

No. 702,312.

Patented June 10, 1902.

J. E. MITCHELL.
DUST COLLECTOR.

(Application filed Feb. 27, 1902.)

(No Model.)

2 Sheets—Sheet 1.

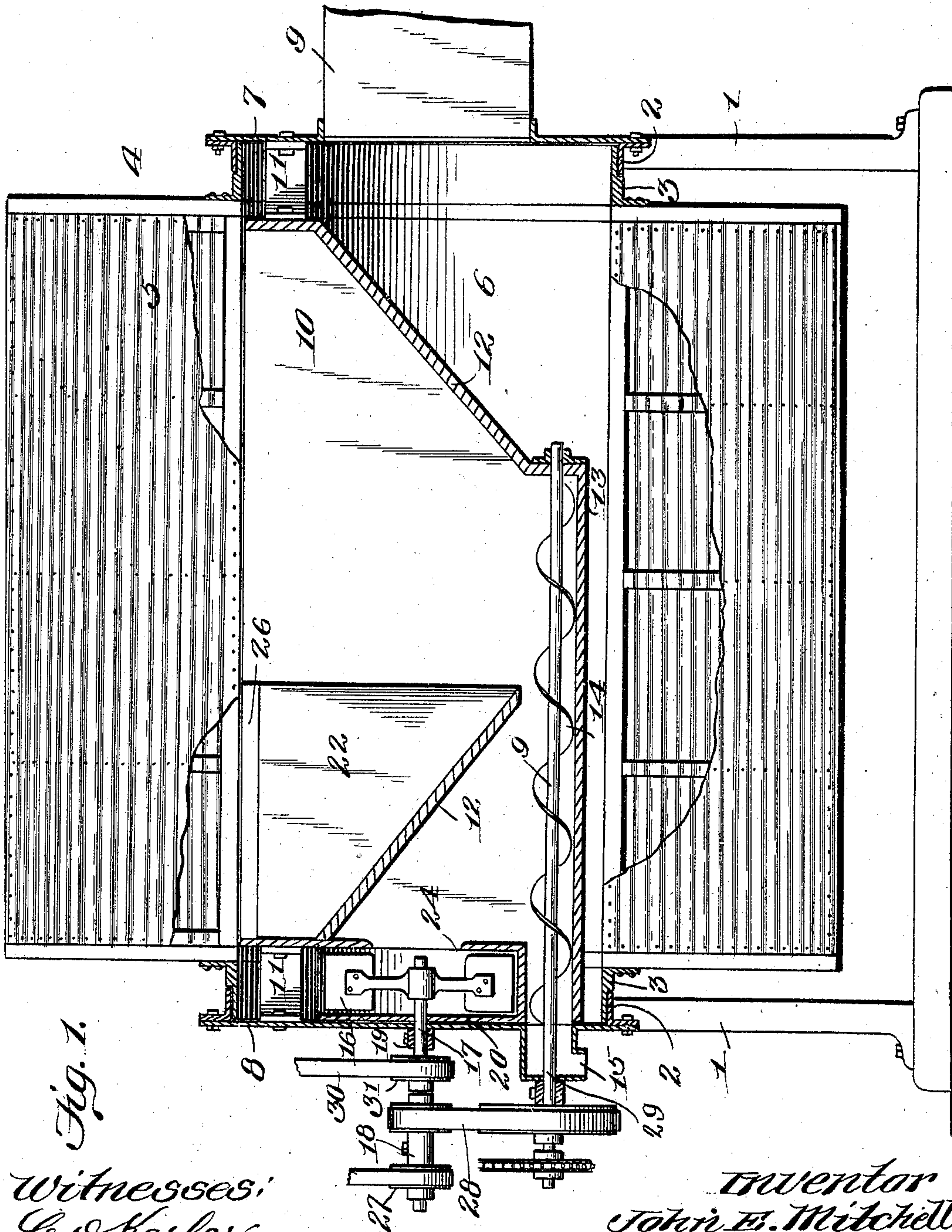


Fig. 1.

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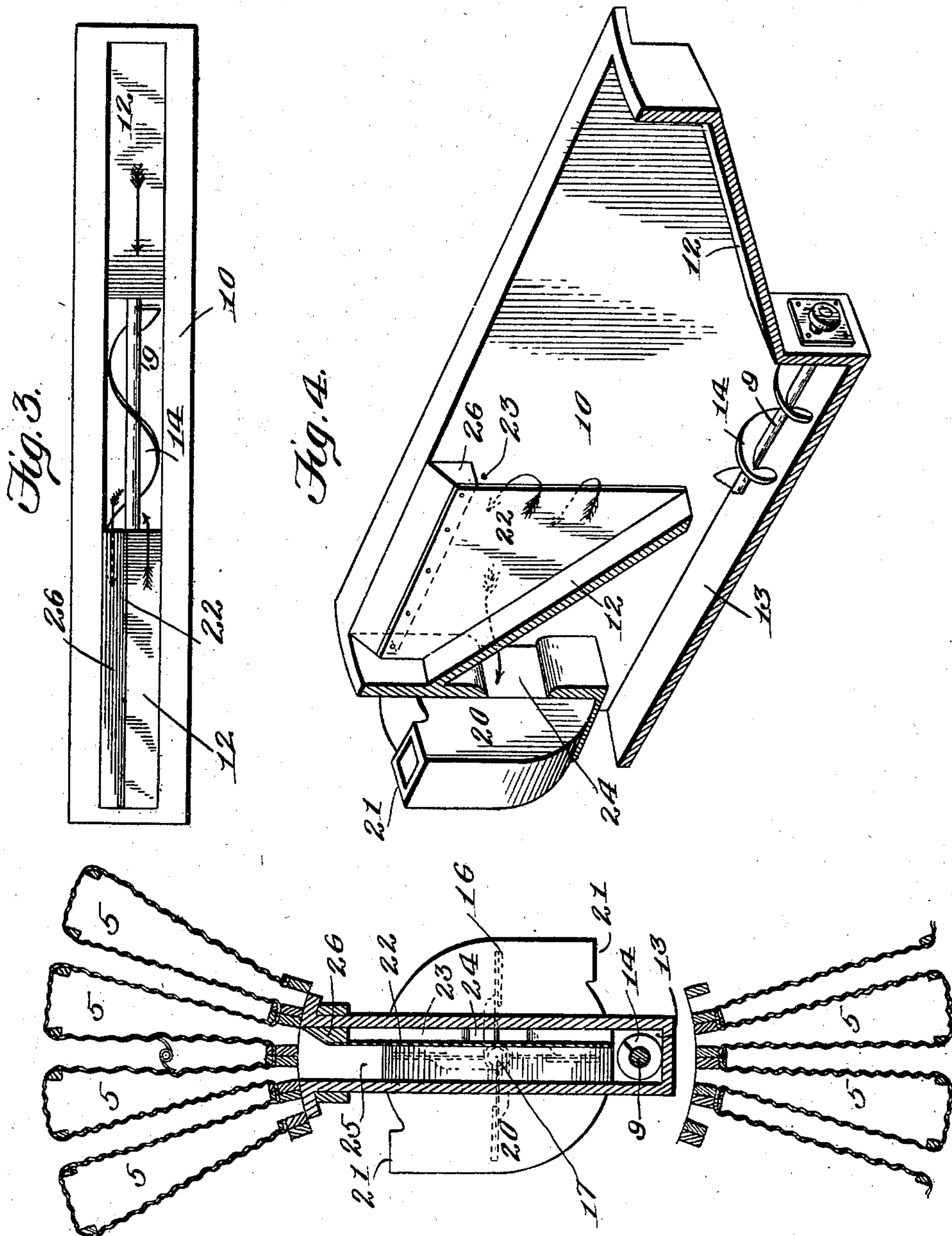
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UNITED STATES PATENT OFFICE.

JOHN E. MITCHELL, OF ST. LOUIS, MISSOURI.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 702,312, dated June 10, 1902.

Application filed February 27, 1902. Serial No. 95,975. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. MITCHELL, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented new and useful Improvements in Dust-Collectors, of which the following is a specification.

In dust-collectors of that class in which a rotary reel is employed having a central drum into which dust-laden air is introduced and having filtering frames or pockets arranged radially thereon and communicating with said drum it is common to employ in connection with certain cleaning devices a dead-air or cut-off chamber located within the drum and communicating with those filtering frames or pockets which are for the time being acted upon by the cleaning devices, the said cut-off chamber having located therein a conveyer for carrying off the dust removed from the filtering-frames and settling to the bottom thereof. It is also common to employ in this class of devices means for creating a back draft or reverse current of air through the filtering frames or pockets being cleaned, the same being produced by connecting the cut-off or dead-air chamber through the medium of an outside pipe with the inlet-opening of the fan or blower which forces the dust-laden air into the machine. A serious objection has arisen to this construction in that the pipe connecting the cut-off chamber with the inlet-opening of the fan becomes choked or clogged with dust, which materially decreases or wholly shuts off the back draft or current of air through the filtering-frames being cleaned. Another objection to this construction, which perhaps may be considered of less importance, is that the pipe connecting the cut-off chamber with the fan referred to is generally of such length and necessarily has so many crooks and turns in it that a high resistance is created to the passage of air therethrough, which makes the suction very feeble and of little use even when the pipe is unclogged or open and free.

My invention is designed to overcome the objections above pointed out; and it consists in the provision of an exhaust or back-draft fan independent of the fan which forces the dust-laden air into the central drum of the machine, which is located within the central

drum of the machine and has its inlet-opening connected directly without the interposition of pipes with the cut-off chamber.

The invention also consists in the provision of a longitudinally-extending diaphragm or partition located in the cut-off chamber adjacent to the back-draft fan forming two parallel connecting passages, one of which leads directly to the inlet-opening of the fan and the other of which communicates directly with those filtering frames or pockets which are located adjacent to said fan, the said partition being designed for the purpose of preventing the dust in the cut-off chamber from being carried by the air-current to the inlet-opening of said fan.

The invention also consists in certain features and details of construction and combinations of parts, which will be hereinafter more fully described and claimed.

In the drawings forming part of this specification, Figure 1 is a sectional elevation illustrative of my invention. Fig. 2 is a partial transverse section of the same. Fig. 3 is a detail plan view of the cut-off chamber, and Fig. 4 is a sectional perspective view of the same.

Like reference-numerals indicate like parts in the different views.

I have illustrated my improvements in connection with a dust-collector constructed substantially in accordance with that shown in Letters Patent No. 683,314, granted to me September 24, 1901. Said improvements are not limited, however, to use upon this particular construction of dust-collector, but may be used upon dust-collectors of similar construction.

The supports 1, upon which the machine is mounted, have been shown as provided at their upper ends with parallel bearing-rings 2, in which the opposite ends of the hub 3 of the reel 4 are mounted to turn. The reel 4 has been shown as provided with a series of radially-arranged filtering frames or pockets 5, whose inner ends communicate with the central drum 6, into which dust-laden air is introduced in any suitable manner. The heads 7 and 8 of the drum 6 are fixed in position, being shown as secured to the bearing-rings 2 at opposite ends of the device. The

main wind-trunk 9, through which dust-laden air is introduced into the machine, is connected with the head 7. Located within the drum 6 and secured in place is a dead-air or cut-off chamber 10, the same being shown as secured to the heads 7 and 8 of the drum by means of the brackets 11. The said cut-off chamber is preferably provided with inclined bottom walls 12, which merge into a trough 13, in which a conveyer 14 is located, the said conveyer being designed for the purpose of removing the dust from the cut-off chamber 10 and discharging it through the passage 15. As is usual in this class of devices the reel 4 has imparted to it a continuous or intermittent rotary movement, so as to bring the filtering frames or pockets 5 successively opposite the cut-off chamber 10. The said cut-off chamber fits in close contact with the inner ends of the filtering frames or pockets and serves to prevent the access of dust-laden air in the drum 6 from those filtering-frames which it is for the time being in communication with.

The construction just described is old and well known and forms no part of my present invention. In connection therewith, however, I employ a suction or back-draft fan 16, located within the drum 6 independent of the fan which forces the dust-laden air into said drum and having its inlet-opening communicating directly without the intervention of pipes or tubes with the cut-off chamber 10. The fan 16 is secured to a shaft 17, which extends through the head 8 of the drum 6 and is mounted in fixed bearings 18 and 19, located outside the drum. I have shown the fan 16 as being mounted within a fan-casing 20, having discharge-openings 21; but it is obvious that said casing 20 may be dispensed with, if desired. I prefer to employ the same, however, as it is designed to force the air from the fan 16 back into the drum 6. Located within the cut-off chamber 10 at the end thereof adjacent to the fan 16 and extending longitudinally of said cut-off chamber parallel to the sides thereof is a diaphragm or partition 22, the same forming on one side thereof a passage 23, which leads directly to the inlet-opening 24 of the fan 16, and on the other side thereof a passage 25, closed on its lower side by the inclined bottom wall 12 of the cut-off chamber and communicating at its upper end with the lower ends of the filtering frames or pockets 5. The upper end of the passage 23 is closed and cut off from the filtering frames or pockets 5 by a longitudinally-extending strip 26. The partition 22 extends from one end of the cut-off chamber 10 and terminates at a point intermediate the ends of said chamber. The same is preferably constructed of sheet metal and secured to the bottom wall 12 of the cut-off chamber and to the strip 26. It may, however, be constructed of any other suitable material and be secured in place in any other suitable manner. The purpose of the dia-

phragm 22 is to prevent the dust from the cut-off chamber 10 being carried by the current of air to the inlet-opening 24 of the fan 16—that is to say, it prevents a direct current passing to the fan 16 from the inner ends of those filtering-frames which communicate with the cut-off chamber at the end thereof adjacent to said fan. It also serves to distribute the force of the current produced by the fan 16 throughout all portions of the filtering frames or pockets which are in communication with the cut-off chamber.

Now it will be observed that as the back-draft or suction fan 16 is located within the drum 6 of the machine it lies in close relation to and has a direct communication with the cut-off chamber 10, into which the dust from the cleaned filtering-frames is caused to fall. No connecting-pipes between the cut-off chamber and said fan are employed, and consequently no clogging of such pipes, which would render the back-draft fan inoperative, can take place. Furthermore, as the connecting-pipes between the cut-off chamber 10 and the fan 16 are dispensed with no abrupt bends or curves to produce resistance to the passage of the air can exist. Furthermore, as the suction or back-draft fan 16 is independent of the fan which forces the dust-laden air into the machine the full force and effect of the fan 16 can be obtained for the single purpose of removing the dust from the filtering-surfaces acted upon. Furthermore, by the provision of the diaphragm 22 all opportunity of dust being carried off by the current to the fan 16 from the cut-off chamber 10 is prevented. The passage 25, which is formed by the cut-off chamber, constitutes what might be termed a "hopper," into which the dust removed from the filtering-surfaces above the same may settle upon the inclined bottom 12. Said dust is cut-off from the direct current to the fan 16, and consequently prevented from being carried off to said fan.

Any suitable means for operating the different parts of the device may be employed. For example, power may be applied from any suitable source to the fan-shaft 17 by a belt passing around a pulley 27 on said shaft and be transmitted from said shaft through the belt 28 and suitable pulleys to the conveyer-shaft 29. Power may also be transmitted by the belt 30, which passes around a pulley 31 on the fan-shaft 17, to the cleaning mechanism. The reel 4 may be rotated, for example, by the means disclosed in my former patent heretofore referred to.

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

1. In a dust-collector, the combination with a drum into which dust-laden air is introduced, filtering-pockets communicating with said drum, and a cut-off chamber for successively cutting off said pockets from said drum, of a back-draft or suction fan independent of the fan for forcing the dust-laden

air into said drum, and having its inlet-opening communicating directly with said cut-off chamber.

2. In a dust-collector, the combination with
5 a drum into which dust-laden air is introduced, filtering-pockets communicating with said drum, and a cut-off chamber for successively cutting off said pockets from said drum, of a back-draft or suction fan located
10 within said drum, and having its inlet-opening communicating directly with said cut-off chamber.

3. In a dust-collector, the combination with
15 a drum into which dust-laden air is introduced, filtering-pockets communicating with said drum, and a cut-off chamber for successively cutting off said pockets from said drum, of a back-draft or suction fan located within said drum, independent of the fan for
20 forcing the dust-laden air into said drum, and having its inlet-opening communicating directly with said cut-off chamber.

4. In a dust-collector, the combination with
25 a drum into which dust-laden air is introduced, filtering-pockets communicating with said drum, and a cut-off chamber for successively cutting off said pockets from said drum, of a back-draft or suction fan, and a

longitudinally-extending partition at one end of said chamber, forming two passages, one 30 of which has its upper end open, and the other of which has its upper end closed and communicates directly with the inlet-opening of said fan.

5. In a dust-collector, the combination with 35 a drum into which dust-laden air is introduced, filtering-pockets communicating with said drum, and a cut-off chamber for successively cutting off said pockets from said drum, of a back-draft or suction fan located 40 within said drum, and a partition in said cut-off chamber extending longitudinally thereof from the end adjacent to said fan to a point intermediate its ends, the said partition forming two passages, one of which has 45 its upper end open, and the other of which has its upper end closed and communicates directly with the inlet-opening of said fan.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 50

JOHN E. MITCHELL.

Witnesses:

MARK MAITLAND,

A. P. WEINGARTNER.