

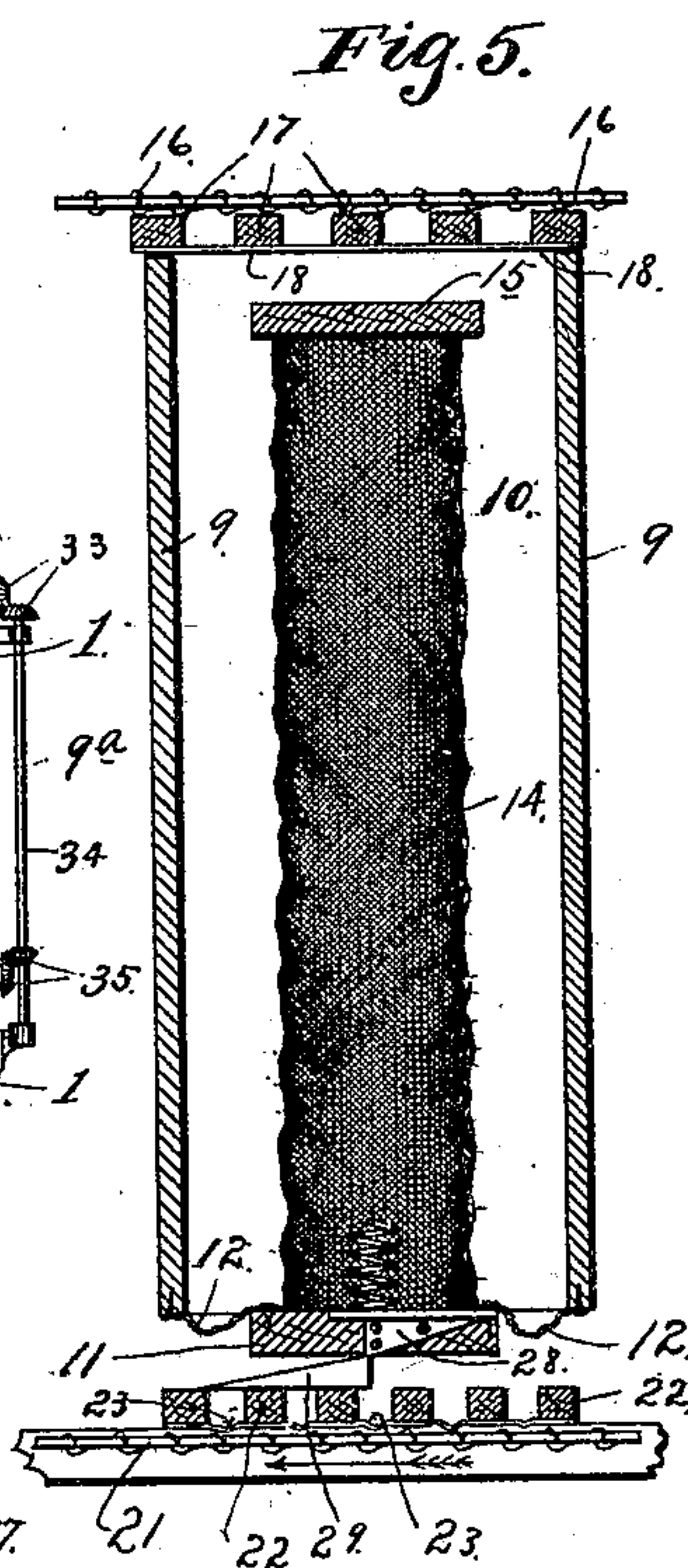
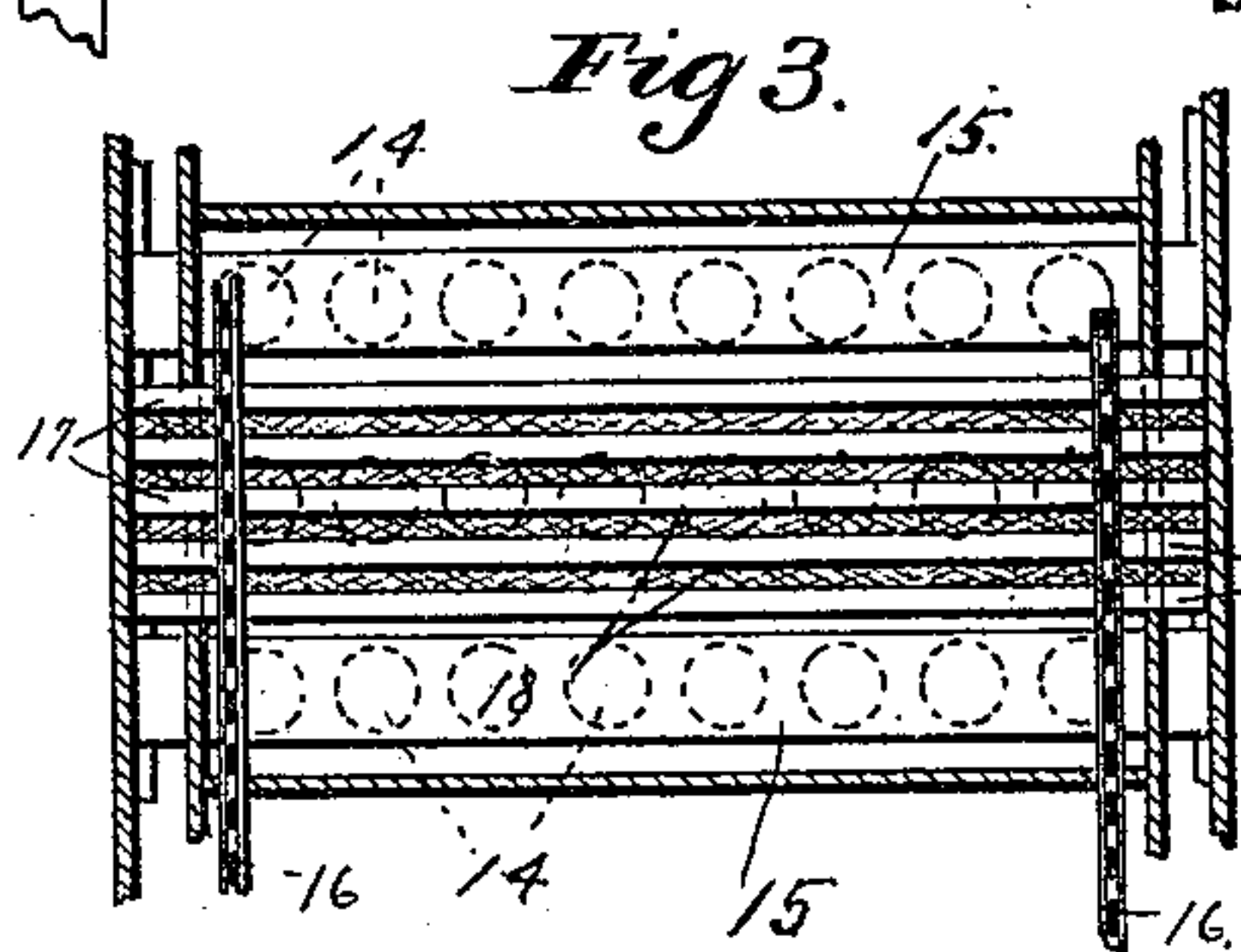
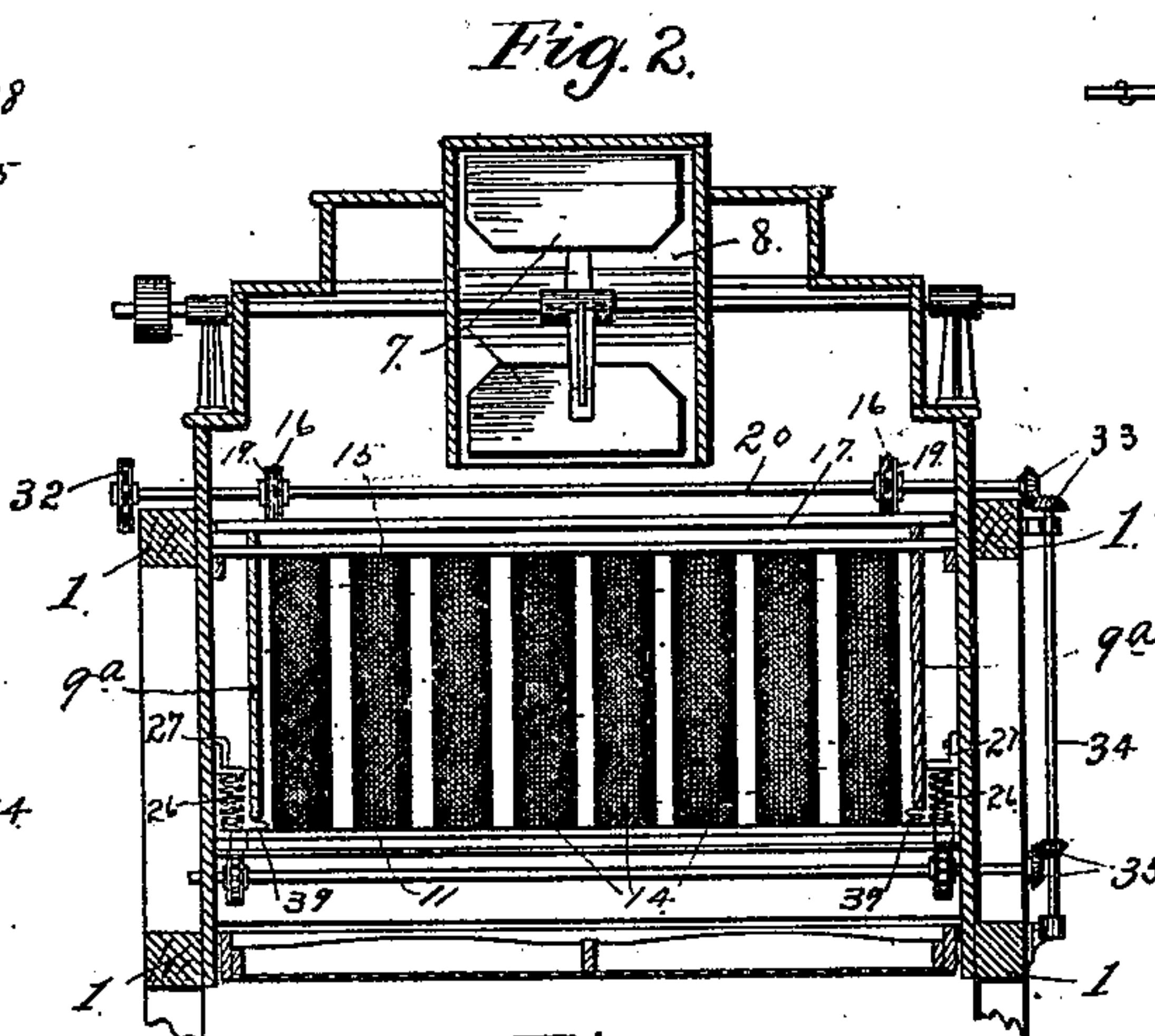
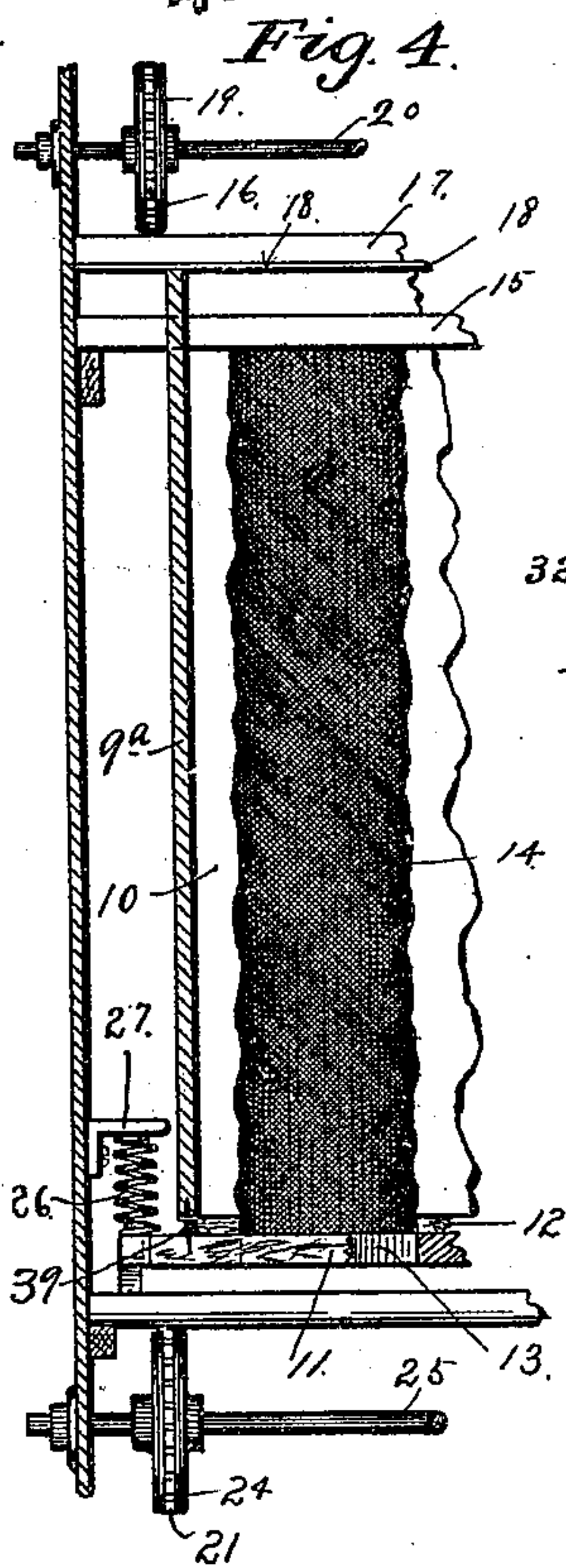
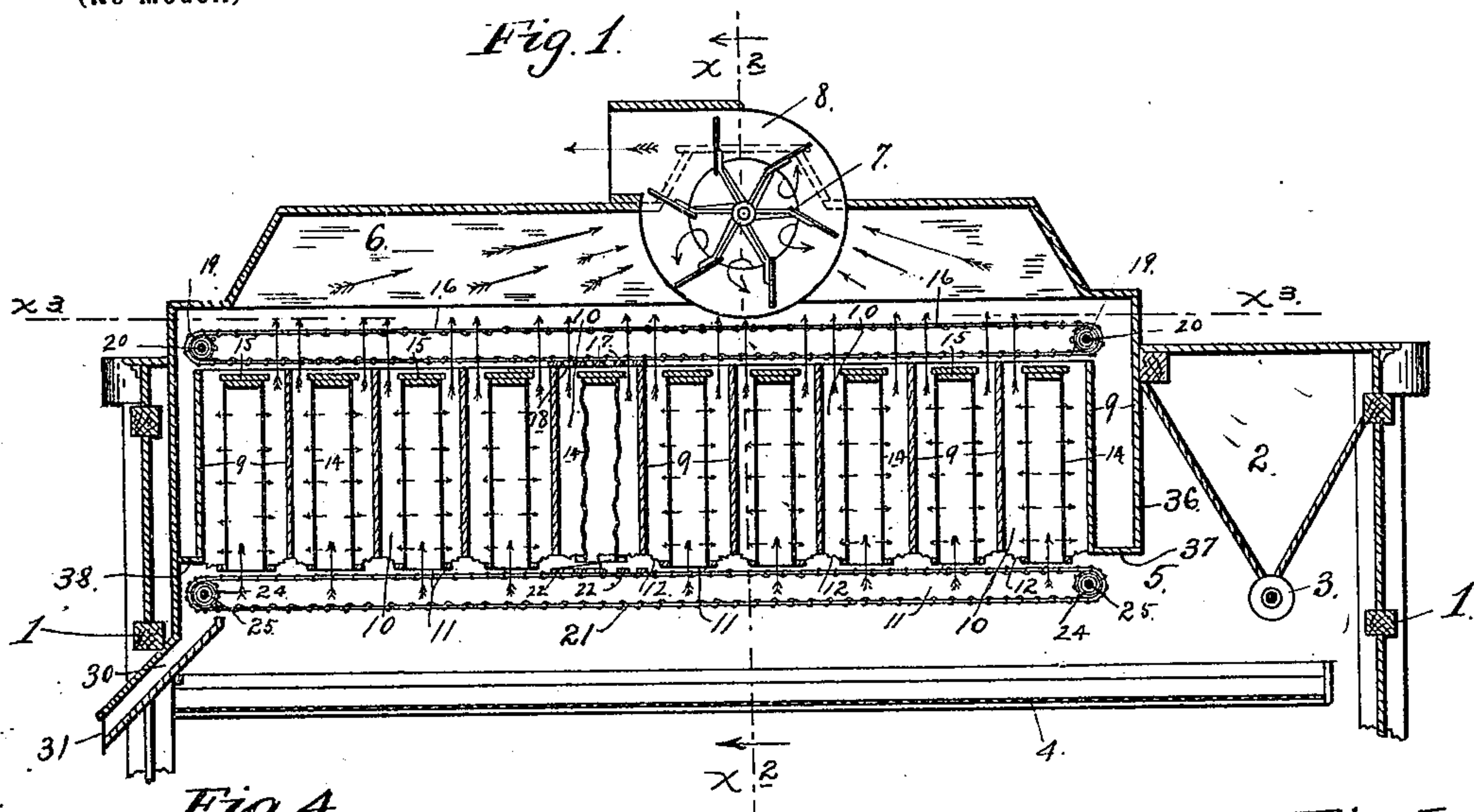
No. 641,681.

Patented Jan. 23, 1900.

E. R. DRAVER.
DUST COLLECTOR.

(Application filed Nov. 5, 1896.)

(No Model.)



Witnesses.

C. F. Kilgore

R. D. Merchant.

Inventor
Emil R. Draver

By his Attorney

Jas. F. Williamson

UNITED STATES PATENT OFFICE.

EMIL R. DRAVER, OF STILLWATER, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO MARIE L. DRAVER, OF SAME PLACE.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 641,681, dated January 23, 1900.

Application filed November 5, 1896. Serial No. 611,185. (No model.)

To all whom it may concern:

Be it known that I, EMIL R. DRAVER, a citizen of the United States, residing at Stillwater, in the county of Washington and State of Minnesota, have invented certain new and useful Improvements in Dust-Collectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to dust-collectors of that type known to the trade as "tubular" dust-collectors, and has for its object to improve the construction with a view of increased efficiency.

To this end my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

Like notations refer to like parts throughout the several views.

Figure 1 is a central longitudinal section through my improved machine as organized for use as part or in connection with a middlings-purifier, with some parts broken away and others removed. Fig. 2 is a vertical cross-section on the line $x^2 x^2$ of Fig. 1. Fig. 3 is a plan view of some of the parts shown in Figs. 1 and 2, with some portions of the parts shown in horizontal section on line $x^3 x^3$ of Fig. 1. Fig. 4 is a detail of some of the parts shown in Fig. 2 on the same section-line as Fig. 2, but on a larger scale, with some portions broken away; and Fig. 5 is a detail in vertical section, taken longitudinally through a portion of the machine, on a larger scale than Figs. 1, 2, and 3, for showing the relation of the traveling parts to one of the collecting-tubes and the cell within which the same is mounted.

The numeral 1 represents the main frame or casing of the middlings-purifier. The numeral 2 represents the feed-hopper, 3 the feed-roll, and 4 one of the sieves of the purifier, all of which parts are of the ordinary standard construction.

The numeral 5 represents the main section of the closed or tight wall chamber above the sieves of the purifier.

The numeral 6 represents the clean-air chamber at the top of the machine.

The numerals 7 and 8 represent, respectively, the fan and fan-case, shown as mounted in the top wall of the machine, and which fan is of the proper construction to operate as a suction-fan for producing forced currents of air through the machine.

The numeral 9 represents a series of transverse partitions connected by end pieces 9^a, which partitions 9 are spaced apart from each other at suitable distances to form a series of cells 10, supported from the side walls of the machine. The said cells 10 are open at their upper ends, but are closed at their lower ends by flexible bottoms composed of a central board or plate 11 and strips 12, of canvas or other flexible material, connecting the said board 11 to the lower ends of the partitions 9. The said bottom board 11 is perforated or provided with holes 13 of the proper size to receive the lower ends of a series of collecting-tubes 14, which are mounted in the cells 10. The said tubes 14 are made of flannel or other suitable material adapted to serve as a collecting-surface and are closed at their upper ends by a common head or cap board or plate 15, fixed at its ends to the side walls of the chamber 5 and serving to suspend the collecting-tubes 14 in proper working positions. The lower ends of the tubes 14 are open and are secured to the walls of the holes 13 in the bottom plate 11. The canvas or flexible sections 12 of the cell-bottoms are made sufficiently slack to permit an up-and-down movement of the bottom plate 11 for "rapping" or shaking the tubes by means which will be presently noted.

Directly over the entire series of cells 10 are mounted chains 16, provided at one or more points with cross-slats 17, connected by canvas or other imperforate flexible material 18 for coöperation as a traveling cut-off device to close the upper ends of the cells 10 one after the other in succession. The flexible body 18 is preferably applied to the outer faces of the slat 17, as shown best in Fig. 5, so as to prevent end openings between the slats 17. The chains 16 are of the proper construction for coöperation with sprockets 19 on transverse supporting-shafts 20, one of which receives motion in any suitable way. Below the series of cells 10 are mounted corresponding chains 21, which have attached

thereto at the proper point transverse slats 22 and a body of canvas 23 or other flexible material, which parts cooperate to form a traveling dust-receiver and partial cut-off device for the lower ends of the collecting-tubes 14. The said sprocket-chains 21 are mounted on sprockets 24, fixed to transverse shafts 25, one of which receives motion in the proper direction from any suitable source. The so-called "traveling cut-off," which is movable over the top of the series of cells 10, and the so-called "traveling dust-receiver," which moves underneath the series of cells, are mounted to travel together or so that the cut-off device will be directly over and will span the top of any given cell 10 when the dust-receiver is directly underneath and spanning the lower end of the cell.

The bottom boards or plates 11, to which the lower or open ends of the collecting-tubes 14 are secured, extend outward beyond the end walls of the cells 10 and are subject, as shown, to the action of springs 26, reacting between the upper faces of said boards or plates, and angle-brackets 27, fixed to the side walls of the chamber 5, as best shown in Fig. 4. The said plates or bottom boards 11 are also provided on the under surfaces of their outer ends with cam-blocks 28 for cooperation with reversely-set cam-blocks 29, carried by the dust-receiver, as best shown in Figs. 4 and 5. The delivery end of the traveling dust-receiver overreaches the mouth or upper end of an off-leading spout or chute 30 for conducting away the dust delivered thereto by said traveling dust-receiver, as shown in Fig. 1. The lower end of the chute 30 is shown as provided with a gravity-gate 31.

It has not been deemed necessary for the purpose of this case to show all the driving connections for all the movable parts of the purifier; but the driving connections for imparting the required motion to the traveling cut-off device and the traveling dust-receiver are obvious from an inspection of Fig. 2. One of the sprocket-shafts 20, which support and drive the traveling cut-off device, is shown as provided at one end with a sprocket or pulley 32, which receives motion from some movable part of the purifier through any suitable connections. (Not shown.) At its opposite end the said driven member of said shafts 20 connects by a pair of miter-gears 33 with a vertical shaft 34, which in turn connects by another pair of miter-gears 35 with one member of the sprocket-shafts 25, which support and drive the traveling dust-receiver. Through these connections the traveling cut-off device, movable over the top of the cells 10, and the traveling dust-receiver, movable under the lower ends of the said cells, will be driven together in the proper directions for the desired cooperation of the cut-off device and the dust-receiver. The said traveling motion of the said cut-off device and dust-receiver is a very slow one.

Having regard now to the action, it is ob-

vious from an inspection of the drawings that all of the cells 10 and all the collecting-tubes 14 will be constantly subject to the suction from the fan 7, except the particular cell 10 and series of tubes 14 therein which at the given time are subject to the action of the cut-off device and the dust-receiver. In this particular cell and the collecting-tubes suspended therein the forced currents of air will be cut off. Otherwise stated, whenever the traveling cut-off device spans the top of any given cell 10 the forced draft therethrough will be cut off, thereby leaving the collecting-tubes 14 in that particular cell suspended in a comparatively dead-air space. At the same time that the given cell is thus covered at the top the dust-receiver will span the lower end of the cell, and at the proper time the cam-blocks 28 and 29 and the cooperating springs 26 will impart a rapping motion to the tubes, thereby freeing the dust from within the tubes and permitting the same to drop onto the canvas 23 of the dust-receiver between the slats 22 thereof. As this rapping or shaking of the collecting-tubes occurs in a dead-air space or when the suction is cut off, the same will be effective to free the dust and clean the tube.

Of course it will be understood that many of the details of the construction might be changed without departing from the spirit of my invention. It is obvious, for example, that the springs 26 might be dispensed with and the gravity of the parts alone be relied upon to give the desired drop and jar to the collecting-tubes. Many other changes will readily suggest themselves to any one skilled in this line of machines.

It should perhaps be noted that while the suction-fan 7 is shown as mounted for delivering the clean air out into the room the same might be mounted, with proper piping, for returning the clean air to the proper point in the middlings-purifier. It should also be noted that while the collectors 14 have been shown as of tubular form they might be of any other desired form. The tubular form, with the tubes of small diameter, is desirable, because the largest possible collecting-surface is thereby rendered available. The word "tubes," therefore, as herein used is intended to cover and include any and all forms of pockets or collectors made up of flexible fabric of the proper material for catching the dust, while permitting the air to pass therethrough. It should also have been noted that provision is made for preventing the air from passing from the main chamber 5 into the clean-air chamber 6 without going through the collecting tubes and cells, which provision is made, as shown, by plates or walls 36, 37, and 38, as best shown in Fig. 1. The said parts 36 and 37 close the passage which would otherwise exist at the head of the series of cells outward of the traveling cut-off device and dust-receiver, while the part 38 serves the same function at the foot of the series of

cells. Any other suitable means of support might be used, of course, for the same purpose. It should also have been noted that the end walls 9^a of the cells 10 are connected at their lower ends to the bottom plates 11 of said cells by canvas 39 or other suitable flexible material which will permit the up-and-down movement of said bottom plates and nevertheless keep the cell closed at its bottom, with the exception of the open lower ends of the collecting-tubes.

It may be here further stated as an obvious modification that the lower portion or mouth of the collecting-tube might itself be expanded and secured to the walls of the cell. Hence it will be understood that the statement in the specification and in certain of the claims that the lower end of the cell is closed is used in the qualified sense that it is closed except for the passage through the open end of the collecting tube or tubes, as the case may be. It will also be understood that the statement that the collecting-tubes are closed at one end does not necessarily imply that they are closed by means of a board or air-proof material, as shown in the drawings, but that the said expression is used in a sense broad enough to include a tube which was closed by the same material of which the tube is formed.

It will be understood that as the tubes are agitated the cells in which they are contained remain stationary, and thus diminish the agitation of the air therein.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a dust-collector, the combination with a casing having dust-receiving and clean-air chambers, said chambers being connected together only through the intermediacy of a series of stationary cells and dust-collecting tubes arranged in said cells, of means for inducing a forced circulation of air from the dust-chamber into the tubes and thence through the cells into the clean-air chamber, means for intermitting the passage of air through the tubes and cells, and means for jarring or shaking the tubes during the intermission in the air-current therethrough.

2. In a dust-collector, the combination with a casing having dust-receiving and clean-air chambers, said chambers being connected together only through the intermediacy of a series of stationary cells and dust-collecting tubes arranged in said cells, of a suction-fan located in the clean-air chamber and operating to draw air from the dust-chamber through the tubes and cells into its own chamber, means for intermittingly closing the cells and tubes against the passage of air, and means for jarring or shaking the tubes during the intermission in the air-passage to shake off the dust collected on the tubes.

3. In a dust-collector, the combination with a casing having dust-receiving and clean-air chambers, said chambers being connected to-

gether only through the intermediacy of a series of stationary cells having dust-collecting tubes arranged therein, of means for inducing a forced circulation of air from the dust-chamber through the tubes and cells into the clean-air chamber, a traveling closure adapted to intermittingly close the cells of said series in succession, and a shaker traveling in unison with said closure and operating to successively jar the tubes of the closed cells and shake off the dust collected thereon while said cells are closed.

4. In a dust-collector, the combination with a casing having dust-receiving and clean-air chambers, said chambers being connected together only through the intermediacy of a series of cells having dust-collecting tubes arranged therein, of means for inducing a forced circulation of air from the dust-chamber to the clean-air chamber through the tubes and cells, means for intermitting the passage of the air through certain of said cells while the current is uninterrupted in others, means for jarring the collecting-tubes in those cells only where the air is cut off, so as to shake off the dust in a dead-air space, and a dust-receiver on which the dust is deposited by gravity.

5. In a dust-collector, the combination with a series of cells having air-proof walls, which cells are normally open at one end and closed at the other, of collecting tubes or pockets in said cells closed at one end and mounted with their open ends forming passages through the closed ends of said cells, means for forcing air through said tubes and cells, a traveling cut-off device mounted to move over the open ends of said series of cells, for cutting off the forced circulation of air therethrough, in succession, and a traveling dust-receiver mounted to move under the open ends of said tubes, for coöperation with said cut-off device, substantially as described.

6. In a dust-collector, the combination with a series of cells having air-proof walls, which cells are normally open at their upper ends and are closed at their lower ends by flexible bottoms, of collecting tubes or pockets in said cells closed at their upper ends and mounted with their open lower ends forming passages through said flexible bottoms of said cells and secured thereto, means for forcing air through said tubes and cells, a traveling cut-off device mounted to move over the upper or open ends of said series of cells, a traveling dust-receiver mounted to move under the open ends of said collecting-tubes, and means carried by said traveling dust-receiver for action on the flexible bottoms of said cells to rap or jar the collecting-tubes, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EMIL R. DRAVER.

Witnesses:

JAS. F. WILLIAMSON,
C. F. KILGORE.