connect the blade to one set of ears and to connect its ear to either of the other ears.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presennce of two witnesses.

HOWARD DAVID SLEAR.
CHESTER GARFIELD ARNOLD.

Witnesses:
JOHN M. JAEK,
EDWARD A. DANIR.