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W. & J. COMERFORD.

DUST COLLECTOR.

No. 370,686. Patented Sept. 27, 1887.

Fig. 1.

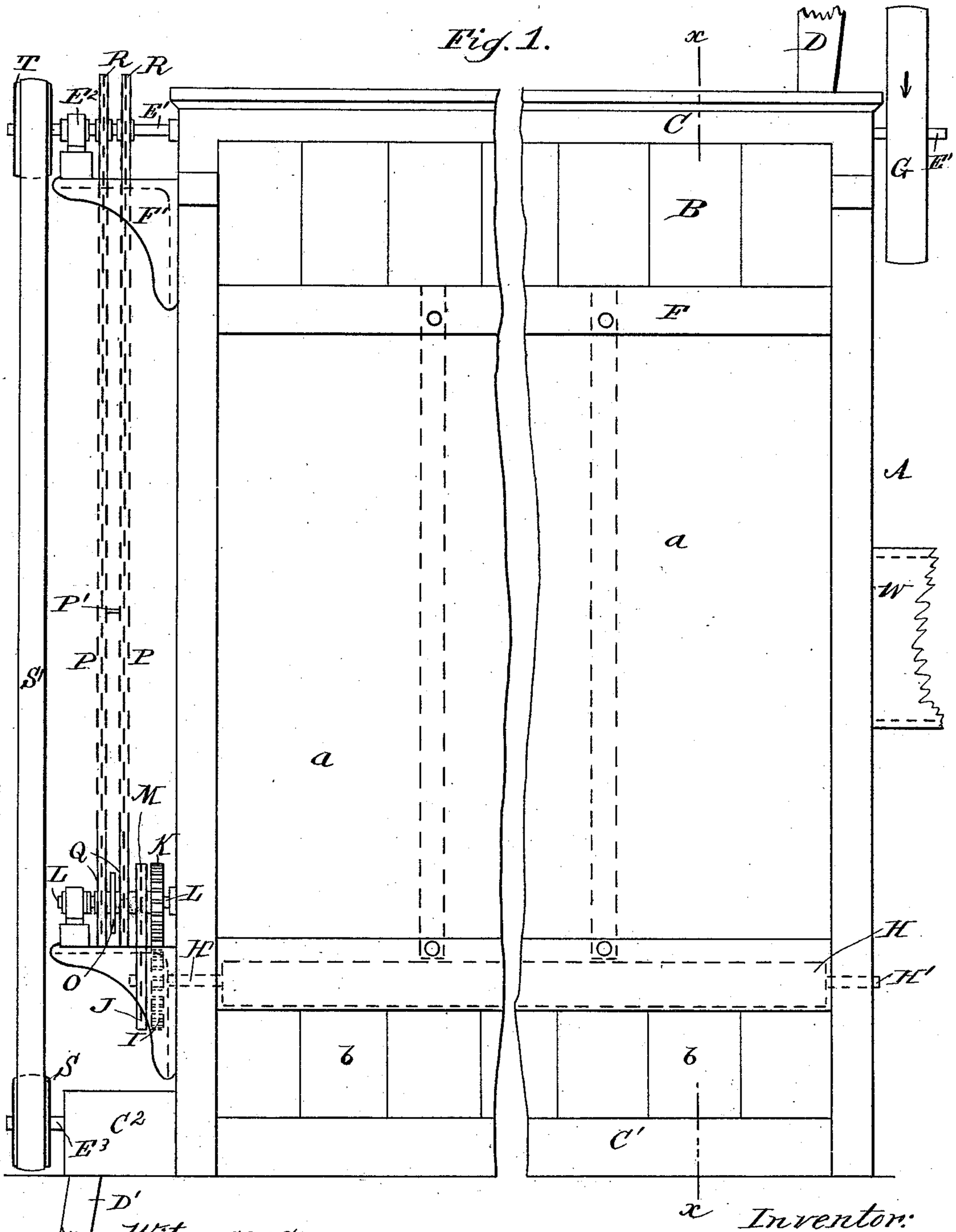

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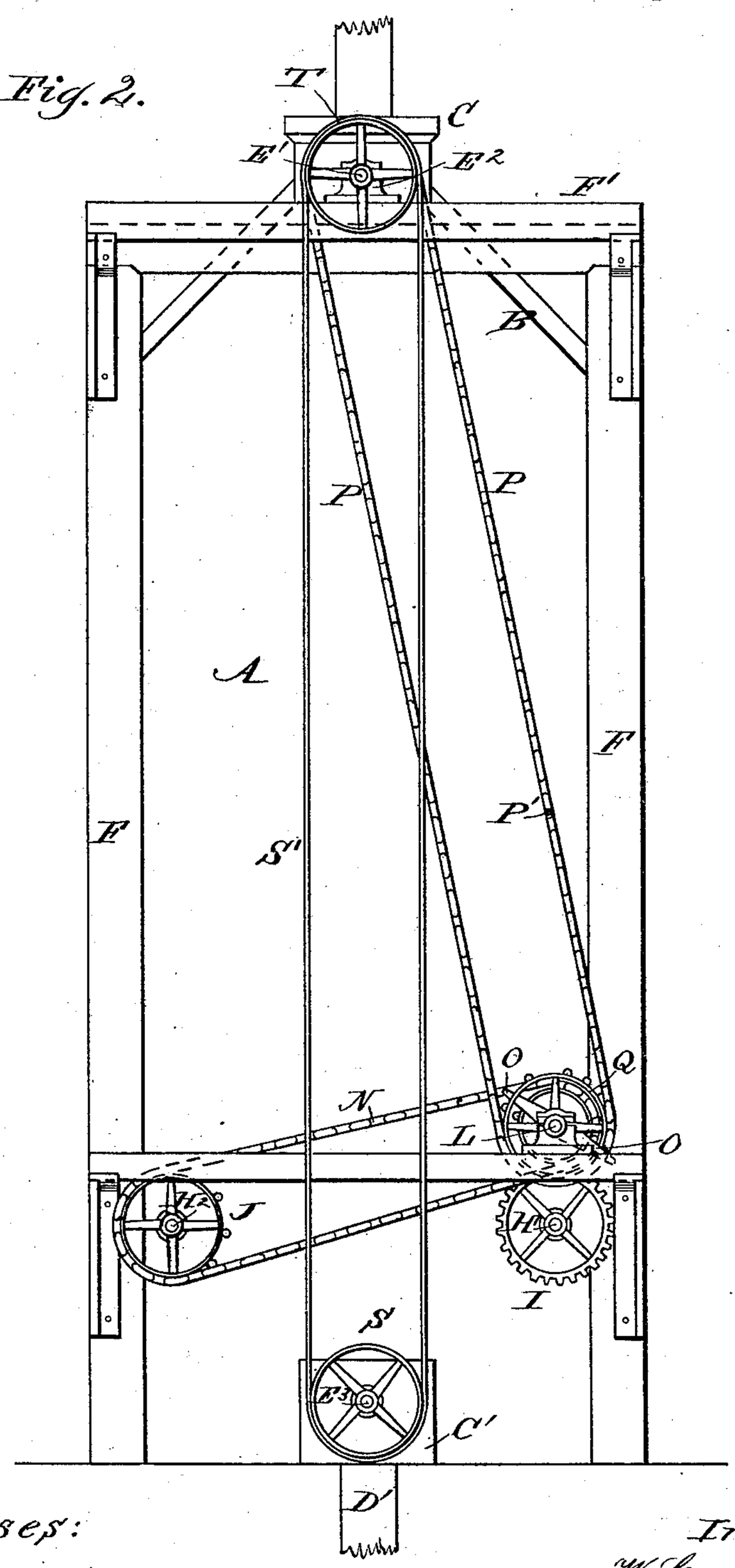
Fig. 2.



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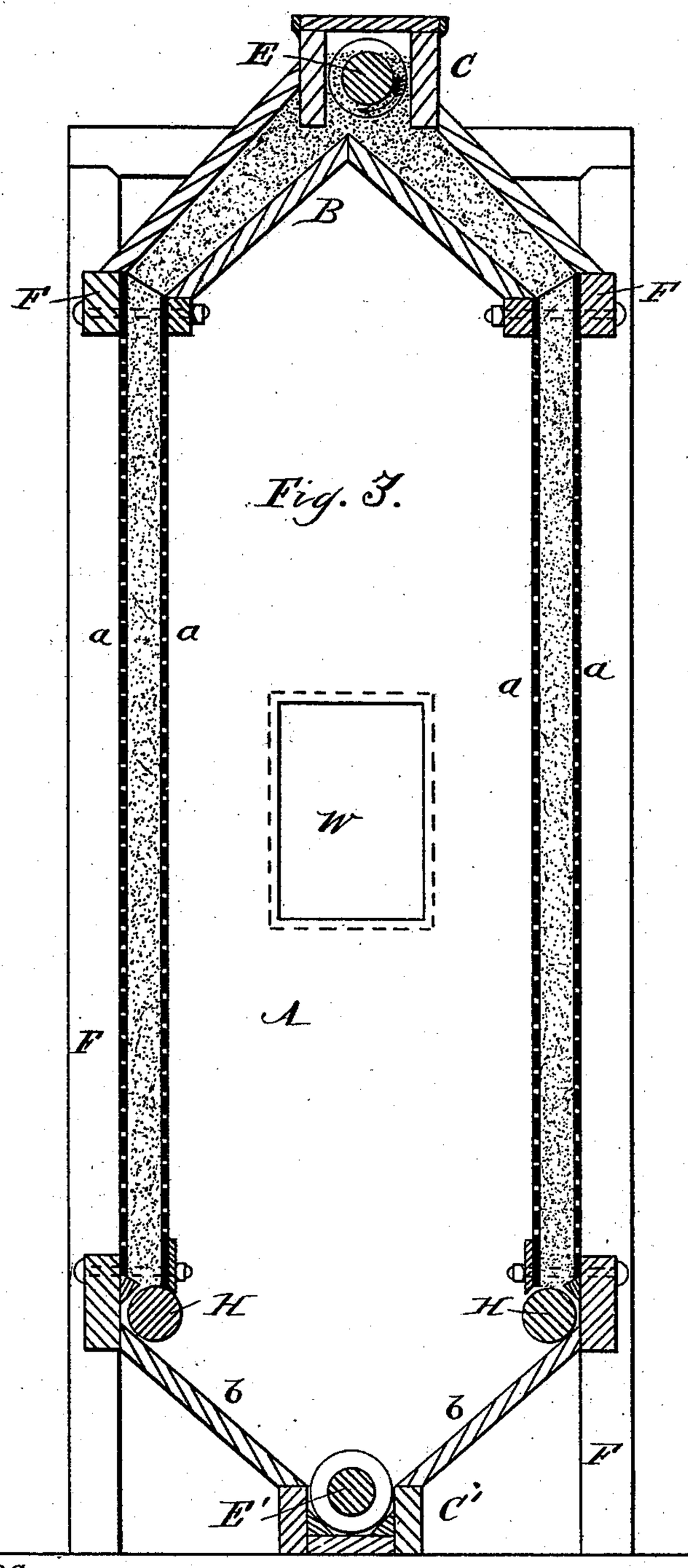

Fig. 3.

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DUST COLLECTOR.

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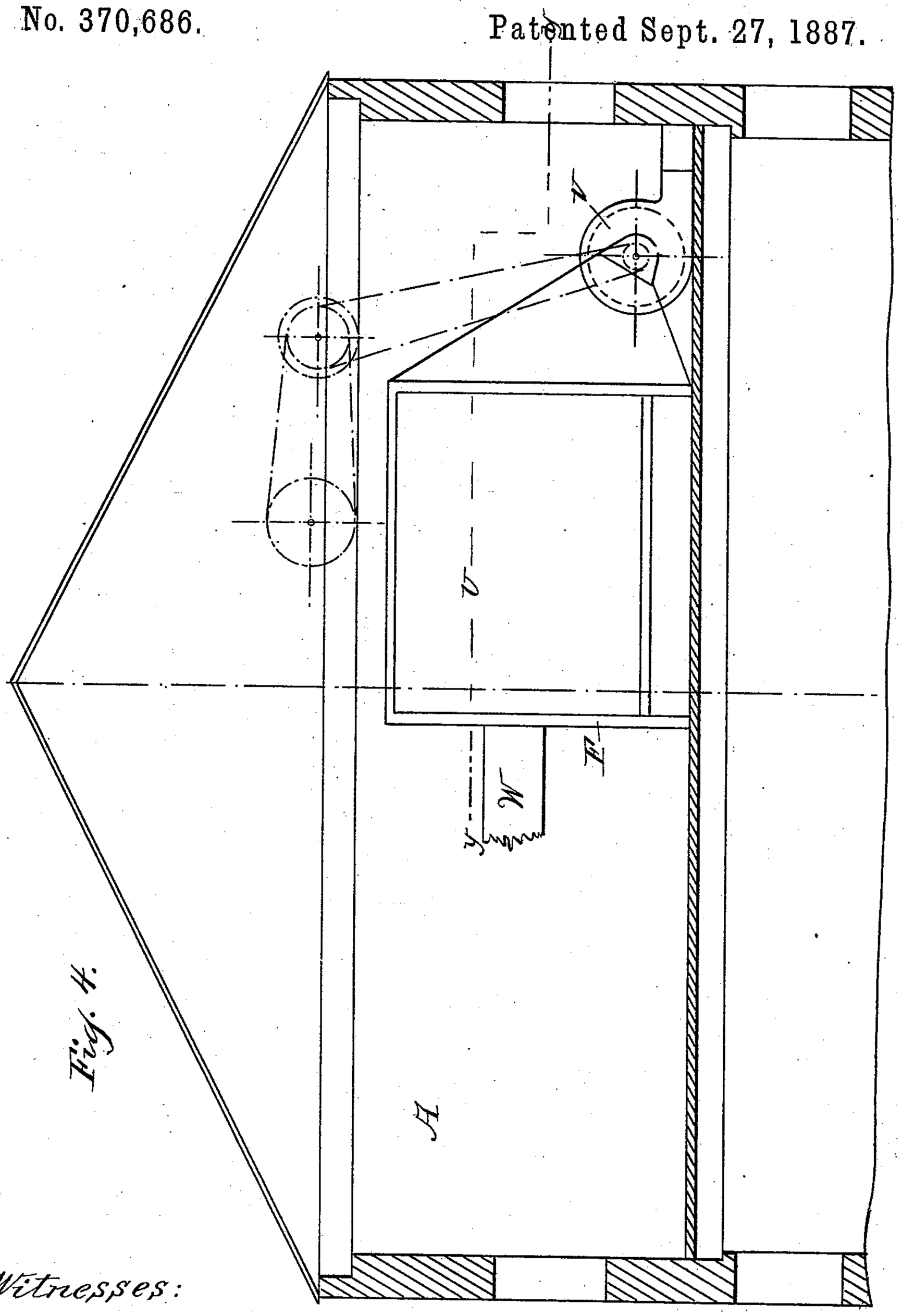

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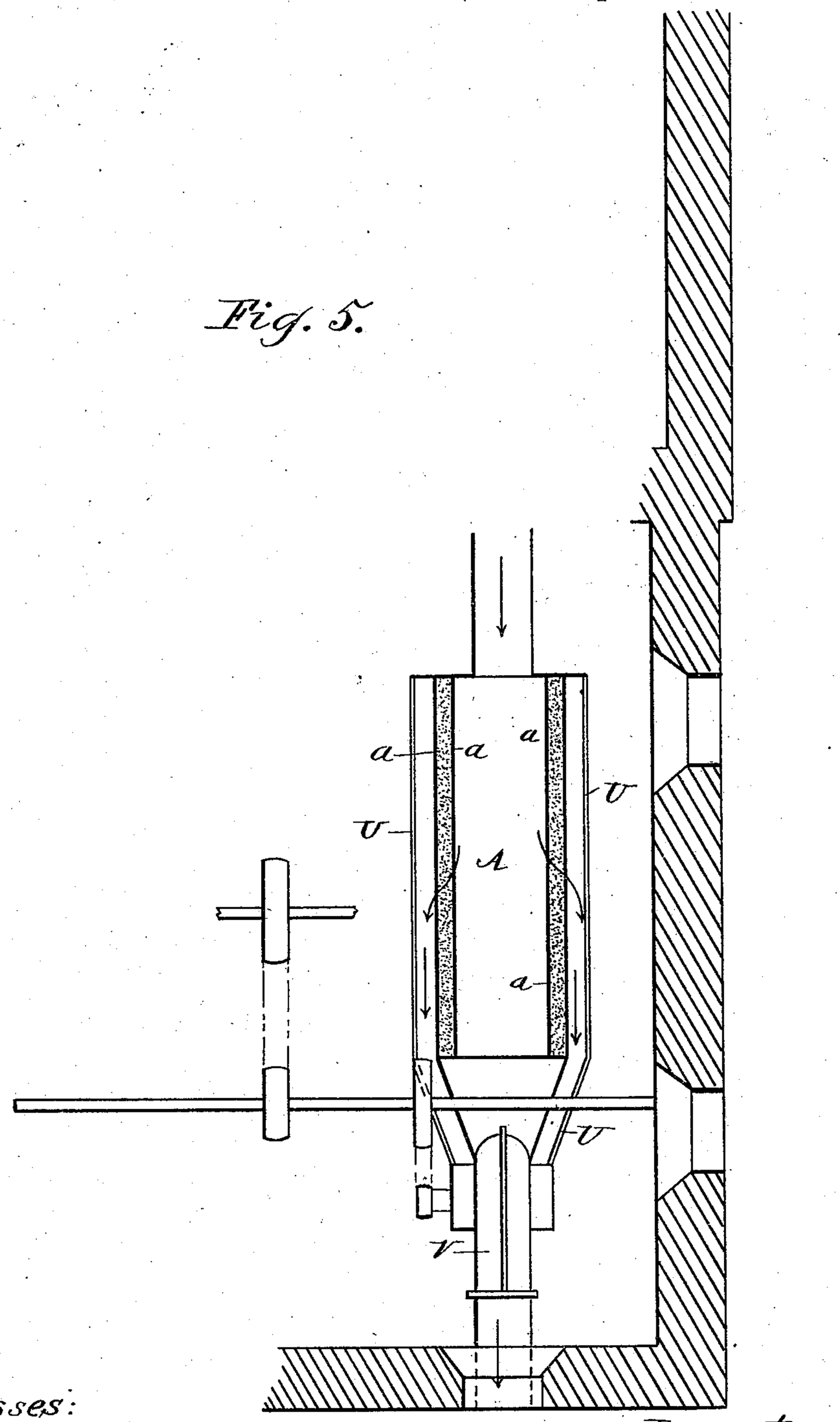
DUST COLLECTOR.

No. 370,686. Patented Sept. 27, 1887.

Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM COMERFORD AND JAMES COMERFORD, OF RATHDRUM, COUNTY OF WICKLOW, IRELAND.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 370,686, dated September 27, 1887.

Application filed July 17, 1886. Serial No. 208,256. (No model.) Patented in England January 18, 1886, No. 777; in France June 15, 1886, No. 176,779; in Germany June 29, 1886, No. 38,486, and in Austria-Hungary October 18, 1886, No. 25,854 and No. 50,404.

To all whom it may concern:

Be it known that we, WILLIAM COMERFORD and JAMES COMERFORD, (trading as James Comerford & Sons,) at present residing at Rathdrum Mills, Rathdrum, in the county of Wicklow, Ireland, have invented new and useful Improvements in Dust-Collectors, (which have been patented in England January 18, 1886, No. 777; in France June 15, 1886, No. 176,779; in Germany June 29, 1886, No. 38,486; and in Austria-Hungary October 18, 1886, No. 25,854 and No. 50,404;) of which the following is a full, clear, and exact description.

This invention relates to improvements in dust-collectors or machines for filtering air in mills, factories, or other places where the air or atmospheric current is charged with stive, dust, or light particles, as in mills for treating corn, middlings, bones, gypsum, drugs, pigments, &c., the object being to collect the particles and prevent waste when such particles are valuable, and merely to intercept them when they are injurious to health.

The invention consists of a dust-collecting machine provided with an air-filter composed of beds or layers of what we term "granular material," the material used depending upon the nature of the particles to be caught, but generally being coarser than, though of a nature analagous to, that of the dust, stive, &c., to be intercepted, when such particles are to be preserved. Thus, in the case of stive or flour-dust, the small wheat separated from good wheat in the preliminary cleaning, or crushed wheat or corn or bran might be used; but small wheat is preferred, as the stive or dust is caught by the beard of the wheat and can be recovered therewith in the process of grinding or in cleaning the same, as hereinafter mentioned. Other grain—such as rice—and small seeds—such as flaxseed, vetches, cockle, &c.—may be used in the same way and form efficient filtering media. When the particles are valueless, any suitable material—as sawdust, ground cork, &c.—may be used. The filtering material selected is bedded between perforated, reticulated, louvered, or otherwise apertured walls or surfaces which permit the passage of air, while retaining all or nearly all of the filtering material.

The invention also consists in the construction and arrangement of the parts of the machine, whereby an intermittent circulation of the air-filtering material or medium is maintained through it, so that the filtering medium is constantly renewed, the material, as it becomes fully charged, being removed for cleaning or other treatment. The passage of the air through the filter may be also intermittent, if desired, so that the air will not pass through the filtering medium while the latter is in motion, as this might cause the disengagement of the dust already caught.

The invention finally consists in the construction and combination or arrangement of parts, substantially as herein described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of one form of machine embodying our invention. Fig. 2 is an end elevation of the same. Fig. 3 is a vertical cross-section of the same on the line *x x*, Fig. 1. Fig. 4 is an elevation of the machine in use, illustrating the production of the air-current therethrough by exhaust. Fig. 5 is a sectional plan view on the line *y y*, Fig. 4.

In carrying out our invention we construct a long and narrow closed chest or chamber, A, the sides of which are formed by double walls *a*, preferably of perforated sheet metal or of wire, but which may be apertured in any other suitable manner, as before stated. Between the walls *a* is packed the granular filtering material, which is supplied thereto on either side through the space between the double-peaked roof B of the chest. Along the top of the roof, but at one side of the ridge thereof, we provide a box or casing, C, into one end of which leads the chute D, through which the filtering material is supplied. For uniformly distributing the said material along the roof and between the walls *a*, we mount an endless screw-conveyer, E, within the casing

C, parallel with but at one side of the ridge of the roof. The supply-conveyer E and its casing C are thus arranged at one side of the ridge of the roof, and the openings through which the filtering material passes to the opposite spaces between the double roof and walls made unequal, in order to counteract the effect of the revolution of the screw, which tends to throw the filtering material laterally in the direction of its rotation, as indicated by the arrow, Fig. 3. The conveyer screw-shaft E′ projects through the ends of the box or casing C, and revolves in suitable bearings therein, and at one end in an additional bearing, E^2, on a bracket, F′, secured to one end of the main frame F of the machine. The conveyer-shaft E′ is revolved from any convenient source of power by means of the driving-pully G on one end of the same.

In order to remove the filtering material from between the walls *a*, as such material becomes charged with the particles of dust, &c., rollers H, which in some cases may be fluted, are mounted beneath and in close proximity to the openings at the bottoms of the walls, which rollers, as they revolve, allow the filtering material to slowly descend by gravity into the hopper-shaped bottom *b*. The shafts H′ H^2 of the rollers H are suitably journaled in the ends of the chest A, and project through one end of the same.

On the end of the roller-shaft H′ is fixed a gear-wheel, I, and on the shaft H^2 a sprocket-wheel, J, is mounted. The gear-wheel I engages with a similar gear-wheel, K, rigidly mounted on a short counter-shaft, L, journaled in suitable bearings on the chest A. On the counter-shaft L is also fixed a sprocket-wheel, M, which is connected with the sprocket-wheel J on the roller-shaft H^2 by an endless chain, N. On the shaft L is fixed a projecting arm, O, which is adapted to be struck by a cross-piece, P′, one or more, connecting a pair of endless chains, P, running over a pair of sprocket-wheels, Q, loosely mounted on the shaft L, and between which the arm O is located. The endless chains P are also passed over a pair of sprocket-wheels, R, fixed on the supply conveyer-shaft E′. With this construction the counter-shaft L is revolved only when the cross-piece P′ on the endless chains P strikes and carries with it the arm O on the shaft L through a partial rotation. The counter-shaft L, and with it the connected discharge regulating-rollers H, are thus intermittently revolved from the continuously-revolving conveyer-shaft E′. Any other suitable mechanism for intermittently revolving the discharge-rollers H may be employed, if desired.

For removing the discharged filtering material from the bottom *b* of the chamber, we arrange a trough, C′, along the foot of said hopper-shaped bottom, in which the charged filtering material is received, and in the trough we mount an endless screw-conveyer, E′, by which the filtering material is carried into the discharge-chute D′, leading from the end of the trough C′ or box-extension C^2 thereof.

The shaft E^3 of the discharge-conveyer E′ is suitably journaled in the ends of the chest A, and carries on its end a pulley, S, which is continuously revolved from the supply conveyer-shaft E′ by a belt, S′, and a fixed pulley, T, on the shaft E′.

An air-chute, W, leads into one end of the chamber A, and conducts the dust-laden air into said chamber. The air is forced therein by the grinding or other machinery in which the air becomes laden with dust, &c., and exhaust-fans may be used in connection therewith for increasing the draft, as shown in Figs. 4 and 5. As therein shown, the filter is inclosed in an air-tight casing, U, in which the air is received after passing through the filtering medium, as shown by the arrows in Fig. 5. This casing U is connected with the inlet of the exhaust-fan V, by which the filtered air is drawn outward, thus drawing the dust-laden air through the filter.

The fans are driven by any convenient power by means of suitable shafting and belts, as shown in Figs. 4 and 5.

In order that the fitering material may be shifted and partially withdrawn without the air passing through it while it is in motion, and in order to prevent any interruption in the air-filtering operation, we may provide duplicate air-filtering or dust-catching machines, the dust-laden air being switched from one to the other by means of a suitable air-valve. This valve may be operated from the chains P, so that while the filtering material is being shifted and removed from the one machine the dust-laden air could be admitted into the other machine, and conversely.

When the intercepted stive or dust is a valuable product, the filtering material may be removed from the filter and cleaned in a suitable sifting-machine, the air-blast not being employed.

The speed of the discharge-rollers is regulated so that the filtering medium will not be allowed to become too fully charged with the dust particles, and thus hinder the passage of the air.

The supply-conveyer E is arranged at one side of the ridge of the roof B, and the spaces for admitting the filtering materials between the walls *a* thus made unequal, so that the tendency of the conveyer E to throw the material in the direction of its rotation, as shown by the arrow, will be equalized.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a dust-collector, the combination of apertured double walls, a traveling bed or layer of granular material between the said walls, and means for supplying fresh material at the top and withdrawing the foul material

at the bottom, substantially as herein shown and described.

2. A dust-collector comprising a closed chest or chamber, having its side walls made double and apertured, granular material between the said double walls, rollers closing the said space at bottom and situated within the main chamber, means for imparting intermittent motion to the said rollers, an air-passage communicating with the interior of the chest, a screw-conveyer above the chest, and mechanism for operating the said rollers and conveyer, all as herein described.

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