

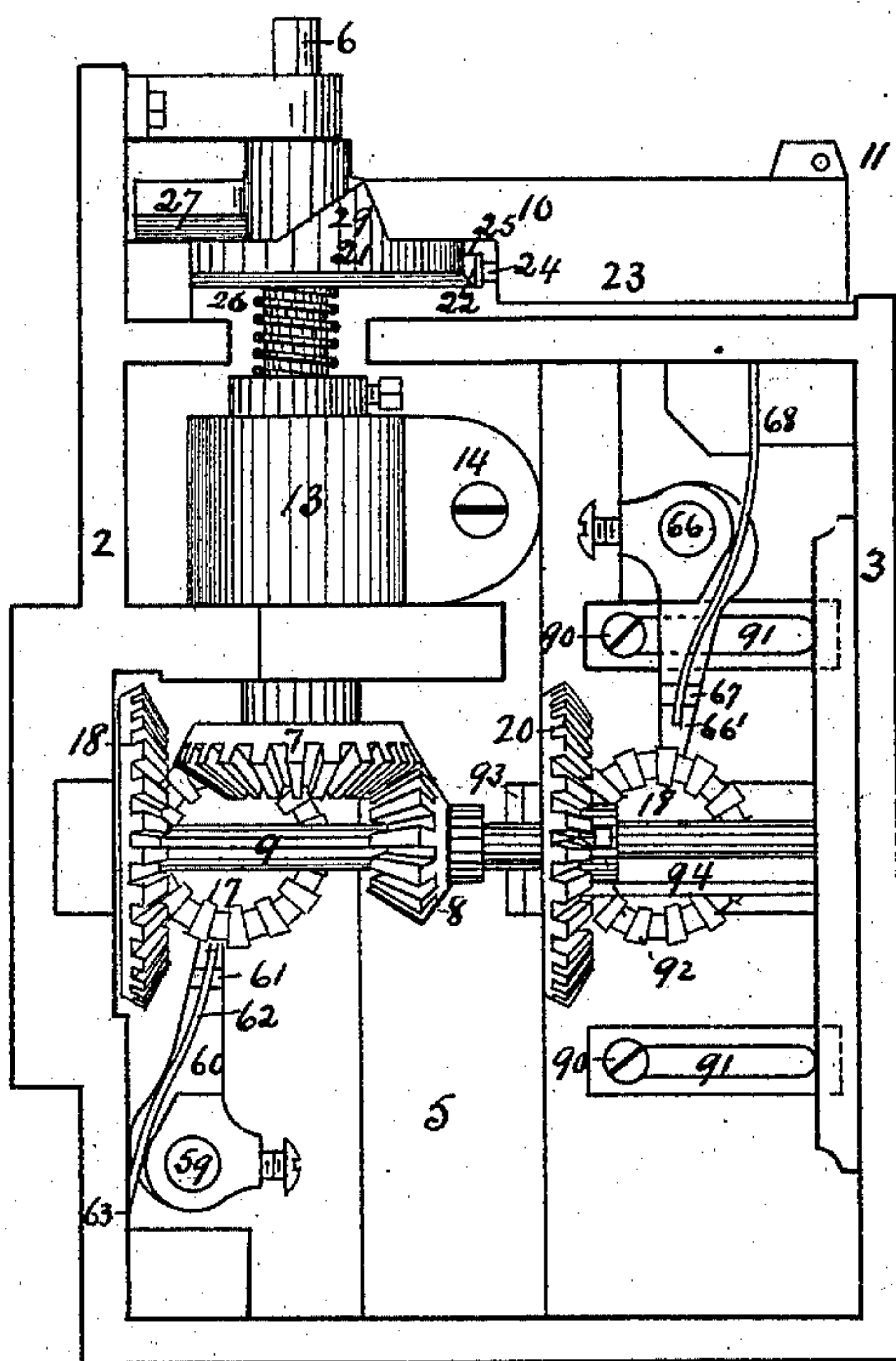
(No Model.)

6 Sheets—Sheet 1.

S. FORRESTER.
STATION INDICATOR.

No. 274,927.

Patented Apr. 3, 1883.



Witnesses,

W. B. Corwin
J. W. Smith

Inventor,

Samuel Forrester
by his attys.
Bakewell & Kerr

(No Model.)

6 Sheets—Sheet 2.

S. FORRESTER.
STATION INDICATOR.

No. 274,927.

Patented Apr. 3, 1883.

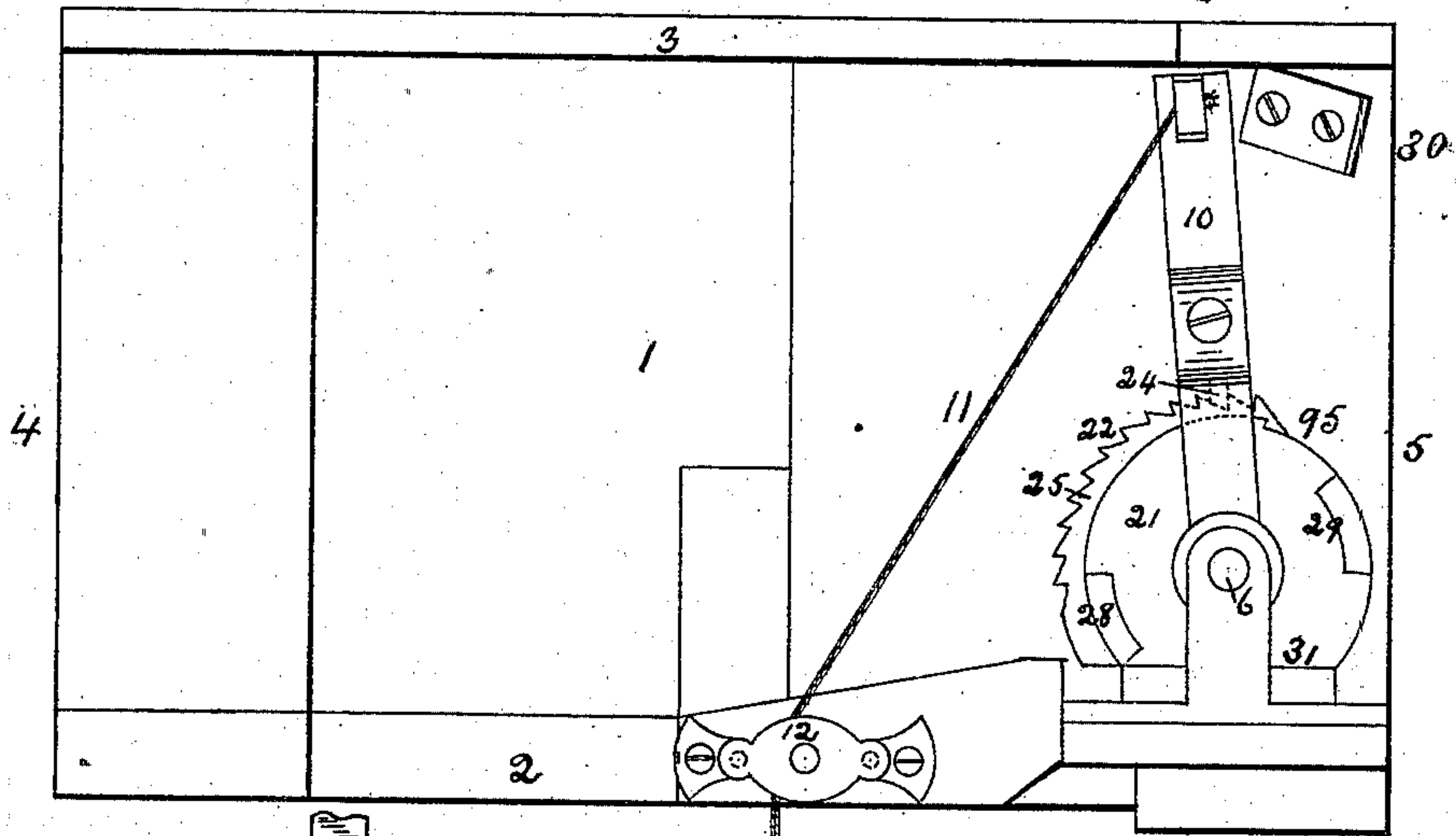


Fig. 3.

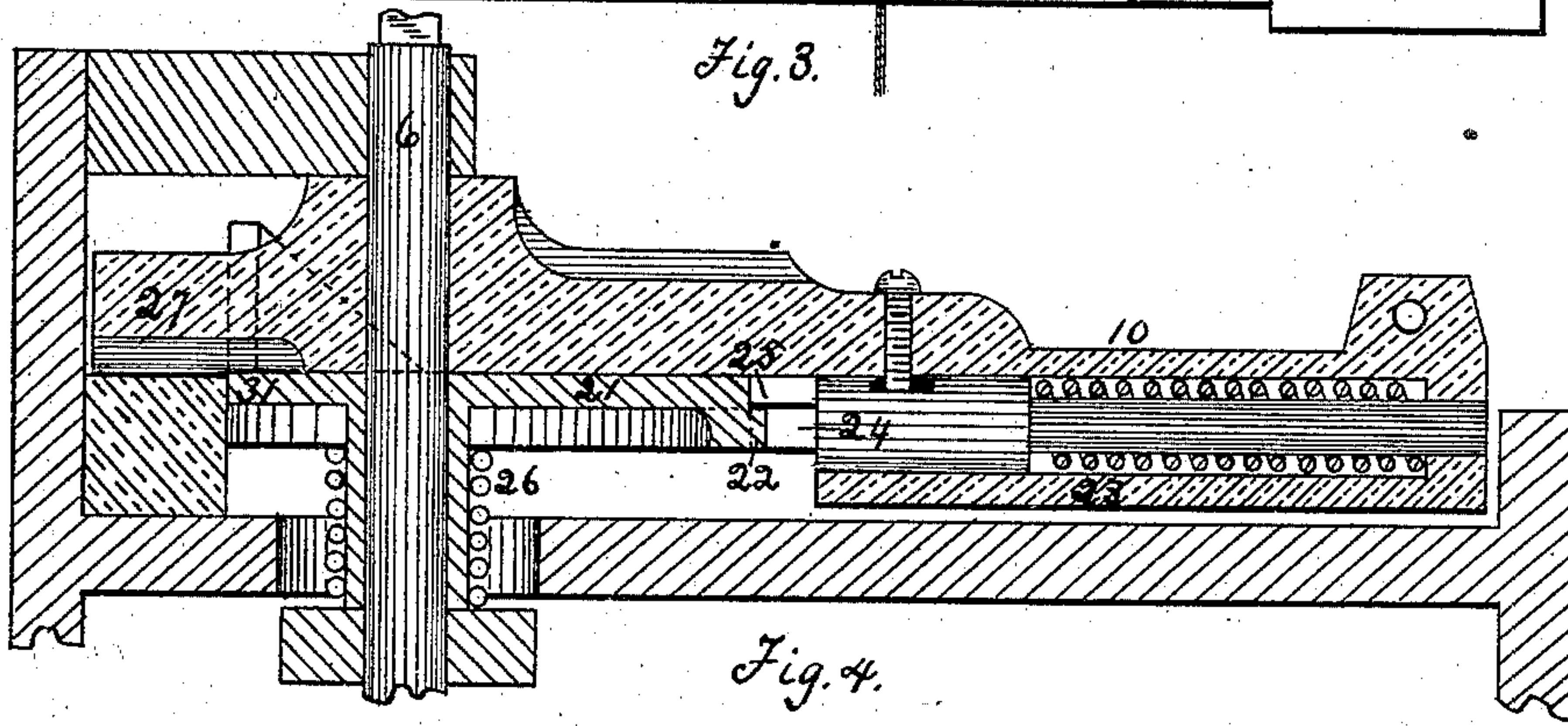


Fig. 4.

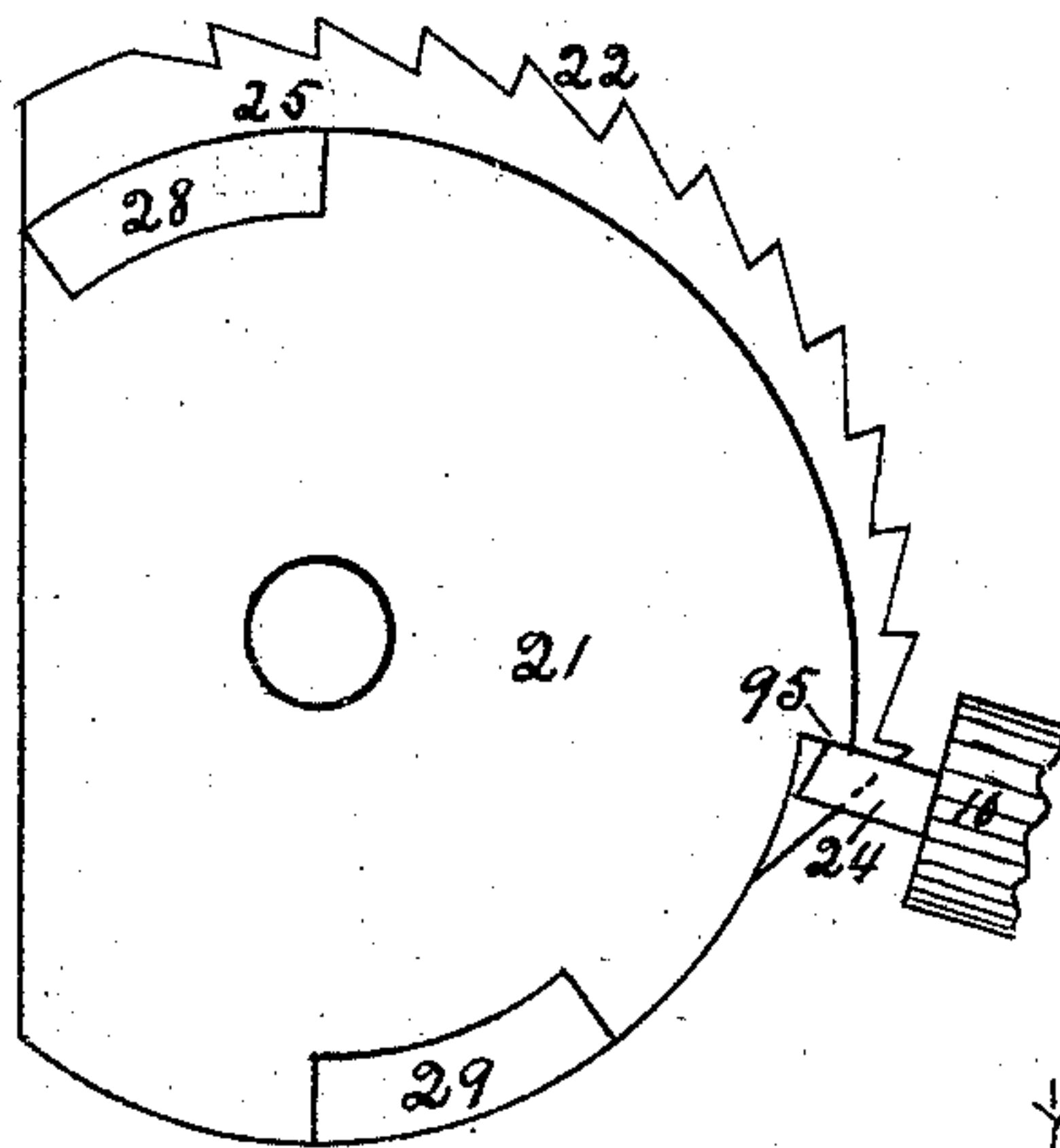


Fig. 5.

Witnesses

W. B. Corwin.
J. K. Smith.

Inventor

Samuel Forrester
by his attys
Bakewell & Kerr

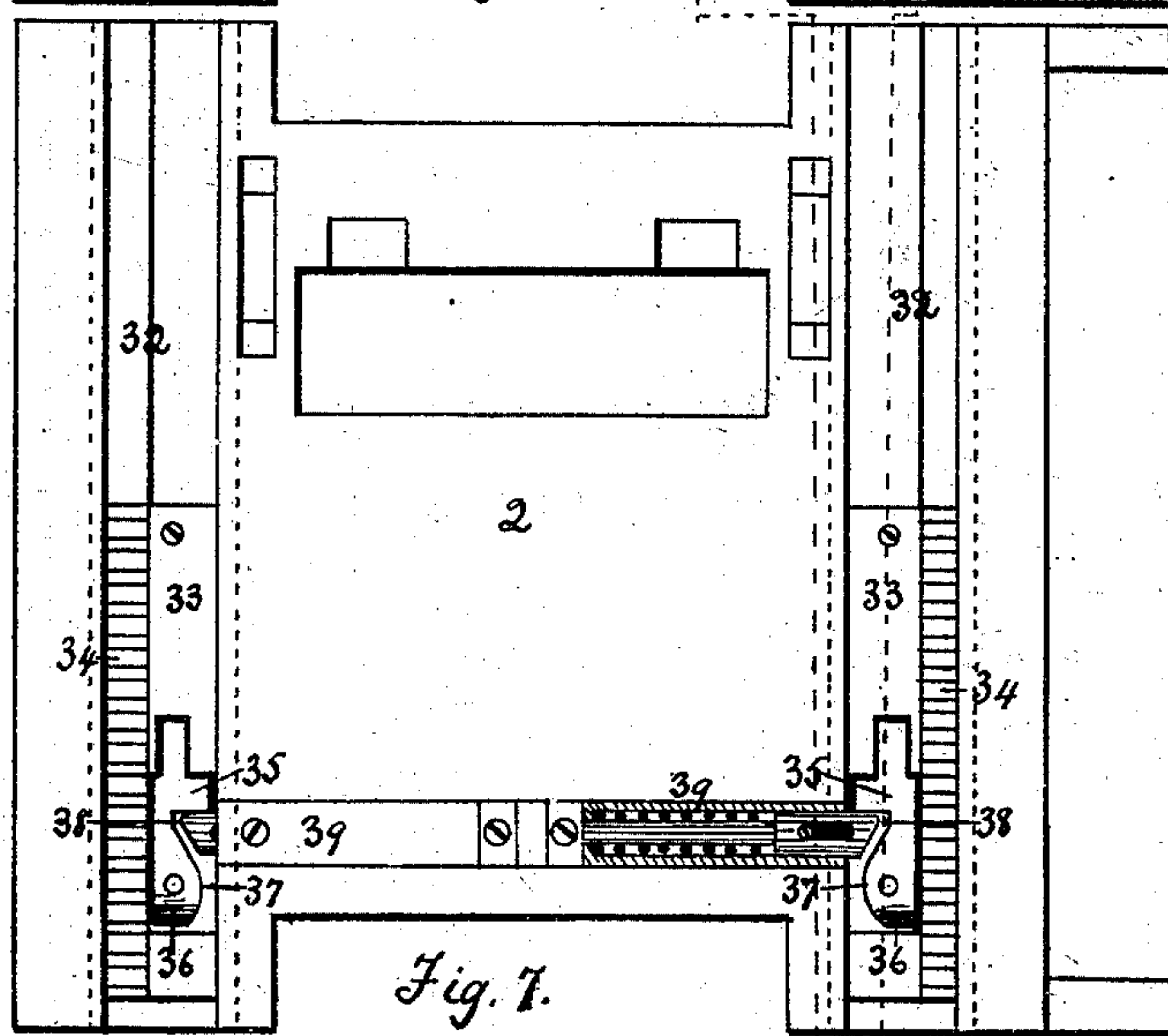
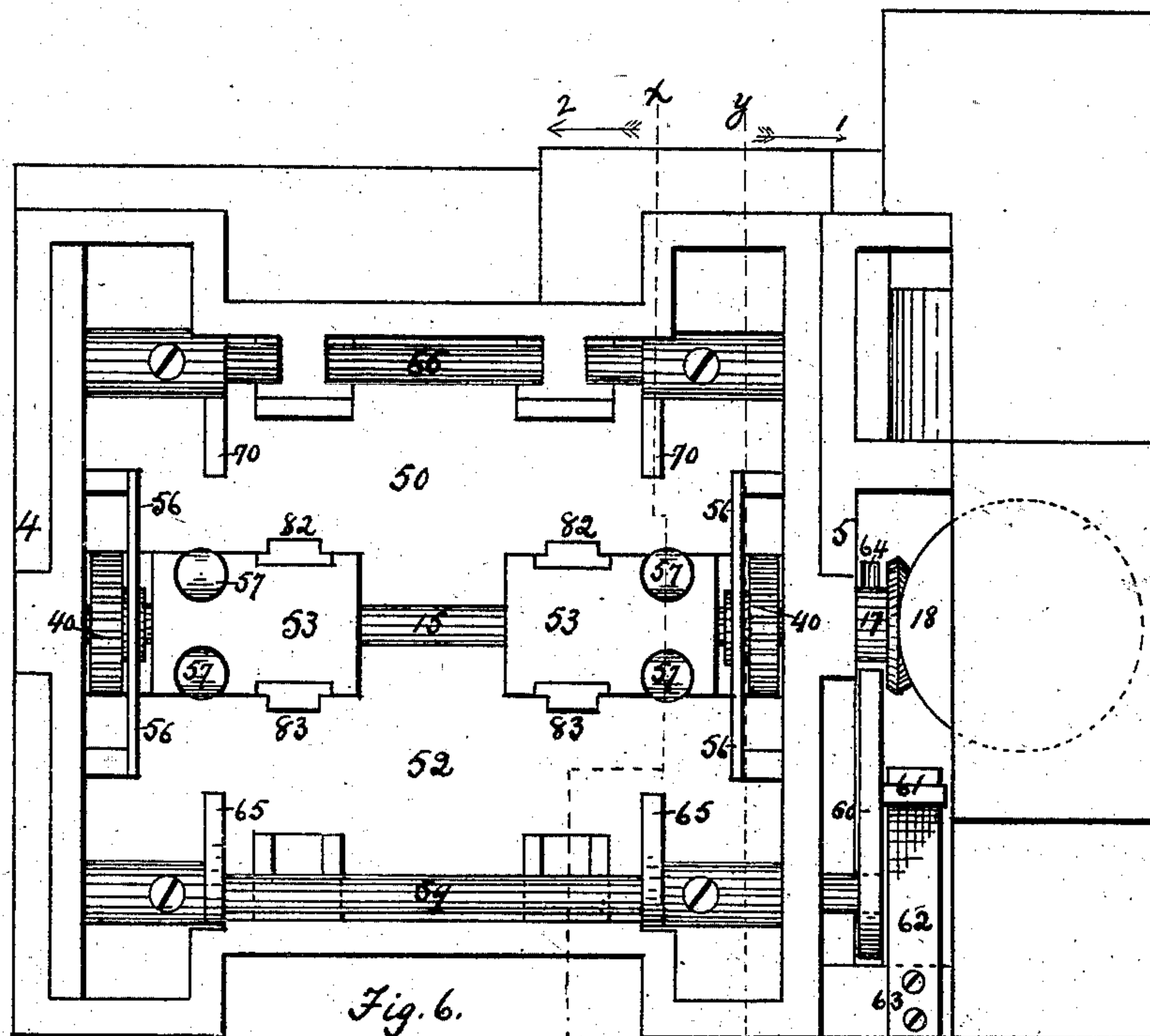
(No Model.)

6 Sheets—Sheet 3.

S. FORRESTER.
STATION INDICATOR.

No. 274,927.

Patented Apr. 3, 1883.



Witnesses
W.B. Cowie
J.K. Smith

Inventor
Samuel Forrester
by his attys
Bakewell & Kern

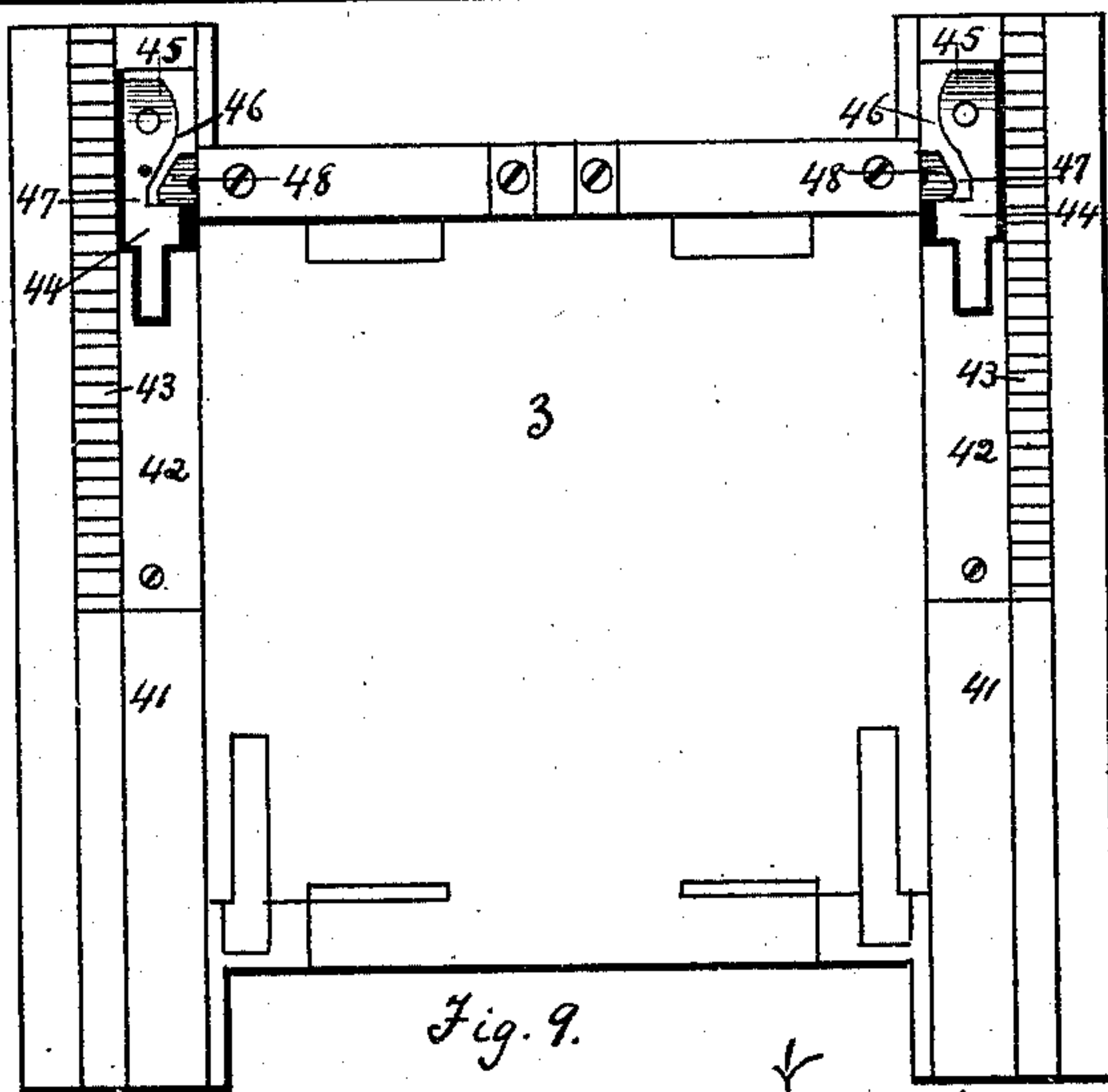
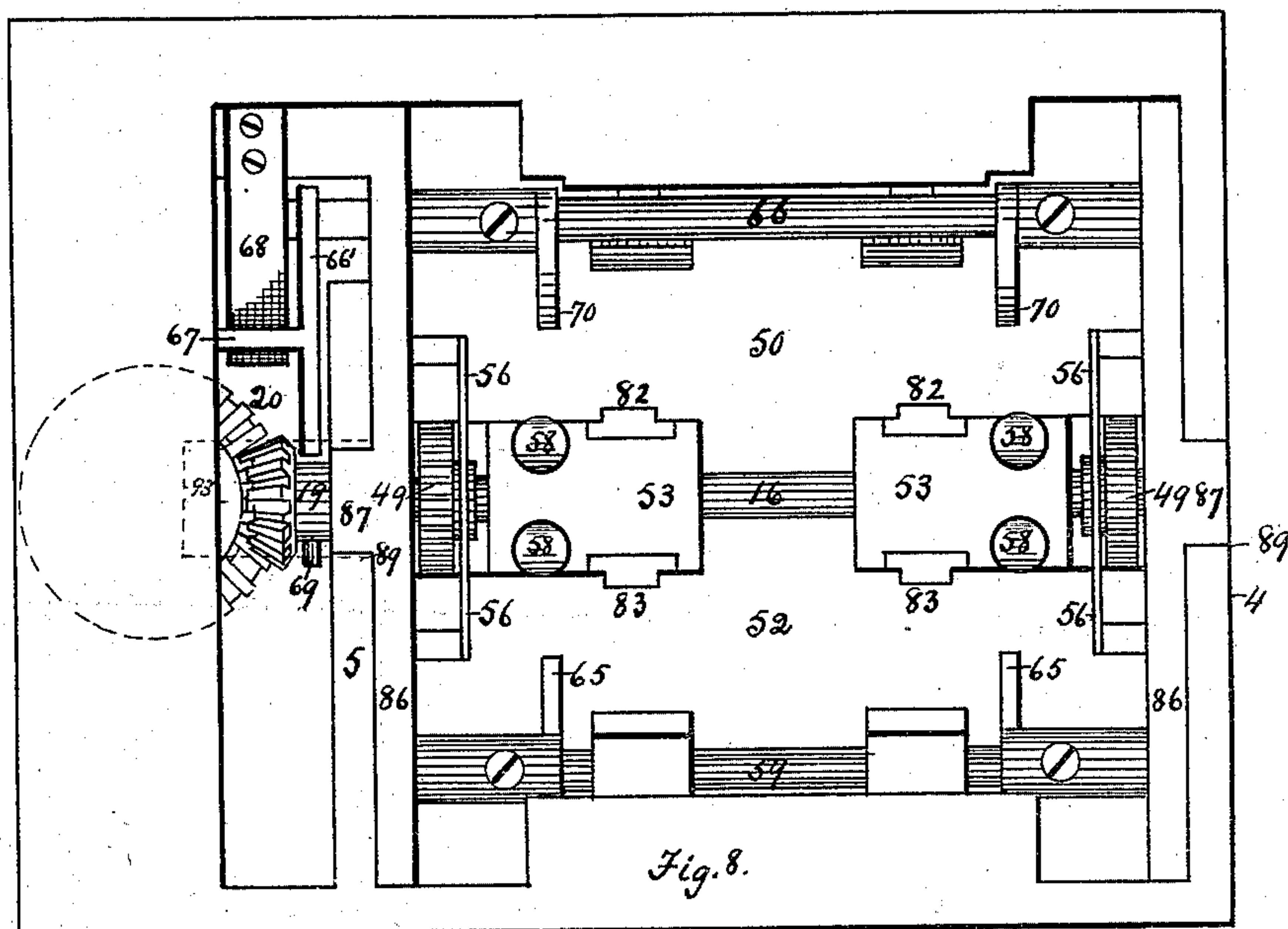
(No Model.)

6 Sheets—Sheet 4.

S. FORRESTER.
STATION INDICATOR.

No. 274,927.

Patented Apr. 3, 1883.



Witnesses
W. B. Corwin
J. K. Smith

Inventor
Samuel Forrester
by his attys
Bakewell & Kerr

(No Model.)

6 Sheets—Sheet 5.

S. FORRESTER.
STATION INDICATOR.

No. 274,927.

Patented Apr. 3, 1883.

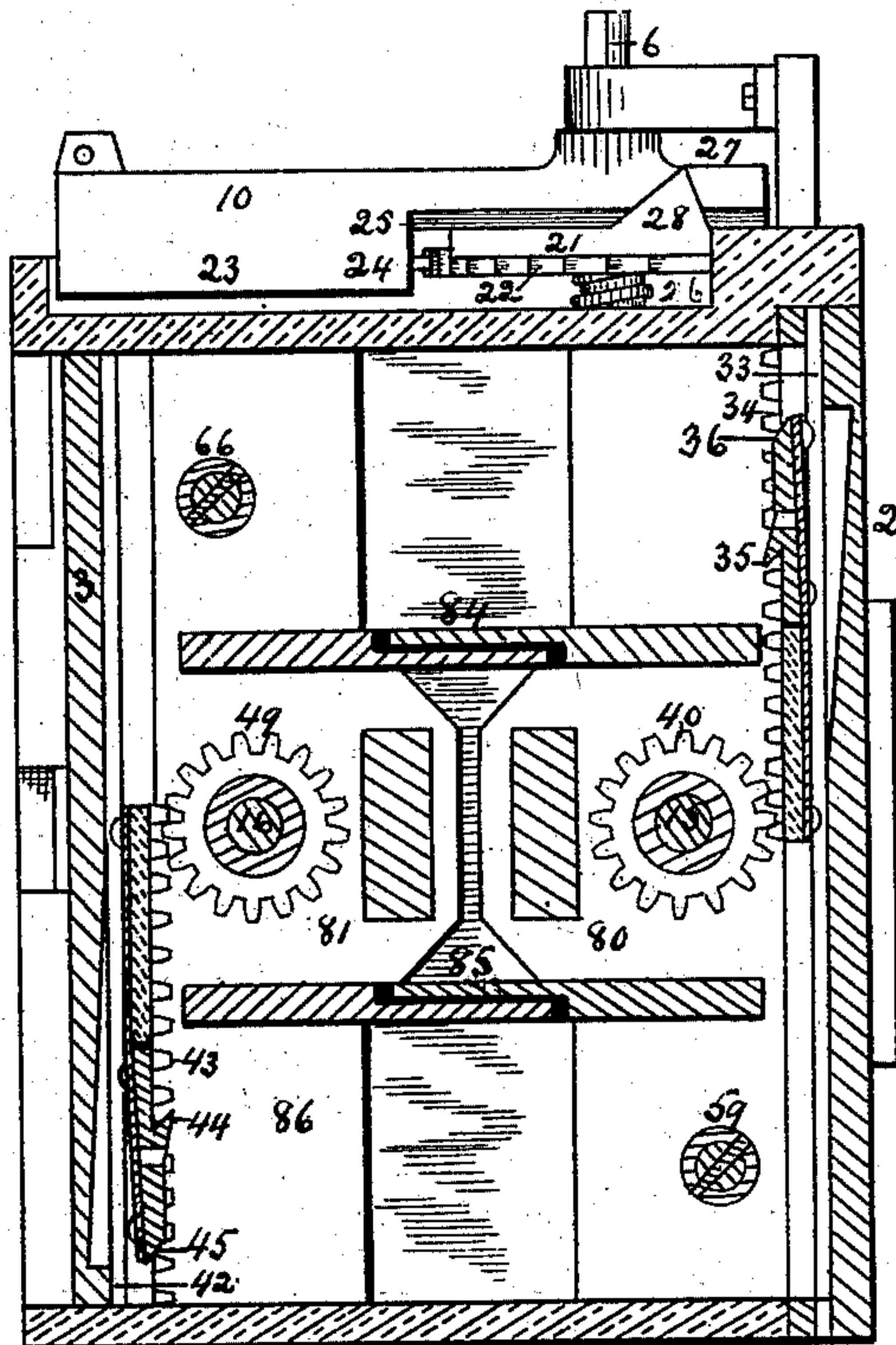


Fig. 10.

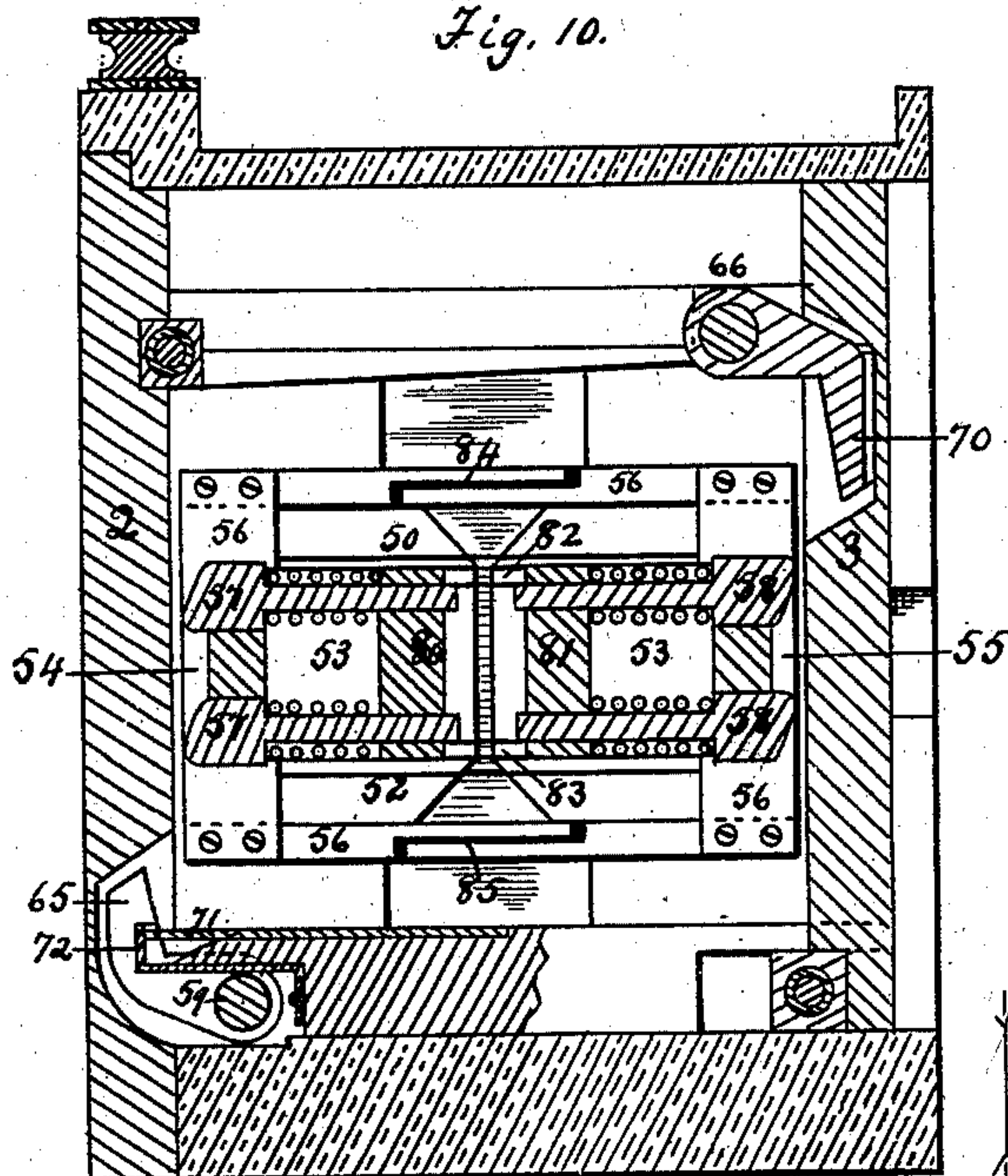


Fig. 11.

Witnesses

W. B. Corwin
J. H. Smith

Inventor

Samuel Forrester
by his attys
Bakewell & Kern

(No Model.)

6 Sheets—Sheet 6.

S. FORRESTER.
STATION INDICATOR.

No. 274,927.

Patented Apr. 3, 1883.

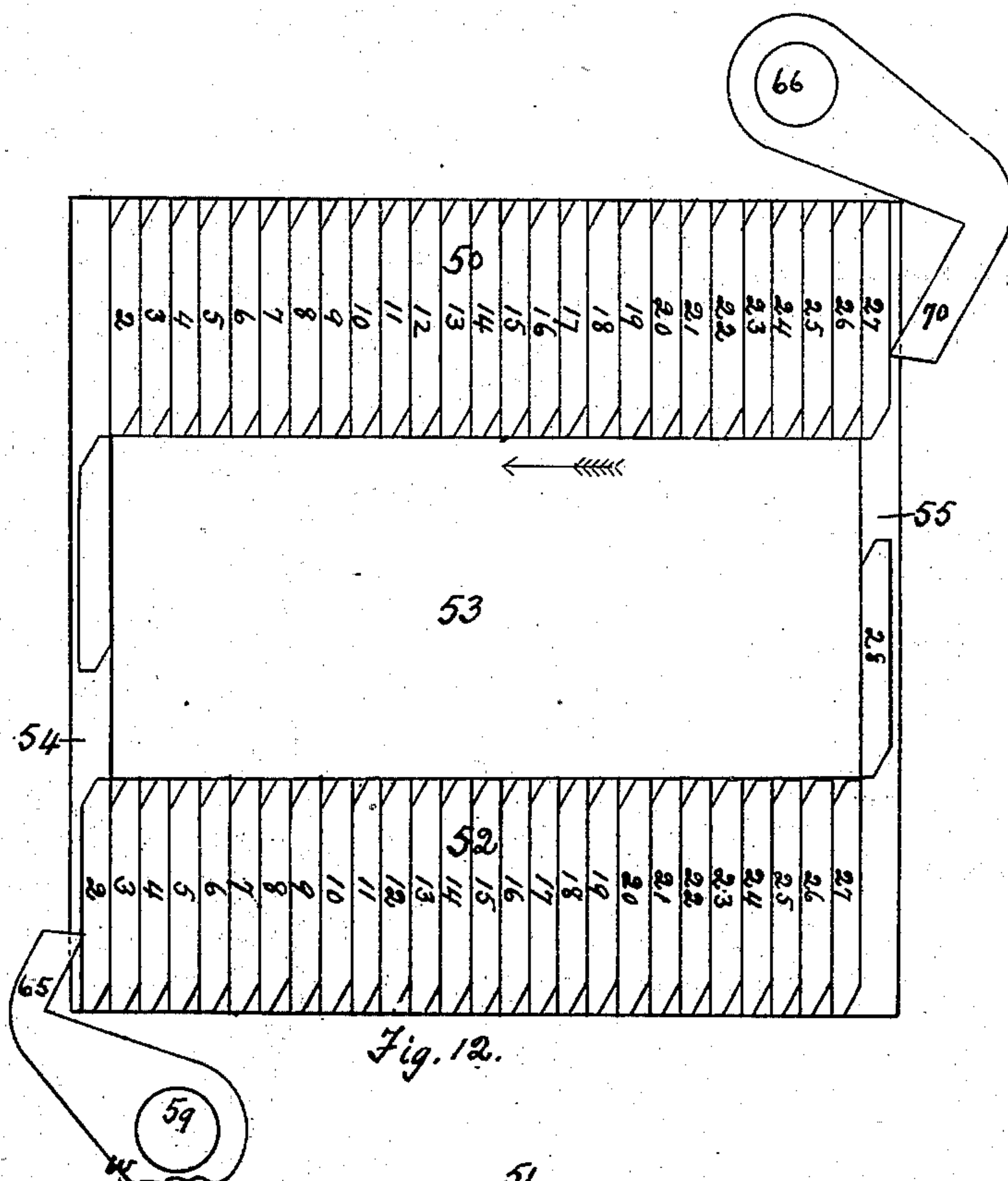


Fig. 12.

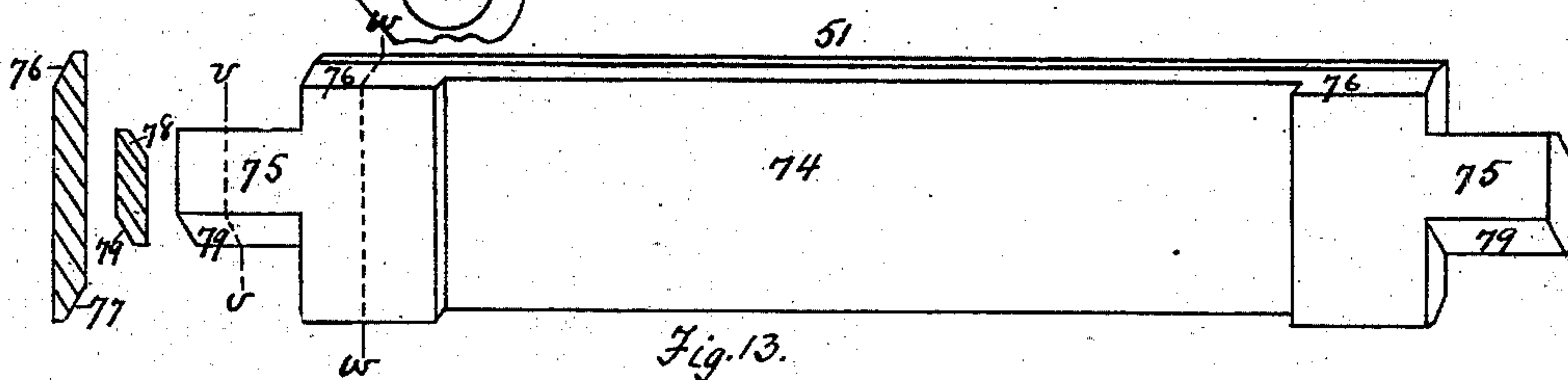


Fig. 13.

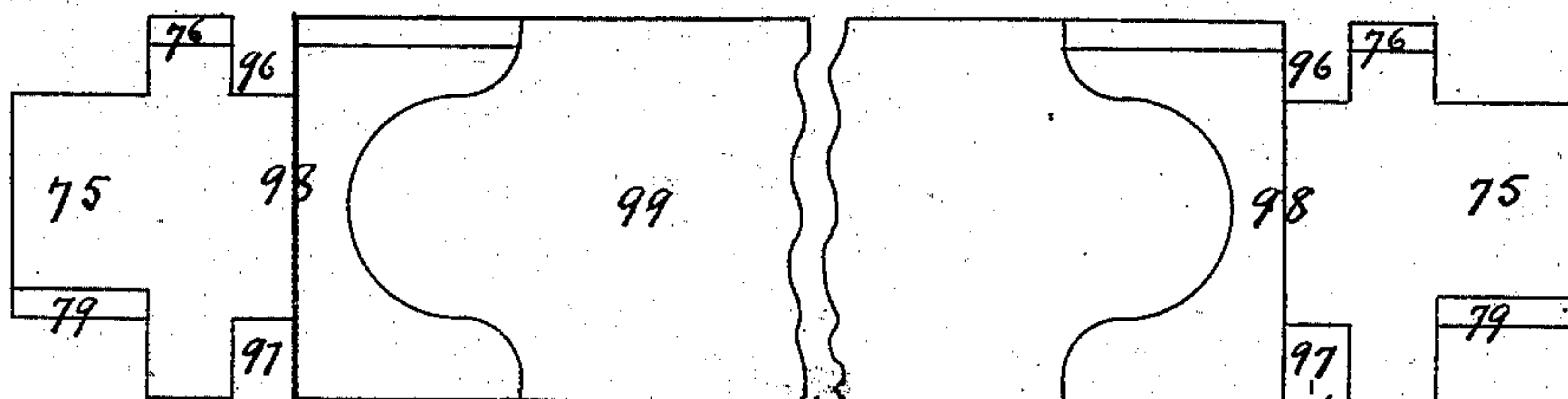


Fig. 14.

Witnesses
W. A. Corwin
J. H. Smith

inventor
Samuel Forrester
by his attys
Bakewell & Kerr

UNITED STATES PATENT OFFICE.

SAMUEL FORRESTER, OF ALLEGHENY, PENNSYLVANIA.

STATION-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 274,927, dated April 3, 1883.

Application filed October 30, 1882. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL FORRESTER, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Station and Train Indicators; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of my improved station-indicator, showing the indicating side. Fig. 2 is an end elevation, showing the power-shaft and power-transmitting devices. Fig. 3 is a plan view. Fig. 4 is a section on the line *z z* of Fig. 3. Fig. 5 is an enlarged plan view of the ratchet-plate and pawl shown in Fig. 3. Fig. 6 is a front elevation, the front being removed. Fig. 7 is an inside view of the front side, the same being turned down from Fig. 6, with its lower edge up. Fig. 8 is a rear elevation, the back side being removed. Fig. 9 is an inside view of the rear side, the same being turned down from Fig. 8, with its lower edge up. Fig. 10 is a vertical cross-section of the machine on the line *y y* of Fig. 6, looking in the direction of arrow 1. Fig. 11 is a vertical section of the device on the line *x x* of Fig. 6, looking in the direction of arrow 2. Fig. 12 is a diagram illustrating the course of the indicating-plates. Fig. 13 is a perspective view of one of the indicating-plates with projected sections on the lines *w w* and *v v*. Fig. 14 is a side view of a modified form of indicating-plate.

Like numbers of reference indicate like parts in each.

The mechanism is contained in a box or case, 1, having front and back sides, 2 and 3, and ends 4 and 5.

Upon the lower end of a shaft, 6, Fig. 2, is a beveled-gear wheel, 7, which meshes into a beveled-gear wheel, 8, mounted on a shaft, 9, which runs at right angles to the shaft 6. At the upper end of the shaft 6 is a radial arm or lever, 10, with which, by means of a cord, 11, extending by sheaves 12 to any desired point, the shaft 6 is turned in a forward direction. The shaft 6 is retracted or turned backward by means of a strong spring, 13, coiled around it, one end of the spring being fastened to the

shaft and the other end being fastened to the case at 14, Fig. 2.

Journaled in the box ends 45 are two shafts, 15 16, the first at the front and the second at the back of the box. On the end of the shaft 15 is a beveled pinion, 17, which meshes into the beveled-gear wheel 8 on the shaft 9, and on the end of the shaft 16 is a beveled pinion, 19, which meshes into the beveled-gear wheel 20 on the shaft 9. Thus the shaft 9 is driven by the shaft 6, and in turn drives the two shafts 15 and 16.

Mounted loosely on the shaft 6, directly under the shaft 10, is a non-rotating disk, 21, which has a ratchet, rack, or quadrant, 22, along the lower edge of the side, around which the arm 10 oscillates, the inclines of the teeth running downward in the direction of the forward movement of the arm.

On the lower side of the arm 10, beyond the racked periphery of the disk 21, is an enlargement, 23, Figs. 2 and 4, in which is a spring-pawl, 24, which bears inward against the rack 22, and, as the arm is swinging forward, slips easily over the inclines; but if the pull on the cord 11 should cease before the arm reaches the limit of its forward motion the pawl catches on the straight sides of the teeth and prevents the spring 13 from throwing the arm back. The rack 22 projects from the lower edge of the periphery of the disk 21, so as to form a sort of a shelf, 25, back of the teeth.

Upon the shaft 6, and pressing up against the disk 21, is a spiral spring, 26, which holds the disk 21 up against the arm 10, so that the rack 22 shall be in the same horizontal plane as that of the pawl 24, to permit the latter to engage the teeth of the former.

On the rear end of the arm 10 is a short arm or projection, 27, and on the upper surface of the disk are two reversed inclines, 28 29, which stand in the paths of the arms 10 and 27, so that when the latter come around against them at the end of the forward turn of the shaft 6 they ride up on them and depress the disk 21 against the spiral spring 26. The depression of the disk causes the rack 22 to pass below the plane of the pawl 24, and the latter to spring out over the rack onto the shelf 25 and against the periphery of the disk. In this position, the pawl, not having any hold, is unable

to prevent the spring 13 from turning the shaft backward, and slides over the smooth shelf until it drops off at the rear end of the rack. Then the disk 21, being no longer held down
 5 by the pawl resting on the shelf, rises and brings the rack to the same level as but in front of the pawl. The arm 10 is limited at this point of its backward movement by a spring stop or buffer, 30. The disk 21 is pre-
 10 vented from turning by having a square side, 31, which abuts against the frame.

On the inner face of the side 2, Fig. 7, are two vertical grooves or ways, 32—one near each end. Two slides, 33, of similar construction,
 15 are placed in the grooves 32. Along the outer edge of each slide 33 is a rack, 34, which extends some distance beyond the body of the slide, on the end of which is a spring-hook, 35, which is beveled on its top and inner sides, as
 20 at 36 and 37, and is fitted with a lateral recess, 38, on its inner side, back of the end bevel. Near the top of the side 2 are two lateral spring-pawls, 39, having beveled ends, which project into the grooves 32 in the path of the
 25 slides, and are designed to operate in connection with the beveled ends of the spring hooks or catches 35. When a pawl, 39, encounters the top bevel 36, it depresses the spring-hook 35, rides over it, and drops into the recess 38,
 30 and when it encounters the double bevel 37 it is itself forced back, and permits the passage of the hook. The purpose of this construction will be stated farther on. The slides 33 are reciprocated in the grooves 32 by the pinions
 35 40 40, Figs. 6 and 10, mounted on the shaft 15, which pinions gear into the racks 34 34. The inner face of the slide 3, Fig. 9, is a fac-simile of that of the side 2, except that it is inverted—that is to say, it has two vertical
 40 grooves, 41, two slides, 42, having racks 43, spring-hooks 44, beveled and recessed at 45 56 47, lateral spring-pawls 48, which racks are geared into by pinions 49 on the shaft 16, all precisely like the parts on the side 2, except
 45 that the side 3, and consequently its attachments, are inverted.

In the upper part of the case, above that part through which the shafts 15 16 extend, is a chamber, 50, Figs. 6, 8, and 11, which extends
 50 the entire depth of the case between the two sides 2 and 3, and this chamber is of a suitable height and length to permit the easy passage through it, in an upright position, of the indicating-plates 51. In the lower part of
 55 the case, below that part through which the shafts 15 16 extend, is a chamber, 52, which is a fac-simile of the chamber 50. Between the chambers 50 and 52 is a boxed-up section, 53, containing the shafts 15 16. The depth of the
 60 boxed section 53 is less than that of the chambers 50 52, so as to leave vertical passages 54 and 55 at the front and rear, respectively, of a width sufficient for the easy edgewise passage of the plates 51 from one chamber, 50 or 52, to
 65 the other. The chambers 50 52 are for holding the indicating-plates and permitting their

passage forward and back in the case, and the passages 54 and 55 are for permitting the pas-
 sage of the plates from one chamber to another. The movement of the plates is forward through
 70 the chamber 50, downward through the passage 54, backward through the chamber 52, and then upward through the passage 55 to the chamber 50, thus making a complete cir-
 75 cuit of the boxed section 53. In this entire circuit the plates always stand on their lower edge, and they are guided in this circuit by the vertical guides 56—one at each end of the
 80 horizontal chambers and vertical passages, and bounding the entire round, so as to form a continuous guiding or bearing surface for both ends of the plates. The guides 56 also
 box in the pinions 40 and 49, so that the ends of the plates 51 shall not encounter them.

In the boxed section 53 are eight (more or
 85 less) spring-holders, 57 58, four at the front and four at the rear, the ends of which are beveled, and project into the passages 54 and 55. The longer sides of the front holders, 57,
 90 are down and those of the rear holders, 58, are up. (See Fig. 11.)

Below the chamber 52, and at the front lower corner of the case, Figs. 2 and 6, is a shaft, 59,
 the end of which projects through the end 5, and is there provided with an arm, 60, having
 95 a slotted lateral projection or lug, 61. One end of a leaf-spring, 62, is fastened to the case at 63 and the other end extends into the slot in the lug 61 and exerts its force to throw the arm
 100 forward, and thereby to turn the shaft 59 in that direction. The end of the arm 60 projects back of the sleeve of the beveled pinion 17 and stands in the path of a lug, 64, projecting ra-
 105 dially therefrom, so that when the pinion 17 turns the lug 64 comes against the arm 60 and forces it backward until it slips past and re-
 110 leases it. The operation of the lug 64 on the arm 60 turns the shaft 59 backward; but when the lug 64 slips past the arm 60 and releases it the spring 62 retracts the arm and turns the
 shaft 59 forward again.

On the shaft 59 are two or more curved ra-
 dial arms or pushers, 65, which oscillate with the shaft, whose office it is, when a plate, 51,
 115 descends through the passage 54 into the chamber 52 to push it and the other plate back in the chamber, to make place for the next descending plate, and then to withdraw them-
 selves, so that they in turn shall not be in the way of the said next descending plate. 120

On the rear side of the machine, Fig. 8, are the following parts, which are duplicates of those last described, but occupy inverted po-
 sitions, viz: a shaft, 66, provided with an arm,
 125 66', having a slotted lug, 67, a spring, 68, a lug, 69, on the sleeve of the pinion 19, and curved radial arms or pushers 70. The shaft 66 occupies the upper rear corner of the case and the pushers 70 project downward and in-
 130 ward and push the plates 51 forward in the chamber 50 as they ascend, one by one, through the passage 55.

Fastened to the bottom or floor of the chamber 52, and projecting into the passage 54, are two or more flat-faced springs, 71, Fig. 11, which are restrained from rising above the level of the floor by guards or stops 72. When the indicating-plates 51 descend into the chamber 50 they alight upon the springs 71 and are forced down thereupon, so as to depress the springs, for the purpose of certainly carrying the plate clear of the spring-holders 57 and of the edge of the boxed section 53 before it is forced back into the chamber 50 by the pushers 65.

In the front side, 2, is an opening, 73, Fig. 1, which may be fitted with a pane of glass, if desired, for exposing to view the name or signal which is on the front side of the indicating-plates.

The indicating-plates 51, Fig. 13, have a body, 74, of any desired length and width, and a square projection, 75, at each end. The top and bottom edges of the body are beveled, as at 76 and 77, and also the top and bottom edges of the projections, as at 78 and 79. The top bevels 76 of the body are reverse to the top bevels 78 of the projections, and the bottom bevels 77 of the body are reverse to the bottom bevels 79 of the projections.

The operation of my machine is as follows: Suppose it be designed for use on a street-car to indicate the names of the cross-streets on the route, and such streets were numbered and ran from 1st to 28th street. In such case fifty-four indicating-plates would be provided, which would be arranged in the chambers 50 52, twenty-seven in each, as shown in the diagram Fig. 12, beginning with 1st at the front of chamber 50 and running back to 27th at the rear, then down to chamber 52, and beginning at 28th in the rear and running forward to 2nd in the front. 1st and 28th being the end numbers, it is unnecessary to duplicate them. The indicating-plates go around always in the direction of the arrow, the course being down passage 54, back through chamber 52, up passage 55, and forward through chamber 50. Thus it will be apparent that as a car is going out, the streets indicated will be from 1st to 28th, and when returning, from 28th to 1st, by simply moving the indicating-plates around in the order of their arrangement. This movement is accomplished as follows: The cord 11 is pulled and draws the lever 10 around, the spring-pawl 24 slipping over the rack 22. This turns the shaft 6, which, by means of the bevel-gearing 7 8, turns the shaft 9, which, by means of the gear-wheels 18 20 and pinions 17 19, turns the shafts 15 16, and they, by means of the lugs 64 69 and arms 60 66', oscillate the shafts 59 and 66. The pushers 70 push the row of indicating-plates 51 in the chamber 50 forward the thickness of one plate, and the pushers 65 push the row in chamber 52 back the same distance. This causes the plate 1st to pass over the edge of the chamber 50 into the passage 54, Fig. 13,

where its ends 75 project into the path of the spring-hooks 35, which, being drawn down at that instant by the action of the pinions 40 on the racks of the slides 33, catch on the ends 75 of the indicating-plate 51 and carry it down through the passage 54 onto the springs 71. At the same instant the plate 28th is carried up by the slides 42 in the same manner from the chamber 52 through the passage 55 to the chamber 50 at the rear of the machine. The pushers 65 70, after acting on the rows of plates, are retracted by the springs 62 68, so as to be out of the way of the plates which are being transferred from one chamber to the other. The spring-holders 57, Fig. 11, project into the passage 54 and into the path of the plates 51; but when a plate descends its lower bevel, 77, working against the beveled ends of the holders 57, forces them back sufficiently to allow the plate to pass. While the plate is passing, the holders bear against it with a yielding but constant pressure, and hold it with sufficient friction to keep it from falling and to require it to be drawn down by the hooks 35, and thus prevent it descending more rapidly at one end than the other and becoming jammed in the machine. The long sides of the holders 57, being downward, prevent the plates from being carried upward on the return movement of the slides 33 by their friction against it. The springs 71 are placed so as to permit a limited movement of the plate below the floor of the chamber 52, so that the plates 51 may certainly be carried past the spring-holders in the boxed section 53. Then the pushers 65 push it back into the chamber 52 before the springs 71 react sufficiently to carry it above the chamber 52. The holders 58, having their long sides upward, support the plates 51 as they are carried up to the chamber 50, and prevent them from being carried down again by the retraction of the slides 42. They also hold the plates always in position to be engaged by the slides.

The beveled form of the spring-hooks 35 and 44 is for the following purpose:

Referring now to the hooks 35, Fig. 10, the row of plates in the upper chamber, 50, when pushed forward by the pushers 70, stand in the path of the ascending slides 33, the top bevels 36 of the spring-hooks encounter the lower bevels 79 on the projections 75 on the ends of the plate. If the spring-hooks 35 were permitted to spring up, when they pass the projections 75 of the plate they would cut and wear each other to such an extent that the hooks would be unable to engage the plates, and so impair the proper operation of the machine. To obviate this danger I have provided the spring-pawls 39, Fig. 7, which project into the grooves 32 in the path of the hooks 35 at a point which will cause the bevels 36 on the hooks to encounter the pawls and depress the hooks before they have passed the edges of the projections 75 of the plate. The pawls 39 hold down the ends of the hooks un-

til the latter pass clear beyond the upper edges of the projections 75 of the indicating-plate. Then the upward movement of the slides causes the pawls to pass over the beveled ends of the hooks 35 and spring into the recesses 38, and thereby permit the hooks to rise into a position to engage the projections 75 on the end of the indicating-plate. The slides 33 are then caused to descend in the grooves 32, which movement causes the bevel 37, acting upon the beveled ends of the pawls 39, to force them back and permit the downward passage of the slides. As the slides descend, the hooks 35 catch on the projections 75 on the ends of the indicating-plate, and carry the plate downward, as before described. The operation of the spring-hooks 44, Figs. 9 and 10, is precisely similar to that described with relation to the hooks 35, the only difference being that the hooks 44 work from the bottom upward, while the hooks 35 work from the top downward.

As described, the indicator-case is fitted to receive only fifty-four indicating-plates. I construct it, however, for use with a greater or less number. In the present instance fifty-four is the minimum number; but the case is capable of being adjusted to receive and operate a greater number in the following way: The boxed section is divided vertically into two parts, (see Figs. 10 and 11,) 80 81, which are connected by extension-slides 82 83, the slides 82 forming the floor of the chamber 50 and the slides 83 the top of the chamber 52. The horizontal parts of the guides 56 are also formed of extension-slides 84 85. The part 81, carrying the shaft 16 and its wheels 19 49 49, is fastened to a movable frame, composed of two upright pieces, 86, Fig. 8, next to the ends 4 and 5 of the case. The ends of the shaft 16 extend through the pieces 86, and are journaled in sliding boxes 87, placed in slots 89 in the end pieces 4 and 5. The frame 86 is secured by set-screws 90, extending through slots 91, Fig. 2, at both ends of the machine, when it has been adjusted to the proper depth to contain the necessary number of indicating-plates. As the movement of the frame 86 will change the position of the shaft 16 and its pinion 19, it will disconnect the pinion 19 from its driving gear-wheel 20. It is therefore necessary to adjust the latter correspondingly, and this is done by slackening the set-screw 92, Fig. 2, and moving the gear-wheel 20 along the shaft 9 to the required position and then tightening the set-screw. I have, however, made the adjustment of the wheel 20 automatic by extending a strap, 93, (see Fig. 2 and dotted line, left-hand, Fig. 8,) from the side of the frame 86 out to the back side of the hub of the wheel 20, as shown in Fig. 2. Then when the frame 86 is moved outward the strap 93 moves the gear-wheel 20 along the shaft 9 and keeps it always in gear with the pinion 19, and when the frame 86 is moved inward the pinion 19, pressing against the gear-wheel 20, moves it along the shaft. The gear-wheel 20 is connected to

the shaft by a feather, 94. When the frame 86 is moved inward or outward the extension-slides 82, 83, 84, and 85 open or close, and always preserve a smooth running or guiding surface for the indicating-plates to move over.

On the shelf 25, at the rear end of the rack 22, is a single tooth, 95, Figs. 3 and 5, having an incline running reversely to the inclines of the ratchet 22. The purpose of this tooth is to catch on the pawl 24, Fig. 5, and prevent the operator from pulling the arm 10 forward before it has had time to reach the end of the shelf and engage with the ratchet 22. The advantage of this arrangement will be apparent from the following explanation. If the operator pulls the cord before the arm 10 has reached the back end of the rack, no movement of the plates will be made in the machine, for the reason that the transferring devices have not gone far enough to catch the ends of the indicating-plates, and consequently if the arm is pulled they will move without transferring the plates. If, however, the arm 10 is drawn forward just before it leaves the shelf 25, it may happen that on account of the wear of the plates or want of accuracy in fitting the machine one of the spring-hooks has reached a position in which to engage its end of the indicating-plate, while its companion hook has not. In such case the drawing of the cord would cause the indicating-plate to be moved at one end and not at the other. This movement would bring such indicating-plate into a diagonal position in the vertical passage, and would cause it to jam and prevent the further operation of the machine. I have therefore provided the single tooth 95 at the rear end of the shelf 25, so as to make it impossible for the arm 10 to be drawn forward just before it finishes its return-stroke. In this way I prevent the danger from this source. The shelf 25 is of such length that when the pawl 24 has passed over its rear end and the disk has been forced up so as to bring the pawl into gear with the ratchet 22 the hooks 35 and 44 have passed beyond the projections 75 on the indicating-plates, and are in position to engage therewith.

The pushers 65 and 70 are caused to strike the plates 51 below their centers in order to avoid tipping them, and for the purpose of giving clearance to the pushers I have cut out or recessed the plates at 96 97, Fig. 14, so as to permit the pushers to engage the preceding plate for a longer time before being retracted out of the path of the vertically-moving plate. The object of this is to enable the preceding plate to get a better footing in the chamber before the pressure is taken away.

As the indicating-plates for some uses require to be made of considerable length, I propose to construct them, as shown in Fig. 14, with thick metallic end pieces, 98, and thin flexible center pieces, 99, preferably made of tin or sheet iron and properly attached to the end pieces. The pushers and spring-holders

will be caused to act against the surfaces of the thick solid end pieces. These plates rest and slide in the chambers 50 and 52 upon the solid end pieces. I also propose to counter-sink that portion of the plate which contains the name, or, in case the plate is made, as in Fig. 14, to set the thin center back from the front faces of the thick ends. The purpose of this is to prevent the rubbing off of the name as the plate passes around in the case.

My invention is designed for use in railroad stations, trains, street-cars, schools, court-rooms, and other places where it is desired to indicate successively names, figures, &c., and for all similar uses.

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

1. In a station or similar indicator, a continuous plate-passage consisting of two horizontal plate-chambers connected at their ends by transfer-passages, oscillating plate-pushers arranged at the receiving ends of the horizontal plate-chambers, reciprocating transfer-slides having spring catches or hooks, in combination with each other and with mechanism for actuating the plate-pushers and transfer-slides, whereby a continuous circulation of the indicating-plates through the passages is effected, substantially as and for the purpose specified.

2. In a station or similar indicator, a continuous plate-passage consisting of two horizontal plate-chambers connected at their ends by transfer-passages, a series of indicating-plates arranged therein, plate-transfer mechanism arranged between the horizontal plate-chambers and boxed thereby, and plate-guides arranged on the boxing of the transferring mechanism to insure the parallel position of the plates in their passage through the transfer-passages, substantially as and for the purpose specified.

3. In a station or similar indicator having two horizontal plate-chambers and end transfer-passages connecting the same, an extensible or telescoping case composed of two sections, each provided with a set of plate-transferring mechanism, said sections connected by extension-slides which form the floor and guides of the plate-chambers, the parts being combined and coacting substantially as and for the purpose specified.

4. In a station or similar indicator, a case having horizontal plate-chambers connected by vertical transfer-passages and adapted for the continuous circulation of indicating-plates, in combination with transfer mechanism arranged in each of the said transfer-passages, and with two sets of reversely-beveled spring-holders arranged to project into the transfer-passages, the bevels on the holders being inclined toward the path of the indicating-plates, substantially as and for the purpose specified.

5. In a station or similar indicator having horizontal plate-chambers connected by transfer-passages, and transfer mechanism arranged

to transfer the indicating-plate from one horizontal chamber to the other, a receiving spring or yielding plate arranged on the floor of the plate-chamber at the junction of the same with the transfer-passage, substantially as and for the purpose specified.

6. In a station or similar indicator having horizontal plate-chambers connected by transfer-passages adapted for the continuous circulation of the indicating-plates, the combination of the transferring devices, which transfer the indicating-plates from one chamber to another, with oscillating pushing devices arranged at the ends of the plate-chambers, which receive the plates from the transfer mechanism, and force the plates from the vertical passages into and through the chambers, substantially as and for the purposes described.

7. The combination, in a station or similar indicator, of extensible chambers for containing the indicating-plates, and rotating shafts in the stationary and movable sections of the same, with a power-shaft and gearing connecting said power-shaft to the rotating shafts in the two sections, a sliding gear-wheel upon the said power-shaft, and a strap extending from the moving section back of the sliding gear-wheel, so as to effect the automatic adjustment of the gear-wheel when the extension slides are moved, substantially as and for the purposes described.

8. In a station or similar indicator, the combination of a pusher arranged at the receiving end of the plate-chamber, in combination with the pusher-shaft having a radial arm, a driven shaft having a projection which acts against such radial arm to operate the pushers, and a spring to retract the pusher-shaft, substantially as and for the purposes described.

9. The combination of a reciprocating transferring device, oscillating pushing devices, and a driven shaft, which causes the transferring and pushing devices to operate successively upon each indicating-plate, substantially as and for the purposes described.

10. The combination, in a station or similar indicator, of a power-shaft, an arm or lever mounted on said shaft, and by which it is operated, a spring mounted on said shaft for retracting it, and a plate-pusher and plate-transferring mechanism actuated from the power-shaft, substantially as and for the purposes described.

11. In a station or similar indicator, the combination, with reciprocating plate-transferring mechanism and the shaft and pinions for actuating the same, of the power-shaft, operating-lever, and retracting-spring with a ratchet and pawl for preventing the retraction of the shaft before the completion of its forward motion, substantially as and for the purposes described.

12. In a station or similar indicator, in combination with the plate-transferring mechanism, a power-shaft, operating-lever, retracting-spring, and pawl, a vertically-moving disk hav-

ing a ratchet on its edge and a shelf back of the ratchet for permitting the pawl to ride backward without encountering the teeth of the ratchet, substantially as and for the purposes described.

13. In a station or similar indicator, the combination, with plate-transferring mechanism and the shafts for operating the same, of the power-shaft, operating-lever, and pawl, a vertically-moving disk having a ratchet along its edge, a spring for sustaining it in front of the pawl during the forward motion of the shaft, and inclines for depressing it, so as to permit the pawl to spring out over its edge at the completion of its forward motion, substantially as and for the purposes described.

14. In a station or similar indicator having plate-transferring mechanism operated from an oscillating power-shaft, the combination, with the power-shaft, operating-lever, and pawl, of a disk having a ratchet, a shelf back of the ratchet, and a reverse-tooth at the rear end of the shelf, a spring for holding the disk up, so that the pawl shall pass over the ratchet during its forward motion, and devices for depressing the disk at the end of the forward stroke, so that the pawl may spring over the ratchet onto the shelf and pass back over the shelf and the reverse tooth upon the retraction of the lever, substantially as and for the purposes described.

15. The combination of the transferring-slides, provided with hooks for engaging the

indicating-plates and geared racks, with a rotating shaft and pinions, which gear into the racks on the slides, substantially as and for the purposes described.

16. The transferring-slides having spring-hooks for engaging the indicating-plates and beveled and recessed ends, in combination with spring-pawls projecting into their paths for the purpose of holding the hooks until past the plates, and then permitting them to come into a position to engage them, substantially as and for the purposes described.

17. The beveled indicating-plates having end projections, the edges of which are beveled reversely to those of the body, substantially as and for the purposes described.

18. In a station or similar indicator having plate-passages for the continuous travel of indicating-plates, oscillating plate pushers provided with mechanism for actuating them and arranged at the receiving ends of said plate-passages, in combination with indicating-plates having notches to permit the passage of the pushers on their reverse movement, and mechanism for delivering said indicating-plates within the throw of the oscillating pushers, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 27th day of October, A. D. 1882.

SAMUEL FORRESTER.

Witnesses:

W. B. CORWIN,

T. B. KERR.