

No. 874,212.

PATENTED DEC. 17, 1907.

C. KUDERER.
PNEUMATIC FAN.
APPLICATION FILED OCT. 20, 1906.

Fig. 1.

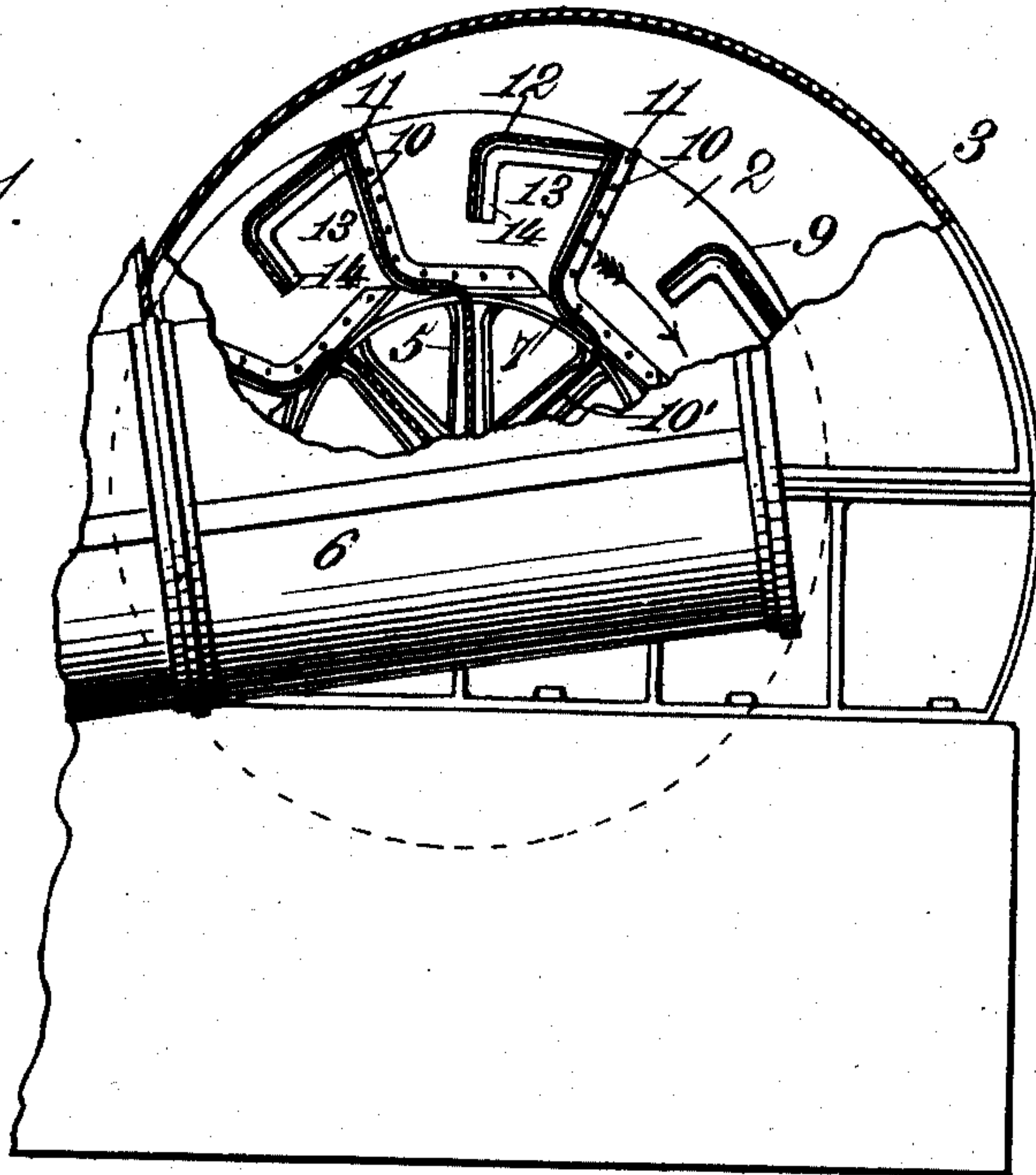
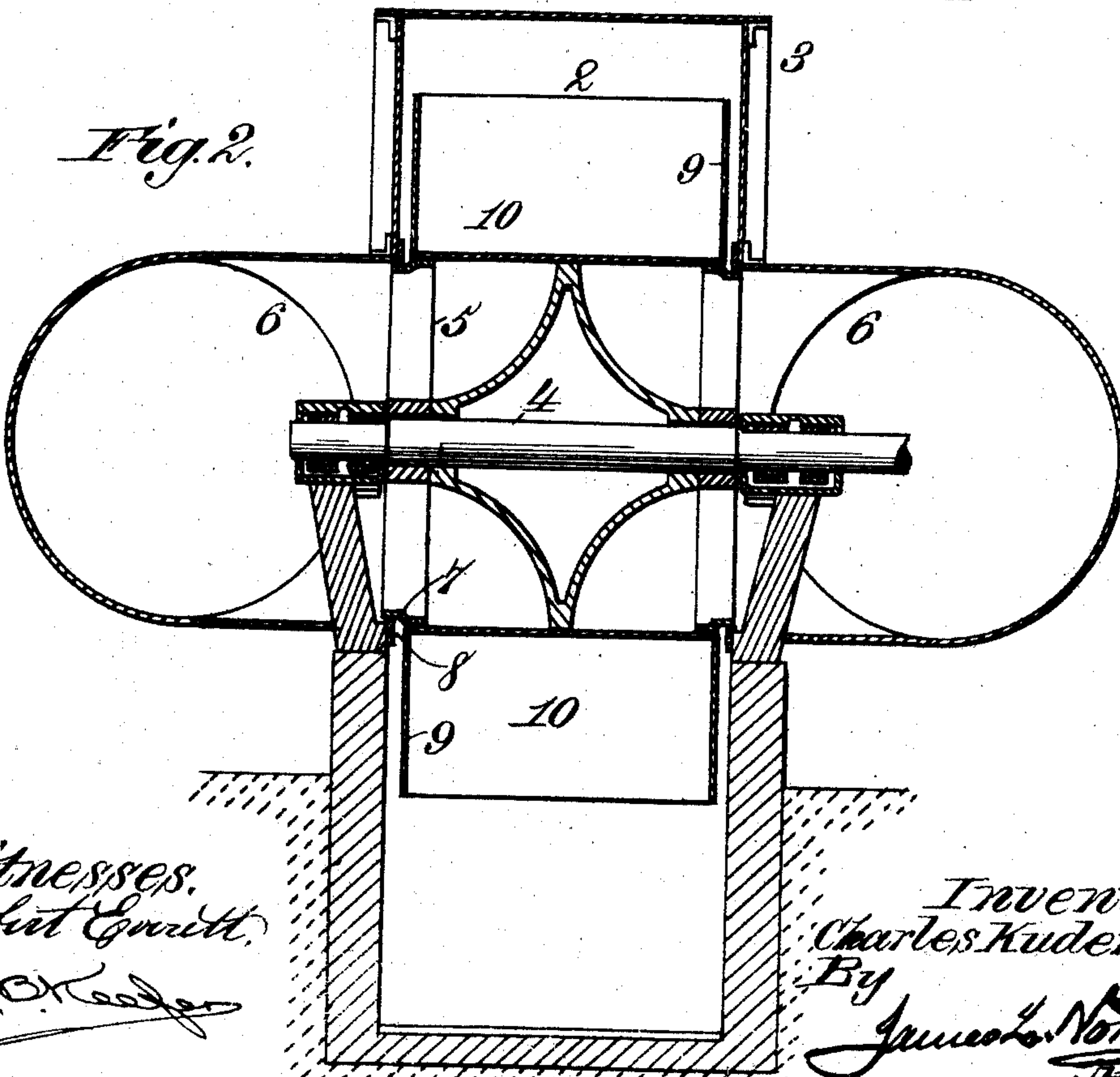


Fig. 2.



Witnesses.
Robert G. Smith.
J. H. Keeler

Inventor.
Charles Kuderer.
By
James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

CHARLES KUDERER, OF ALLEGHENY, PENNSYLVANIA.

PNEUMATIC FAN.

No. 874,212.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Original application filed January 9, 1906, Serial No. 295,284. Divided and this application filed October 20, 1906. Serial No. 339,862.

To all whom it may concern:

Be it known that I, CHARLES KUDERER, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Pneumatic Fans, of which the following is a specification.

This invention relates to pneumatic fans.

A fan involving my invention may be put to several advantageous uses, one of which is as a part of the ventilating system of a mine, such for example as fully set forth in my copending application for patent for ventilating apparatus, filed January 9, 1906, Serial Number 295,284, of which the present case is a division. I provide an article of the character set forth which is simple in construction, effective in operation and strong.

In the drawings accompanying and forming a part of this specification I show in detail one form of embodiment of the invention which to enable those skilled in the art to practice said invention will be fully set forth in the following description, while the novelty of said invention will be included in the claims succeeding said description.

Referring to the drawings, Figure 1 is a sectional side elevation of a fan including my invention. Fig. 2 is a transverse sectional view of said fan.

Like characters refer to like parts throughout the figures.

The fan shown is denoted in a general way by 2. The casing for the fan may be of any desirable character, the one shown being designated in a general way by 3. The fan shaft which in practice is supported in some suitable way for rotation is denoted by 4 and may be driven in any desirable way. Fastened in some suitable way to said shaft are the hubs of spiders as 5, the spaces between the arms of said spiders serving for the entrance of air into the fan which air initially passes through the inlets 6 in the opposite sides of the casing. The rims of the spiders are designated by 7 and ordinarily, but not necessarily, are of polygonal form, an octagonal shape being satisfactory. Between the two rims 7 and the casing 2 I may interpose packings as 8 to provide air tight joints therebetween. The sides of the fan are designated by 9, they being of angular form, in parallelism and surrounding the two rims 7. Said sides 9 are separated from the sides of the casing 3. The impelling blades or vanes of

the fan are designated by 10 and in the present instance are of substantially obtuse angular form in cross section, although the two branches thereof merge upon a curve instead of upon an angle. As a means for conveniently mounting these blades or vanes in place I may provide angular strips as 11 arranged in transversely alined relation; that is, one strip 11 will be directly opposite a similar and cooperating strip, a blade as 10 being fastened to the two opposite strips. One branch of each pair of strips 11 is fastened to the external surface of the rim 7, while the other branches thereof are fastened to the inner faces of the two sides 9 for which purpose rivets, bolts or other suitable means may be provided. To each face, therefore, of each rim 7 is attached one branch or arm of a strip 11. These strips are preferably angular in cross section to provide for their ready mounting in place and for the proper connection therewith of the impelling blades or vanes 10.

The space between the extreme inner ends of two adjacent blades or vanes constitutes a throat for the passage of air. This air may pass in opposite directions through the said throat as will be obvious. I prefer to make the spokes or arms of the spiders 5 of V form or wedge shape in cross section and to face the apexes of the V portions outward as in this way I secure the least possible resistance to the incoming air. By making the spokes or arms in this shape I also provide strength.

Between each two opposite blades or vanes 10 I arrange blades as 12 of angular form in cross section and each consisting of an elongated body portion provided with an inwardly extending portion which in the present case is substantially radially disposed of the fan 2. The forward ends of the bodies of the blades 12 are tightly fitted against the blades or vanes 10. These blades 12 also extend from one side 9 to the other side 9 of the fan casing and each of them with an adjacent and cooperating blade or vane 10 provides a pocket which I will denote by 13. These pockets are filled with air which is compressed therein, the compressed air serving to cushion the air which enters the fan 2 under high velocity. As will be apparent, the blades 12 are fitted to the blades or vanes 10 and extend rearward from the latter and then inward. The blades 12 may be secured

in position in any desirable way; for example, they may be fastened to the angularly shaped strips 14 which in turn are fastened to the inner surface of the fan sides 9.

5 I have stated that the shaft 4 may be driven in any desirable way, for example, I may use a steam engine or an electric motor for such purpose to turn the fan in the direction shown by the arrow in Fig. 1.

10 The blades 10 are preferably formed integral with the shanks or bodies 10', as shown clearly in Fig. 1. These shanks or bodies 10' extend outwardly from the shaft 4 and are disposed radially or substantially radi-
15 ally of the fan and constitute in effect continuations of such blades.

It will be evident from what has been stated that the blades of my fan wheel have pockets at their rear sides. These pockets, which
20 in the present case are situated near the outer ends of said blades, subserve a very important function. The air entering the fan travels at a high velocity; at times in the neighborhood of 3200 feet a minute. This air
25 enters the pockets and is compressed therein and it serves to cushion the rapidly moving streams of air. The air expands as the pockets revolve away from the point of cut-off thereby giving to the air a continuous and
30 uniform velocity of discharge out of the fan wheel into the fan housing or casing.

What I claim is:

1. A fan involving a casing and blades, blades extending rearwardly from the first-
35 mentioned blades, near the outer edges thereof and provided with inwardly extending portions to furnish pockets on the rear of said first-mentioned blades.

2. A fan involving a casing and blades,
40 said blades having pockets on their rear sides

to receive and compress air which acts to cushion the air entering said fan.

3. A fan having spiders and sides, angular strips fastened to the sides and spiders, respectively, angular impelling blades con- 45 nected to said strips and extending from one side to the other, and angular blades fastened to said sides and fitted respectively against the rear faces of the first-mentioned blades and forming with the latter pockets. 50

4. A fan having a shaft, spiders fastened to said shaft, sides united with said spiders, shanks or bodies extending outward from the shaft and disposed substantially radially of the fan, angular impelling blades joined 55 to the outer ends of the respective shanks or bodies and integral with the latter, and substantially angular blades fastened to the rear faces of the impelling blades and forming with the latter pockets, all the blades 60 extending from one of said sides to the other.

5. A fan wheel having sides provided with eyes and also having blades extending from the central portion of the fan uninterruptedly along irregular planes to the peripheries of 65 the respective sides, and angular blades connected with the outer ends of the first mentioned blades on the rear sides thereof and their free portions extending substantially radially toward the axis of the wheel, the 70 several blades presenting air-receiving pockets.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES KUDERER.

Witnesses:

T. BROWN,
ALFRED OEHLER.