Dec. 17, 1929. L. O. MONROE 1,739,604

FAN

Filed Feb. 14, 1927 2 Sheets-Sheet 1

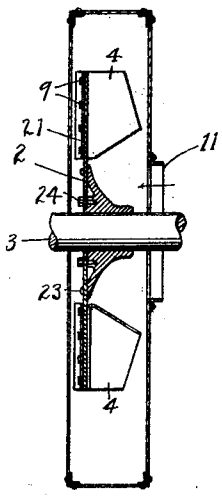


Fig. 2.

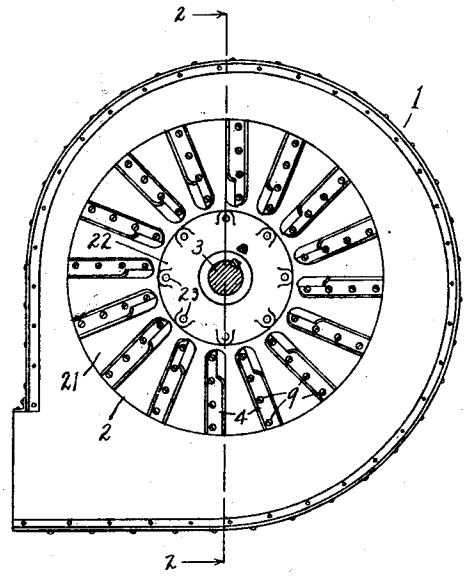


Fig. 1.

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Filed Feb. 14, 1927 2 Sheets-Sheet 2

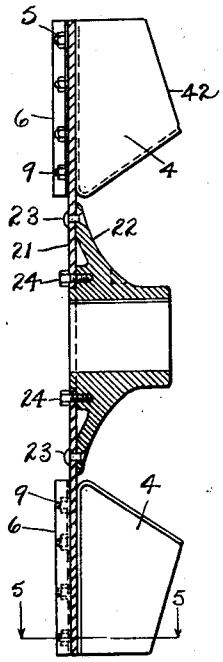


Fig. 4.

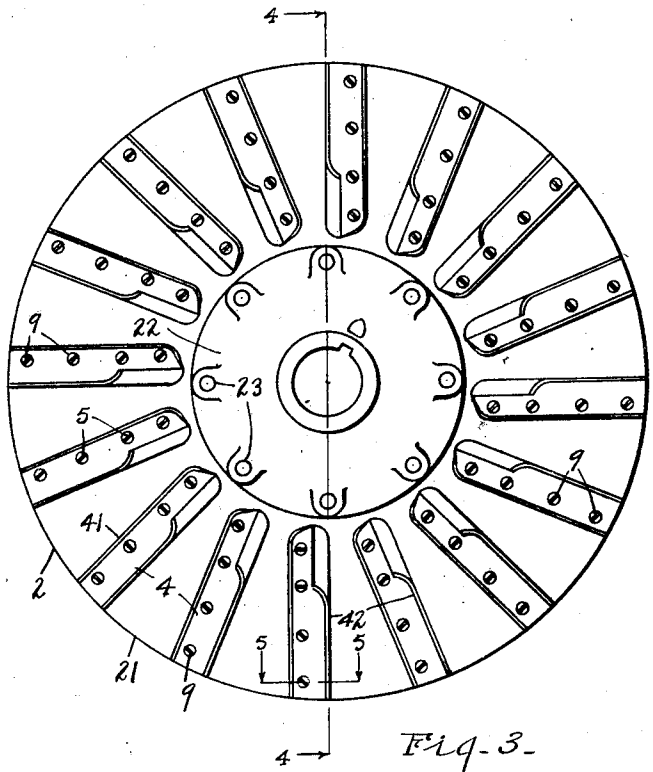


Fig. 3.

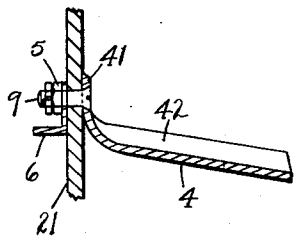


Fig. 5.

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UNITED STATES PATENT OFFICE

LEWIS O. MONROE, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO CLARAGE FAN COMPANY, OF KALAMAZOO, MICHIGAN

FAN

Application filed February 14, 1927. Serial No. 168,042.

This invention relates particularly to fans for delivering powdered fuel or other similar or abrasive material.

The objects of the invention are:

First, to provide a fan structure of large capacity permitting free passage of the abrasive material, in which the fan blades are detachable and renewable.

Second, to provide in such a structure a formation and disposition of fan blade which protects its fastenings and thereby insures durability.

Third, to provide improved protection means for such fastening.

Objects pertaining to details and economies of my invention will definitely appear from the detailed description to follow. The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing forming a part of this application, in which:

Fig. 1 is a detail side elevation of the fan and its volutes constituting my invention taken from the intake side, the intake side wall of the fan being removed.

Fig. 2 is a detail sectional elevation taken on line 2—2 of Fig. 1.

Fig. 3 is an enlarged detail elevation of the fan wheel or rotor itself removed from its shaft from the blade side.

Fig. 4 is a detail sectional elevation of the fan wheel or rotor taken on line 4—4 of Fig. 3.

Fig. 5 is an enlarged detail sectional view taken on line 5—5 of Figs. 3 and 4, showing details of the fan blade structure and the method of protecting its fastenings.

The parts will be identified by their numerals of reference which are the same in all views.

1 is the fan volute. 2 is the fan wheel made up of a central conical shaped casting 22 and a circular disk 21, preferably of half-inch steel plate, to which the central tapered hub casting 22 is secured by means of rivets 23 at its outer edge and by cap screw 24 near the center. The hub is suitably keyed or otherwise secured to the driving shaft 3.

The fan blades 4 are flanged with an oblique flange 41 and secured to the plate 21 by countersunk screw bolts 9 with the usual lock nut devices. The fan blades 44 are obliquely disposed and their inner ends made considerably wider than their peripheries and protected by a curved flange portion 42, shown particularly in detail in Fig. 5.

From this arrangement it will be seen that the delivery of powdered coal or other abrasive material is very effective without undue wear upon the flange. The fan revolves as indicated by the arrow. The blade of the fan is presented edgewise at the flange. The powdered fuel is sucked in at the intake 11 as seen in Fig. 2. The material entrained by the air is then passed radially outward and does not closely approach the plate 21, the fan blades throwing the material away from the disk and carrying it forward, and the connecting screws 5 are thereby protected.

Also back of the nuts on the back side of the plate 21 I provide a flange blade 6 which avoids abrasion there by directing a current radially out along the side of the disk, thereby preventing the powdered material entering between the disk and the volute wall.

By this means it is possible to run a fan indefinitely by simply renewing the blades as they become worn. Due to their formation they are readily produced and afford protection for the connection. Only the blades need to be renewed, the connecting bolts being preserved for a comparatively long period.

The formation of the blades distributes the material in such manner that there is little or no wear on the plate or the connecting bolts for the fan, and the fan is consequently of indefinitely long life by merely renewing the fan blades.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination of a volute with intake at the side, a fan comprising a flat circular plate with a conical hub block therefor, to the flat side of which conical hub block the circular plate is secured, fan blades with oblique flanges suitably secured thereto by coun-

tersunk connecting bolts, the inner ends of the said fan blades being broad at the central part and with forwardly projecting flanges protecting the said connections, a flanged bar on the back of the disk to cause circulation for protecting the nuts, as specified.

2. The combination of a volute with intake at the side, a fan comprising a flat circular plate with a conical hub block therefor, to the flat side of which conical hub block the circular plate is secured, fan blades with oblique flanges suitably secured thereto by countersunk connecting bolts, the inner ends of the said fan blades being broad at the central part and with forwardly projecting flanges protecting the said connections as specified.

3. The combination of a volute with intake at the side, a fan comprising a flat circular plate with a hub therefor, fan blades with oblique flanges suitably secured to said plate by countersunk connecting bolts, the inner ends of the said fan blades being broad at the central part protecting the said connections, and a flanged bar on the back of the disk to cause circulation for protecting the nuts, as specified.

In witness whereof I have hereunto set my hand.

LEWIS O. MONROE.