April 2, 1929. G. R. GOLDTHWAITE 1,707,719

FAN CASING

Filed May 15, 1928

Fig. 1.

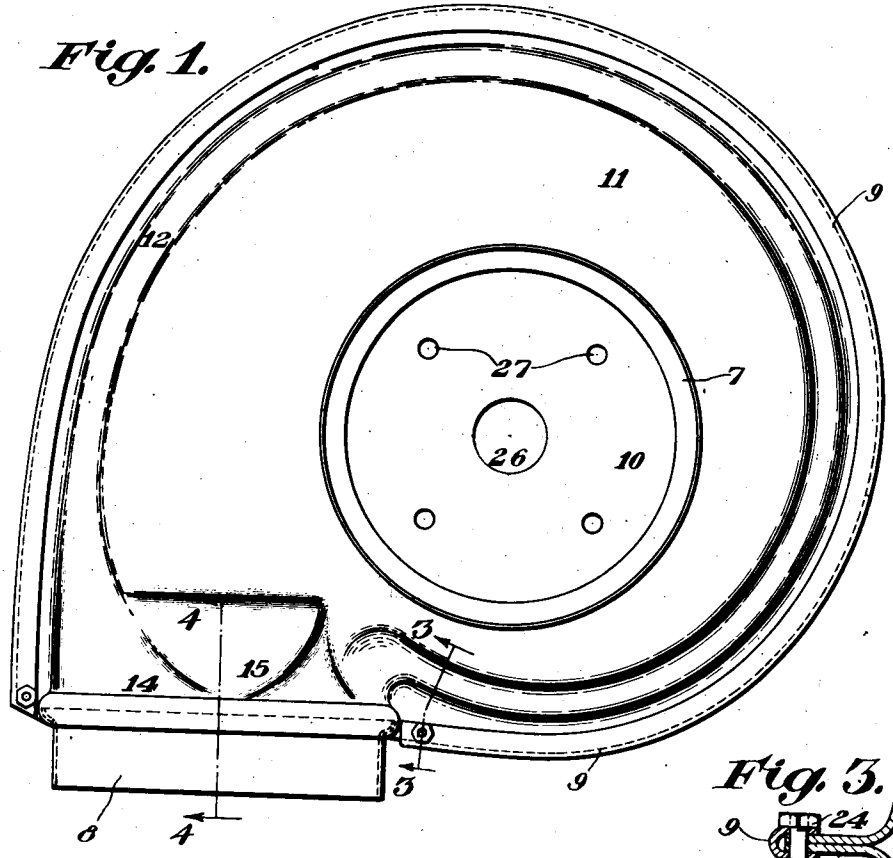



Fig. 3.

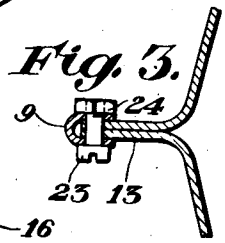
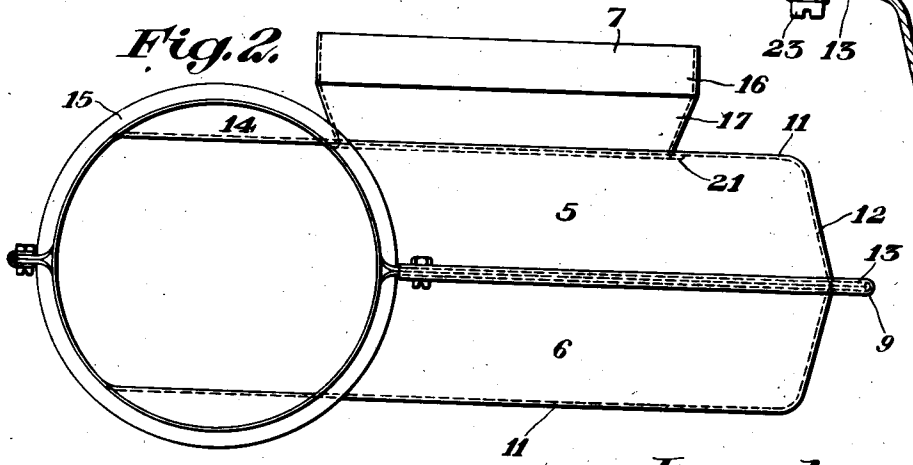



Fig. 2.



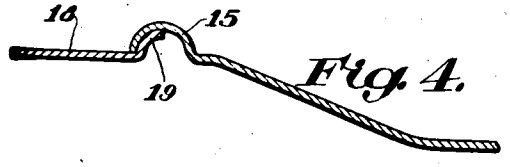




Fig. 4.

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Patented Apr. 2, 1929. 1,707,719

# UNITED STATES PATENT OFFICE.

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## FAN CASING.

Application filed May 15, 1928. Serial No. 277,997.

The present invention relates to fan casings for centrifugal fans.

The object of the present invention is to provide a fan casing which shall be of low manufacturing cost, being particularly adapted to be shaped or pressed from sheet material, which will require a minimum of machine work in manufacture and assembling, and which will be of light weight yet of strong and rugged construction and of pleasing appearance and finish.

To the above ends the present invention consists in the parts and combination of parts hereinafter described and more particularly defined in the claims.

The present invention is illustrated in the accompanying drawings which show what is now considered the preferred embodiment for a single intake centrifugal fan with provision for both intake and discharge connections. In these drawings Fig. 1 is a side elevation of the casing on the intake side; Fig. 2 is a bottom plan view of Fig. 1; Fig. 3 is a detailed sectional view on an enlarged scale on line 3—3 in Fig. 1; and Fig. 4 is another detailed sectional view on an enlarged scale on line 4—4 of Fig. 1.

The fan casing illustrated in the drawing comprises five parts; the two halves or side members of the casing, which are indicated generally at 5 and 6, the intake connection 7, the discharge section 8, and the U-shaped securing bead or strip 9. The two halves or side members 5 and 6, which are symmetrical except for the intake opening in the part 5 and the several smaller apertures in part 6, comprise the substantially flat side walls 11 from which extend the inwardly turned over portions 12 forming each respectively one-half of the roundabout or peripheral surface of the casing. These portions 12 are in turn bent or pressed outwardly at their free edges to form the flanges 13 which contact face to face with one another in the assembled casing. Adjacent the discharge or outlet the flat side walls 11 and the peripheral portions 12 of each side member are merged into a semi-cylindrical discharge or outlet portion 14 which is provided adjacent its curved edges with the outwardly extending bead or semi-circular groove 15.

The intake connection 7 is circular in cross section and of integral construction, being conveniently formed by spinning a suitably shaped flat annulus of sheet metal. This intake connection comprises a short cylindrical portion 16 of somewhat greater diameter than the intake opening and a taper or frusto-conical portion 17 extending into such intake.

The outlet or discharge section 8 is also cylindrical in cross section and of integral construction, also preferably formed by spinning a flat annulus with its inner edge or margin provided with a quarter-rounded bead 19. (See Fig. 4.)

The U-shaped securing bead or strip is formed from a long, narrow, piece of sheet metal bent or folded upon itself into substantially U-shape in cross section. This may conveniently be formed by a rolling operation which not only folds the strip into U-shape, but also bends or curves it into more or less semi-circular outline whereby it may be easily fitted to the involute shape of the casing.

The separate parts are assembled and secured together as follows: The inlet section 7 is first secured in the inlet opening 10 of the side member 5 by expanding and rolling over the inner edge of the taper portion 17, which is arranged to extend inwardly slightly beyond the face of the half 5, bringing such rolled over margin into close contact with the inner face of the wall 11 as shown at 21 in Fig. 2, and holding the inlet section fixedly in position.

The outlet section 8 is then positioned on one of the halves of the casing with the quarter-rounded bead 19 resting in the groove 15. The other half is then placed in position with its groove 15 engaging the bead 19 of the outlet section and with the flanges of the two halves in contact.

The two halves and the outlet section are now secured together by means of the U-shaped bead or strip 9 which fits snugly over the outer margins of the flanges and is held from displacement at each end by the screws 23 and nuts 24, the former passing through the strip and flanges adjacent the groove 15. The expanding and rolling over of the lip or flange 21 of the inlet section and the boring or punching of the holes for the screws 23 constitute the entire machine work necessary for the assembling of this casing. Any roughness or unevenness in the edges of the connecting flanges 13 is covered by the

smooth, rounded strip 9 which thus has the double function of holding the parts securely together and also of affording a finish for the edges of the flange.

The casing may be supported in any convenient or desirable manner. In the drawing the half of the casing opposite the intake is shown as provided not only with the shaft receiving opening 26, but also with four bolt holes 27 for mounting the casing upon the bearing pedestal or other structure.

Where the fan is to be used for handling gas, all liability of leakage at the joint between the flanges and beads may be avoided by the application of a suitable paint or putty to these parts while assembling.

It will be noted that except for the two screws and nuts for fastening the ends of the U-shaped securing strip, every part of the casing is formed by pressing or spinning from a suitably shaped blank of sheet material, thus a minimum of cost for material and manufacture is assured.

Inasmuch as no castings are required for this construction, a great saving in weight is effected. This is of advantage, particularly with fans and fan combinations which are of more or less portable character. Furthermore, liability of breakage in shipment, which is necessarily present with thin walled cast metal casings, is wholly avoided.

The present construction also greatly facilitates the splitting or opening of the casing for the purpose of repair or replacement of the fan wheel within, since it is only necessary to take out the two screws which fasten the ends of the securing strip in order to remove the latter, when the casing will be free to be taken apart.

While in the accompanying drawings and the foregoing description the present invention has been shown and described as embodied in a particular form of single inlet casing with both inlet and discharge connections, it is to be understood that the present invention is not necessarily limited to the same or to the exact forms and proportions shown but may be embodied in other forms of casing and arrangements of parts within the scope of the claims.

Having thus described the invention, what is claimed is:

1. A casing for a centrifugal fan comprising two pressed metal side members having cooperating flanges at their margins, one of said members being provided with an inlet opening and both of said members having semi-cylindrical portions cooperating to form a circular discharge opening, the semi-cylindrical portions being provided with an annular groove, a cylindrical outlet section provided with an annular bead adapted to be received within the annular groove on the side members, and means for securing the side members and the outlet sections together comprising a U-shaped strip for engaging the outer edges of the flanges of the side members to hold said flanges in close contact, the strip being provided with fastening devices at each end.

2. A casing for a centrifugal fan comprising two side members having peripheral contacting flanges and semi-cylindrical outlet portions, one of said members being provided with an inlet opening, an integrally formed inlet section extending into the inlet opening and having a flange engaging the inner face of the side member adjacent such opening, an integrally formed circular outlet section adapted to extend into the circular outlet opening, and means for securing the two side members together and the outlet section in the outlet opening comprising a U-shaped strip embracing the marginal portions of the flanges and a securing device at each end of the strip for securing the ends of the strip to the flanges leaving the strip smooth and free from projections throughout its entire length between said securing devices.

3. A casing for centrifugal fans comprising two side members having peripheral contacting flanges and semi-cylindrical outlet portions each provided with a groove, one of said members having an inlet opening, an inlet section extending into the inlet opening and having its inner margin expanded outwardly to form a securing flange, a cylindrical outlet section having an annular bead adapted to be received in the grooves of the outlet portions of the side members, and means for clamping the side members together with their flanges in contact and with the outlet section secured between the outlet portions, said means comprising a U-shaped bead embracing the marginal portions of the flanges, and a screw for each end of the strip passing through the bead and the flanges for anchoring the ends of the strip to the flanges.

4. A casing for a centrifugal fan comprising two pressed metal side members each member being shaped to form the side walls, one-half the roundabout and one-half the outlet portions of the casing, the roundabout portions being provided with contacting flanges and one of the side members having an inlet opening, and a U-shaped securing strip embracing said flanges to hold the two members of the casing together, the securing strip being fixed at each end to the flanges.

In testimony whereof I have signed my name to this specification.

GEORGE R. GOLDTHWAITE.