

(No Model.)

4 Sheets—Sheet 1.

S. H. WILSON.
DUST COLLECTOR.

No. 582,967.

Patented May 18, 1897.

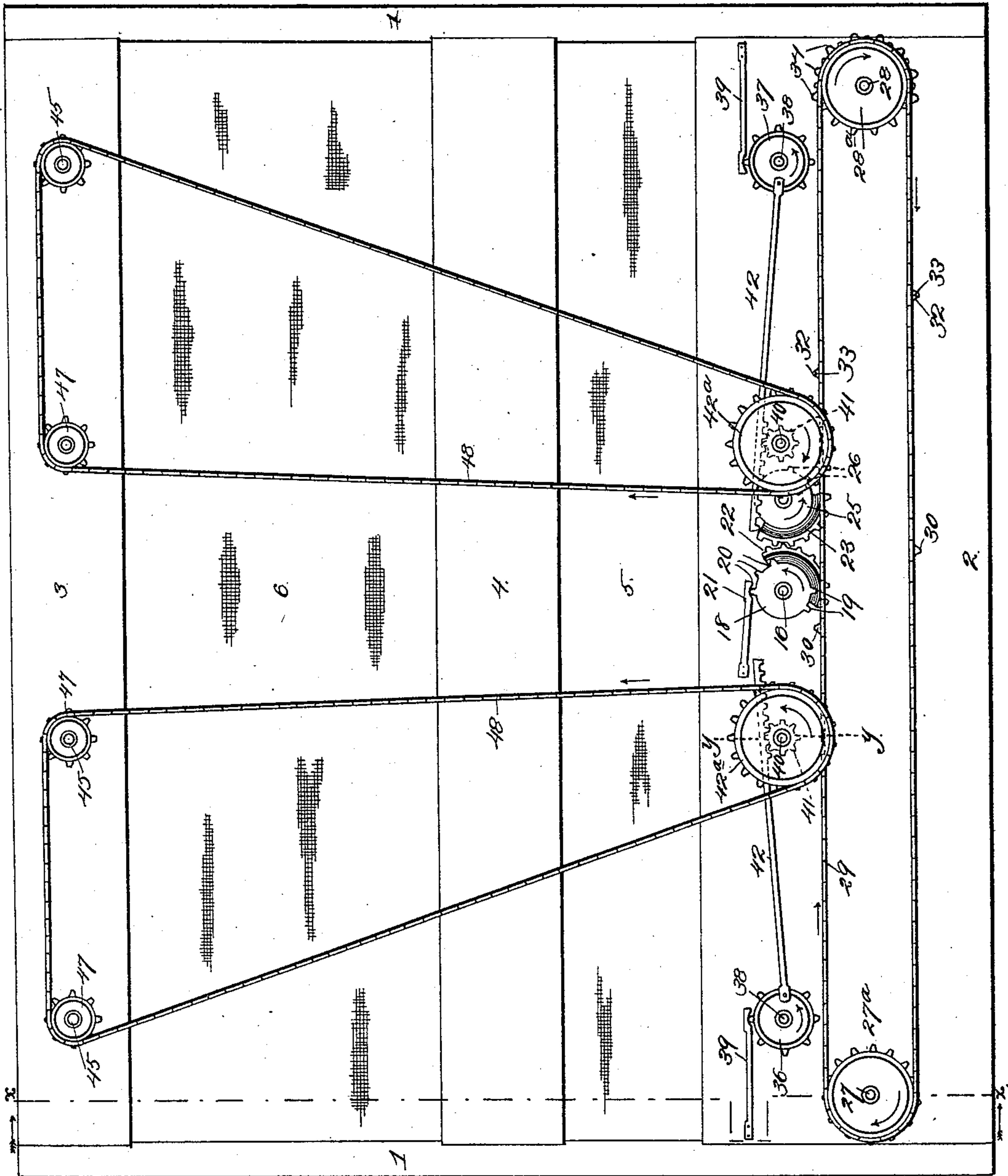


Fig. 1.

Witnesses:

F. G. Fischer
G. P. Thorpe

Inventor:
S. H. Wilson.

By *Edmond Edmond*
Attys.

(No Model.)

4 Sheets—Sheet 2.

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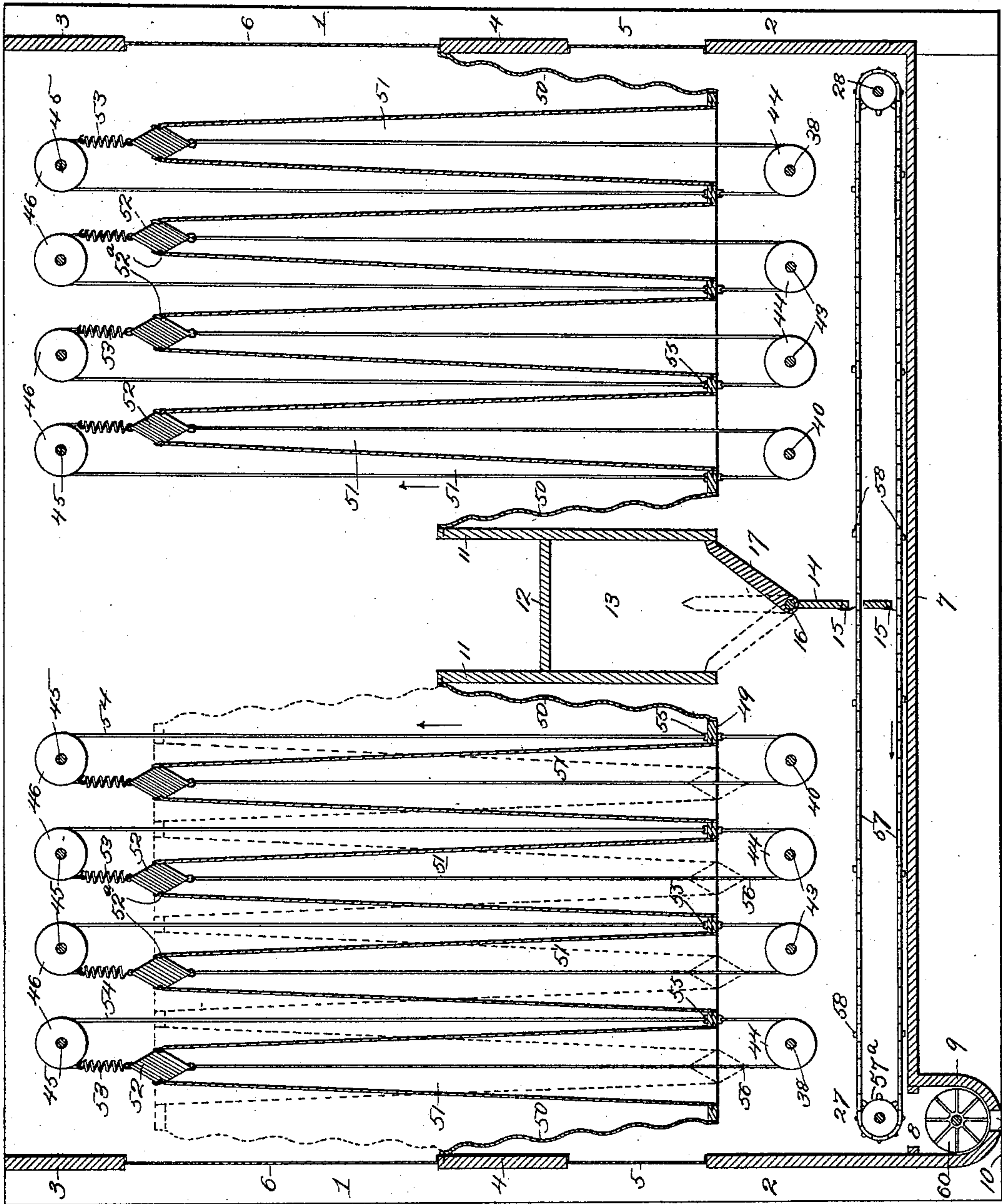


Fig. 2.

Witnesses:

F. G. Fischer
G. B. Thorpe

Inventor:
S. H. Wilson.

By Higdon & Higdon
Attys.

(No Model.)

4 Sheets—Sheet 3.

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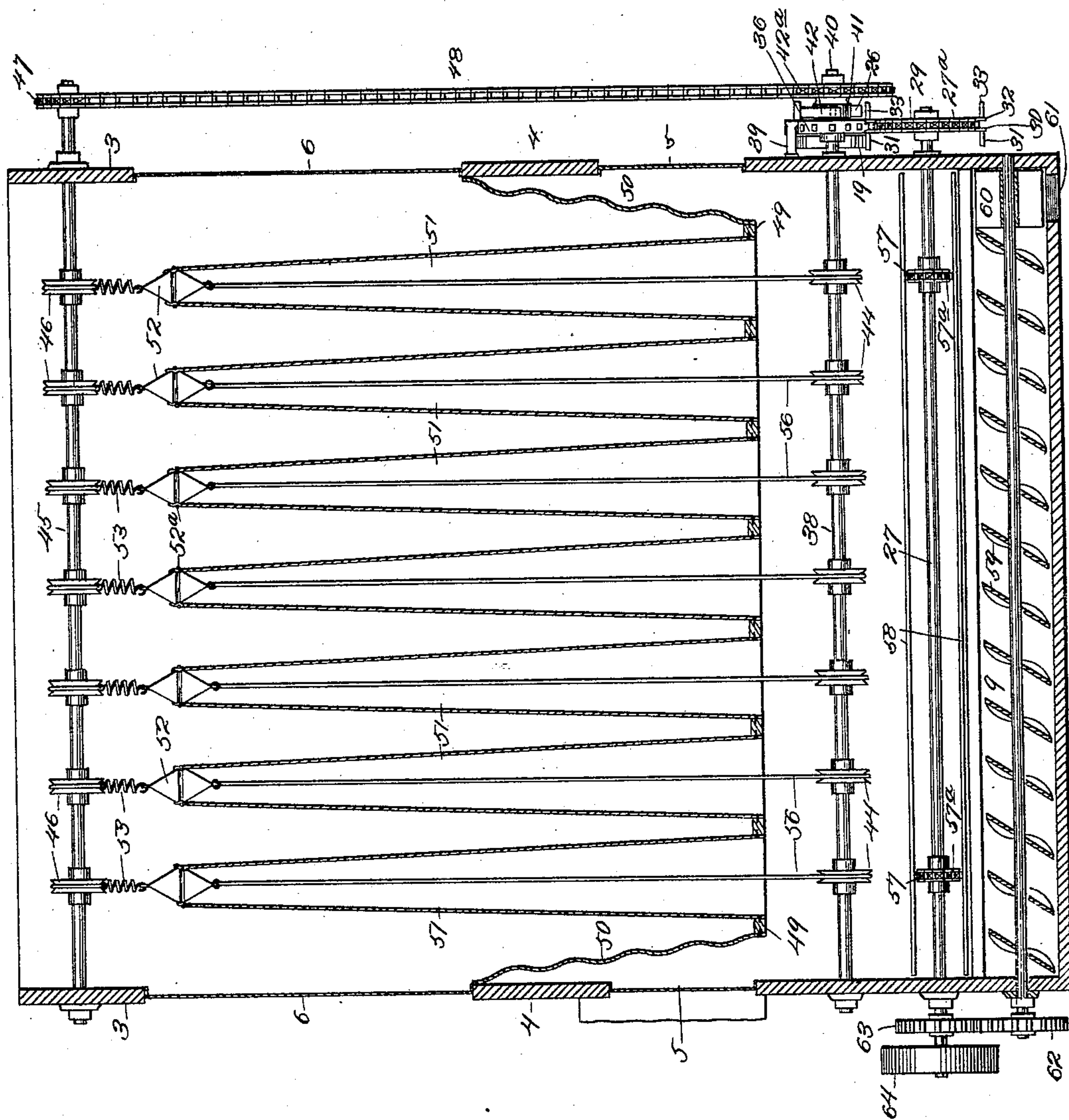


Fig. 3.

Witnesses:

F. G. Litchey
G. F. Horne

Inventor:

S. H. Wilson.

By Higdon & Higdon
Attys.

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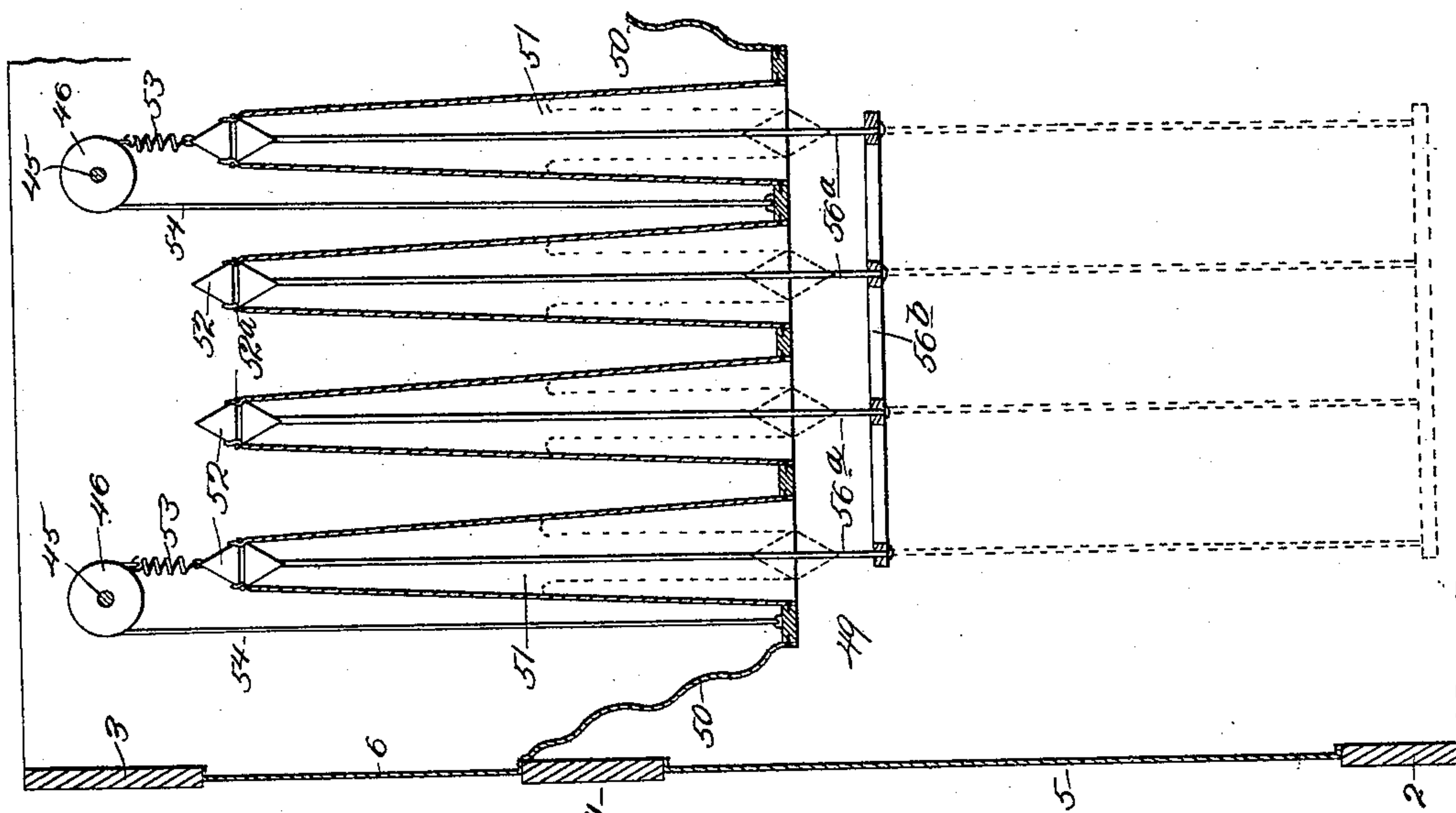


Fig. 8.

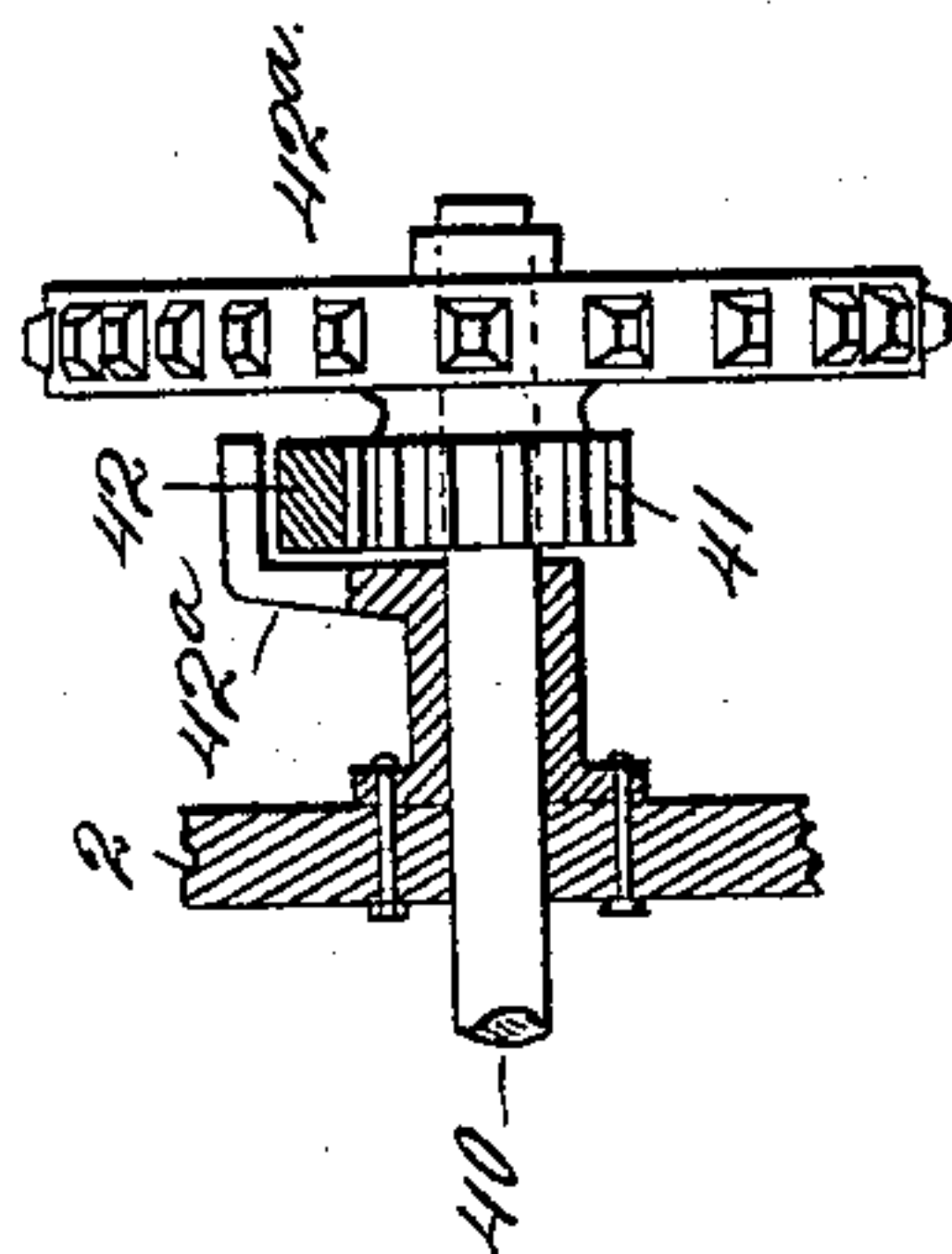


Fig. 7.

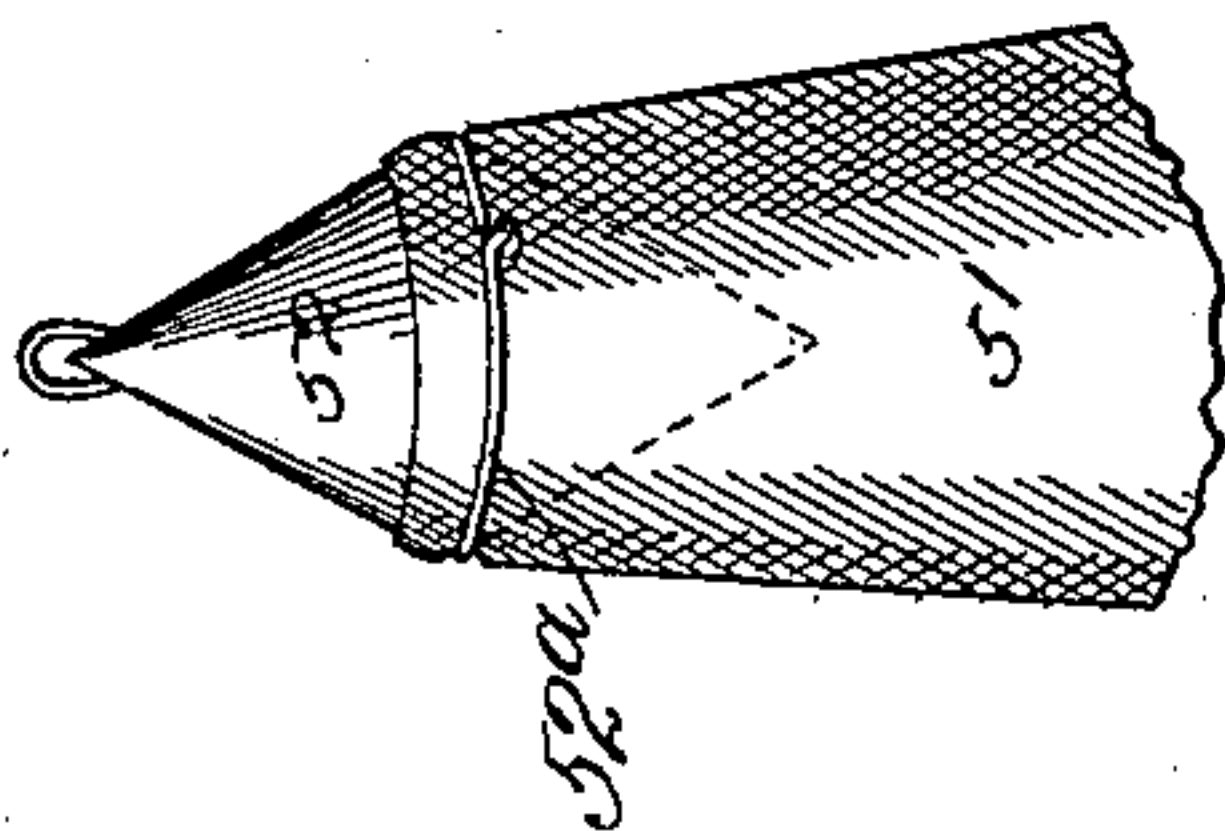


Fig. 6.

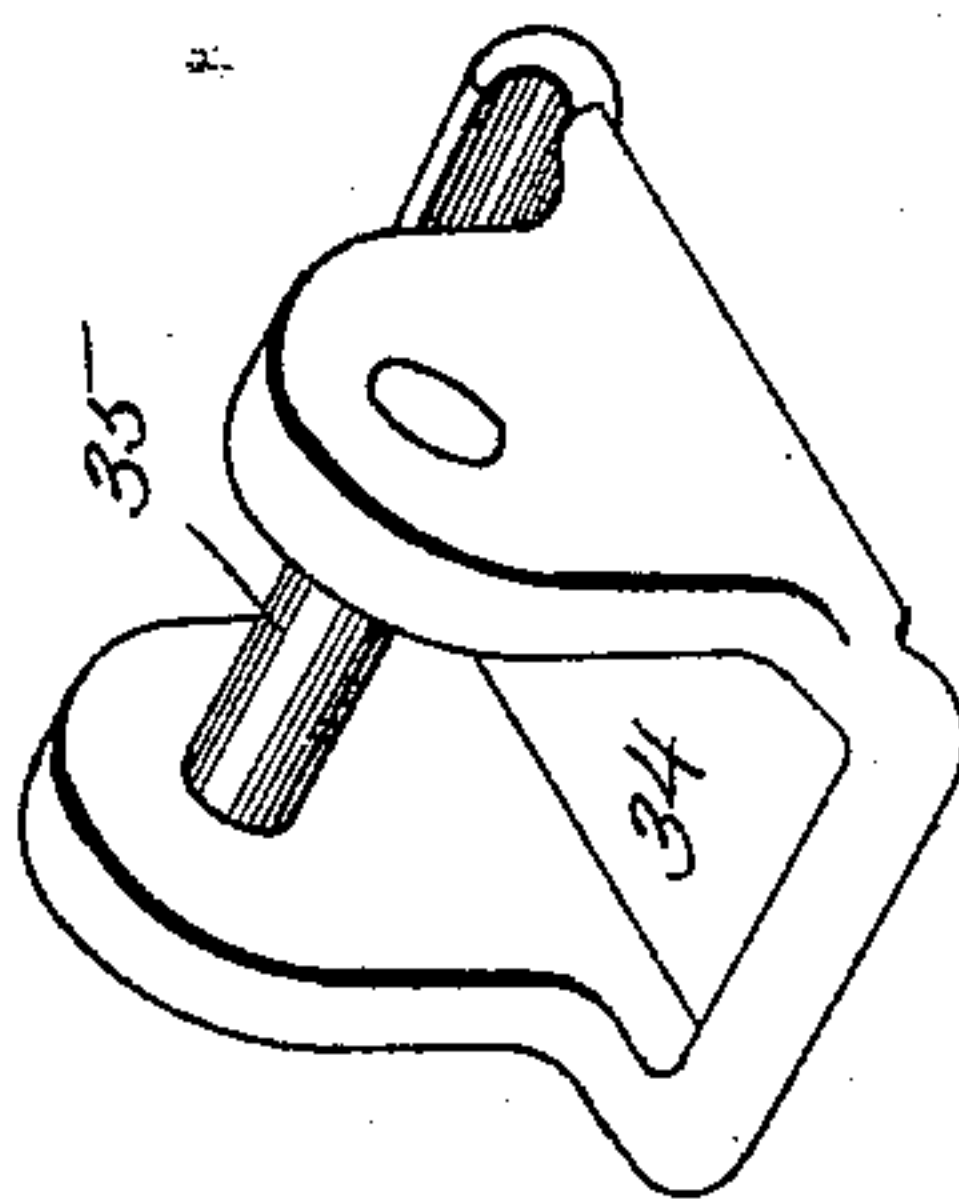
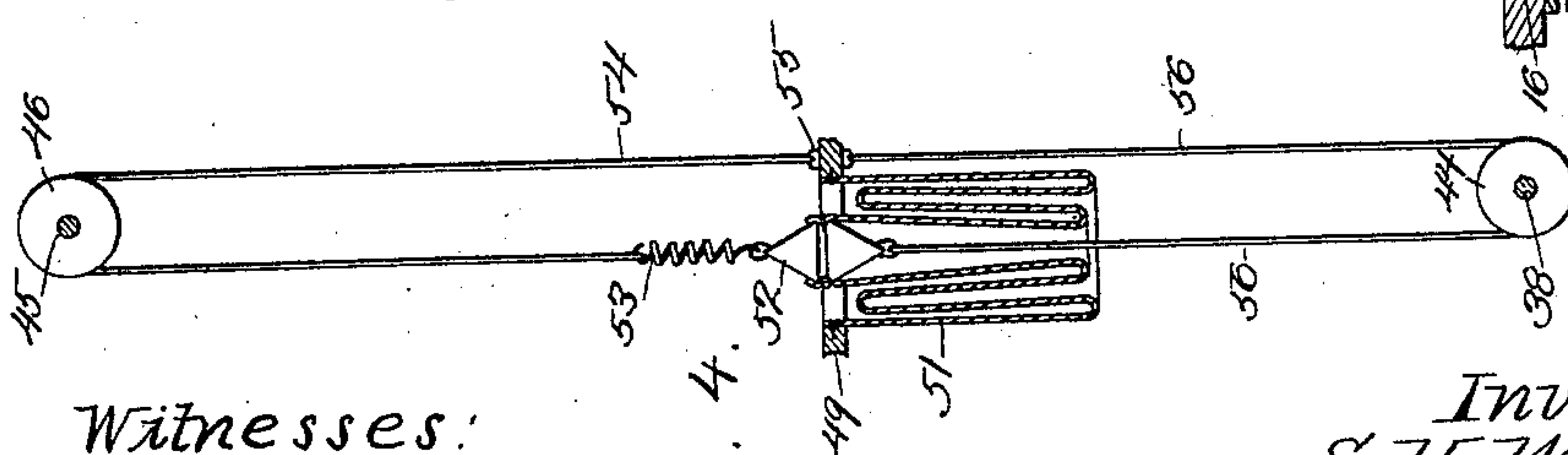
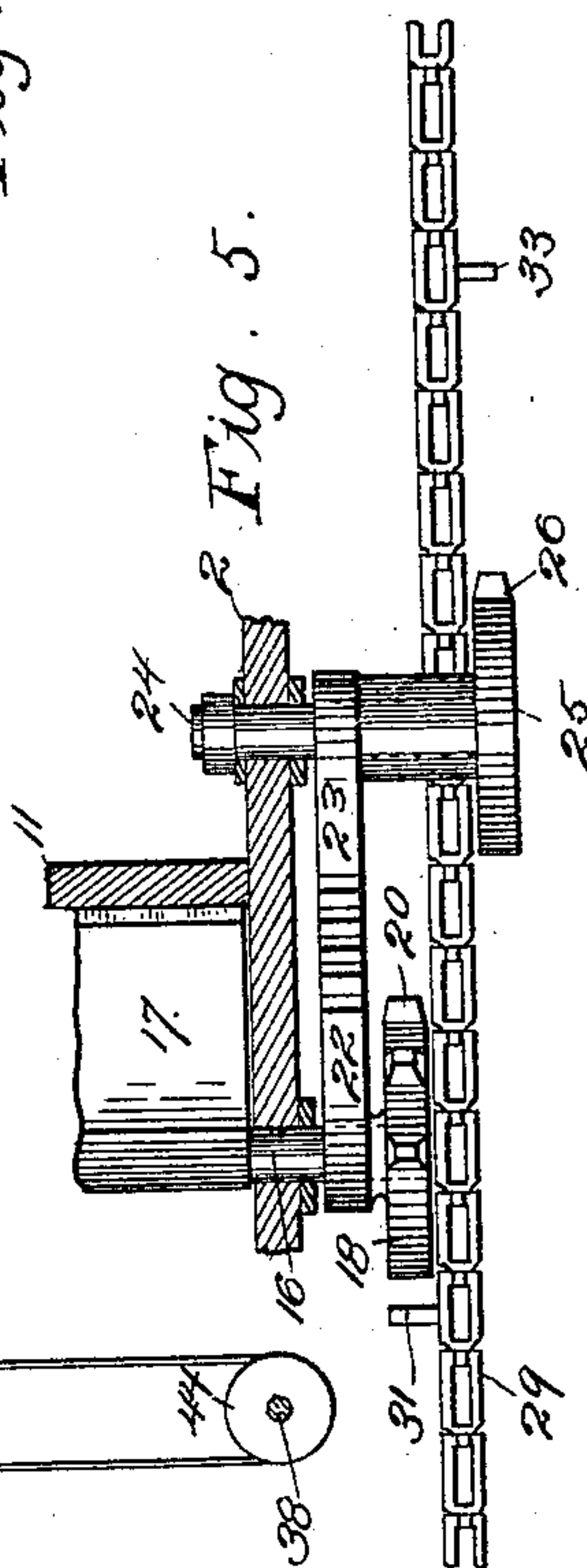


Fig. 9.



Witnesses:

F. G. Litchey
L. J. Thorpe

Fig. 4.

Inventor:
S. H. Wilson.

By *Hydon & Hydon*
Attys.

UNITED STATES PATENT OFFICE.

SAMUEL H. WILSON, OF LEAVENWORTH, KANSAS.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 582,967, dated May 18, 1897.

Application filed June 1, 1896. Serial No. 593,894. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL H. WILSON, of Leavenworth, Leavenworth county, Kansas, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to dust-collectors; and it consists in certain novel and peculiar features of construction and combinations of parts which will be hereinafter described and claimed.

The object of the invention is to produce a machine of this character which is very thorough and reliable in its operation of purifying the dust-laden air which enters the machine and collecting the settled dust and discharging it at any desired point outside of the machine.

Secondary objects of the invention, comprising the important features of detail, construction, and arrangement, will hereinafter appear and be pointed out in the appended claims.

In order that the invention may be fully understood, reference is to be had to the said accompanying drawings, wherein—

Figure 1 represents a side view of a dust-collector embodying my invention. Fig. 2 represents a vertical longitudinal section of the same. Fig. 3 represents a vertical cross-section of the same, taken on the line $x x$ of Fig. 1. Fig. 4 represents a detail sectional view of one of the straining-tubes and the means for turning the same inside out, said figure illustrating it in the position which it will assume approximately while being so manipulated. Fig. 5 represents in plan view and on an enlarged scale a portion of the valve for controlling the entrance of air to the machine and also represents in plan that part of the mechanism for operating or adjusting said valve and in horizontal section a part of the framework of the machine. Fig. 6 is a detail perspective view, on an enlarged scale, of one of the chain-links which, through the medium of other instrumentalities, causes the straining-tubes to assume one position—viz., turn inside out and then re-assume their original positions, so as to thoroughly and effectually dislodge any dust

thereon. Fig. 7 is a perspective view, on an enlarged scale, of the closed end of one of said tubes. Fig. 8 is a sectional view taken on the line $y y$ of Fig. 1, but on a larger scale. Fig. 9 is a sectional view of a part of the framework of the machine provided with a modified arrangement of the mechanism for manipulating the straining-tubes—viz., the tubes which turn inside out.

Referring to said drawings in detail, the framework of the machine is preferably rectangular and may be composed of four uprights or corner-posts 1, boarded in at their lower ends and sides, as at 2, and at their upper ends and sides, as at 3. Between the boarding 2 and 3 said standards are also preferably connected by the boards 4, and the spaces between the boards 2 and 4 and 3 and 4 are connected, respectively, by pieces of cloth or wire-gauze 5 and 6, or said spaces may be boarded up, as preferred.

The framework or casing is provided with a bottom 7, which at one end is provided for its full width with a slot 8, whereby the interior of the framework or casing communicates with the conveyer-spout 9, provided with a discharge-opening 10 at one end. Extending transversely of the middle portion of the framework or casing and arranged a suitable distance apart are parallel boards 11, which preferably extend in a vertical direction from the upper margin of the boarding 2 to the upper margin of the boarding 4, and connecting said transverse boards 11 is a horizontal board 12, which closes the upper end of the air-chamber 13, which chamber at times communicates at its lower end with similar chambers at the bottom of the framework or casing, which chambers I will hereinafter term the "settling-chambers." Said air-chamber is also adapted at times to be cut off from communication with one or the other of said settling-chambers, for a purpose which will hereinafter appear. Said settling-chambers are separated by the transversely-extending partition 14, which extends from the bottom 7 of the casing to a point within a suitable distance of and vertically below the middle of the air-chamber, and said partition is provided with longitudinal slots closed by flexible valves or covers 15, for a purpose which will also hereinafter appear. At the upper end

of the partition 14 a shaft 16 extends transversely of and is journaled in the casing, and mounted rigidly thereon is the valve 17, which is adapted to be properly adjusted to deflect
 5 all of the dust-laden air from the chamber 13 into one settling-chamber or the other or divide the current and permit it to pass into both chambers. At one end and externally of the casing the shaft carries a disk 18, which
 10 is provided at opposite points with two teeth 19 and with three teeth 20, which latter teeth are adapted to be engaged one at a time by a friction pawl or brake 21, of spring metal or equivalent material, for the purpose of hold-
 15 ing the valve in its adjusted position. Cast integrally with said disk, preferably, and interposed between the same and the adjacent wall of the casing is a toothed segment or mutilated gear-wheel 22, which meshes at all
 20 times with a similar toothed segment or mutilated gear-wheel 23, mounted loosely upon a stub-shaft 24, secured to the casing and projecting outwardly and parallel with the shaft 16. Cast integrally with the mutilated
 25 gear-wheel 23 or rigidly connected therewith in any suitable manner is a disk 25, provided with two teeth 26. This disk is preferably arranged at a greater distance from the side of the casing than its companion disk 18, here-
 30 inbefore described. The object of this arrangement will hereinafter appear.

27 and 28 designate transverse shafts, which are arranged in the lower outer corners of the settling-chambers hereinbefore referred to,
 35 and mounted rigidly upon the outer ends of said shafts are sprocket-wheels 27^a and 28^a, respectively, which are connected by an endless sprocket-chain 29, arranged in a vertical plane between the toothed disks 18 and 25.
 40 Diametrically opposite links of said chain are provided with offsetting ears 30, from which project laterally and toward the same side or inwardly the pins 31, which are adapted at intervals to engage the teeth 19 of the toothed
 45 disk 18, and operate the same, so as to adjust the valve 17. Between the lugs 30, and at suitable distances from the same and from each other, a second pair of links are provided with lugs 32, from which project later-
 50 ally, and in a direction opposite to the pins 31, or outwardly, the pins 33, and said pins are adapted at intervals to engage the teeth 26 of the disk 25 and operate the same, and thereby, through the medium of the segments
 55 or mutilated gear-wheels 22 and 23, operate the valve 17 in the direction opposite to its movement when operated through the medium of the toothed disk 18, or, in other words, one disk operates the valve so as to discharge
 60 the dust-laden air from the chamber 13 into one settling-chamber and the other adjusts said valve so that the air is discharged into the opposite settling-chamber. 34 designates, in this instance, eight links of said chain, which are mounted between the lugs 32 and
 65 are provided with outwardly-projecting ears, connected by pins or teeth 35, which pins or

teeth are adapted to engage or rotate the sprocket-wheels 36 and 37, each of which has
 70 teeth equal in number to the said links 34. Said sprocket-wheels are arranged externally and at the same side of the casing, being mounted loosely upon the projecting ends of the shafts 38, extending transversely through
 75 the settling-chambers at the lower corners of the casing. The movement of said sprocket-wheels is limited to the movement induced by the positively-applied pressure of the pins 35 by means of the friction-brakes 39, which
 80 are preferably of spring metal and secured externally to the framework or casing. The transverse shafts 40 extend through each settling-chamber adjacent to its inner end and in the same horizontal plane as the shafts 38,
 85 and mounted loosely upon said shafts externally of the casing are the cog-pinions 41, provided with the same number of teeth as the said wheels 36 and 37, and 42 designates rack-bars, which engage said pinions and have
 90 the same number of teeth and are mounted upon wrist-pins projecting from the faces of the said wheels 36 and 37, so that with each complete revolution of said wheels, and consequent reciprocation of the rack-bars, the
 95 large cog-wheels 42^a, cast with or fastened to the pinions 41, and consequently loosely mounted upon the shafts 40 externally of the frame or casing, are caused to complete two
 100 revolutions in opposite directions. As each is caused to rotate by the advancing rack-bar in the reverse direction to that indicated by its arrow, Fig. 1, the follower rises and the filtering-tubes are turned inside out, as
 105 hereinafter described, and as such movement is reversed by the rearward movement of its rack the follower is lowered and the tubes resume their normal position. Transverse
 110 shafts 43, occupying the same horizontal plane as the shafts 38 and 40, are arranged between said shafts, and may also be journaled at their opposite ends in the casing, so that one
 115 set of shafts extend through each settling-chamber, each set consisting of four shafts, though it is to be understood, of course, that a greater or less number may be employed. Mounted loosely upon each of said shafts are
 120 an equal number of grooved pulleys 44. A corresponding series of transversely-extending and horizontal shafts 45 occupy the upper end of the framework or casing, and each
 125 shaft is superposed relative to one of the shafts below, and mounted upon said shafts are a corresponding series of grooved guide-pulleys 46. The shafts 45 of said upper series, which are arranged vertically above the shafts 38 and 40, extend outwardly of the
 130 framework or casing, and mounted rigidly upon such extending ends are cog-wheels 47, also provided with eight teeth, and said cog-wheels are connected by endless chains 48 with the large cog-wheels 42^a, hereinbefore referred to, and each provided with thirty-two teeth.

49 designates a pair of follower-boards, one

being located at each side of the air-chamber 13 within the framework or casing, and said follower-boards are provided with circular openings equal in number to and vertically above the guide-pulleys 44. Attached to said boards in any suitable manner are annular air-straining cloths 50, which at their opposite margins are secured to the upper margins of the boarding 4 of the framework or casing and the transverse boarding 11, as shown clearly in the drawings.

51 designates air-straining tubes, which are conical or tapering in form, preferably, and have their open and larger ends secured in the openings or holes of the followers 49 in such manner that said ends of the tubes are always kept open to their widest extent. The opposite end of said tubes embrace and are closed by a double conical plug 52, being secured in grooves in said plugs preferably by wire clasps 52^a. (See Fig. 7.) The upper ends of said plugs are attached to the lower ends of the spiral retractile springs 53, and said springs in turn are attached to cords 54, which extend over the guide-pulleys 46 and are attached at their lower ends to the followers between the tubes, as shown at 55. The opposite ends of said plugs are attached to the cords 56, engaging the lower series of guide-pulleys 44, and having their opposite ends attached to the under side of the followers 49, as shown most clearly in Fig. 2. By this arrangement it is obvious that the cords 54 and 56, together with the plugs 52, springs 53, and follower 49, constitute in effect endless connections attached to said strainer-tubes. The springs 53 are employed to take up any slack in the endless connections 54, so that at all times such connections will be at the requisite tension for positive and reliable operation. It is to be understood, of course, that other endless connections, mechanical equivalents of the one shown, may be employed to accomplish the same purpose, and that the tensioning-springs may be dispensed with or the cords or connections tensioned in a variety of other ways without departing from the spirit of my invention. In the bottom of the casing or framework, and extending longitudinally of the settling-chamber, are the chains 57, which engage small sprocket-wheels 57^a upon the shafts 27 and 28, and said chains are connected by cross-strips 58, (see Figs. 2 and 3,) so as to constitute a drag for sweeping the accumulated dust from the floors of the settling-chambers and discharging it through the opening 8 into the transverse spout 9 at one end of the framework or casing. Said drag extends through the openings closed by the flap-valves 15, (see Fig. 2,) which valves prevent the dust-laden air passing from one settling-chamber into the other. Located in the spout 9 is a spiral conveyer 59, and mounted upon one end of its stem or shaft is a radial-armed wheel 60, which at all times bridges the opening 10, communicating with the discharge-chute, (not shown,) running to any suitable

point, so as to prevent the dust-laden air forced into the settling-chamber escaping at such point, but which permits the conveyer to feed the dust through it in a continuous stream, as will be readily understood. Mounted upon one end of the conveyer stem or shaft externally of the casing is a cog-wheel 62, which meshes with a similar cog-wheel 63, mounted upon the shaft 27, and said shaft is driven through the medium of the belt (not shown) and the belt-wheel 64. (See Fig. 3.)

In practice the machine is set in motion by throwing the belt (not shown) in gear with the pulley, or it may be driven in any other suitable manner, and the large spiral conveyer, the drag, and the chain 29 are simultaneously and continuously operated. The chain 29 also periodically and alternately, through the medium of the links 34, operates the sprocket-wheels 36 and 37 and the valves by means of the disks 18 and 25. The alternate operation of the sprocket-wheels 36 and 37 consequently, as hereinbefore explained, causes the rotation at a corresponding speed of the pinions 41, cast or otherwise securely fastened to sprocket-wheels 42^a, and, through the medium of the endless chains 48 and the sprocket-wheels 42^a and 47, the corresponding rotation of the shafts 45, and the rotation of said shafts, through the medium of the endless connections between the pulleys 44 and 46, rotates the latter with no strain on said connections and causes the upward movement of the follower and the downward movement of the closing-plugs of the straining-tubes 51. By the time one-quarter of a revolution of the wheels 36 37 has taken place, or, in other words, after two links 34 have engaged and operated said wheels, (though only one of them is rotated at a time, as hereinbefore explained,) the follower and the plugs occupy the relative positions shown in Fig. 4, while the strainer-tubes are bagged or folded approximately as shown in said figure, though in practical operation it is more completely folded, and is effectually rubbed and brushed throughout its entire length, so as to dislodge all of the dust clinging to the inside of the tube and cause it to drop down into the settling-chamber below. By the time the said wheels have completed their half-revolution or four teeth of the same have been engaged by a corresponding number of links of the chain 29 the tube is turned completely inside out and the end closed by the plug occupies the position formerly occupied by the follower, while the follower occupies the position formerly occupied by the plug, as illustrated clearly by dotted lines in Fig. 2. At the same time the flexible strainer-cloths 50 are caused to assume the position shown in dotted lines, same figure, by the upward movement of the follower. The continued rotation of said wheels next reverses the operation just described—that is, the followers and the plugs reassume their original positions and the strainer-tubes are again turned in-

side out, with their open ends or mouths presented downwardly, as before. This double reversal of each set of tubes takes place once with each complete circuit of the chain 29,

5 first one set operating and then the other.

In practical operation the dust-laden air is forced into the chamber 13 from either end and enters one or both settling-chambers, accordingly as the valve is in its inclined or
10 vertical position. When the valve occupies the position shown in full lines, Fig. 2, the entire volume of dust-laden air enters the left-hand settling-chamber, and because it cannot escape below it passes into the series
15 of strainer-tubes and up between the walls of the framework or casing and the strainer-cloth 50. The air under pressure escapes freely through said tubes and said cloth, but the finer particles of dust cling to said tubes
20 and said cloth, the heavier particles immediately on escaping from the air-chamber 13 dropping down upon the floor of the settling-chamber. This action continues and the dust accumulates upon said straining-surfaces,
25 and that upon the floor of the settling-chamber is at the same time swept continuously into the spout 9 and is discharged by the conveyor through the opening 10. This action continues until the first pin 31 comes in con-
30 tact with the foremost tooth of the disk 18 and operates the same, thereby throwing the valve to its vertical position, as shown in dotted lines, Fig. 2, so as to permit the air to pass into both settling-chambers simultaneously.
35 The valve continues in this position until the first link 34 of the chain 29 comes into engagement with the sprocket-wheel 36 and starts it rotating. At the same time the sec-
40 ond pin 31 comes in contact with the second or rearmost tooth of the disk 18 and thereby throws the valve to the inclined position shown in dotted lines, Fig. 2, and entirely cuts off the entrance of air to the left-hand settling-chamber, so that the same becomes for
45 the time being a dead-air chamber, while the whole volume of air is caused to pass into the right-hand settling-chamber. With the beginning of the rotary movement of the sprocket-wheel 36 the follower begins to rise
50 and the conical plugs to descend through the medium of connections hereinbefore described and in the manner hereinbefore explained, and the continued operation of said sprocket-wheels through the medium of the
55 successive links 34 causes said tubes to turn completely inside out and then turn back again or assume their original position, as hereinbefore explained. Immediately they have reassumed such position the foremost
60 pin 33 comes in contact with the foremost tooth 26 of the disk 25 and operates said disk and thereby causes the valve to again assume its vertical position and permit the dust-laden air to enter both chambers. The valve con-
65 tinues in this position until the links 34 have performed about one-third of their circuit or until the foremost link comes in contact

with and operates the sprocket-wheel 37 and through the medium of the connections de-
scribed begins to turn the tubes over the
70 right-hand settling-chamber inside out. Immediately after such motion is begun the second pin 33 comes into engagement with the second or rearmost tooth 26 of the disk 25 and throws the valve to the position shown in Fig. 75
2, so that such operation takes place in a dead-air chamber. All succeeding operations are repetitions of that described, and it is obvious from the description, taken in connection with
80 the drawings, that the air passing through said machine is most thoroughly and effectively freed from dust and that the latter is positively and reliably discharged from the ma-
chine. It is also obvious that by turning the tubes inside out in the manner described they
85 bag and rub or brush themselves thoroughly, so that the dust which accumulates upon them is thoroughly and effectually dislodged periodically, so as to keep them in the best
possible condition at all times for separating
90 the dust and other foreign particles from the air and permitting the purified air to pass up through the machine and escape. By inspection of Fig. 4 it is obvious that the entire sur-
face of each bag, as it is turned inside out
95 and back again, is rubbed by some other portion or by the follower or the conical plugs. The shape of said plugs is important in that they insure the reliable operation of said
tubes—that is, being centered with reference
100 to said tubes they prevent them, in their reversing operation, from bagging in such manner as to interfere with the proper movement in opposite directions of said followers and
said plugs.

Referring now to Fig. 9, it will be noticed that I show a modified form of mechanism for turning the tubes inside out. In this figure
it will be noticed that I employ the follower
110 49 and the flexible connections 50 with the walls of the casing and connect certain of the conical plugs 52, which close the smaller or attenuated ends of the tubes, preferably the
end or corner ones of each series, with the
115 springs 53 and 54, guided over pulleys 46, in the manner hereinbefore described. In lieu of the flexible connection 56 I preferably employ a series of rods 56^a, which extend cen-
trally of said tubes and are attached at their
120 upper ends to the opposite or lower ends of the conical plugs, and the lower ends of said rods are carried by or connected to a rigid
horizontal frame 56^a, so that they shall be maintained in their proper relative positions.
The vertical reciprocation of said frame, by
125 suitable mechanism, causes the tubes to be turned inside out in the manner hereinbefore explained.

It is to be understood, of course, that the tubes may be disposed in other positions than
130 the vertical and that mechanical equivalents may be employed and changes, as in the form, proportion, arrangement, or detailed construction of the parts, may be made without

departing from the spirit and scope or sacrificing any of the advantages of my invention.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dust-collector, the combination with a suitable casing, of a perforated frame therein, a flexible air-straining partition surrounding said frame and attached at its opposite margins to the same and to the walls of the casing so as to suspend said frame in said casing, air-straining tubes secured at their open ends in the perforations of said frame, and means to synchronously raise said suspended frame and turn said tubes inside out, substantially as described.

2. In a dust-collector, the combination with a suitable casing, of a perforated frame therein, a flexible air-straining partition surrounding said frame and attached at its opposite margins to the same and to the walls of the casing so as to suspend said frame in said casing, air-straining tubes secured at their open ends in the perforations of said frame, and means to synchronously raise said suspended frame and turn said tubes inside out, and to reverse such movement and cause said parts to resume their original positions, substantially as described.

3. In a dust-collector, the combination with a suitable casing provided with a settling-chamber at its lower end and an air chamber or passage communicating with the settling-chamber, of a perforated follower, a filtering or air-straining tube having a closed end and an open end, the latter being secured in a perforation of said follower, a flexible air-straining partition attached at one margin to said follower and at its opposite margin to the wall of the casing so as to partition the casing in conjunction with the tube and the follower above the settling-chamber, and means to turn said tube inside out, for the purpose set forth.

4. In a dust-collector, the combination with a suitable casing provided with two settling-chambers, and an air-chamber adapted to discharge into either or both of said settling-chambers, of a perforated follower above each settling-chamber, flexible annular air-strainers attached at their opposite margins to said followers and to the walls of the casing above each settling-chamber so as to intercept the passage of the dust upwardly between said walls and said follower, and a series of filtering or air-straining tubes having their open ends secured in said perforated followers, and means to turn said tubes inside out, substantially as described.

5. In a dust-collector, the combination with a suitable casing provided with two settling-chambers, and an air-chamber adapted to discharge into either or both of said settling-chambers, of a perforated follower above each settling-chamber, flexible annular air-strainers attached at their opposite margins to said followers and to the walls of the casing above

each settling-chamber so as to intercept the passage of dust upwardly between said walls and said followers, a series of filtering or air-straining tubes having their open ends secured in the perforated followers, and means to cause the followers and the closed ends of the tubes to move in opposite directions so as to turn said tubes inside out, substantially as and for the purpose set forth.

6. In a dust-collector, the combination with a suitable casing provided with two settling-chambers, and an air-chamber adapted to discharge into either or both of said settling-chambers, of a perforated follower above each settling-chamber, flexible annular air-strainers attached at their opposite margins to said followers and to the walls of the casing above each settling-chamber so as to intercept the passage of dust upwardly between said walls and said followers, a series of filter or air-straining tubes having their open ends secured in the perforated followers, means to cause the followers and the closed ends of the tubes to move in opposite directions so as to turn said tubes inside out, and a valve controlling the passage of air from the air-chamber and adapted alternately to deflect all of the air into each of said settling-chambers, and at times to permit it to enter both simultaneously, substantially as described.

7. In a dust-collector, the combination of a suitable casing provided with settling-chambers at its lower end, an air-chamber, perforated followers arranged above each settling-chamber, flexible partitions between the followers and the walls of the casing, and filtering or air-straining tubes having their open ends secured in the perforations of said followers and arranged to turn inside out, with a valve, a toothed disk mounted upon the stem of the same, a mutilated gear-wheel upon said stem, a stub-shaft, a toothed disk mounted thereon, a mutilated gear-wheel rigidly connected thereto and meshing with the first-named gear-wheel, and an endless chain provided with pins for engaging alternately said toothed disks and thereby adjusting said valve, substantially as described.

8. In a dust-collector, the combination with a suitable casing provided with a settling-chamber at its lower end, a perforated follower, a flexible air-strainer partition connecting said follower with the wall of the casing, a series of shafts below and above said follower, guide-pulleys mounted thereon in alinement with each perforation of the follower, flexible filtering or air-straining tubes having their open ends secured in the perforations of the follower, endless connections attached to said filtering-tubes and engaging said guide-rollers, and means to rotate said shafts, and thereby cause the double reversal of said tubes—that is, cause them to turn inside out and then resume their original positions, substantially as set forth.

9. In a dust-collector, the combination of a suitable casing, provided with two settling-

chambers and an air-chamber, a perforated follower above each settling-chamber, a flexible air-straining partition connecting each follower to the surrounding walls of the casing, a series of shafts in each settling-chamber and above each settling-chamber and said followers, guide-pulleys mounted thereon, filtering or air-straining tubes having their open ends secured in the perforations of said followers, endless connections attached to the closed ends of the same and engaging the vertically-alined guide-rollers, sprocket-wheels upon certain of said shafts, chains connecting them, a pinion upon one of the shafts at each side of the valve-chamber, a sprocket-wheel upon another shaft at each side of the valve-chamber, rack-bars wristed to the same and engaging said pinions, and an endless chain provided with links for alternately engaging said sprocket-wheels, and thereby turning said series of tubes inside out alternately, substantially as described.

10. In a dust-collector, the combination of a suitable casing provided with two settling-chambers and an air-chamber, a perforated follower above each settling-chamber, a flexible air-strainer partition connecting each follower to the walls of the casing, a series of shafts in each settling-chamber and above each settling-chamber and said followers, guide-pulleys mounted thereon, filtering or air-straining tubes having their open ends secured in the perforations of said followers, endless connections attached to the closed ends of the same and engaging the vertically-alined guide-rollers, sprocket-wheels connected by chains, upon certain of said shafts, a pinion upon one of the shafts, at each side of the valve-chamber, a sprocket-wheel upon another shaft at each side of the valve-chamber, rack-bars wristed to the same and engaging said pinions, a valve arranged between the settling-chambers at the lower end of the air-chambers, a toothed disk upon the stem of the same externally of the casing, a second toothed disk geared to the first-named disk, and an endless chain provided with a series of links which alternately engage the sprocket-wheels to which said rack-bars are wristed, and provided also with oppositely-projecting pins which alternately engage said toothed disks and thereby adjust the valve at the proper time, substantially as and for the purpose set forth.

11. In a dust-collector, the combination of

a suitable casing provided with a settling-chamber at its lower end, a perforated follower in said casing and above said chamber, a flexible partition attached at its opposite margins to said follower and the walls of the casing, a filter or air-straining tube having one end secured in the perforation of said follower, a conical plug closing the opposite end of said tube, and connections attached to the opposite ends of said plug, whereby it is drawn back and forth through said tube in order to turn the latter inside out, for the purpose set forth.

12. In a dust-collector, the combination with a suitable casing provided with a settling-chamber at its lower end, a perforated follower above said chamber, a flexible partition connecting the same with the walls of the casing, a filter or air-straining tube, a double conical plug closing and embraced by one end of said tube, the opposite end of said tube being secured in its opened or expanded position in the perforation of the follower, guide-pulleys in vertical alinement with each other and at opposite sides of said follower, and flexible connections engaging the same and having their opposite ends attached to the follower and the opposite ends of said plug, substantially as set forth.

13. In a dust-collector, the combination of a suitable casing provided with a settling-chamber at its lower end, a perforated follower above said chamber, a flexible partition connecting the same with the walls of the casing, a filter or air-straining tube, a double conical plug closing and embraced by one end of said tube, the opposite end of said tube being secured in its open or expanded position in the perforation of the follower, guide-pulleys in vertical alinement with each other and at opposite sides of said follower, flexible connections engaging said pulleys and attached to said follower, and one of them also to one end of the conical plug, and a retractile spring attached to the opposite end of said plug and to the opposite end of the other flexible connection, substantially as and for the purpose described.

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

SAMUEL H. WILSON.

Witnesses:

E. E. DULEY,

FRANK A. PICKETT.