

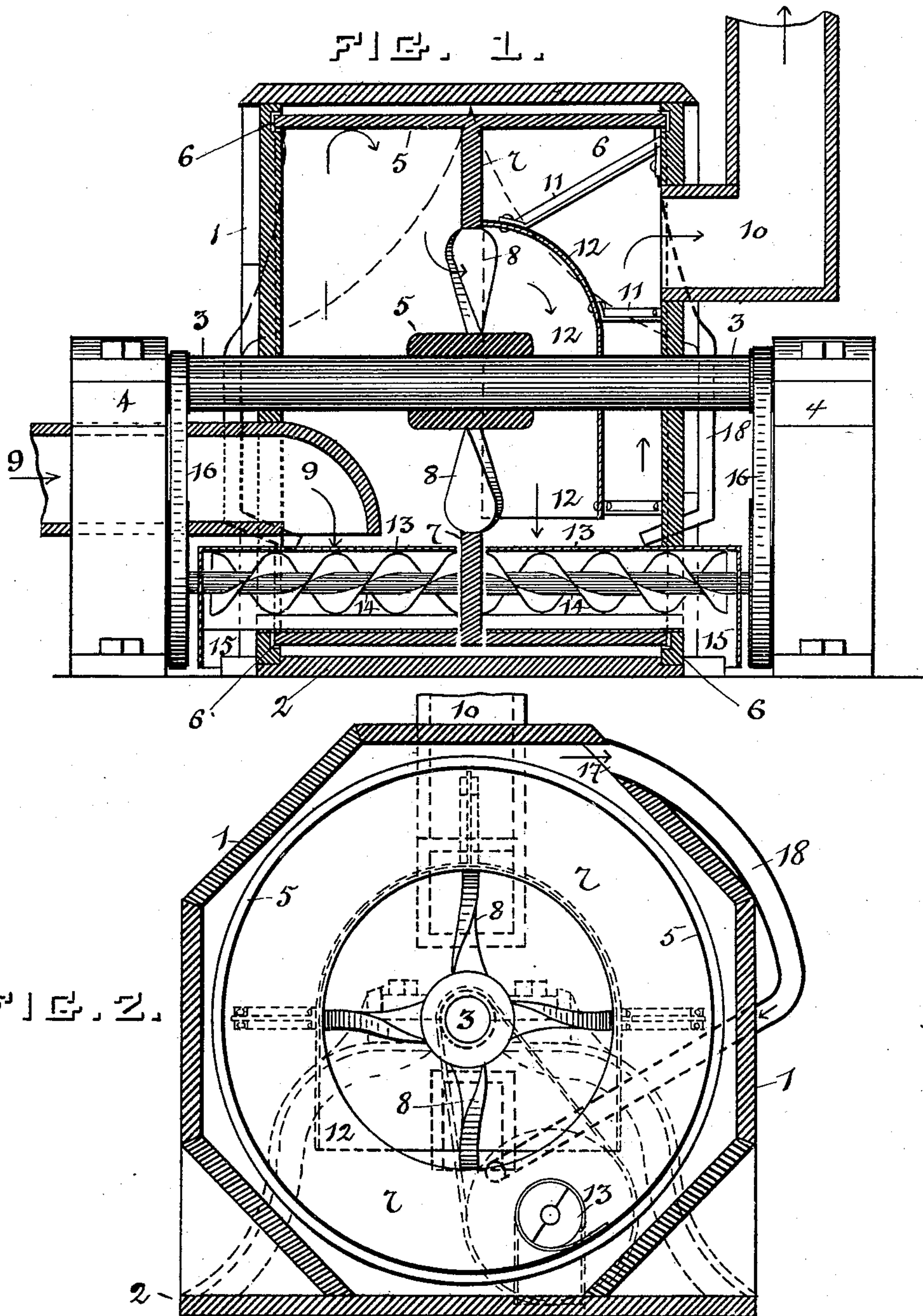
(No Model.)

2 Sheets—Sheet 1.

J. B. BARNES.
DUST COLLECTOR.

No. 407,392.

Patented July 23, 1889.



WITNESSES:

C. Raymond Weaver
 Inc. S. Patterson.

INVENTOR
Joshua B. Barnes.

BY *Price Stewart*
ATTORNEYS.

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FIG. 3.

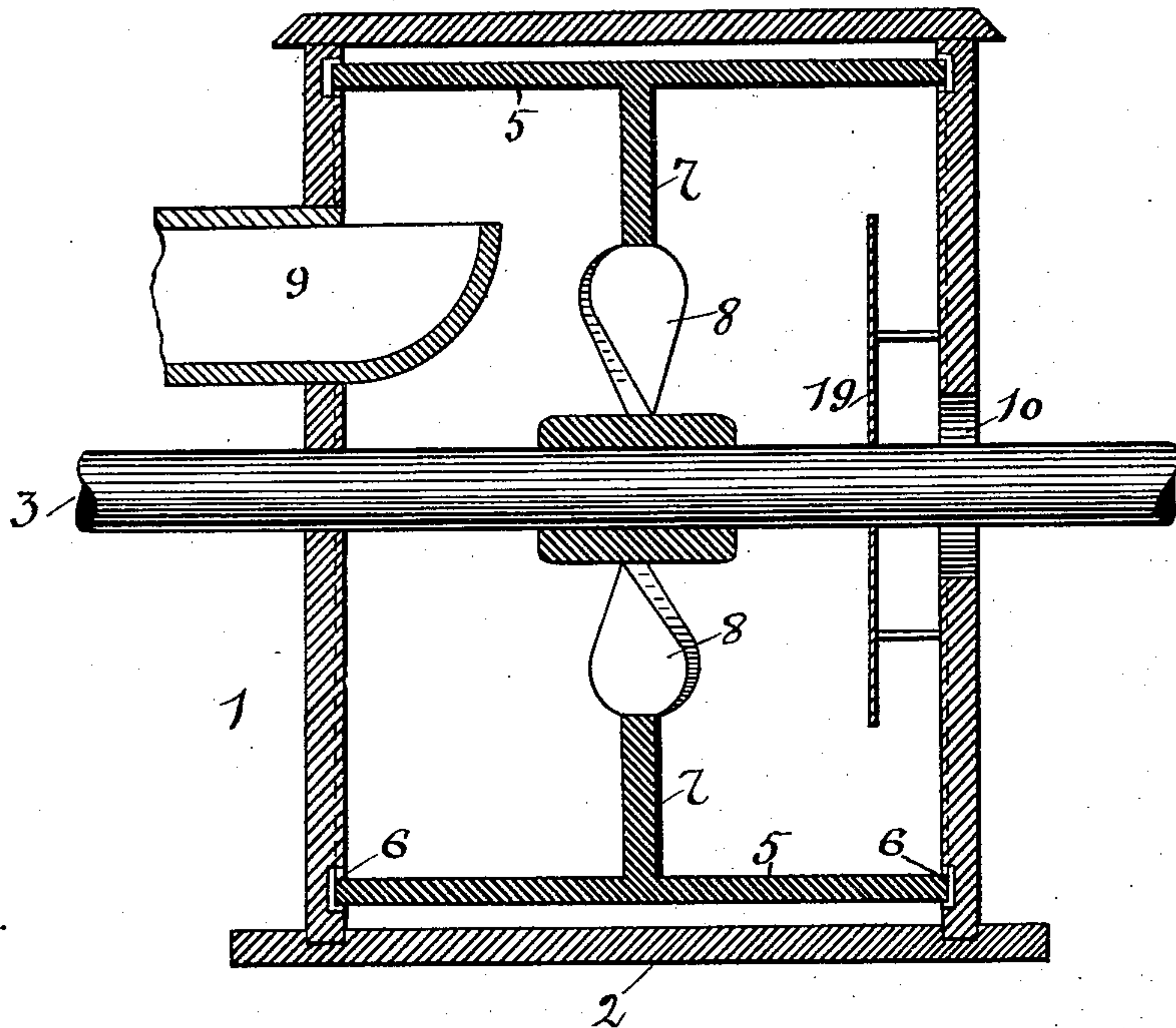


FIG. 4.



WITNESSES:

C. Raymond Weaver
Geo. S. Patterson

Joshua B. Barnes

INVENTOR

BY *Price & Stewart*

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSHUA B. BARNES, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO
JOSEPH J. SELDNER, OF SAME PLACE.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 407,392, dated July 23, 1889.

Application filed January 15, 1889. Serial No. 296,439. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA B. BARNES, of the city of Baltimore, and State of Maryland, have invented a certain new and useful Improvement in Dust-Collectors for Flour-Mills, of which the following is a full and complete specification, reference being had to the accompanying drawings, in which similar letters of reference indicate similar parts.

Figure 1 is a sectional elevation of my dust-collector, taken parallel to the shaft. Fig. 2 is a sectional elevation of the dust-collector casing, taken at right angles to the shaft, and a full elevation of the dust-collector contained therein. Fig. 3 is a sectional elevation of the dust-collector, with some of the parts removed and showing a different position for the dust-inlet pipe and a different form of dust-deflector. Fig. 4 is a full elevation of the driving-shaft and hub of pulley and showing one of the spokes in horizontal section, the rest being removed.

The object of my invention is to provide a cheap, compact, and successful dust-collector, by which the flour which in the operation of many machines in a flour-mill, particularly the purifiers, becomes suspended in the atmosphere and must either be lost by being blown out into the air or collected in some way.

My dust-collector consists of a centrifugal cylinder and a fan combined, by means of which the dust is sucked or driven through the centrifugal cylinder, where it is collected and the air, more or less freed of flour, allowed to escape.

My invention may be carried into operation in many ways. The fan may be placed in such a position in front of the collector that it will drive the air laden with dust through it in spite of the resistance offered by the rapidly-revolving spokes; or it may be placed beyond the collector, so as to suck the dust-laden air through the collector; or, where compactness is desired, the collector may be constructed, as I have shown it in my drawings, with the centrifugal cylinder and fan combined, so that they can be made in one piece and operated by the same shaft and power.

In the drawings, 1 represents the casing of the collector, which is generally made of

wood, or may be of any other material, and is preferably cylindrical in shape, or octagonal, as shown, and closed at the ends, so as to be comparatively air-tight except where perforations are purposely made. This casing is secured upon a suitable stand 2.

3 is a shaft suitably journaled in pillow-blocks 4 4 and driven by any form of power. (Not shown.) The shaft passes through the center of the casing parallel to its axis.

Keyed to the shaft on the interior of the casing is a broad-faced cylinder 5. This is of such a width as to fill the entire interior of the casing, the edges of the rim running in circular grooves 6 6 in the vertical ends of the casing. These grooves should be made of such a size as to permit the edge of the pulley to run freely in them without touching the wood of the casing, for the reason that if the pulley running at very high speed should touch the casing fire would result from friction. On the interior of the pulley, at the point where the arms would join the rim, a web 7 is cast, which is circular in form, and is united to the interior of the rim at its center. This web is about one-third or one-half of the radius of the pulley in depth. To its interior edge the arms 8 8 are attached. The arms 8 8 are made in the form of the wings of a fan and are set at any desired angle. That shown in Fig. 4 is probably the best position.

Passing through one of the vertical sides of the case 1 into its interior, and also into the interior of the pulley, is a dust-pipe 9, the size of which must be determined by the size of the collector, the speed at which it is run, and the pressure exerted by the fan. The outlet of the dust-pipe on the interior of the collector is turned down at a right angle, so as to deliver its dust at right angles to the interior of the rim. The position at which the dust-pipe enters the collector is immaterial, provided its outlet delivers the dust at right angles to the interior of the pulley-rim. In Fig. 3 I have shown the dust-pipe introduced into the upper part of the casing, but preserving the proper direction of the outlet. Experience has shown that it is desirable to place the outlet of the dust-pipe at such a distance from the interior of the pulley-rim

that the area between the mouth of the pipe and the pulley-rim will be about equal to that of the pipe, so as to avoid any retardation of the inflowing stream of air due to its having to be forced through a space smaller than the pipe. In the opposite end of the casing from that at which the dust enters is the air-pipe 10. As shown in Figs. 1 and 2, this pipe is located above the driving-shaft; but in Fig. 3 it is shown as a simple opening around the shaft.

Secured to the interior of the casing 1 by braces 11 11 is the deflecting-shield 12. (Shown in Figs. 1 and 2.) This shield consists of a semi-cylinder of any suitable material, closed at the top and open at the bottom, and of such a size as to cover entirely the open space on the interior of the web. This shield, standing immediately beyond the fan, will deflect all of the air drawn through it and turn it so as to cause it to impinge a second time upon the interior of the pulley-rim at right angles to it. Both sides of the ends of the casing of the collector are perforated with two circular holes, through which pass the dust-collectors 12 and 13 and conveyers 14 14. The position of the collectors is immaterial, so long as they are so located and adjusted as to collect the dust as it adheres to the interior of the centrifugal cylinder. The collectors are nearly cylindrical in form and are of thin metal, the edges of which, instead of being joined so as to form a complete cylinder, are lapped over one another a short distance and separated, so that the interior edge remains in the line of the periphery of the cylinder, while the exterior one is flared out, so as to form a projecting lip throughout the length of the cylinder, which, being placed in close contact with the interior of the pulley-rim, will scrape off and collect within the cylinder whatever adheres to the interior of the pulley-rim.

On the interior of the collectors are placed screw conveyers 14 14, the shafts of which are provided on their outer ends with pulleys or gears 16 16, by which they may be given suitable revolution. The ends of the collectors on the outside of the casing are provided with spouts 15 15, by which the flour-dust collected may be delivered at any desired place.

The casing being somewhat larger than the pulley, and the pulley necessarily fitting loosely in the grooves 6 6, some dust will escape from the interior of the pulley into the casing outside thereof. The rapid revolution of the pulley inside of the casing will cause a rapidly-revolving current of air to circulate inside of the casing, and consequently to carry with it all dust that escapes from the collector. The motion of this current of air will be sufficient if an opening be provided in its path to drive the suspended dust out of the opening. A provision of this kind is made by making an opening 17 in the casing at or near the top, and inserting into this opening two funnel-pipes 18 18, which cover

the opening and re-enter the casing at a point within the collector. Referring to Fig. 3, another form of shield 19 is there shown, which consists of a flat disk of thin metal covering the outlet and acting as a deflector.

The operation of the device is as follows: Air laden with flour and other dust enters the collector by the pipe 9 and is delivered from its turned-over end against the interior of the pulley or centrifugal cylinder at about right angles to the surface thereof, the pulley having been previously raised to a requisite rate of speed. The dust as it falls upon the interior of this revolving cylinder will be carried from under the mouth of the dust-pipe and borne upward with the revolution of the pulley. The rapid revolution of the pulley will, by centrifugal action, cause this dust to continue to adhere to the interior of the pulley, where it will become caked together in a mass. The air formerly laden with dust and bearing such particles of dust as may not have been caught upon the interior surface of the pulley will pass through the fan, which is formed by the skewed arms of the pulley, and as it does so strike upon the deflector 12 and be deflected from a course parallel to the shaft and turned downward to a course at right angles to the shaft, where it will be projected a second time against the interior of the pulley at right angles thereto. Here the same operation will take place which resulted from the original impact of dust-laden air which entered the collector by the dust-pipe. The dust projected against the interior surface of the pulley at right angles or about right angles will collect upon the surface and be carried from under the mouth of the deflector by the revolution of the pulley and caused to cake upon the interior of the pulley by centrifugal force. This second inpinging of the air against the interior of the pulley will cause almost all of the dust to be collected, and the air freed from dust will pass up behind the deflector and out through the air-pipe 10. As the interior of the pulley becomes coated with a layer of flour and other dust, the dust will come in contact with the flared lip of the collector 13, which is located, as previously described, on the interior of the pulley and with this flared lip resting against the interior face of the collector. The dust adhering to the interior surface of the collector will be scraped off and caught in the cylinder 13, from which it will be removed by the revolution of the screw conveyer 14 and ejected from the apparatus through the spout 15. The conveyer 13 is run by any suitable mechanism. The drawings show a belt and a pair of pulleys; but any other convenient mechanism may be employed for this purpose.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a dust-collector, the combination of a revolving centrifugal cylinder, through which the dust-laden air is made to pass, a fan suit-

ably located to cause a current of air to flow through said cylinder, and a dust-laden air-inlet pipe projecting into the interior of said cylinder and delivering its air and dust at approximately right angles to the interior of the cylinder, as and for the purpose specified.

2. In a dust-collector, the combination of a revolving centrifugal cylinder provided with arms connecting said cylinder to a hub, said arms being skewed so as to form the wings of a fan, substantially as described.

3. In a dust-collector, the combination of a centrifugal cylinder provided with skewed arms connecting the interior thereof, with a revolving shaft passing through its center and by which said cylinder is turned, and dust-collectors projecting into the interior of said cylinder and bearing against the interior surface thereof, whereby the dust which adheres to the interior surface of said centrifugal cylinder will be collected and removed therefrom, and a dust-laden air-inlet pipe projecting into the cylinder on the side into which the air is drawn by the fan.

4. In a dust-collector, the combination of a centrifugal cylinder provided with skewed arms connecting the interior thereof, with a revolving shaft passing through its center and by which said cylinder is turned, and dust-collectors projecting into the interior surface thereof, and a screw conveyer operating within said dust-collector to remove the same therefrom, and a dust-laden air-inlet pipe projecting into the cylinder on the side into which the air is drawn by the fan, substantially as described.

5. In a dust-collector, the combination of a centrifugal cylinder connected to a revolving shaft by arms which are skewed so as to form fan-wings, and a dust-laden air-inlet pipe projecting into the cylinder on the side into which the air is drawn by the fan, and a deflector located within said centrifugal cylinder and on the side of the fan-arms, from which the air is forced in position to deflect the air which is forced through the fan and cause it to impinge upon the interior of the centrifugal cylinder at about right angles thereto.

6. In a dust-collector, the combination of a

centrifugal cylinder connected to a revolving shaft which passes through the center thereof by arms which are skewed so as to form the wings of a fan, with a dust-inlet pipe the end of which is curved so as to deliver its dust at right angles to the interior surface of the centrifugal cylinder, and a deflector located on the side of the fan, to which the air is forced in position to deflect the air which comes through the fan and cause it to strike upon the interior surface of the centrifugal cylinder at about right angles thereto, substantially as described.

7. In a dust-collector, the combination of a centrifugal cylinder mounted upon and secured to a revolving shaft by arms which are skewed so as to have the wings of a fan, with a casing surrounding said cylinder and closing the ends thereof, and a dust-laden air-inlet pipe projecting into the cylinder on the side into which the air is drawn by the fan, and a pipe leading from the interspace between the cylinder and the casing and terminating upon the interior of the collector, so as to deliver air and dust which may escape into said interspace from the interior of the collector back into the interior of the collector, substantially as described.

8. In a dust-collector, the combination of a centrifugal cylinder connected to a revolving shaft which passes through the center thereof by arms which are skewed so as to form the wings of a fan, with a dust-inlet pipe the end of which is curved so as to deliver its dust at right angles to the interior surface of the centrifugal cylinder, and a deflector located on the side of the fan, to which the air is forced in position to deflect the air which comes through the fan and cause it to strike upon the interior surface of the centrifugal cylinder at about right angles thereto, and a head closing the end of the cylinder from which the air escapes, perforated with an air-outlet aperture.

JOSHUA B. BARNES.

Witnesses:

ARTHUR STEUART,

WALTER S. WILKINSON.