

(No Model.)

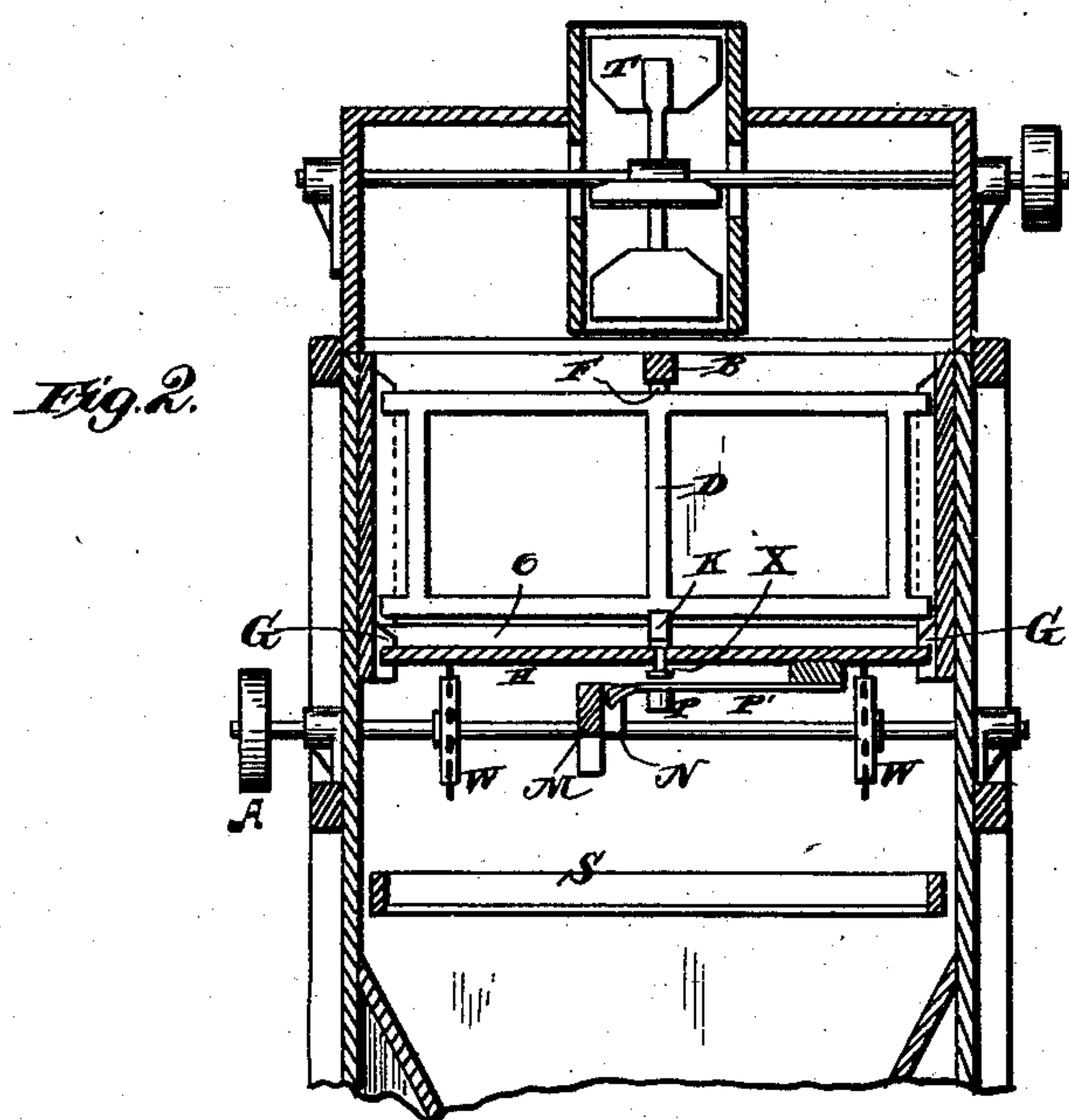
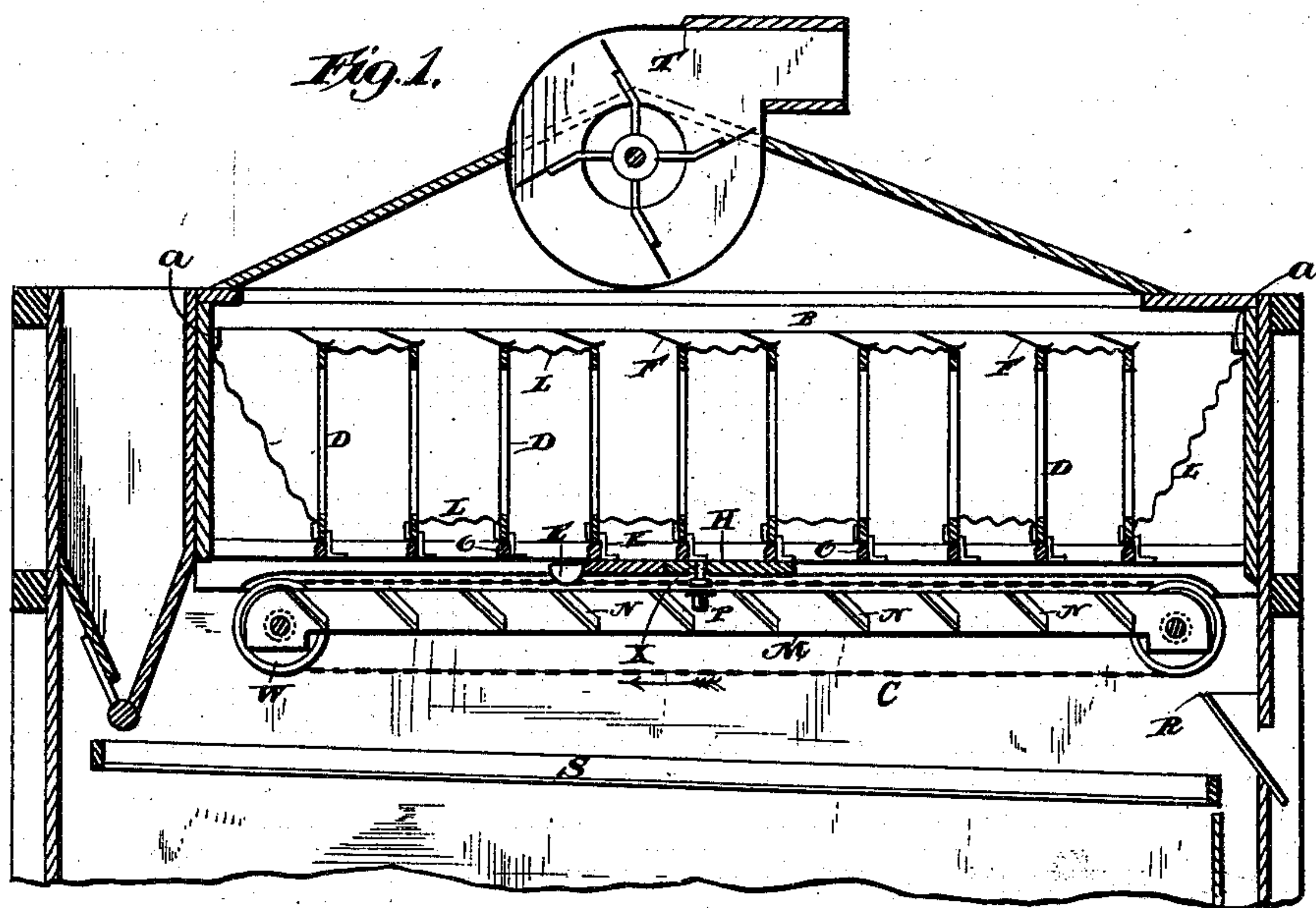
2 Sheets—Sheet 1.

J. McDANIEL.

DUST CATCHING APPARATUS FOR MIDDLEINGS PURIFIERS.

No. 259,888.

Patented June 20, 1882.



Witnesses.

Robert Everett.
Vinton Coombs

Inventor.

James McDaniel.

By James L. Norris.
Atty

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Fig. 3.

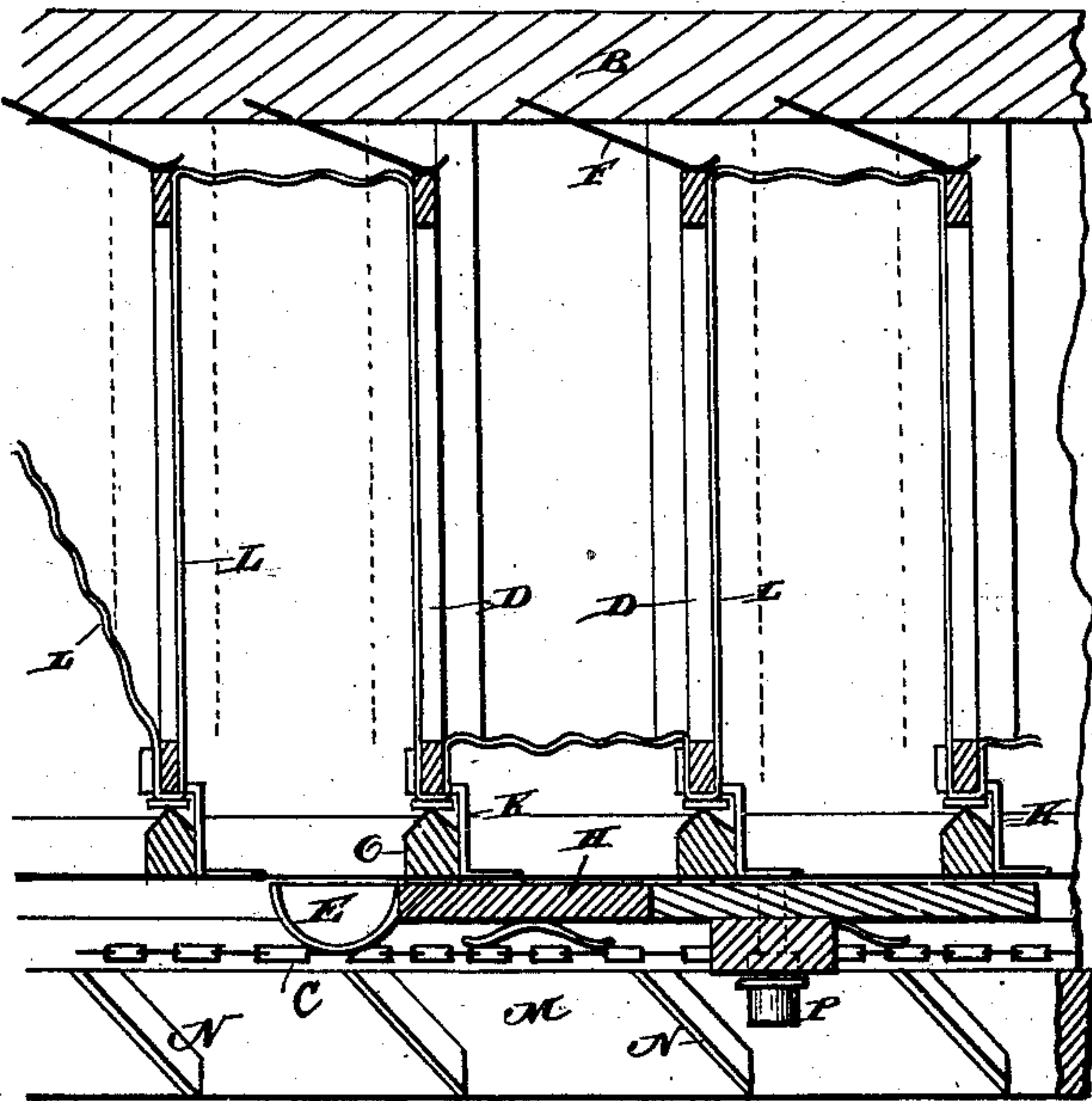


Fig. 4.

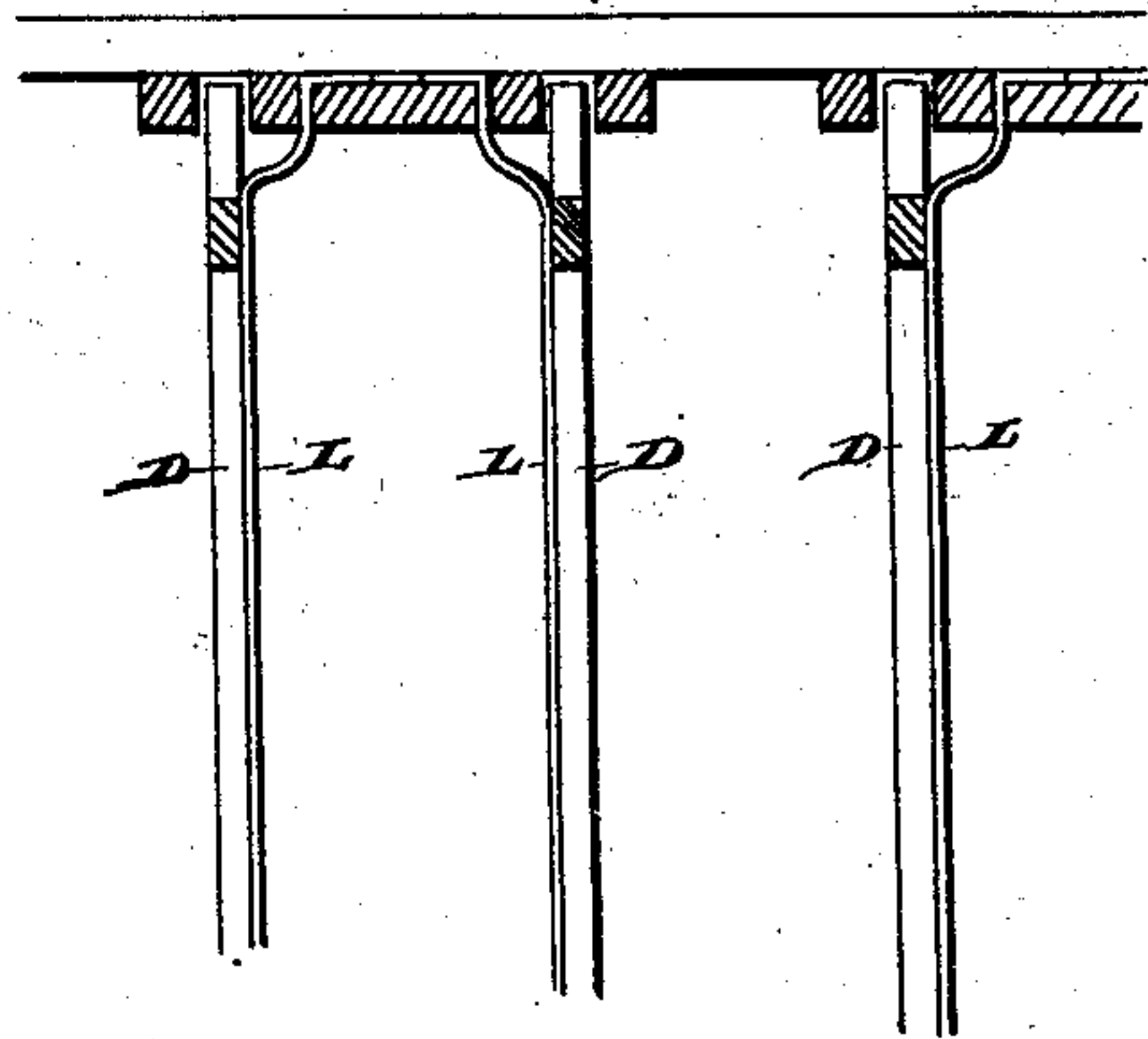
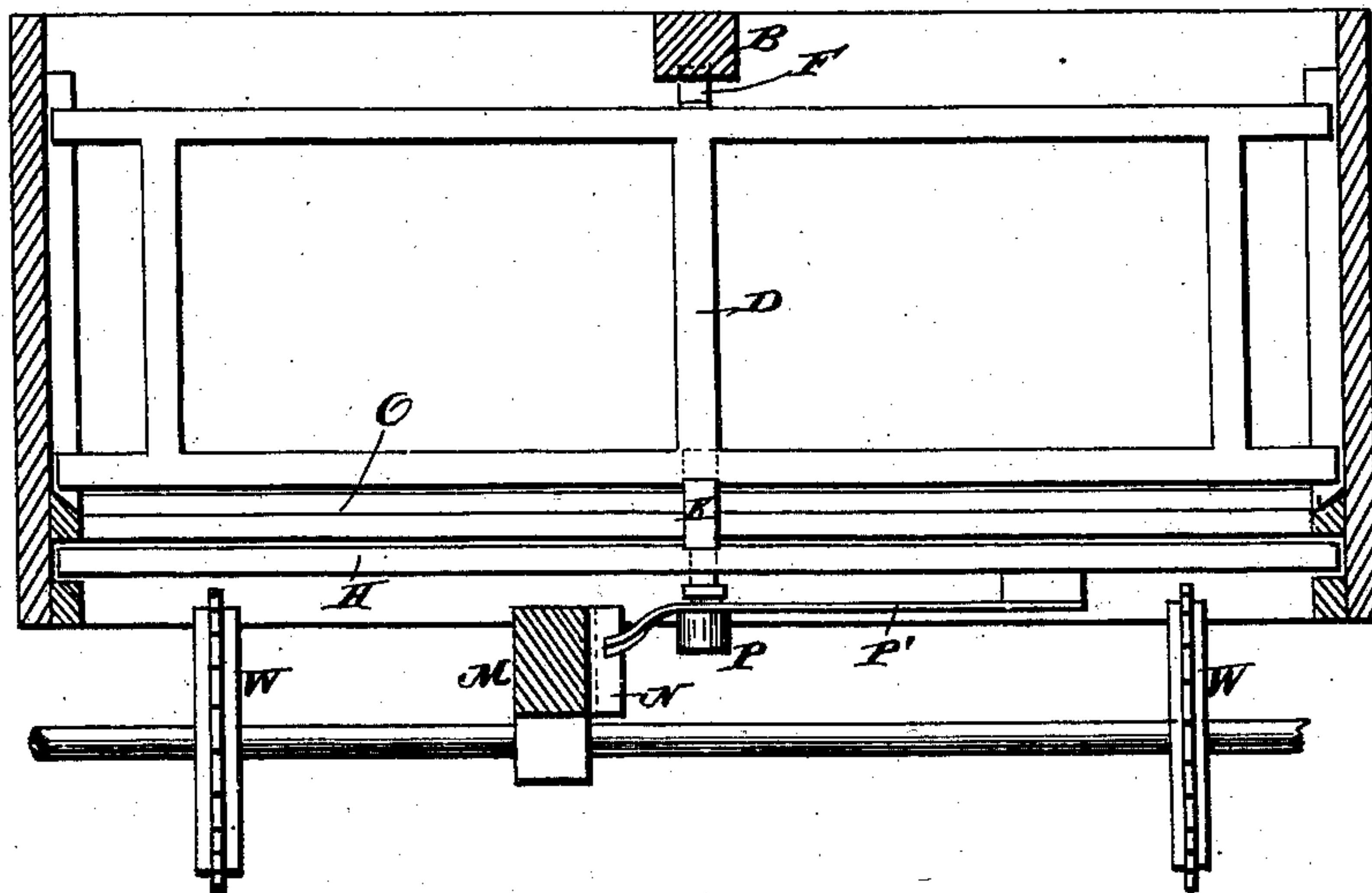


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES McDANIEL, OF MINNEAPOLIS, MINNESOTA.

DUST-CATCHING APPARATUS FOR MIDDLEINGS-PURIFIERS.

SPECIFICATION forming part of Letters Patent No. 259,888, dated June 20, 1882.

Application filed April 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES McDANIEL, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented new and useful Improvements in Dust-Catching Apparatus for Middlings-Purifiers, of which the following is a specification.

My invention relates to an improved dust-catching apparatus for middlings-purifiers, bolting-chests, and similar machines, the object being to prevent accumulations of dust within the machine or mill, thereby avoiding liability of explosions and other inconveniences; and the invention consists in a dust-catching apparatus comprising a series of vertically-movable frames or diaphragms, to which is attached a continuous dust-cloth that is connected with the sides and ends of the machine, and so arranged that while closely attached to said frames they may be jarred or moved independently of each other for the purpose of detaching the dust deposited upon the cloth, said dust being caught upon a traveling apron, from which it is automatically scraped into a trough attached thereto, and thence discharged at intervals into a pocket leading to the outer side of the machine.

The invention also consists in certain peculiarities in the construction and arrangement of parts, as hereinafter more fully set forth.

In the accompanying drawings, which illustrate my invention, Figure 1 is a longitudinal section, showing the application of my invention to an ordinary sieve-purifier, my improved dust-catching apparatus being arranged between the fan and shaker. Fig. 2 is a transverse section of the same. Fig. 3 is an enlarged longitudinal section of the dust-catching apparatus, showing, by means of dotted lines, where the edges of the dust-cloth come in contact with the sides of the machine. Fig. 4 is a sectional top view, showing the manner of fastening the dust-cloth to the sides of the machine, and also the cleats for holding in position the diaphragms to which said dust-cloth is attached. Fig. 5 is an enlarged transverse section of the dust-catching apparatus and means for operating the same.

Like letters are used to designate the same parts throughout the several views.

The dust-catching apparatus illustrated in these drawings consists of a series of vertically-movable diaphragms or frames, D, that are preferably placed within the machine in a vertical position above the sieve or shaker-frame S, and between it and the fan T an endless dust-cloth, L, that is connected with the opposite ends and sides of the machine, being attached to the said frame in the manner hereinafter described, and an apron, H, to which is attached a trough, E, and a spring-knocker, P, being arranged beneath said diaphragms and dust-cloth, and provided with suitable actuating mechanism, whereby the frames or diaphragms are jarred for the purpose of removing the dust and conveying it from the machine when required. These devices may be placed at any point in the open space above the sieve, between it and the fan, or may be placed on top of the machine, or between said machine and its fan, and may be readily operated in connection with any purifier in which the middlings are cleaned during the process of milling by means of or with the assistance of an air current or currents.

The diaphragms or frames D are arranged transversely at suitable intervals, and rest in a vertical position upon the beveled surfaces of stationary bars O, the lower ends of the frames being provided centrally or at suitable points with knee-pieces K, that are bolted to said frames. By means of these knee-pieces the frames D are raised or moved vertically, as will be hereinafter described.

Above the frames D is a longitudinal bar, B, to which are attached the counter-springs F, that force the frames back upon the bars O when said frames have been raised by the mechanism employed for jarring or moving them.

The endless dust-cloth L, which is attached to the frames D, may be composed of any material best adapted to give free vent to the air and at the same time prevent the passage of dust to the fan. This cloth is connected with the ends and sides of the machine, and is so attached to the frames D as to close the spaces between the same at the top and bottom alternately, and allow a free upward movement of the frames independent of each other.

By referring to Figs. 1 and 3 it will be seen

that the cloth L is arranged to run loosely from the head of the machine to and under the first or nearest frame D, being cleated to the lower edge of the frame, thence drawn tightly along the frame, and covering the same, to its top, where it is again cleated. It is then passed loosely to the top of the next or second frame, cleated, and drawn tightly to its bottom, thence under said second frame and again cleated and passed loosely to the lower end of the next or third frame, and so on, being thus arranged to cover said frames and alternately close the spaces between the same at top and bottom. The cloth is also drawn tightly along each frame, from side to side, and is secured to the upright pieces of the frame, as shown in Fig. 4. Having been attached to each frame in the manner described, the cloth, after being passed under the last frame, is run loosely to the ends of the machine-frame and turned under and cleated thereto, as shown at *a* in Fig. 1. It will be seen that by this manner of arranging the endless dust-cloth the frames to which it is attached may be moved vertically and independently of each other, as may be required. This results from the cloth being left slack on all sides and between the frames.

Beneath the bars O is an apron, H, that may be made in one or more sections, as desired. This apron is driven by the endless chains C, that are carried by the star-pulleys W, which are mounted upon shafts provided with a driving-pulley, A, as shown in Fig. 2.

To the rear end of the apron H is attached a dust receptacle or trough, E, and to the under side of the apron is attached a spring-knocker, P, having a spring, P', that is adapted to come in contact with the under sides of the inclined planes N, so as to depress the knocker P and cause the same, on the recoil of the spring after passing beneath an inclined plane, to be brought forcibly against a cushion-pin, X, which plays in an opening formed in the apron. This cushion-pin is thus caused to strike against the under side or foot of one of the knee-pieces K, thereby raising the frame D, to which it is attached, the frame being immediately forced downward by the tension of its counter-spring F, so as to come in forcible contact with its supporting-bar O throughout its length. It will be seen that the frame thus receives a jar that causes the dust collected on the attached cloth L to fall upon the apron, whence it is scraped by the bars O into the trough E, that is carried at the rear end of said apron. The inclined planes N are formed upon or attached to a bar, M, which is supported or journaled on the shafts of the star-wheels W in any suitable manner, and said inclined planes are arranged at proper distances beneath the bars O to insure a proper action of the spring-knocker P upon the cushion-pin X, and thereby actuate the frames D in succession.

The operation of the apparatus is as follows: The air-current produced by the fan carries the dust and light particles of bran up-

ward, where they are arrested by the cloth L, attached to the vertical diaphragms or frames D, while the air is permitted to pass through to the mill-room, thus obviating the necessity of employing dust-rooms and blow-spouts. The apron H is caused to move in the direction shown by the arrow in Fig. 1 by means of the wheels or pulleys W and their attached chains. It will be seen that as the apron is carried around by the chains it is caused to pass to the head of the machine and through the cleats G, which are provided on each side for the purpose of holding it in proper position beneath the supports of the diaphragms to which the dust-cloth is attached. When the apron is thus caused to cover the spaces between the head of the machine and the first two diaphragms the air-current is shut off from said spaces and the spring-knocker P has passed under the first inclined plane and strikes against the cushion-pin X, which in turn strikes the foot of the knee-piece and jars the first one of the frames D, at the same time throwing it up against its counter-spring F, which immediately forces it back on the stationary bar O, where it rests. The apron moves on and covers the ends of three adjoining frames, when the second frame is likewise jarred. The air-current being now shut off at the under side of the dust-cloth from the first to the third frames, it will be seen that as the middle one of these frames moves upward the air-space will be greater than when the frame was down, and as the return movement of the frame is quick and sudden from the blow the said frame has received there will be a vibration of the air back through the cloth in the opposite direction from the course of the air-current when the air was being drawn through the cloth, thereby facilitating the action of the knocker in clearing the dust-cloth. The dust thus loosened and detached from the cloth falls on the traveling apron, and as said apron moves along, in the manner before described, the stationary bars O, with which it is brought in contact, will scrape the dust into the trough or receptacle E. After all the frames have thus been acted upon and the attached cloth freed from dust the apron, in turning with the chain at the tail end of the machine, causes the trough to empty its contents into a pocket, R, whence the discharged dust passes to the outside of the machine, the operation being repeated as often as may be necessary.

It will be seen that the manner of attaching the continuous dust-cloth to the vertical frames or diaphragms is such that while said cloth is drawn tightly over each frame it is left slack between them, so that each frame may be moved or jarred separately and independently of the others. The arrangement of the stationary bars upon which the vertical frames are supported is such that they not only serve as supports for said frames, but also act efficiently in scraping the accumulated dust from the traveling apron into its attached trough, besides forming, in connection with the apron, a

positive shut-off against the passage of air-currents. By providing a cushion-pin that is arranged to work through an opening in the apron the knocker and its actuating mechanism may be placed on the under side of the apron in a convenient position, where they are free to operate without interference with other parts. It will also be seen that the employment of counter-springs arranged to act upon the upper ends of the frames, so as to force them down against the drawing action of the fan and upward impulse of the knocker, enables said frames to be constructed of light material without impairing their efficiency and with the advantage of lessening their cost.

What I claim is—

1. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with vertical frames or diaphragms and a continuous dust-cloth attached closely to said frames, with slack portions of cloth intervening, said cloth being so arranged as to close the spaces between the frames alternately at top and bottom, of mechanism for jarring the frames separately, whereby they may be cleaned independent of each other, substantially as described.

2. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with the purifier-frame and vertical diaphragms arranged therein, of a continuous dust-cloth secured to the sides and ends of the purifier-frame and attached closely to the diaphragms, so as to close the spaces between said diaphragms, with slack portions of the cloth arranged alternately at the top and bottom of the spaces, whereby each frame or diaphragm is adapted to be moved or jarred independent of the others, substantially as described.

3. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with vertical moving frames having a continuous dust-cloth attached thereto, and a traveling apron arranged horizontally beneath said frames, of stationary horizontal bars placed between the apron and frames, and adapted to serve as supports for the vertical frames and provide a shut-off against the apron, whereby the passage of air-currents is prevented and the apron cleaned or scraped as it passes beneath said bars, substantially as described.

4. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with vertical frames supporting a dust-cloth, of a traveling apron having a cushion-pin adapted to work in an opening formed therein, and provided on its under side with a spring-knocker and mechanism for causing said knocker to strike against the cushion-pin at intervals, thereby jarring the vertical frames separately, substantially as described.

5. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with the cloth-supporting frames, a continuous dust-cloth secured to the sides and ends of the purifier, a traveling apron arranged beneath the

cloth-supporting frames, and provided with a dust-receiving trough, and mechanism for jarring the frames separately and at intervals, of an endless carrying chain or chains, star-pulleys, and mechanism for actuating said pulleys, whereby the apron and its attachments are caused to shut off the air-currents, jar the dust-cloth and its supporting-frames, and convey the detached dust from the machine, substantially as described.

6. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with a traveling apron, of a trough attached thereto, and a series of bars arranged above the apron and adapted to scrape the dust therefrom and into the attached trough, substantially as described.

7. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with a traveling apron having a cushion-pin therein and a spring-knocker, of a longitudinal bar arranged beneath said apron, and provided with a series of inclined planes adapted to engage the spring-knocker and depress the same, thereby causing it to recoil against the cushion-pin arranged in the apron, whereby said pin is brought in forcible contact with one of the cloth-supporting frames, substantially as described.

8. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with vertical frames or diaphragms provided with continuous dust-cloth, of a longitudinal bar arranged above said frames, and provided with counter-springs adapted to bear upon the upper ends of the frames and hold them down against the action of the fan and jarring mechanism, substantially as described.

9. In a dust-catching apparatus for mid-dlings-purifiers, the combination, with a fan and a sieve or shaker frame, of a series of vertical frames arranged between said fan and sieve, and provided with a continuous dust-cloth arranged to close the spaces between said vertical frames alternately at top and bottom, substantially as described.

10. In a dust-catching apparatus for mid-dlings-purifiers, the combination of vertical frames provided with a continuous dust-cloth and metallic knee-pieces with horizontal stationary bars adapted to support said frames, a traveling apron, endless chains, a cushion-pin in said apron, a spring-knocker, a trough, inclined planes placed beneath the apron and adapted to engage with and actuate the knocker, thereby jarring the frames and raising them vertically, and counter-springs attached to a bar above the frames and adapted to force them down, substantially as described.

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

JAMES McDANIEL. [L. S.]

Witnesses:

C. B. TIRRELL,
L. A. REED.