

No. 683,314.

Patented Sept. 24, 1901.

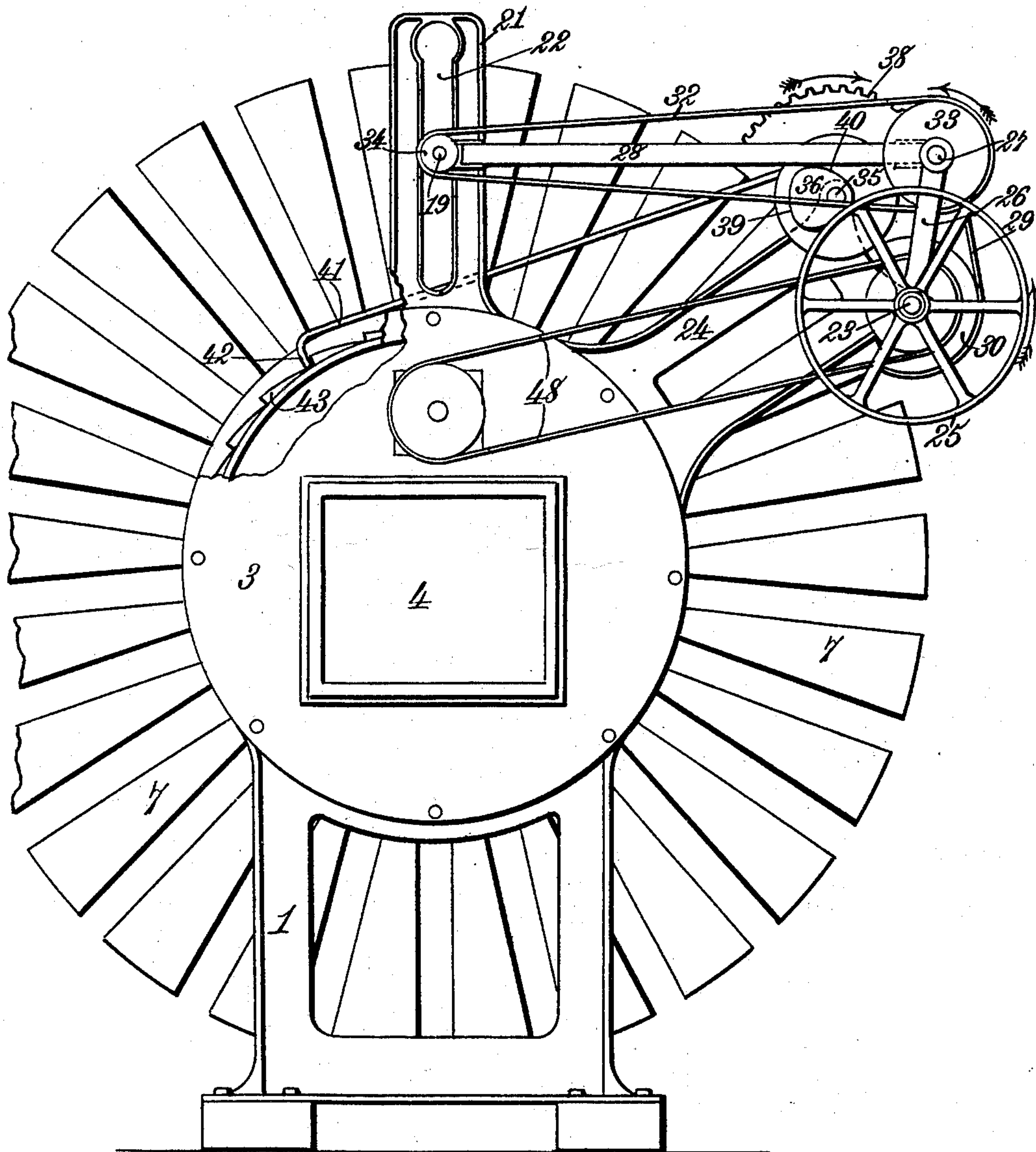
J. E. MITCHELL.
DUST COLLECTOR.

(Application filed Feb. 27, 1901.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



Witnesses.
Robert Garrett.
Dennis Sundry.

Inventor:
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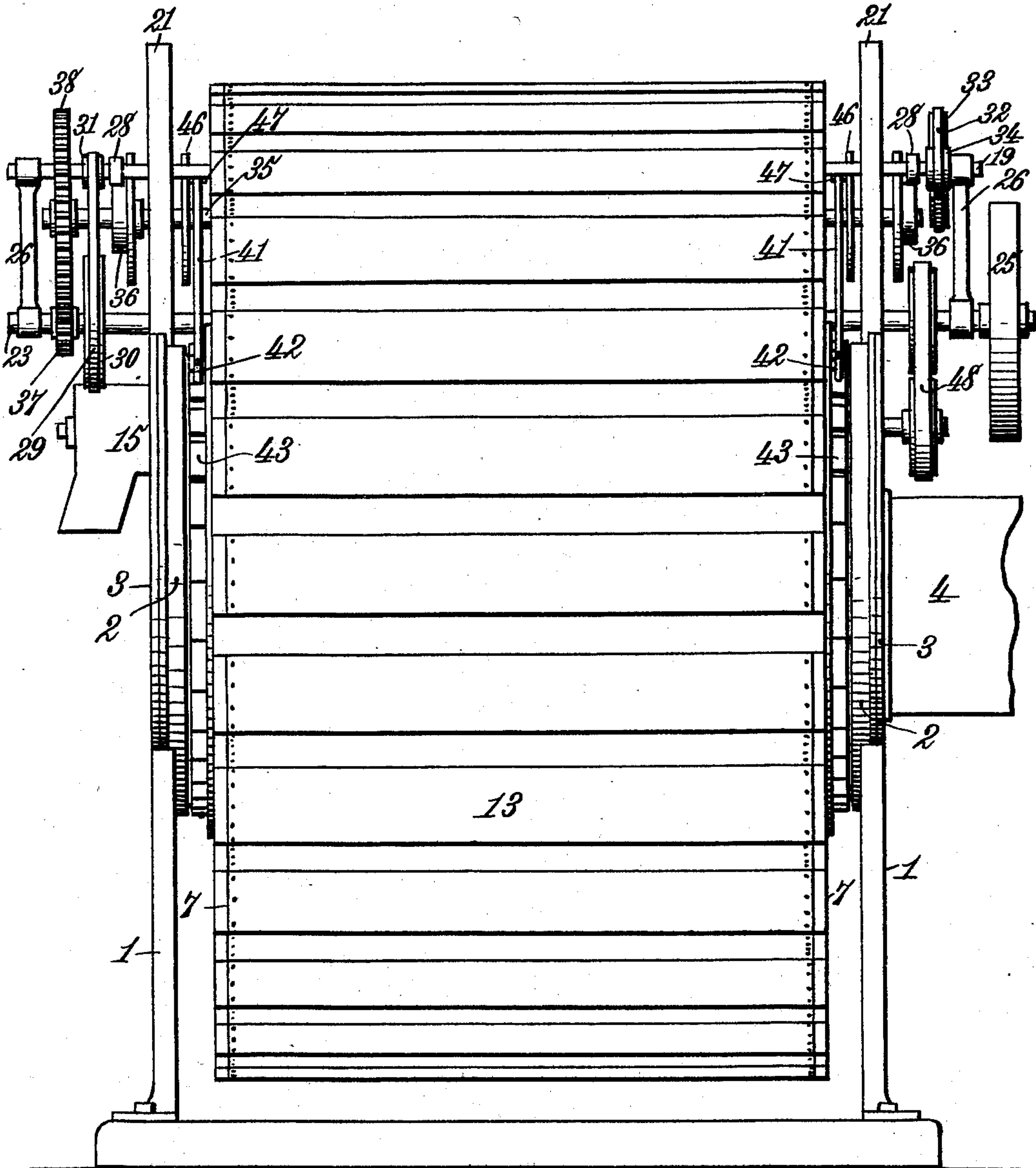
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(No Model.)

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Fig. 2.



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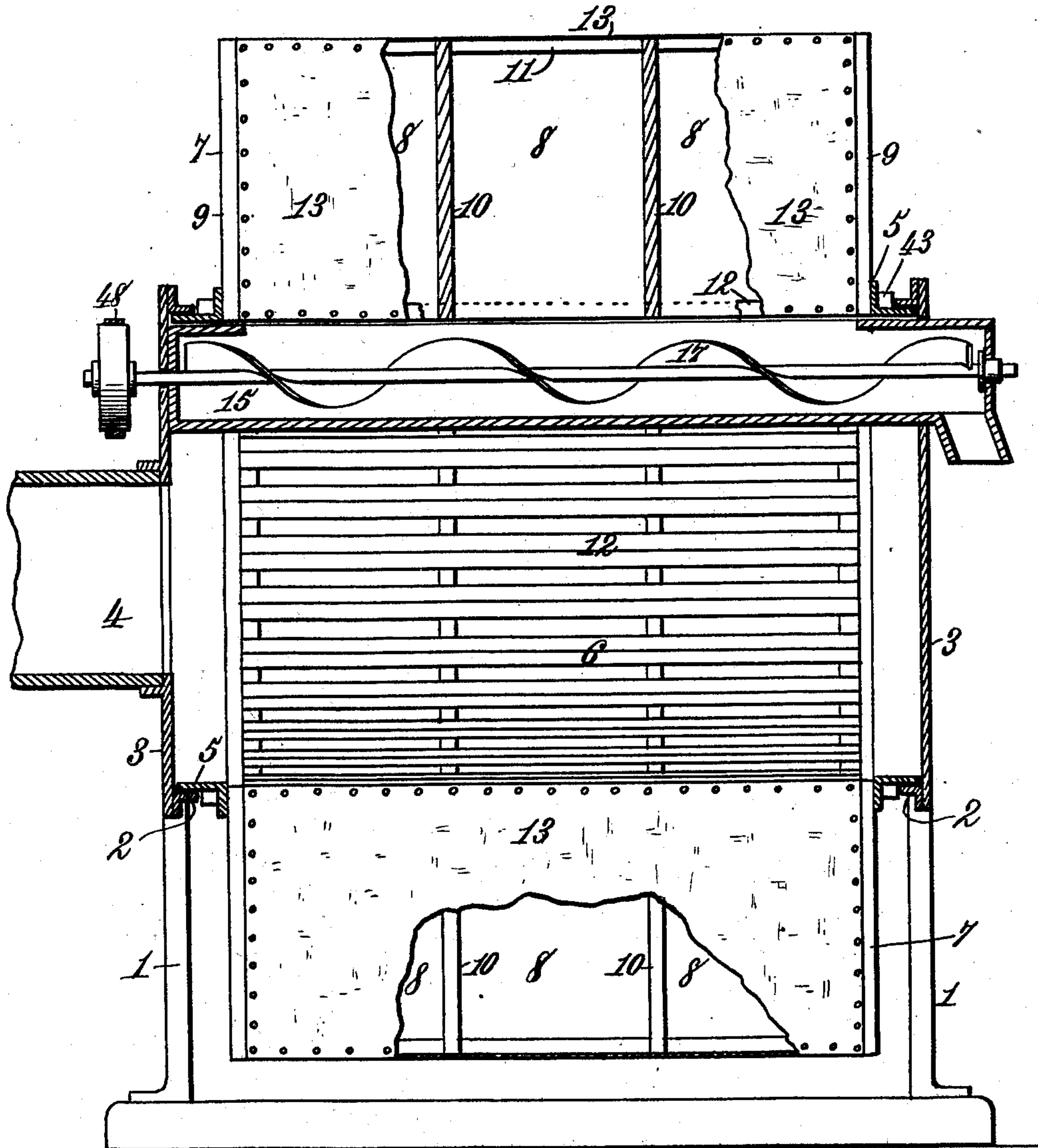
J. E. MITCHELL.
DUST COLLECTOR.

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(No Model.)

4 Sheets—Sheet 3.

Fig. 3.



Witnesses.
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4 Sheets—Sheet 4.

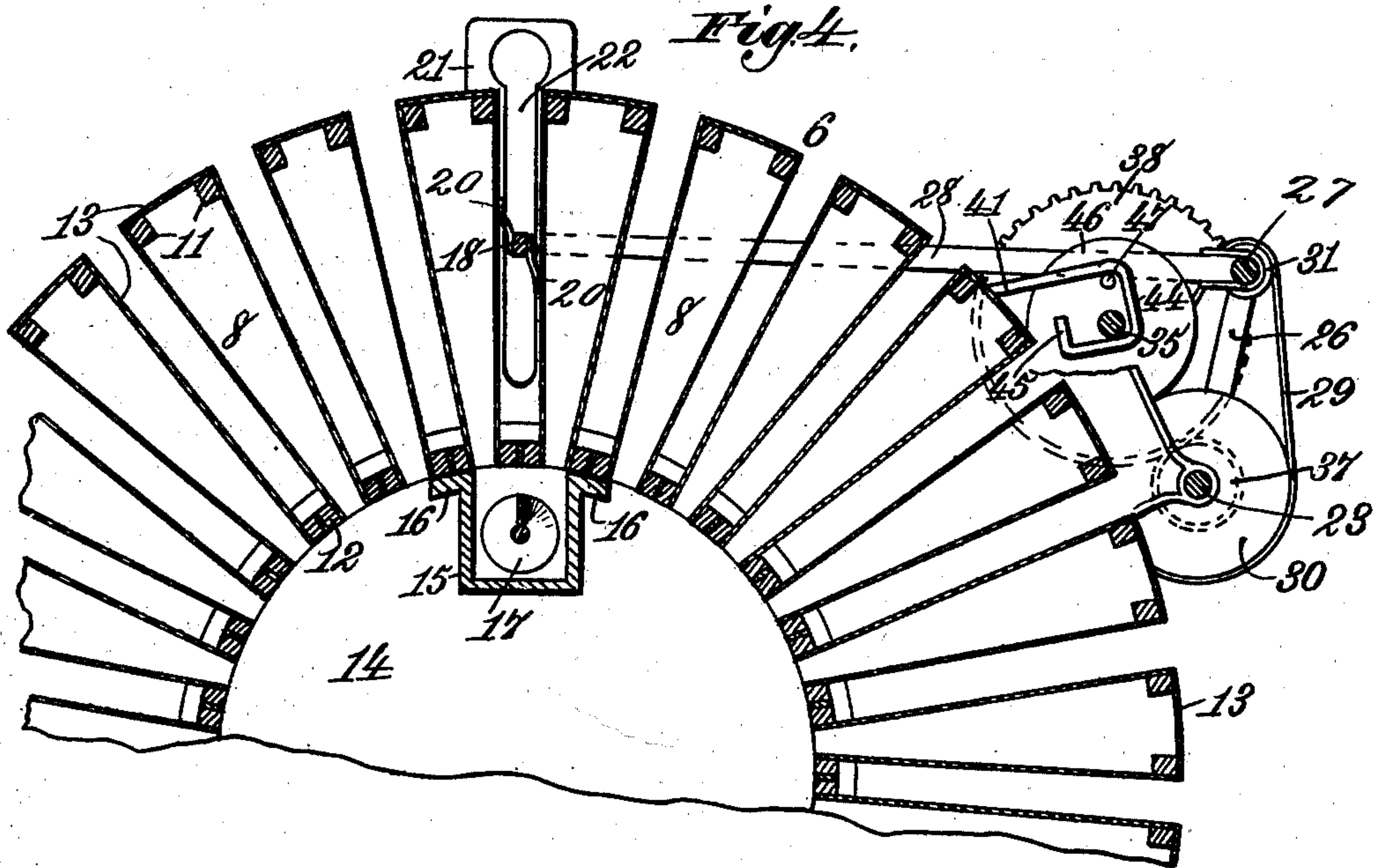
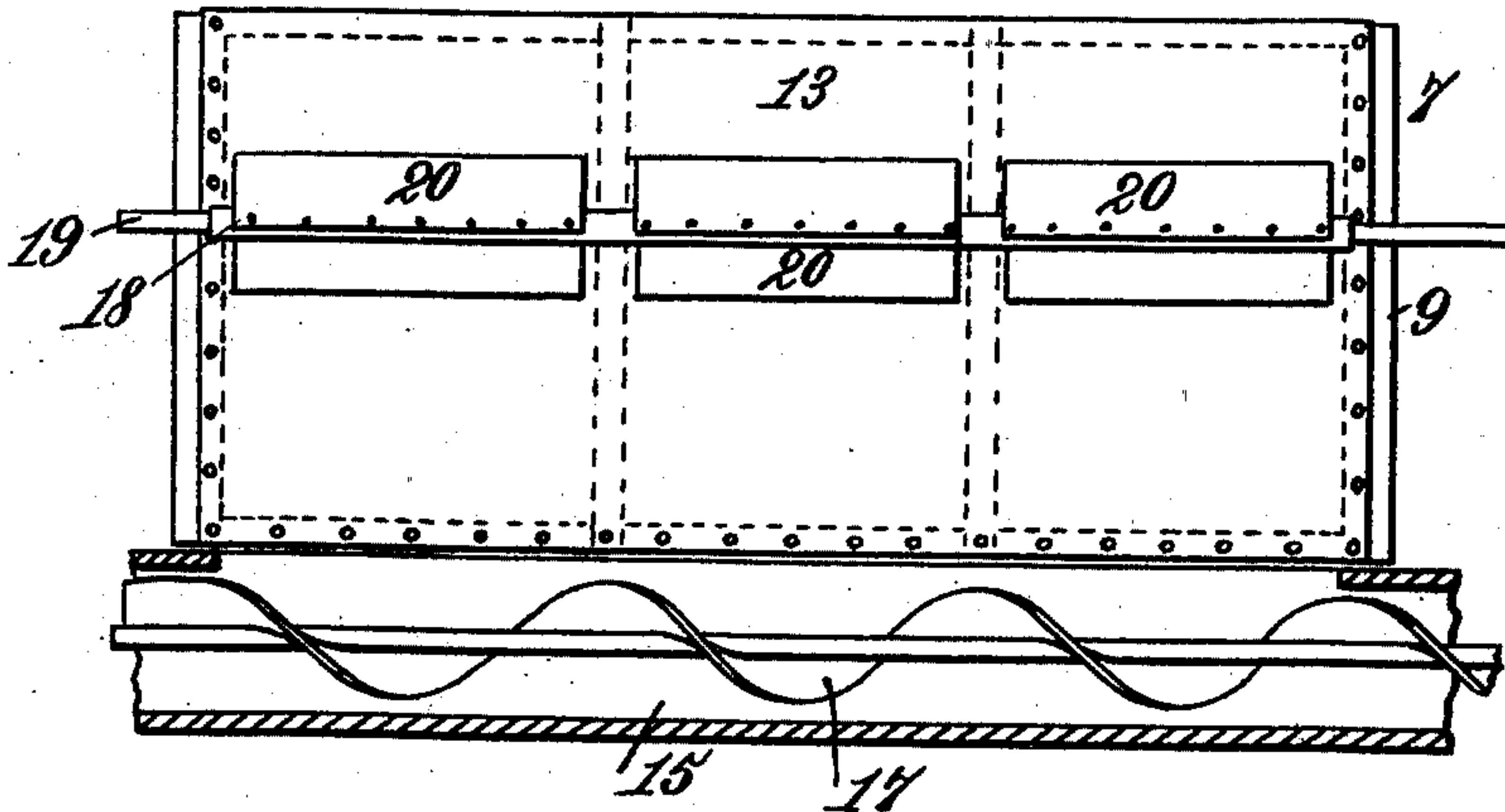


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN E. MITCHELL, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE MITCHELL-PARKS MFG. CO., OF SAME PLACE.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 688,314, dated September 24, 1901.

Application filed February 27, 1901. Serial No. 49,123. (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.

My invention relates to dust-collectors, the object of the same being to provide novel means for dislodging the dust from, and thereby cleaning, the filtering-walls thereof.

The invention consists of a traveling cleaner designed to agitate all portions of the filtering-walls, to brush the outer surface thereof, and to force a reverse current or blast of air therethrough.

It 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 an end elevation of a dust-collector embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical central longitudinal section. Fig. 4 is a transverse section of a portion of the reel, and Fig. 5 is a detail view showing in elevation one of the filtering-frames and the cleaning device.

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

The frame of the machine is made up of the uprights 1, having the bearing-rings 2 secured thereto and arranged parallel to each other at opposite ends of the machine. These bearing-rings 2 are closed by the stationary heads 3, one of which is provided with an opening with which the wind-trunk 4 for the introduction of dust-laden air to the interior of the apparatus communicates. Mounted in the bearing-rings 2 are the annular hubs 5 of the intermittently-rotatable reel 6, the said reel having radially-extending segmental spokes 7, secured to the hubs 5, and containing the filtering frames or chambers 8. Each of the filtering-frames 8 is made up of the segmental end pieces 9, the intermediate segmental diaphragms or partitions 10, the longitudinally-extending strips 11, connecting the outer ends of the end pieces 9 and seated in recesses therein and in the intermediate partitions 10, the longitudinally-ex-

tending strips or ribs 12, connecting the inner ends of the end pieces 9, and the filtering-cloth 13, which extends around the side edges and outer ends of the end pieces 9 and diaphragms or partitions 10 and is tacked or otherwise secured thereto and to the longitudinal strips 11 and 12. These filtering-frames are radially arranged in the reel 6, with the end pieces 9 thereof secured to the spokes 7 of said reel. When the filtering-frames are in place in the reel 6, the inner ends of the said frames or the longitudinal strips 11 thereof form a central drum 14, into which dust-laden air from the wind-trunk 4 is introduced. Each of said filtering-frames communicates at its inner end with said central drum, and said frames are separated from each other, as clearly shown.

Located within the drum 14, extending longitudinally of the machine and projecting beyond the fixed heads 3, is a cut-off or dead-air dust-receiving chamber 15, the same being provided with lateral wings or guards 16, which lie in close contact with the inner surfaces of the longitudinal strips 12 of the filtering-frames 8. Said cut-off chamber 15 is designed for the purpose of excluding dust-laden air in the drum 14 from a plurality of the filtering-frames 8 and to receive the dust which is removed from the filtering-walls of those frames which are in communication with it. The same is provided with a rotary screw conveyer 17 for removing the dust collected therein from the machine.

To provide for the dislodgment of the dust from the filtering-walls of the frames or chambers 8 as they are successively brought opposite the cut-off chamber 15 during the intermittent movement of the reel 6, I have provided a traveling rotary cleaner 18. This cleaner consists of a rotary shaft 19, provided with a plurality of flexible blades 20, adapted during the rotary movement of said shaft to strike against the contiguous filtering-walls of two adjacent filtering-frames 8, thereby agitating said filtering-walls, imparting a brush-like action to the outer surfaces thereof and forcing a current or blast of air through said filtering-walls. The shaft 19 in addition to the rotary movement which is imparted to it also has a bodily vertical

movement imparted to it for the purpose of causing it to traverse the entire length of the filtering-walls upon which it is operating and for the purpose of enabling it to pass
 5 from the space between two adjacent filtering-chambers to the space between the next two adjacent chambers. To effect this operation of the rotary cleaner, I provide guide-brackets 21, secured to the main frame of the
 10 machine, at opposite ends thereof, and provided with elongated slots 22, in which the ends of the shaft 19 fit and move. Motion, both rotary and vertical, is imparted to the shaft 19 from the main drive-shaft 23, mounted
 15 in brackets 24, secured to and projecting outwardly from the bearing-rings 2 of the main frame and having a pulley 25 thereon, by means of which the same may be driven from any suitable source of power. Pivotally
 20 connected to the drive-shaft 23 at opposite ends of the machine are the links or arms 26, and in the upper ends of said arms is loosely mounted a shaft 27. Pivoted loosely to the shaft 27 are the arms or rods 28, which
 25 are pivoted to the shaft 19 of the rotary cleaning device 18. The shaft 27 is driven from the main shaft 23 by means of a belt 29, which passes around a drum or pulley 30 on the shaft 23 and a corresponding drum or pulley
 30 31 on the shaft 27. The pulley 31, however, is smaller than the pulley 30, so that the shaft 27 is driven at a higher rate of speed than the shaft 23. The rotary motion of the shaft 27 is transmitted to the shaft 19 of the rotary
 35 cleaning device 18 by means of the belt 32, which passes around a drum or pulley 33 on the shaft 27 and a drum or pulley 34 on the shaft 19. The pulley 34 is of smaller diameter than the pulley 33, as a result of which
 40 the shaft 19 is driven at a higher rate of speed than the shaft 27. The connections just described constitute the means whereby the power of the drive-shaft 23 is transmitted to the rotary cleaning device 18 for the purpose
 45 of rotating the latter. To provide for the bodily or traveling movement of the rotary cleaning device 18, I employ a cam-shaft 35, mounted in an arm of the bracket 24, heretofore referred to, and provided with triangular
 50 cams 36, adapted to engage the lower sides of the rods or arms 28. The shaft 35 is connected with and driven from the shaft 23 by means of the gear 37 on the shaft 23 and the gear 38 on the shaft 35. As the gear 37
 55 is smaller than the gear 38, the cam-shaft 35 will be driven at a lower rate of speed than the shaft 23. I have stated that the cams 36 are triangular. By this I mean that each of said cams is provided with a curved sur-
 60 face 39, which is concentric with the shaft 35, and with two curved surfaces 40, leading thereto. During the rotation of the shaft 35 the arms 28, to which the shaft 19 of the rotary cleaning device is connected, are raised
 65 and lowered. When the surfaces 39 of the cams 36 are in engagement with the arms or rods 28, the free ends of said arms or rods or

those to which the shaft 19 is connected will be at their highest point, and they will remain at this point during the whole time that the
 70 cam-surface 39 is in contact therewith. During this interval the reel 6, carrying the filtering-frames 8, will be rotated, so as to bring another set of filtering frames or chambers
 75 opposite the cut-off or dead-air chamber 15. This intermittent movement of the reel 6 is imparted by means of the pawls 41, whose hooked ends or engaging portions 42 are
 80 adapted to engage the ratchet-teeth 43 on the hubs 5 of said reel. The ratchet-teeth 43 correspond in number with the number of the filtering-frames 8 and are so disposed that when the pawls 41 are actuated the reel 6 will
 85 be moved the distance of the space between two filtering-frames to bring a different set of said filtering-frames opposite the cut-off or dead-air chamber 15. The ends of the pawls
 90 41, opposite the hooks 42 thereon, are each recurved to form a shoulder or abutment 44 and bent back upon themselves to form a flange or engaging portion 45. This recurved
 95 and bent end of each of the pawls 41 surrounds the shaft 35, and said shaft has secured to it adjacent to each of said pawls a disk 46, provided with an eccentric-pin 47. During the rotation of the shaft 35 in the di-
 100 rection of the arrow shown in Fig. 1 the pin 47 on each of the disks 46 is first brought into engagement with the shoulder 44 on each of the pawls 41, which action moves said pawls
 105 to the right, so as to cause a corresponding movement to be imparted to the reel 6. As soon as said pawls have reached the limits of their movements in one direction they rest
 110 for a short period of time upon the shaft 35, while the pins 47 move around to a position where they engage the flanges 45 on each of said pawls and move said pawls to the rear, so that they are in position to engage the next
 115 ratchet-tooth 43, as will be readily understood. During one complete revolution of the shaft 35, therefore, the rotary cleaning device 18 is raised and lowered, so as to traverse the entire
 120 length of the space between the two adjacent filtering-frames 8, which are in communication with the cut-off chamber 15, and while said cleaning device 18 is held out beyond the periphery of the reel 6 said reel is moved, so as to bring a second set of filtering-frames 8 opposite the cut-off chamber 15 ready
 125 for the next operation of the cleaner 18.

The rotary conveyer 17 in the cut-off chamber 15 is driven from the main shaft 23 by means of a belt 48.

In operation power is applied to the main
 125 driving-shaft 23 through the pulley 25 thereon from any suitable source. The rotation of the drive-shaft 23 through the belts 29 and 32 causes a corresponding rotation of the shafts 27 and 19 at a greatly-accelerated rate
 130 of speed. At the same time the shaft 35 is rotated in the opposite direction at a slower rate of speed. The rotation of the shaft 23 therefore causes the rapid rotation of the ro-

tary cleaner 18. The rotation of the shaft 35, which is driven from the shaft 23, causes an intermittent rotation of the reel 6 and also causes a bodily vertical movement to be imparted to the rotary cleaning device 18 while the reel 6 is at rest. During the bodily movement of the rotary cleaner 18 the same is caused to traverse the space between the two filtering-frames, which are for the time being in communication with the cut-off or dead-air chamber 15. The said cleaner therefore acts upon the entire surface of the filtering-walls of said frames throughout their entire length. As said cleaner is rapidly rotated the flexible blades 20 thereof are caused to strike against and thereby agitate said filtering-walls. This agitation causes the dislodgment of the dust from said filtering-walls and the deposition of the same in the cut-off chamber 15, from which it is discharged by means of the rotary conveyer 17. The blades 20 are unitedly of greater length than the space between the two adjacent filtering-frames upon which said blades are acting, and a brushing action upon the exterior surface of the filtering-walls of said frames is imparted by said blades 20 in addition to the agitation of said walls. Furthermore, a blast or current of air is produced by the rapid rotation of the cleaner 18, which passes from the exterior to the interior of the filtering-walls acted upon and tends to more completely dislodge the dust from the inner surfaces of said walls. It will thus be seen that each of the filtering-walls of the different filtering-frames in the reel 6 is successively cleaned by the traveling rotary cleaner 18 and that said cleaner acts not only to agitate said filtering-walls, but to brush the exterior surface thereof and to force a reverse blast of air therethrough.

I have described herein but one embodiment of my invention, and as it is obvious that many minor changes in the construction and arrangement of the different parts may be made without departing from the nature or spirit of the invention I desire it to be distinctly understood that I do not limit myself to the specific details shown except as defined by the appended claims.

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 the filtering-walls thereof having plane surfaces, of a rotary cleaner, means for automatically rotating and bodily moving said cleaner, and means for causing the bodily movement of said cleaner in a straight line.

2. In a dust-collector, the combination with the filtering-walls thereof having plane surfaces, of a rotary cleaner, common operating means for automatically rotating and bodily moving said cleaner, and means for causing the bodily movement of said cleaner in a straight line.

3. In a dust-collector, the combination with two contiguous filtering-walls, of a rotary

cleaner provided with blades designed to agitate said filtering-walls, means for automatically rotating and bodily moving said cleaner in contact with said walls and means for causing the bodily movement of said cleaner in a straight line.

4. In a dust-collector, the combination with an intermittently-rotatable reel, radially-arranged filtering-frames thereon each having straight walls parallel to the adjacent walls of the contiguous frames, the said walls being separated from each other and communicating with a central drum into which dust-laden air is introduced, and a cut-off chamber communicating with a plurality of said frames, of a rotary cleaner for the walls of said frames which are in communication with said cut-off chamber, means for automatically rotating and bodily moving said cleaner, and means for causing the bodily movement of said cleaner in a straight line.

5. In a dust-collector, the combination with an intermittently-rotatable reel, radially-arranged filtering-frames thereon separated from each other and communicating with a central drum into which dust-laden air is introduced, and a cut-off chamber communicating with a plurality of said frames, of a rotary cleaner for the filtering-walls of the frames which are in communication with said cut-off chamber, means for automatically rotating and bodily moving said cleaner back and forth between said frames in contact with said walls during the periods of rest of said reel, and guides for causing the bodily movement of said cleaner in a straight line.

6. In a dust-collector, the combination with an intermittently-rotatable reel, radially-arranged filtering-frames therein, separated from each other and communicating with a central drum into which dust-laden air is introduced, and a cut-off chamber communicating with a plurality of said frames, of a rotary cleaner for the walls of the frames which are in communication with said cut-off chamber, the said cleaner comprising a shaft and flexible blades thereon, pivotally-mounted arms in which the ends of said shaft are mounted to turn, a movable support in which said arms are pivoted, a cam-shaft having cams thereon adapted to engage said arms for raising and lowering said cleaner, and a drive-shaft for rotating said cleaner and for rotating said cam-shaft, as and for the purpose set forth.

7. In a dust-collector, the combination with an intermittently-rotatable reel, radially-arranged filtering-frames therein, separated from each other and communicating with a central drum into which dust-laden air is introduced, and a cut-off chamber communicating with a plurality of said frames, of a rotary cleaner for the walls of the frames which are in communication with said cut-off chamber, the said cleaner comprising a shaft and flexible blades thereon, pivotally-mounted arms in which the ends of said shaft are

mounted to turn, a movable support in which said arms are pivoted, a cam-shaft having cams thereon adapted to engage said arms for raising and lowering said cleaner, connections between said cam-shaft and said reel for imparting intermittent movement to the latter, and a drive-shaft for rotating said cleaner and said cam-shaft.

8. In a dust-collector, the combination with a reel, radially-arranged filtering-frames therein whose inner ends communicate with a central drum into which dust-laden air is introduced, and a cut-off chamber communicating with a plurality of said filtering-frames, of a rotary cleaner for removing the dust from the walls of the filtering-frames which are in communication with said cut-off chamber, the said cleaner comprising a shaft and flexible blades thereon, pivotally-mounted arms in which the ends of said shaft are mounted to turn, a movable support in which said arms are pivoted, a cam-shaft provided with cams adapted to engage said arms for moving said cleaner back and forth in the space between the filtering-frames which are in communication with said cut-off chamber, and to a point beyond the periphery of said reel, a ratchet on said reel, a pawl cooperating with said ratchet for imparting an intermittent movement to said reel, the said pawl being connected with and operated by said cam-shaft, and a drive-shaft for rotating said cleaner and said cam-shaft.

9. In a dust-collector, the combination with a reel, a series of radially-arranged filtering-frames therein whose inner ends communicate with a central drum into which dust-laden air is introduced, and a cut-off chamber communicating with a plurality of said frames, of fixed guides secured to the main frame at the opposite ends of said reel in line with said cut-off chamber and provided with

elongated slots, a rotary cleaner, comprising a shaft bodily movable and guided in said slots and flexible blades secured to said shaft, a main drive-shaft, links pivoted thereto, a counter-shaft mounted in said links and geared with said drive-shaft, arms or rods pivoted at their opposite ends to said counter-shaft and to the cleaner-shaft, the said cleaner-shaft being rotated from said counter-shaft, a cam-shaft geared with said drive-shaft and having cams thereon adapted to engage said arms or rods for moving said cleaner back and forth in the space between the filtering-frames which are in communication with said cut-off chamber and to a point beyond the periphery of said reel, and means for imparting an intermittent movement to said reel, the same being thrown into operation when said cleaner is at a point beyond the periphery of said reel and said cleaner being moved back and forth during the periods of rest of said reel.

10. In a dust-collector, the combination with a reel having ratchet-teeth thereon, of means for imparting an intermittent movement to said reel, the same comprising a rotary shaft, a disk thereon, a pin secured eccentrically to said disk, and a pawl having one end hooked and adapted to engage said ratchet-teeth, and its other end recurved to form a shoulder and bent back upon itself to form a flange, said shoulder and flange being adapted to be engaged by said pin for moving said pawl in opposite directions, 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:

ALBERT P. WEINGARTNER,
DENNIS PARKS.