(No Model.)

V. D. ANDERSON.

CENTRIFUGAL FAN.

No. 529,689. Patented Nov. 27, 1894.

Fig. 3.

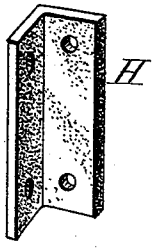
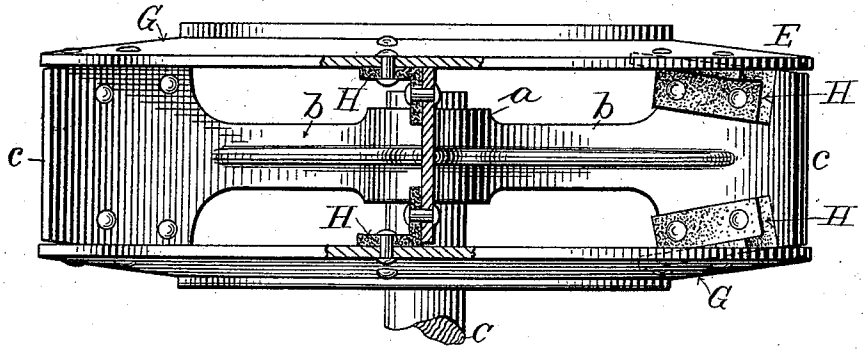


Fig. 1

Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

VALERIUS D. ANDERSON, OF CLEVELAND, OHIO.

CENTRIFUGAL FAN.

SPECIFICATION forming part of Letters Patent No. 529,689, dated November 27, 1894.

Application filed May 12, 1894. Serial No. 511,000. (No model.)

To all whom it may concern:

Be it known that I, VALERIUS D. ANDERSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Centrifugal Fans, of which the following is a specification.

My invention relates to centrifugal fans, and consists in certain novel features of construction hereinafter set forth, whereby the fans are peculiarly adapted for use in connection with the exhaust of rendering apparatus, garbage destroyers, &c.

Figure 1 is a perspective view of a fan embodying my improvements; Fig. 2, an edge view of a fan center or wheel, with a portion shown in section; and Fig. 3, a detail view hereinafter referred to.

As ordinarily constructed, exhaust fans and other fans of this general description have their blades and the disks bracing or connecting said blades, constructed of steel or iron, stamped out and bent to shape. In the practical use of such fans in connection with the exhaust of rendering apparatus, it has been found that these parts rapidly deteriorate, and in a short time are destroyed. The cause of this was long believed to be the presence of fumes or gases which chemically acted upon and ate away the metal of the fan blades, spiders and disks; but from careful observation and experiment I am convinced that the trouble is due, in part at least, to the presence of fine particles of gritty matter in the exhaust current, and the impact of these particles upon the comparatively soft metal acting in much the same manner as does the sand blast. This seems evidenced by the fact that the wear is principally on the receiving or intaking side of the fan, while other parts are comparatively exempt from such injury. To overcome this difficulty I make the parts of cast iron, chilled or otherwise, instead of mild steel, or relatively soft metals heretofore used, and I thereby secure entire immunity from the destructive action above noted and heretofore universal. In order to make the use of cast iron practicable, however, a special construction is necessary, as it is found that when the parts are made of cast iron in the same general form as of wrought iron or steel, and the wheel is turned at its usual speed, centrifugal force is sufficient to throw the wheel apart, such having been the actual result with fans so constructed by leading makers at my request, and although not speeded to their intended capacity, or that at which such fans are ordinarily run. This difficulty, I have found, is due to the fact that the cast iron, and especially if the iron be chilled, cannot be drawn together so as to put the parts in proper relative position without placing the different parts under tension or compression such as will cause them to fly to pieces when speeded. I therefore interpose between the cast iron parts, connecting pieces of softer and ductile metal, as brass, which, yielding, adapts itself to any inequalities due to shrinkage or warping of the castings, and permits the thorough and proper joinder of the parts without placing them under strain or compression.

Referring again to the drawings, A indicates the shell or casing of a centrifugal fan; B, a bracket bolted to one side thereof and carrying the fan shaft or spindle C in suitable boxes or bearings, with a band pulley D between. This arrangement of placing two bearings on one side of the fan case enables me to stop the fan shaft at a point within the casing and to make the entire central portion of the opposite wall of the case open so as to afford a free and adequate inlet for the air into the shell. This feature is, however, old, and is not claimed by me.

E indicates the fan wheel or "center," as it is commonly termed. This consists of a central hub *a*, bored to fit the shaft C, and a series of arms *b* terminating in blades *c* which are given the proper angle or curve to suit the purpose for which the fan is intended. These blades are preferably narrower at their outer than at their inner portions, though this is not essential.

G, G indicate two annular disks or rings, which have a diameter about equal to that of the circle touching the outer extremities of the fan blades *c*. These disks are here shown as dish shaped, to fit snugly against the edges or sides of the fan blade *c* which, as above mentioned, are narrower at their outer edges than nearer the center. The parts of the fan or wheel "center," that it is to say the spider comprising the hub, arms and blades, and

the disks or rings, are made of cast iron, preferably chilled, though not necessarily so. The disks are connected with the fan blades by means of angle blocks or plates H, which are made of brass, copper, or any other relatively soft or ductile alloy or metal capable of yielding or giving sufficiently to accommodate itself to any lack of nicety in the fit of the parts G and *c*, one to the other. These plates H are riveted to the disks G and blades *c*, and are preferably placed at the back of the blades in order that the impelling surfaces may be smooth and unobstructed. It is obvious that bolts may be used instead of rivets, and in fact, that any suitable fastenings may be employed, the essential feature of the invention consisting in the interposition of relatively soft and ductile connecting pieces between the disks G and the fan blades *c*.

Practical use of fans thus constructed, subject to all the conditions under which other fans are worked, and continuing over a period of many months, has demonstrated the high efficiency of the same, and the entire remedying of the difficulties incident to the use of other fans.

It is apparent that if the piece H be made of thin and elastic metal, measurably good results may be secured, but this I consider inferior to the construction above set forth, owing to the lack of strength.

Having thus described my invention, what I claim is—

A centrifugal fan wheel composed of a cast iron spider and blades, cast iron stiffening disks, and independent connecting pieces formed of yielding metal or alloy and firmly united to the blades and disks, substantially as and for the purpose explained.

In witness whereof I hereunto set my hand in the presence of two witnesses.

VALERIUS D. ANDERSON.

Witnesses:
A. D. ANDERSON,
WM. H. DE WITT.