No. 704,900. Patented July 15, 1902.

J. E. MITCHELL.

DUST COLLECTOR.

(Application filed Dec. 9, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

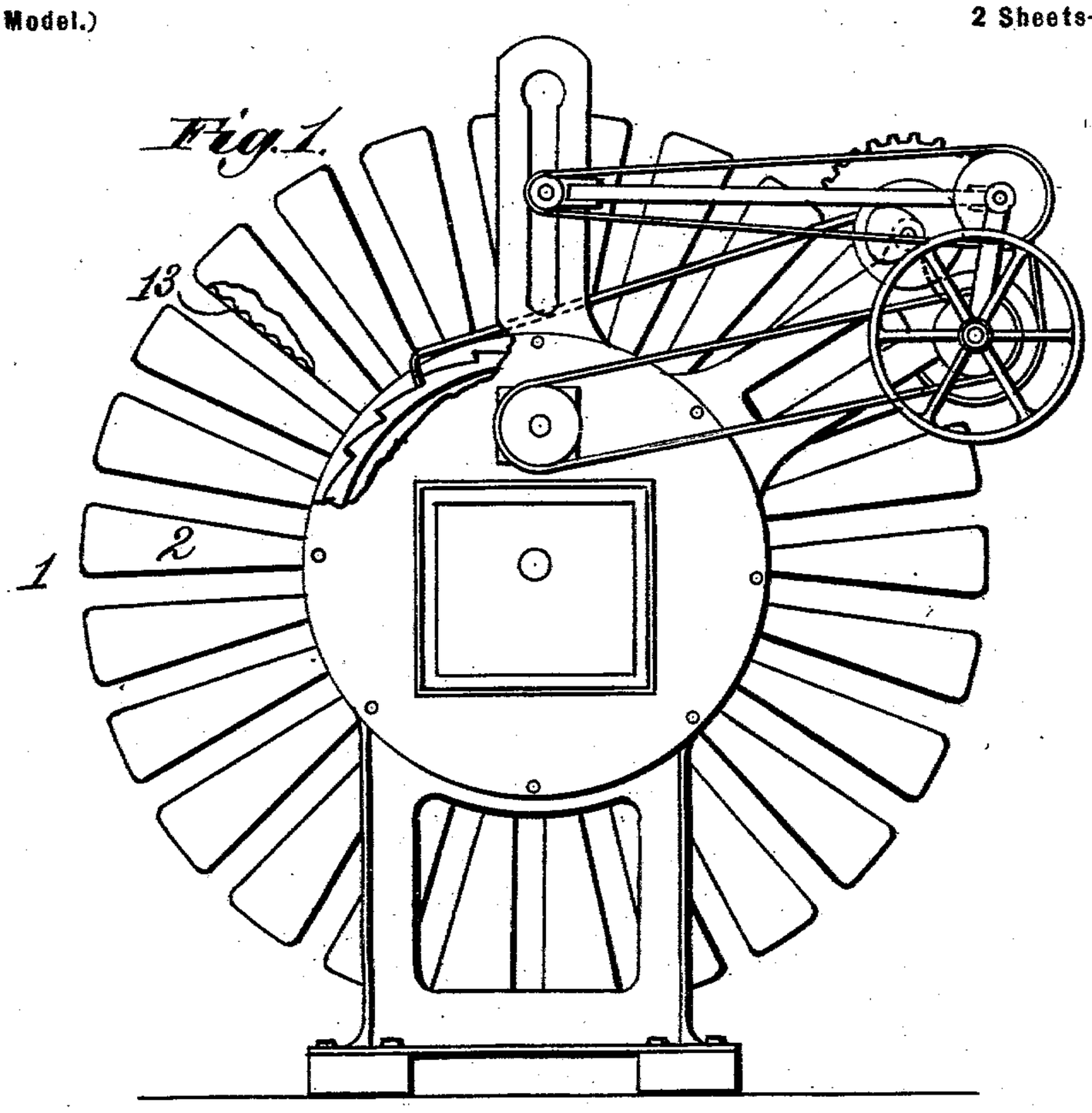

Fig. 2.

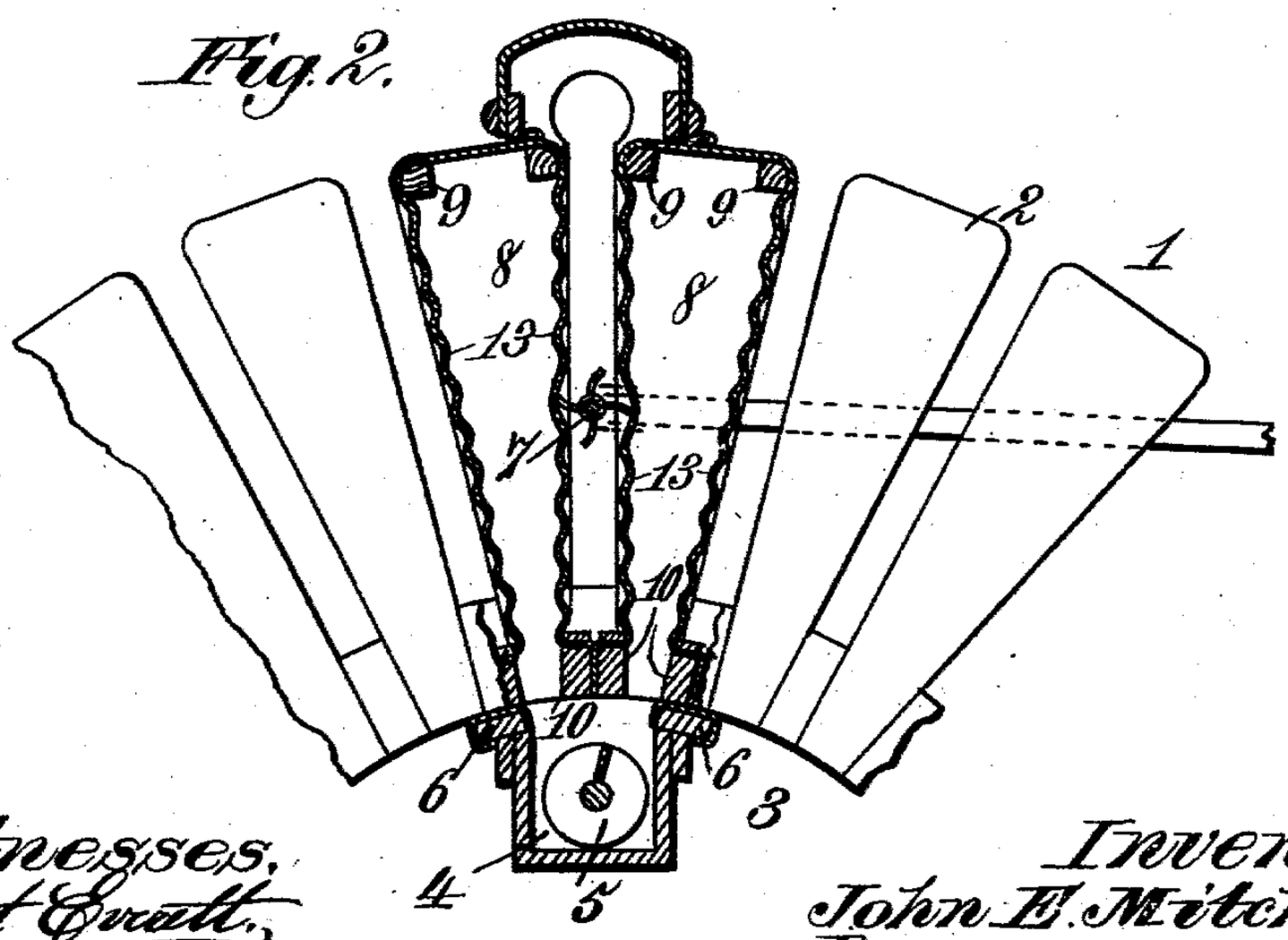

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Fig. 3.

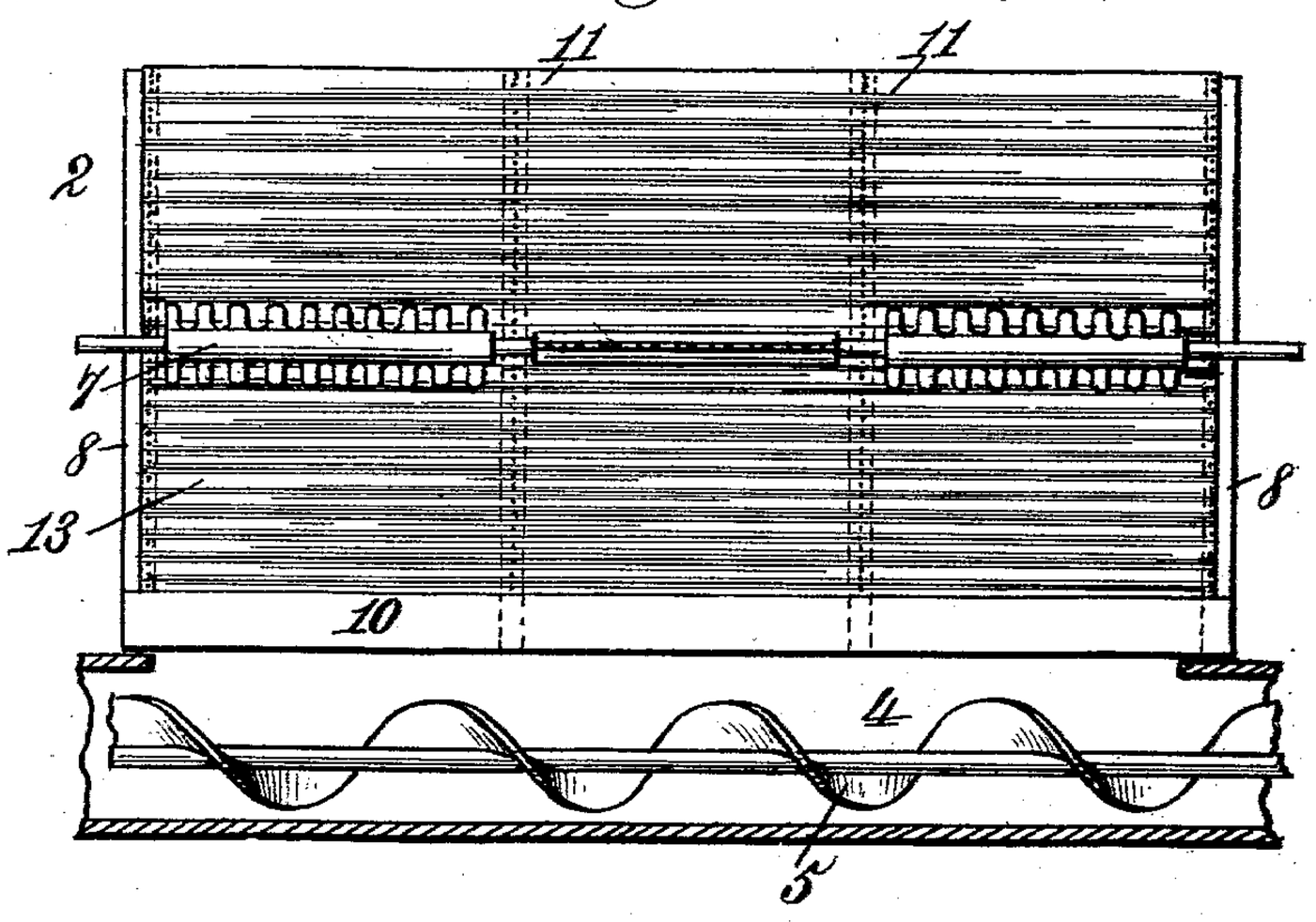
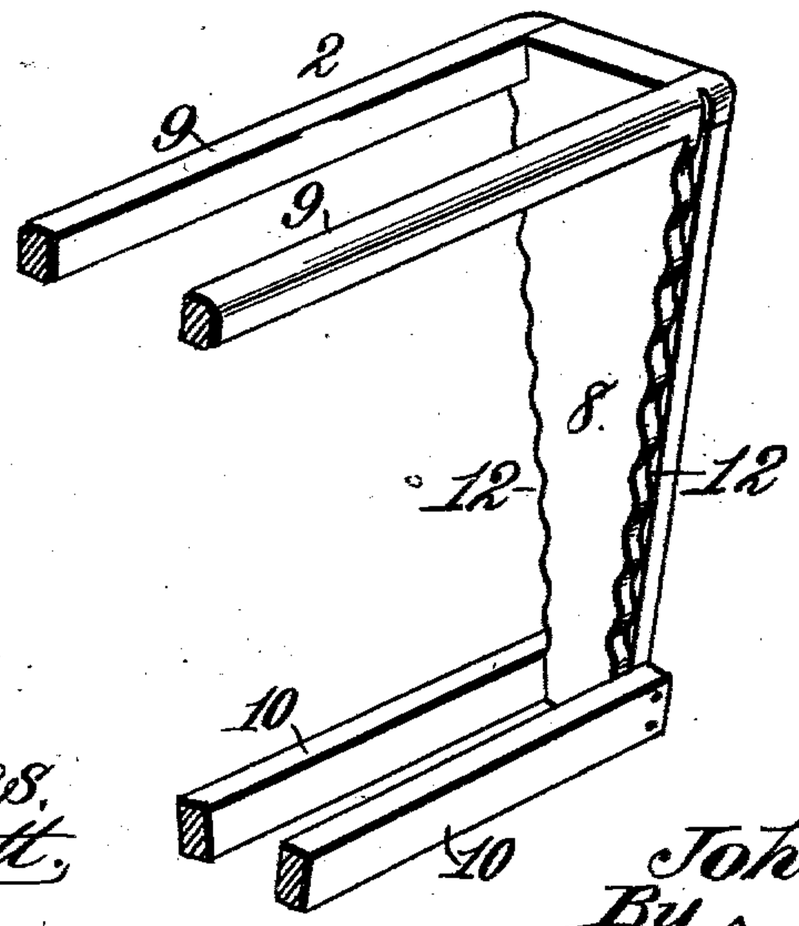


Fig. 4.



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UNITED STATES PATENT OFFICE.

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DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 704,900, dated July 15, 1902.

Application filed December 9, 1901. Serial No. 85,258. (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 United States Letters Patent granted to me September 24, 1901, No. 683,314, I have shown and described certain improvements in dust-collectors, in which are employed an intermittently-rotatable reel having a central drum therein, into which dust-laden air is introduced, a cut-off or dead-air chamber provided with a screw conveyer located at the upper part of said drum, a series of radially-arranged segmental filtering-frames carried by said reel, and a rotary and bodily-movable cleaner for agitating and thereby removing the dust from the filtering-surfaces of those frames which are for the time being in communication with said cut-off chamber. The filtering-cloth on each of the frames in the construction referred to is stretched tight and the surface thereof is plane. Under some circumstances it has been found impossible to completely remove the dust from the filtering-walls of the frames, especially when the same is of a soft sticky nature unless the cleaner which operates thereon is rotated at a high rate of speed. Even then it is difficult to remove all of this fine, soft, sticky dust, as the tightly-stretched filtering-walls do not move or vibrate freely. Another objection that has arisen to the construction referred to and which also exists in other devices of the same nature where the filtering-walls are straight or plane is that when the dust is round or granular it will fall from the filtering-frames containing the same down into the central drum when said filtering-frames are approaching their vertical positions and before they arrive at a point opposite the cut-off chamber in said drum. The result is that eventually the central drum and all of the filtering frames or chambers become filled with dust and it is necessary to remove the same from the reel in order to clean them and get the machine into proper working condition again.

My present invention is designed to overcome the objections above noted, and consists in forming the filtering-cloth which constitutes the filtering-walls of the different frames with corrugated or fluted surfaces. When this form of cloth is employed, the same may be readily cleaned, even when the dust thereon is of a soft sticky nature, by a rotary cleaner operated at a low rate of speed. Furthermore, the corrugations form pockets in the surfaces of the filtering-cloth, in which granular dust may lodge and by which said granular dust is prevented from falling back into the central drum when the filtering-frames approach their upright positions during the intermittent movement of the reel.

Other advantages are obtained by the novel construction and arrangement of the filtering-cloth, which will be more fully hereinafter set forth.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of a dust-collector constructed in accordance with my invention. Fig. 2 is a cross-sectional view of a portion of the same. Fig. 3 is a longitudinal section, and Fig. 4 is a detail perspective view of one of the filtering-frames.

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

The intermittently-rotatable reel 1 carries the filtering-frames 2, which are radially arranged therein, and the inner ends of said filtering-frames form a central cylindrical drum 3, into which dust-laden air is introduced. Within the drum 3 and at the upper end thereof is located a cut-off or dead-air chamber 4, having a conveyer 5 therein for discharging the dust removed from the filtering-frames to a point outside the machine. The said cut-off chamber is provided with lateral wings or guards 6, designed to engage the inner ends of the different filtering-frames 2 and serving to cut off a plurality of said filtering-frames from access of the dust-laden air in the drum 3. Coöperating with the contiguous filtering-walls of two adjacent filtering-frames, which are for the time being in communication with the cut-off chamber 4, is a rotary cleaner 7, which cleaner, in addition to its rotary movement, has imparted to it a bodily movement, so as to cause the same to traverse the space between two contiguous filtering-walls from the outer ends thereof to the inner.

The parts above described may all be of

substantially the same construction as the corresponding parts shown in my prior patent above referred to, with the exception of the filtering-frames 2. Each of the said filtering-frames is made up of parallel segmental end pieces 8, strips 9 connecting the outer corners of said end pieces 8 with each other and strips 10 connecting the inner corners of said end pieces one with the other. There may also be provided, if desired, the intermediate partitions 11 between the end pieces 8, substantially as shown in my prior patent above referred to. The side edges of each of the end pieces 8 and partitions 11 are corrugated, as shown at 12, and extending around the strips 10 and 9 to form the filtering-walls of each frame is a cloth 13. The said cloth is tacked or otherwise secured to the strips 10 and 9 and to the corrugated edges 12 of the end pieces 8 and intermediate partitions 11. The said filtering-cloth is thereby formed with the corrugated or fluted surfaces along the sides thereof. Said cloth is stretched between the end pieces 8 8, but is left unstretched between the strips 10 and 9. The object of corrugating the side edges of the end pieces 8 and partitions 11 is for the purpose of forming corrugations in the filtering-cloths which are attached thereto. This object may, however, be accomplished by other means than that herein described, and I therefore do not limit myself to the specific construction shown.

In other respects than those herein noted my improved dust-collector is substantially the same as that shown in my prior patent referred to and the operation of the same is similar. When two of the corrugated filtering-walls 13, which lie opposite the cut-off chamber 4, are acted upon by the rotary cleaner 7, it will be obvious that said filtering-cloth may yield or bend outwardly from said cleaner and be vibrated to a greater extent than if the walls were straight and stretched tight at all points. The result is that the cleaner 7 may be operated at a lower rate of speed and will remove the dust from the corrugated filtering-walls much more effectively. As a lower rate of speed of the rotary cleaner 7 may be employed, it will be obvious that there is less friction between said cleaner and said filtering-walls and the cloth of which said walls is made will be subjected to less wear, and will consequently last much longer. Furthermore, by reason of the fact that the corrugations in the cloth 13 produce what may be termed "auxiliary" pockets in the filtering-surfaces of the different frames, these pockets will provide lodgment for any coarse granular dust and prevent the same from falling back down into the drum 3 from the frames during the intermittent movement of the reel when said frames are approaching an upright position. This is an important feature of advantage in my improved device; but, in addition, it may be stated that by reason of the formation of the corrugations in the cloth 13 a larger area of filtering-surface is provided than could be produced in the same space were the surfaces of said filtering-cloth left plane.

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

1. In a dust-collector, a series of corrugated filtering-surfaces, a cleaner therefor, and means for moving said cleaner successively into contact with said surfaces.

2. In a dust-collector, a series of corrugated filtering-surfaces, a movable cleaner coöperating therewith, and means for moving said filtering-surfaces successively into the path of movement of said cleaner.

3. In a dust-collector, a series of corrugated filtering-surfaces, a cut-off chamber for successively cutting off said surfaces from access of dust-laden air, a cleaner for said filtering-surfaces, and means for moving said cleaner into contact with said filtering-surfaces as they are brought into communication with said cut-off chamber.

4. In a dust-collector, the combination with an intermittently-rotatable reel having a central drum therein into which dust-laden air is introduced, a cut-off chamber in said drum, and a rotary and bodily-movable cleaner, of a plurality of radially-arranged filtering-frames carried by said reel, each of said frames having the filtering-walls thereof provided with corrugated surfaces adapted to be engaged by said cleaner when said frames are in communication with said cut-off chamber.

5. In a dust-collector, the combination with an intermittently-rotatable reel having a central drum therein into which dust-laden air is introduced, and a cut-off chamber in said drum, of a series of radially-arranged filtering-frames carried by said reel, and communicating at their inner ends with the said drum, each of said frames having the filtering-walls thereof provided with auxiliary pockets, a plurality of said frames being adapted to be cut off from said drum by said cut-off chamber, and a cleaner acting upon the contiguous walls of two adjacent filtering-frames when the same are in communication with said cut-off chamber.

6. A filtering-frame for dust-collectors, comprising end pieces having corrugated side edges, strips connecting said end pieces, and a web of filtering-cloth passing around said strips and secured thereto and to the corrugated edges of said end pieces, as and for the purpose set forth.

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

JOHN E. MITCHELL.

Witnesses:
A. P. WEINGARTNER,
MARK MAITLAND.