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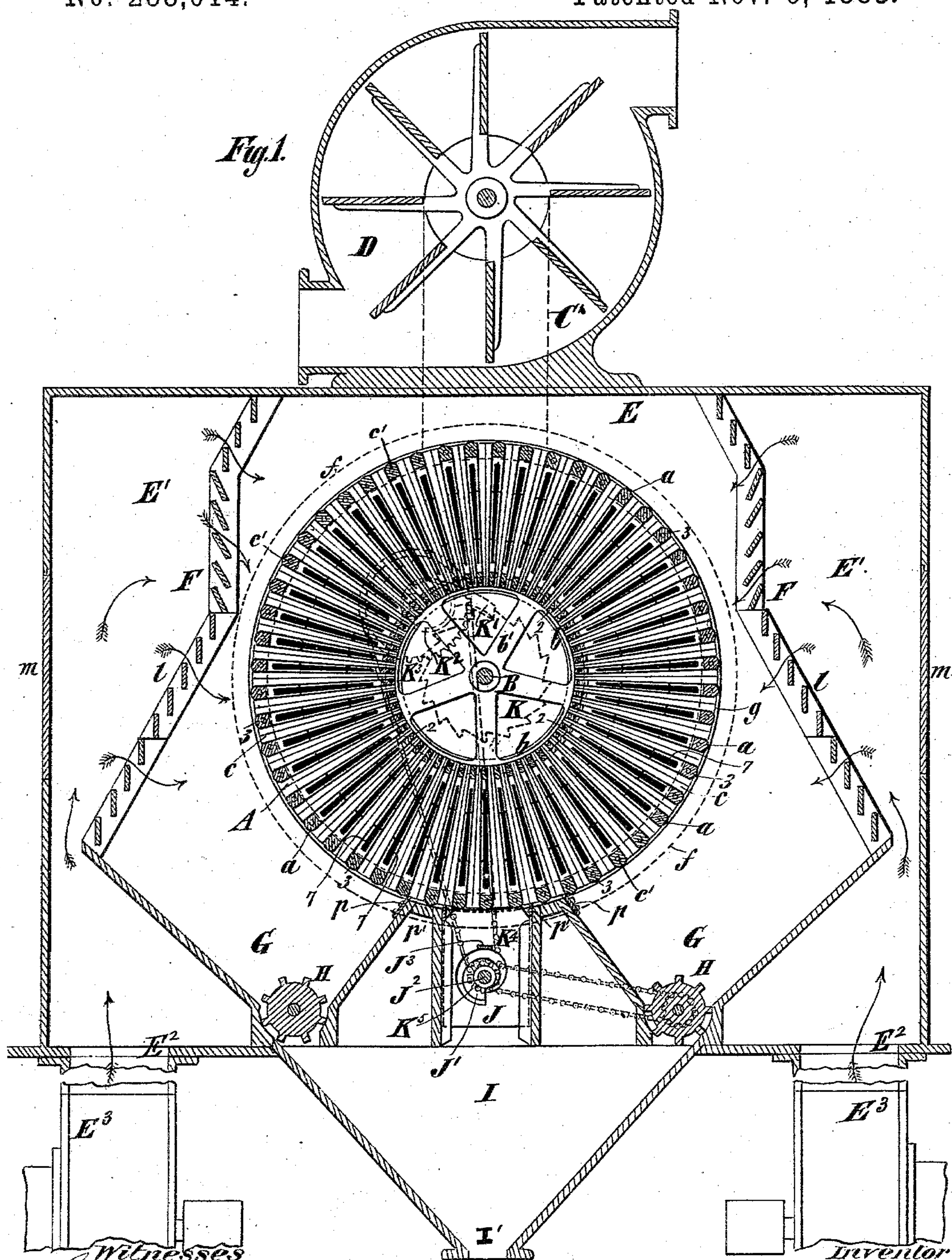
3 Sheets—Sheet 1.

P. CHANEY, Jr.

DUST COLLECTOR.

No. 288,014.

Patented Nov. 6, 1883.



Witnesses
Chaudler Hall
James R Bowen.

Phineas Chaney, Jr.
by his attorney,
Edwin H. Moore

(No Model.)

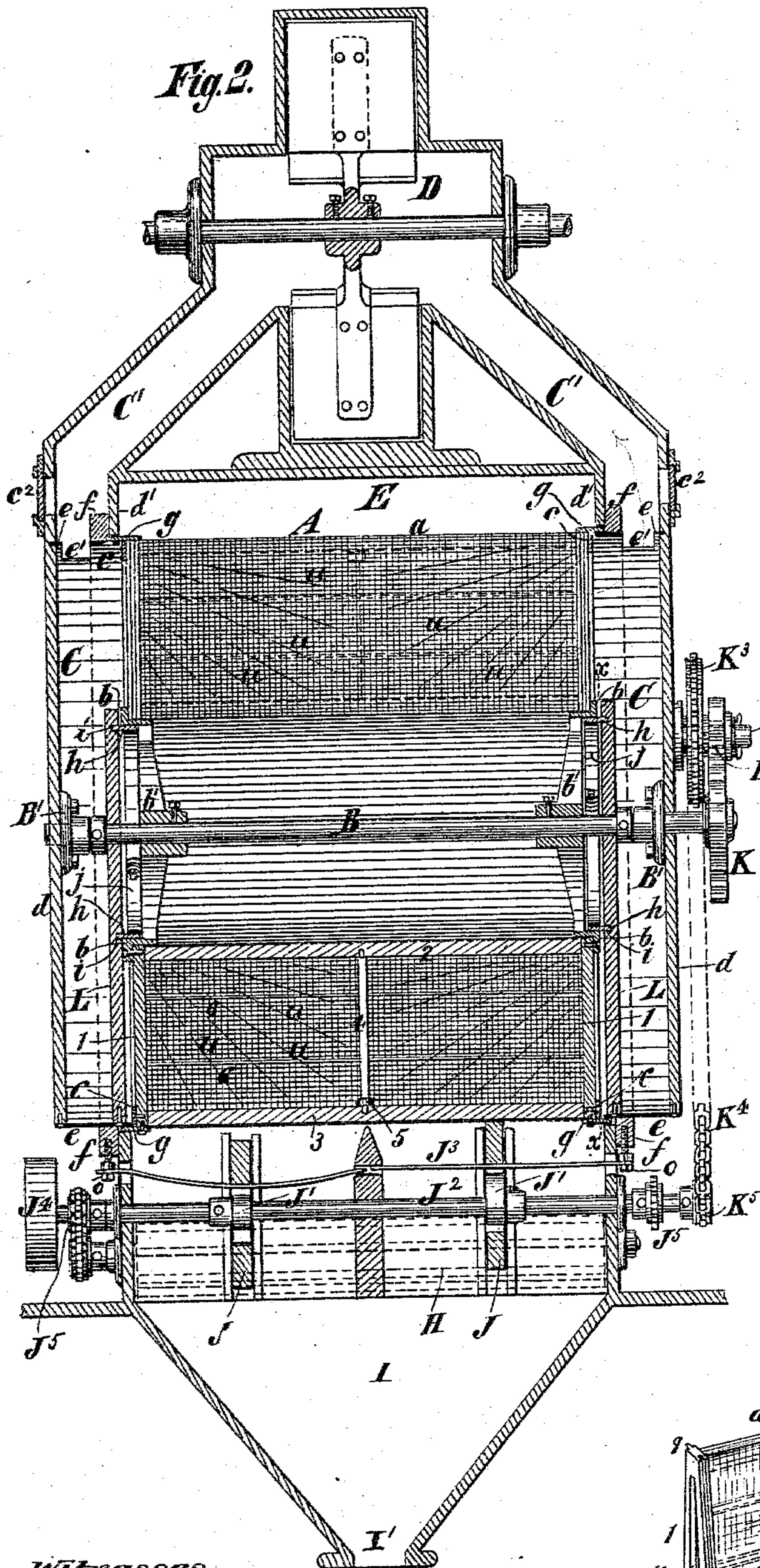
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P. CHANEY, Jr.

DUST COLLECTOR.

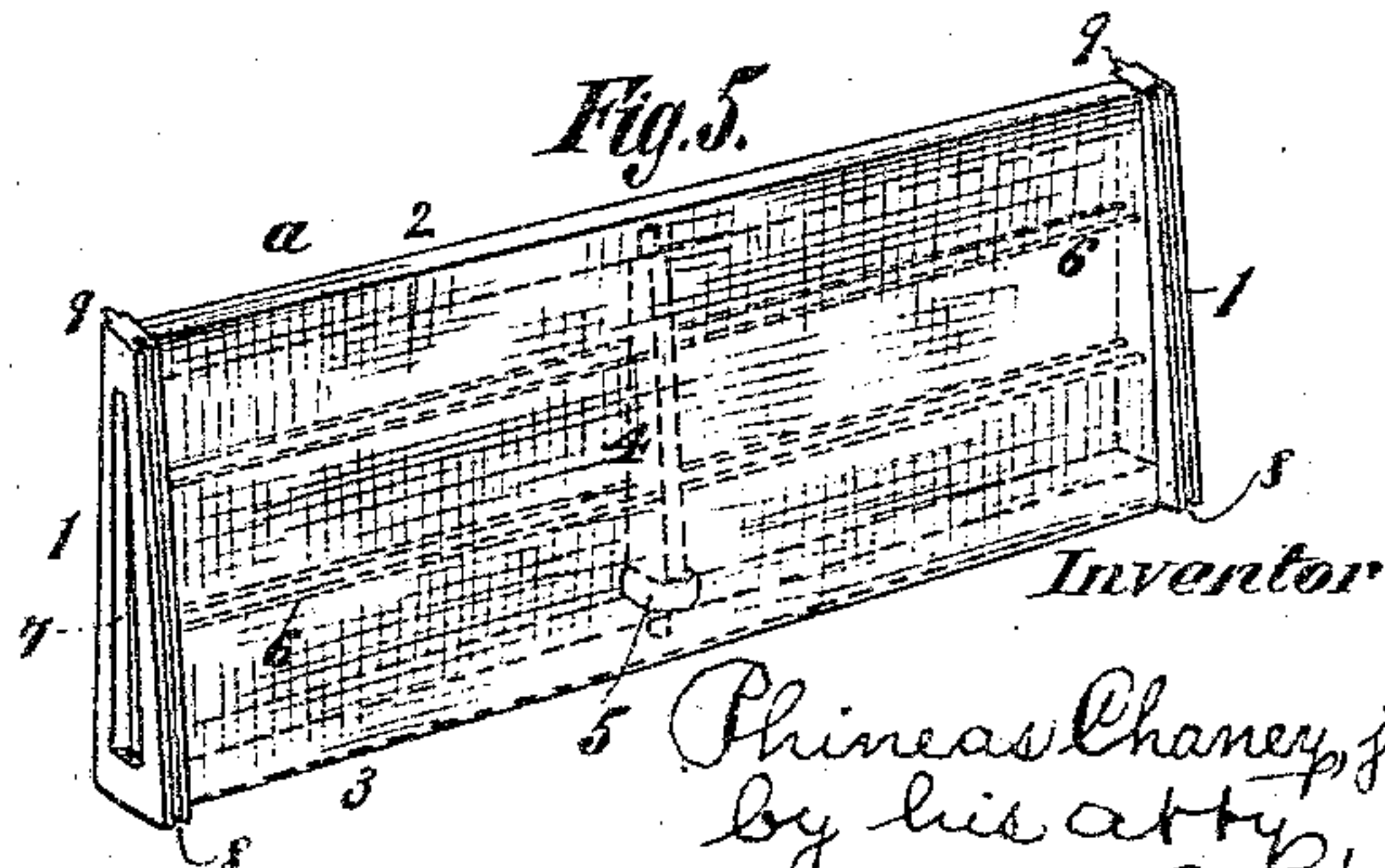
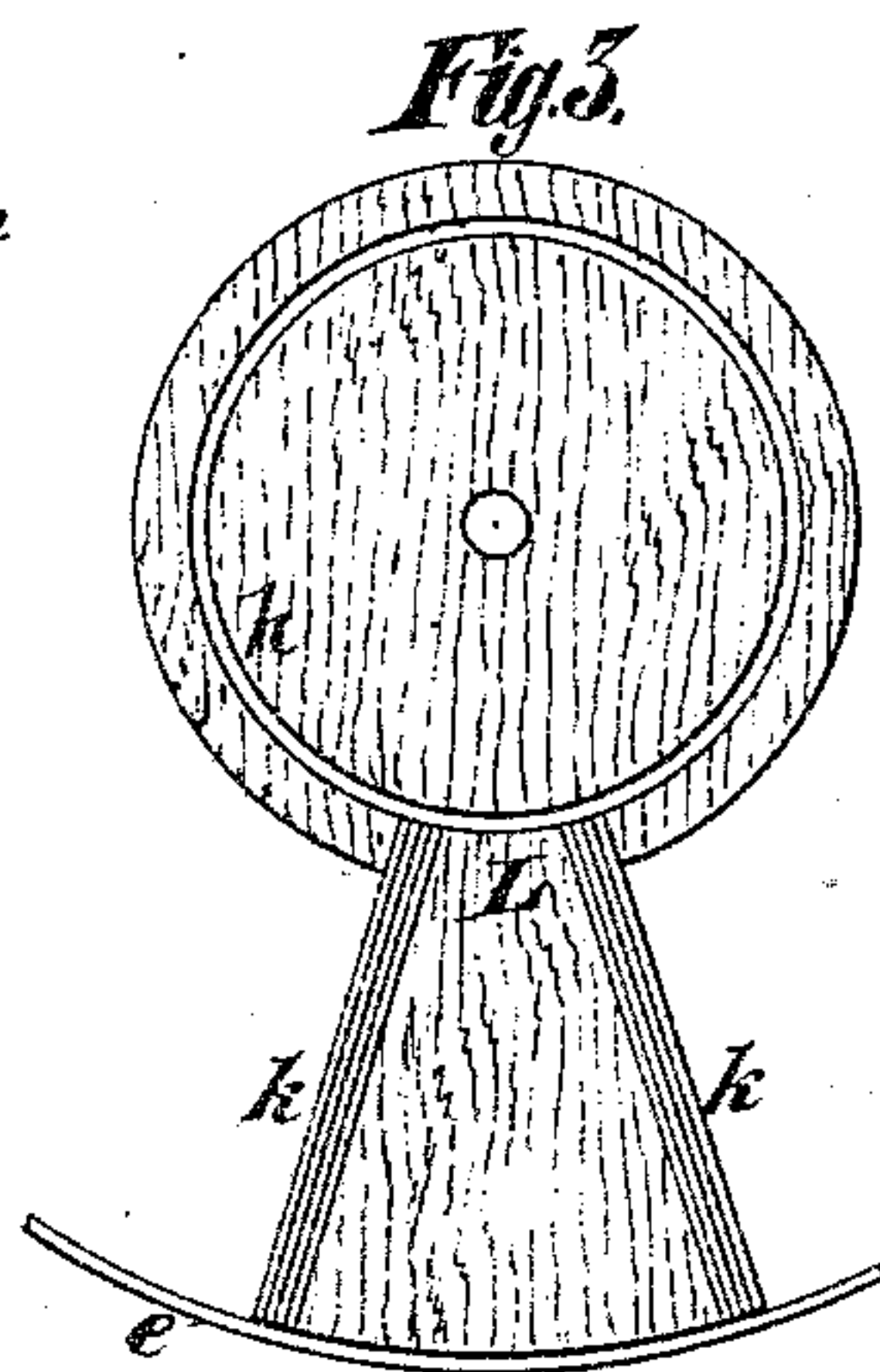
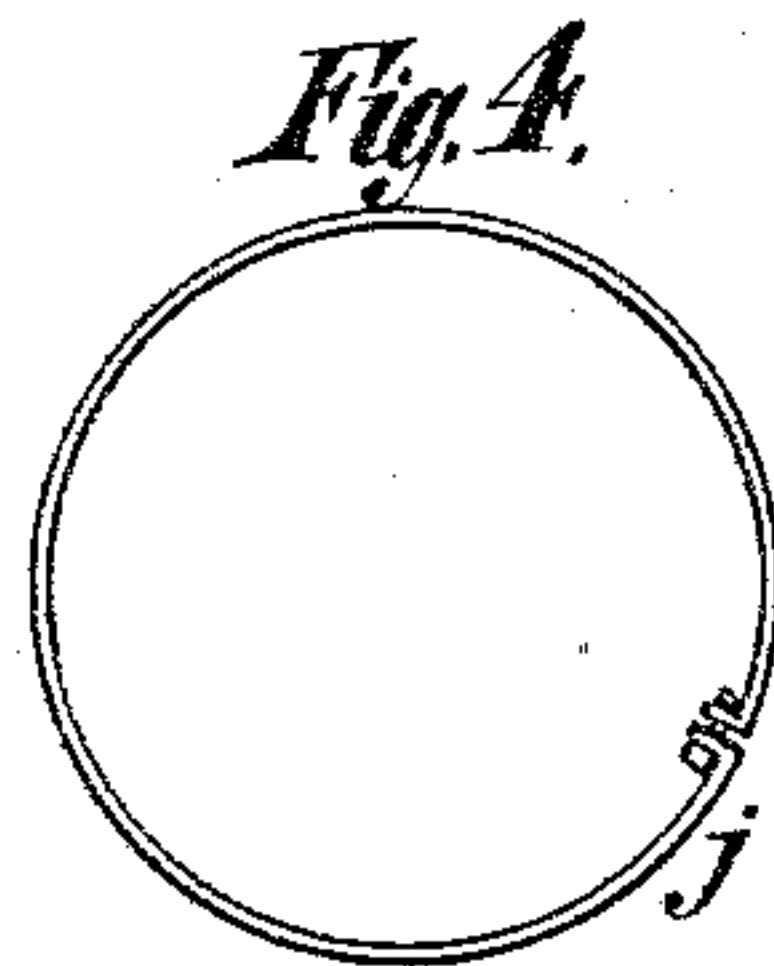
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Witnesses

Witnesses
Charles Hall
James R. Bowen.



5 Phineas Chaney, jr
by his atty,
Edwin H. Brown

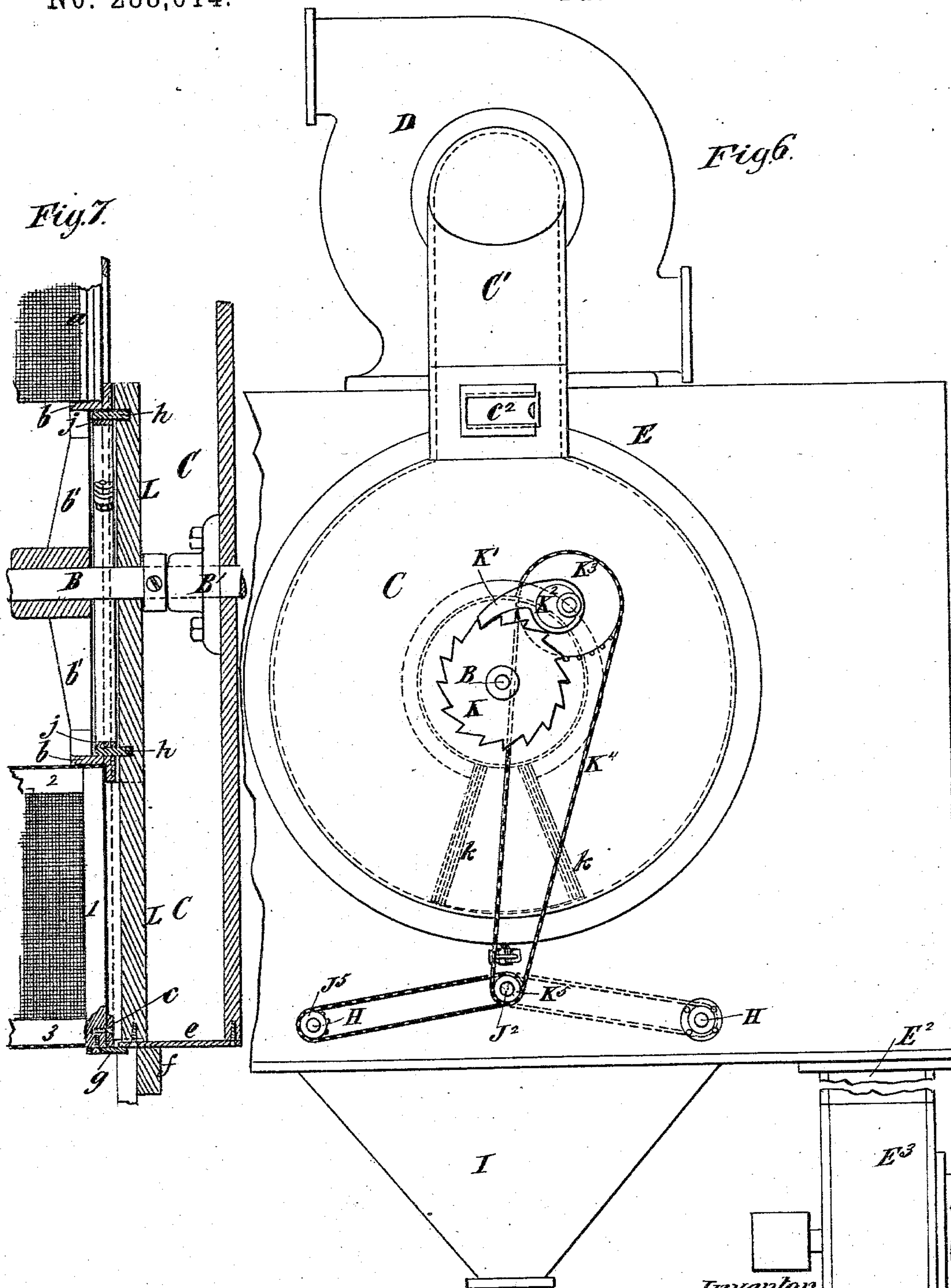
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3 Sheets—Sheet 3.

P. CHANEY, Jr.
DUST COLLECTOR.

No. 288,014.

Patented Nov. 6, 1883.



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UNITED STATES PATENT OFFICE.

PHINEAS CHANEY, JR., OF BROOKLYN, NEW YORK.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 288,014, dated November 6, 1883.

Application filed July 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, PHINEAS CHANEY, Jr., of Brooklyn, in Kings county, and the State of New York, have invented a certain new and useful Improvement in Dust-Collectors, of which the following is a specification.

This improvement will be described in detail, and then pointed out in the claims.

In the accompanying drawings, Figure 1 is a transverse vertical section of a dust-collector embodying my improvement. Fig. 2 is a central vertical section thereof, taken in a plane at right angles to that of Fig. 1. Fig. 3 is a view of one of the standards, whereby a rotary separator, forming a part of the dust-collector, is supported, and cut-off appliances used in connection with said standard, the same being seen from the plane indicated by the line $x x$, Fig. 2. Fig. 4 is an edge view of a ring whereby a circular packing which is employed in the machine is supported. Fig. 5 is a perspective view of one of the chambers of a rotary separator. Fig. 6 is an exterior view of a portion of one side of the dust-collector, illustrating the mechanism for imparting a rotary motion to the separator; and Fig. 7 is a vertical section corresponding to Fig. 2, but on a larger scale, showing one end portion of the separator, a standard supporting the same, and parts adjacent thereto.

Similar letters of reference designate corresponding parts in all the figures.

A designates the rotary separator of the dust-collector. It consists, essentially, of a number of chambers, a , which are made separate and independent of one another, and are fitted together radially and occupy positions between frames $b c$. Each of the chambers a consists of end pieces, 1, connected near the extremities by longitudinal rails 2 3. Stretchers 4 extend between the rails 2 3 at about the middle of their length. They are affixed to the rails 2, and have interposed between them and the rails 3 cushions 5, of india-rubber or other resilient material. Pairs of rods 6 extend between the end pieces, and they may extend through the stretchers. In the end pieces are openings 7. In one of the side edges of each end piece is a groove, 8, and at the other side edge thereof is a tongue, 9. It will be observed that the end pieces taper longitudinally. The taper is such that the end

pieces of the whole series of chambers a may be fitted together in the form of a circle with their tongues and grooves intermatched. The various parts of the frames of the chambers a may be made of wood, with the exception of the cushions 5 and the rods 6. The latter will preferably be made of metal; but even they may be made of wood. Cotton or linen cloth or other suitable fabric is wrapped around the rails 2 3 and rods 6 of the chamber a , and is united by sewing or by tacking its ends to one of the said rails. It will also be tacked to the end pieces. It will be seen that each of the chambers a is complete in itself and independent of the others, and that unobstructed spaces are left between the sides of adjacent chambers, so that air may pass diametrically across the separator.

The frames b are of circular form, with flanges at the front. They are supported by spiders b' , which are rigidly affixed to a shaft, B, so as to turn therewith. This shaft is supported in bearings B' , which are fastened to the walls d of the housing of the dust-collector. The frames c are circular in form, and extend around the outer sides or faces of the end pieces of the chambers a , near the wider extremities. Nails or screws c' pass through these frames c into the end pieces of the chambers a , and thereby secure the chambers in place.

Outside the ends of the separator are education-chambers C. These education-chambers C consist of pieces of sheet-iron or other suitable material, e , bent into circular form, extending from the walls d of the housing inwardly toward the ends of the separator A. These pieces e extend close to the end pieces of the chambers a , near their outer extremities. Their inner edges are fastened to the inner peripheries of circular ribs f . These ribs are secured to walls d' . In the upper part of the pieces e are openings e' , through which communication is afforded between the education-chambers and passages C' , that lead to the central part of a suction fan-blower, D. All the openings 7 of the chambers a , except such as are cut off in a manner and for a purpose which will be hereinafter explained, are in communication with these education-chambers. Packings, consisting of bands of india-rubber, leather, or like material, g , are fastened by nails or screws to the outer extremities of

the end pieces of the chambers *a*, and extend between the walls *d'* and the pieces *c*, forming part of the eduction-chambers.

Between the eduction-chambers and surrounding the separator A circumferentially is a receiving-chamber, E, into which is discharged the air from which dust, consisting of flour or other valuable material, is to be collected. The packings *g* prevent leakage of air from the receiving-chamber into the eduction-chambers without passing through the separator. Packings *h*, consisting of bands of india-rubber, leather, or other suitable material, are fitted against the inner peripheries of the frames *b*, and extend outwardly beyond the same into grooves *i* in the standards of cut-offs L. Metal bands *j*, fastened at the ends by screw-bolts, are expanded within these packings to hold them against the frames *b*. The upper portions of the cut-off standards are circular, but their lower portions have diverging sides, fitted with packings *k* of india-rubber, leather, or other suitable material, adapted to impinge against the end pieces of the chambers *a* of the separator A. These packings *k* are so arranged that the end pieces of three adjacent pieces, *a*, of the separator may be rotated into a position opposite the space which is between the packings. The standards of the cut-offs fit the shaft B. They also extend to and are secured in contact with the pieces *e* of the eduction-chambers C. The packings *h* prevent leakage of air between the eduction-chambers C and the space encircled by the chambers *a* of the separator A. Obviously, if blocks of wood were fitted to the spiders *b'* of the separator to close the spaces between their arms, this object could be attained without the use of the packings *h*. The packings *k* cut off communication between the eduction-chambers C and the openings 7 in the end pieces of those chambers *a* which are opposite the space which is bounded by these packings.

The manner of combining the packings *g* *h* *k* with the parts to which they are applied may be best seen in Fig. 7, but is also shown in Figs. 2 and 3.

The dust-laden air is discharged into the chambers E' through ducts E², from force-blowers E³, portions of which are shown in Fig. 1, and which may be of any suitable construction. The dust-laden air thence passes from the antechambers E' to the receiving-chamber E. These antechambers E' are separated from the receiving-chamber E by lattices F. When the dust-laden air strikes these lattices, it is divided into numerous currents, which are deflected downwardly, and at the same time checked to such an extent that the heavier particles of dust fall by gravity into collecting-chambers G. The lattices have removable sections *l*, which may be removed to afford access to the chambers *a* of the separator A. The inner sides of the upright rails of the removable lattice-sections *l* may rest against shoulders, and the bottoms of said rails may rest on the

tops of the rails of the lower sections. The removable sections *l* will then be held in place by gravity. By removing the pins which secure any one of the chambers to the frames *c*, and detaching the packings *g* therefrom, that chamber may be withdrawn for the purpose of repairing it. Doors *m* in the outer walls of the antechambers E' afford access to the antechambers. At the bottom the collecting-chambers G are provided with rotary gates H, which, as they rotate, discharge the dust which collects in them into the main collecting-chamber I, without permitting air to pass between the compartments, except such as may occupy part of the spaces between the plates of the gates as they rotate from the collecting-chambers G into the main collecting-chamber I. This main collecting-chamber I has at the bottom a spout, I'. The main collecting chamber I has fitted in slideways in a mouth-piece with which it is provided a number of knockers, J. But two are here shown, although any desirable number may be employed. The mouth-piece of the main collecting-chamber I is wide enough for three of the chambers *a* of the separator to occupy a position over it at one time. When any three of these chambers are over it, the openings 7 in their end pieces are cut off by the cut-off packings *k* from communication with the eduction-chambers C. The knockers J are retracted from the chambers *a*, which are thus cut off by eccentrics or cams J' on a rotary shaft, J², and are impelled against these chambers by springs J³. The springs J³ are supported at their adjacent ends in a stationary standard, and at the outer ends they are connected to screw-bolts *o*, whereby the force with which they actuate the knockers may be varied.

At the top of the collecting-chamber I are strips of packing *p*, made of india-rubber, leather, or other suitable material, and inside the mouth-piece of this chamber are similar packings, *p'*. These packings *p* *p'* extend to the separator and prevent leakage of air between the parts on which the packings are arranged and the separator.

The mechanism for imparting rotary motion to the separator and to the gates H is shown in Figs. 2 and 6, and in dotted outlines in Fig. 1.

On the shaft B is rigidly affixed a ratchet-wheel, K, on which acts a pawl, K', that is loosely pivoted to a crank-wrist, K², extending from a wheel or pulley, K³. The periphery of the wheel or pulley K³ is provided with sprocket-teeth, with which engages a chain, K⁴, and said wheel K³ is supported on a fixed stud projecting from the side of the machine. The chain K⁴ also engages with a sprocket-wheel, K⁵, which is mounted on the shaft J². The shaft J² is provided with a pulley, J⁴, on which may be fitted a belt for imparting motion to the shaft. The shaft J² constitutes the driving-shaft of the machine. On the shaft J² are sprocket-wheels J⁵, which receive chains

that also pass around sprocket-wheels on the journals of the rotary gates H and transmit motion thereto from the said shaft.

The teeth of the ratchet-wheel K are of such number that every time the pawl K' impels the wheel a tooth forward three of the chambers *a* of the separator A, that were over the mouth-piece of the main collecting-chamber I, will be moved past the mouth-piece of said chamber, and the three succeeding chambers will be rotated into a position over the mouth-piece of the said chamber, and will be cut off by the cut-off packings *k* from communication with the eduction-chambers. The motion of the separator is intermittent, it being allowed to dwell while the pawl K' plays over the teeth of the ratchet-wheel. While three chambers dwell over the mouth-piece of the main collecting-chamber I, the knockers strike them and shake the dust from them. As these chambers are then cut off from the suction of the eduction-chambers the detachment of the dust through the jar or shake produced by the knockers is facilitated. The knocker-cams are set so as to operate the knockers alternately. Some of the dust will be shaken by the action of the knockers from other chambers, *a*, than those which are immediately over the mouth-piece of the main collecting-chamber I. This dust will fall into the chambers G, and will escape thence through the gates H into the chamber I.

The separator is really between the receiving-chamber E and the eduction-chamber C. The air can pass from the receiving-chamber between the several chambers *a* of the separator; hence if one of the force-blowers is delivering more dust-laden air than the other, the excess of air can pass over to the side of the separator where the lesser stream of dust-laden air is being delivered. The dust-laden air, before it can pass into the eduction-chambers, must pass through the cloth of the chambers *a* into the space inclosed thereby, and thence through the openings 7 of the end pieces of these chambers into the eduction-chambers. In passing through the cloth of the chambers *a* the dust is separated from the air. The dust which is carried on the cloth around to the mouth of the main collecting-chamber I is deposited into the said chamber by the action of the knockers. The suction-blower is preferably rotated, so that it will induce an outward current of air slightly in excess of the aggregate currents which are delivered by the force-blowers E³. In the eduction-passages C' are slides or valves *c*², whereby air may be admitted from outside the dust-collector into the eduction-passages. By adjusting these valves I am enabled to so neutralize some of the action of the suction-blower as to cause a portion of the dust-laden air delivered by the force-blowers E³ into the receiving-chamber E to pass downward between the chambers *a* of the separator, when they are cut off, to the main collecting-chamber I. The dust in this current of air is not wasted as it passes into the main collect-

ing-chamber. In fact the passage of this current of air into the collecting-chamber without first passing through the cloth of the separator is a relief to the separator, for if this current of air passed through the separator the separator would have to do the additional work of separating the dust from it. This current of air passing between the cut-off chambers *a* of the separator aids in detaching the dust therefrom. I make the suction-blower run in excess of the force-blowers and then neutralize it, because it would be impracticable to make such a fixed relation between the action of the blowers as is necessary to produce the desired result, owing to the varying conditions of the dust-laden air and of the cloth of the separator. The dust-laden air passing through the separator tends to rush to the openings by which communication is established between the eduction-chambers C and the eduction-passages C'; hence the air passes to these openings at various angles. This is advantageous in that the passage of air across the surfaces of the cloth at different angles continually shifts the nap of the cloth and keeps it distended, so that it will catch and hold a larger quantity of dust than it would otherwise. This passage of air over the cloth at different angles can best be understood by means of the fine lines *u*, shown on the chambers *a* in Fig. 2. As the tendency of the air in the chambers *a* is always upward, no matter in what position the chambers are brought by the rotation of the separator, it follows that the direction of the air in the chambers, which are at any time at the upper part of the separator, will be toward the upper and outer ends of the openings 7 in the ends of said chambers from all parts thereof, while the direction of air in the chambers which are at the lower part of the separator will be toward the upper and inner ends of the openings 7 in the ends of said chambers; hence it is obvious that when the chambers are at the lower part of the separator the air will pass over the cloth in a different direction from that which it will take when the chambers are at the upper part of the separator. It will also be observed that when the chambers *a* are brought into horizontal positions at the sides of the separator the air in the chambers will pass directly toward the end openings, 7, in a direction parallel with the shaft B. It will be observed that the air in passing through this dust-collector comes in contact with the cloth of the separator but once.

The cushions 5, at the ends of the stretchers 4 in the chambers *a*, prevent the knockers from injuring the chambers.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a dust-collector, a separator composed of a number of chambers, *a*, fitted together by means of tongues and grooves and secured by the frames *b c*, substantially as specified.

2. In a dust-collector, the combination, with a rotary separator composed of a number of

separate chambers arranged radially to the circumference of the separator, having unobstructed spaces between their side and openings in their ends, of a receiving-chamber communicating with the spaces between the sides of the chambers of the separator, and eduction-chambers communicating with the openings in the ends of the chambers of the separator, substantially as specified.

3. In a dust-collector, the combination, with an annular rotary separator composed of a number of separate chambers arranged radially to the space encircled by them, and having unobstructed spaces between their sides which communicate with the space encircled by them, and also having openings in their ends, of a receiving-chamber communicating with the spaces between the sides of the chambers of the separator, and eduction-chambers communicating with openings in the ends of the chambers of the separator, substantially as specified.

4. In a dust-collector, the combination, with the annular separator A, composed of chambers *a*, having unobstructed spaces between their sides and openings in their ends, of the receiving-chamber E, communicating with the spaces between the sides of the chambers of the separator, the eduction-chambers C, communicating with the openings in the ends of the chambers of the separator, and the packings *g h*, forming tight joints between the receiving-chamber E and the eduction-chambers C at the outer and inner circumference of the separator, substantially as specified.

5. In a dust-collector, the combination, with the annular separator A, composed of chambers *a*, the eduction-chambers C, and the cut-off standards L, having grooves *i*, of the packings *h* and the metal bearings *j*, substantially as specified.

6. In a dust-collector, the combination, with a separator composed of a number of separate chambers, of a receiving-chamber, antechambers separated from the receiving-chamber by lattices, and eduction-chambers, substantially as specified.

7. In a dust-collector, the combination, with a separator composed of a number of detachable chambers, of a receiving-chamber, antechambers, and lattices comprising removable sections, which facilitate access to the chambers of the separator when desirable to remove the same, substantially as specified.

8. In a dust-collector, the combination of an annular separator composed of a number of chambers having unobstructed spaces between their sides, and an open space encircled by the chambers, so that air may pass diametrically across the separator between the chambers without passing through the cloth of the latter, a collecting-chamber, eduction-chambers communicating with the chambers of the separator through openings in the ends of the latter, a cut-off whereby a number of separator-chambers will be cut off from the eduction-chambers, a receiving-chamber com-

municating with the spaces between the sides of the separator - chambers, force-blowers whereby dust-laden air is delivered into the receiving-chamber, a suction-blower in communication with the eduction-chambers and adapted to suck out a larger stream than the aggregate quantity of air forced in by the force-blowers, and slides or valves whereby the action of the suction-blower may be neutralized to such an extent that air will pass downwardly between the chambers of the separator into the collecting-chamber, substantially as specified.

9. In a dust-collector, the combination, with a separator, of a main collecting-chamber, supplementary collecting-chambers, and rotary gates through which the dust in the supplementary collecting-chambers may be discharged into the main collecting-chamber, substantially as specified.

10. In a dust-collector, the combination, with an intermittently-rotated separator composed of a number of chambers having openings in their ends, of cut-offs arranged at the ends of the separator, substantially as specified.

11. In a dust-collector, the combination, with an intermittently-rotated separator composed of a number of chambers having openings in their ends, of stationary cut-offs arranged at the ends of the separator, substantially as specified.

12. In a dust-collector, the combination, with an intermittently-rotated separator composed of a number of chambers having unobstructed spaces between their sides, of cut-offs, knockers for acting on chambers of the separator which are cut off, a collecting-chamber, and means whereby a current of dust-laden air is caused to pass downwardly through the spaces between the chambers of the separator which are cut off and into the collecting-chamber without passing through the cloth, substantially as specified.

13. In a dust-collector, the combination, with an intermittently-rotated separator, of the cut-offs L and the collecting-chamber I, substantially as specified.

14. In a dust-collector, the combination, with a rotary separator composed of a number of separate chambers arranged radially to the circumference of the separator, having unobstructed spaces between their sides and openings in their ends, of means for admitting dust-laden air to the spaces between the chambers of the separator, and means for inducing a current at the ends of the chambers in a direction across the ends of the separator, whereby, as the separator rotates, the air will act on the cloth of its several portions at different angles as such portions assume different positions, substantially as herein specified.

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Witnesses:

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