

No. 796,882.

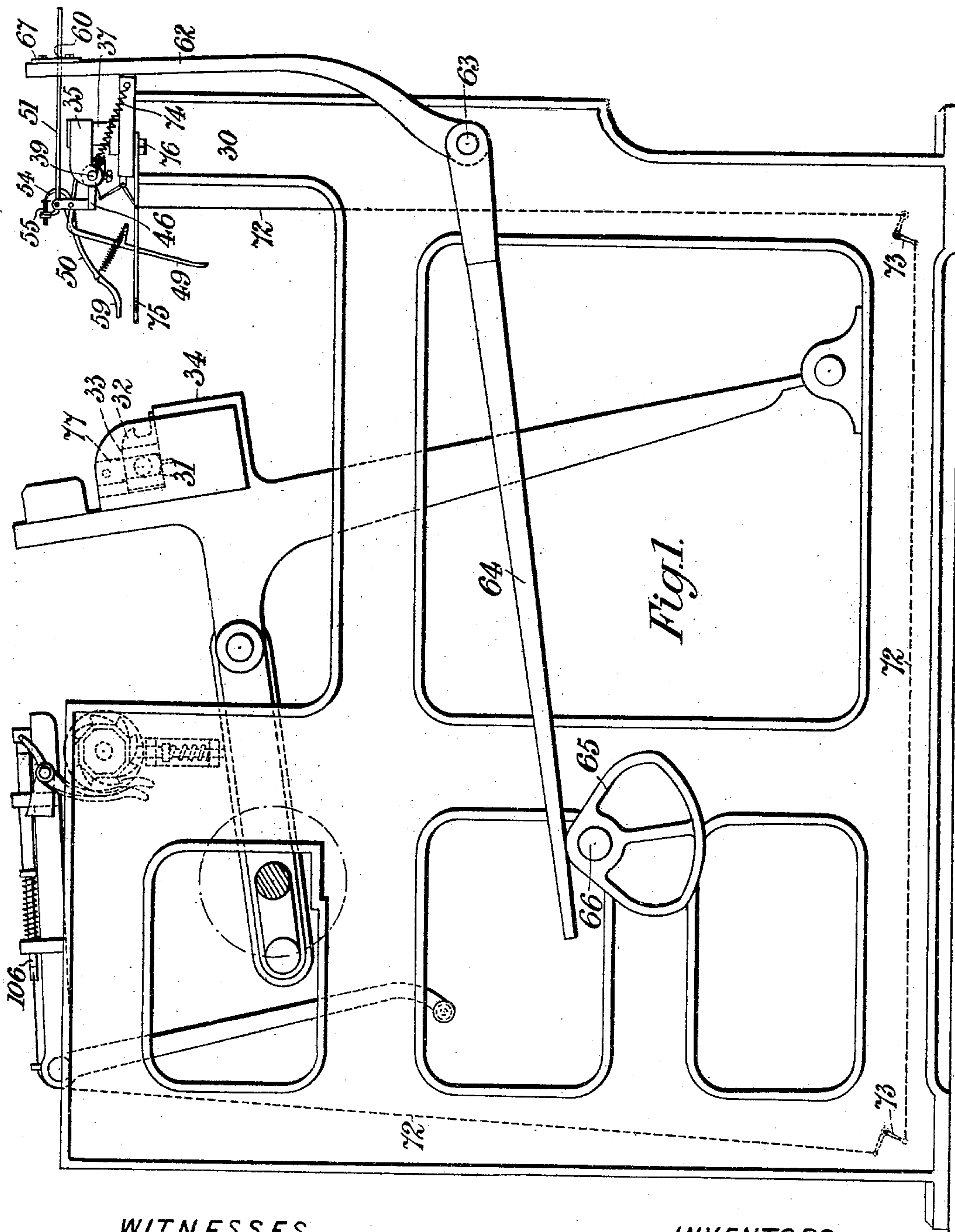
PATENTED AUG. 8, 1905.

A. E., A. & G. WALKER.

# WEFT REPLENISHING MECHANISM FOR LOOMS.

APPLICATION FILED JAN. 26, 1903.

5 SHEETS—SHEET 1



WITNESSES.

Stephen Ginsto  
Fred W. Engler.

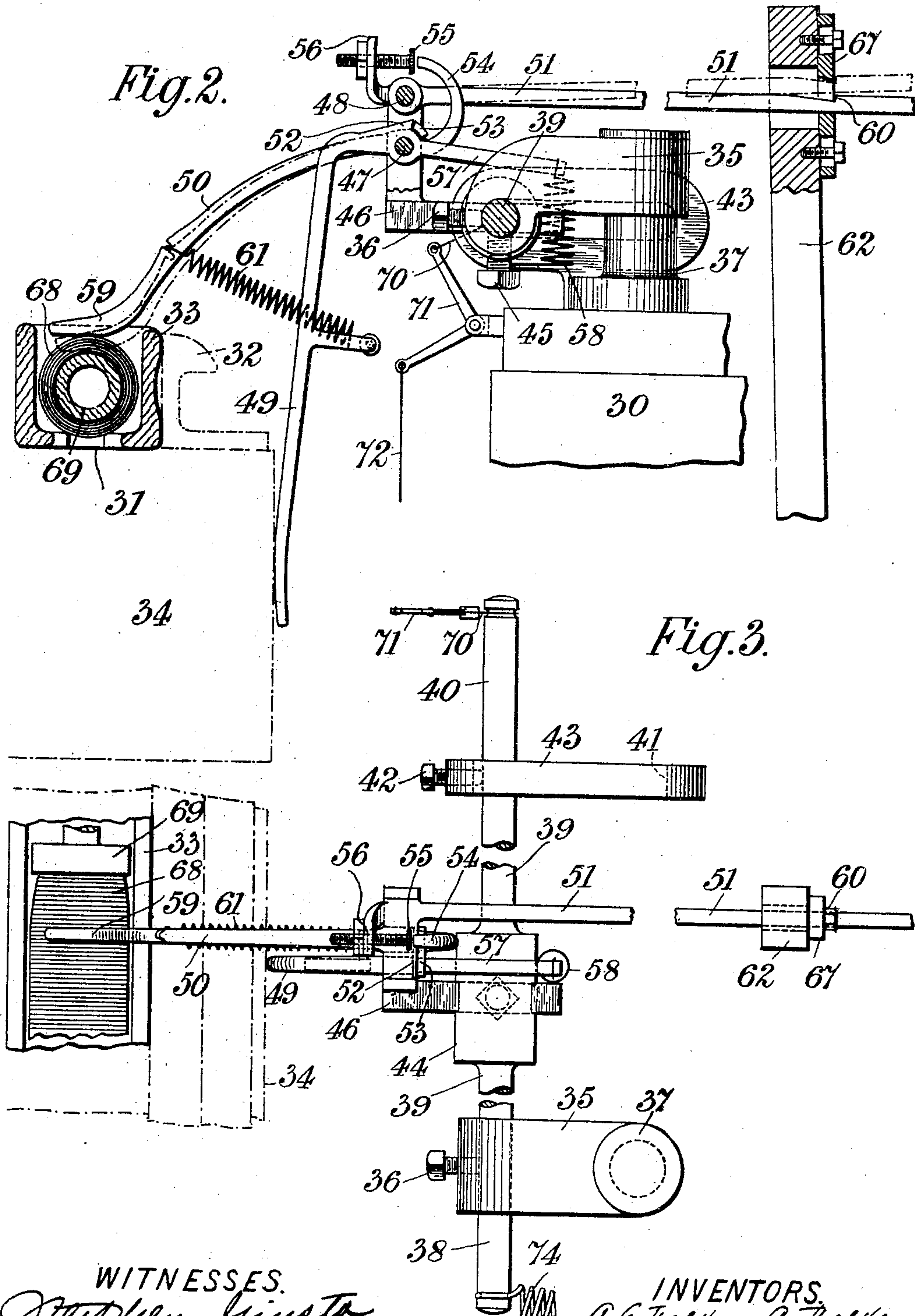
**INVENTORS.**

A. E. Walker, A. Walker,  
and George Walker,  
by Wilkinson & Fisher  
Attys.

A. E., A. & G. WALKER.  
WEFT REPLENISHING MECHANISM FOR LOOMS.

APPLICATION FILED JAN. 26, 1903.

5 SHEETS—SHEET 2.



WITNESSES.

*Stephen Prista.*  
*Fred W. Coughlin.*

INVENTORS.

*A. E. Walker, A. Walker,*  
*and Gen. Walker,*  
*by Wilkinson & Fisher,*  
*Attys.*

No. 796,882.

PATENTED AUG. 8, 1905.

A. E., A. & G. WALKER.  
WEFT REPLENISHING MECHANISM FOR LOOMS.

APPLICATION FILED JAN. 26, 1903.

5 SHEETS—SHEET 3.

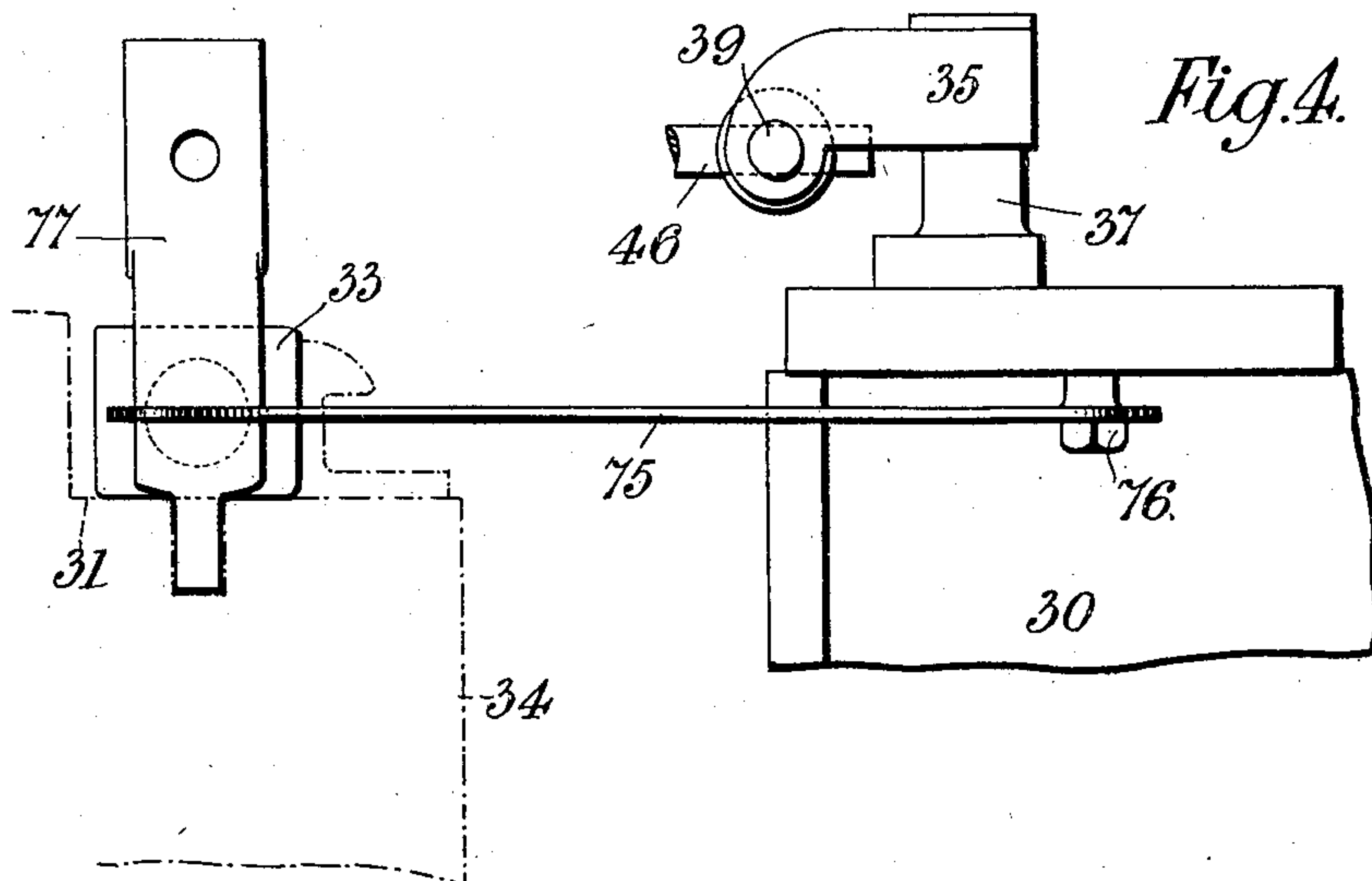
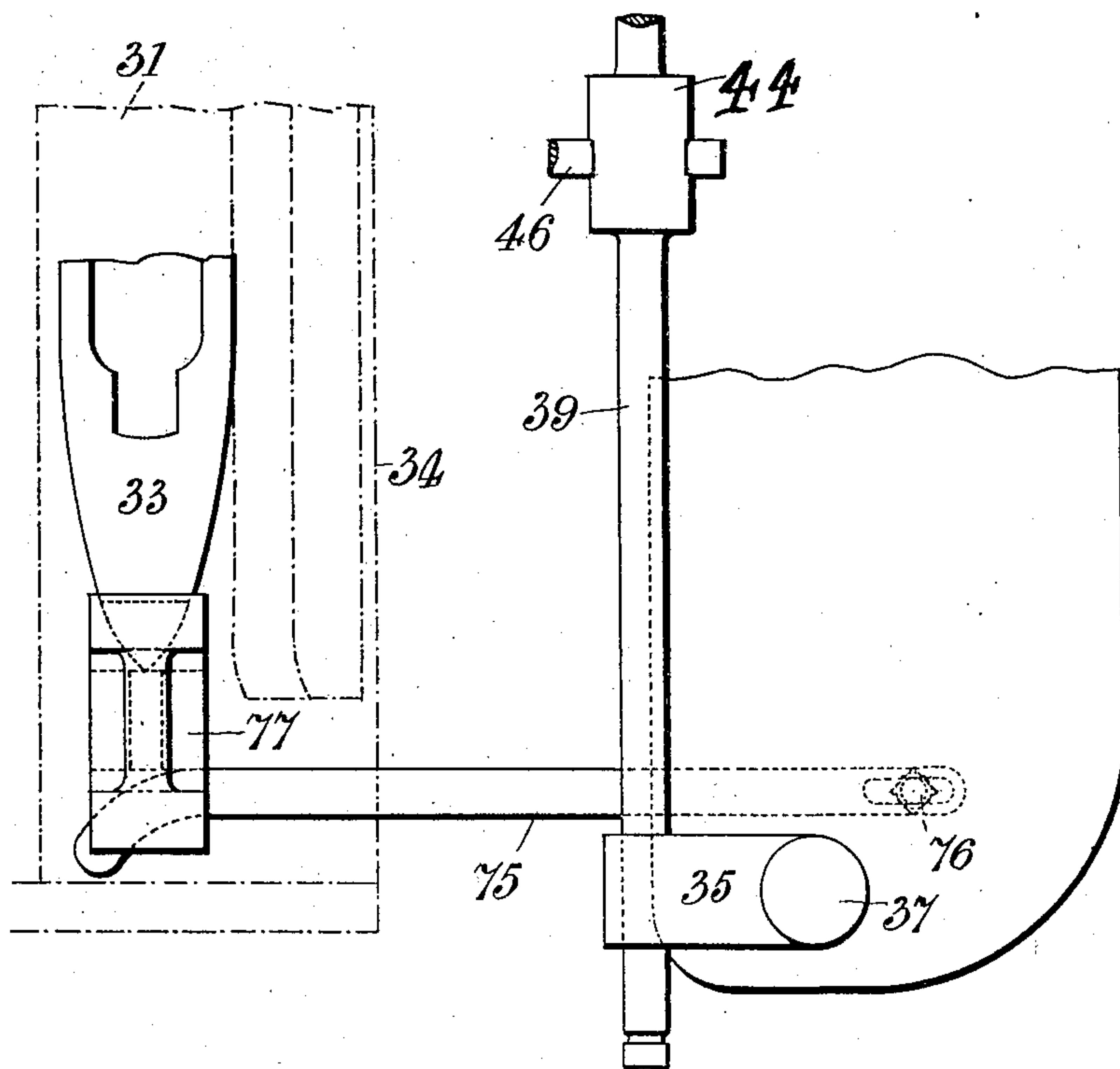


Fig. 5.



WITNESSES.  
*Stephen Kinta*  
*Fred W. Engle*

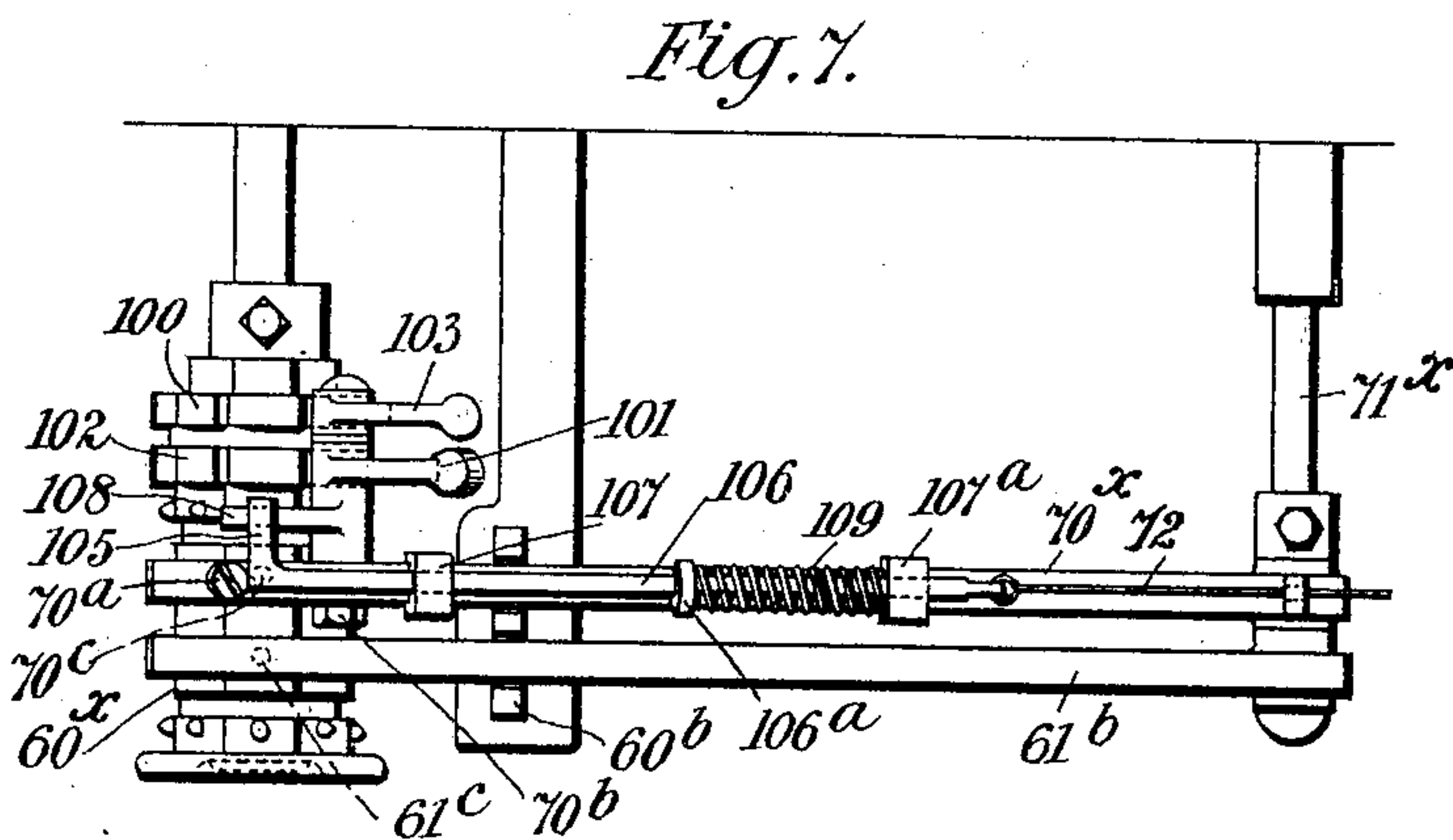
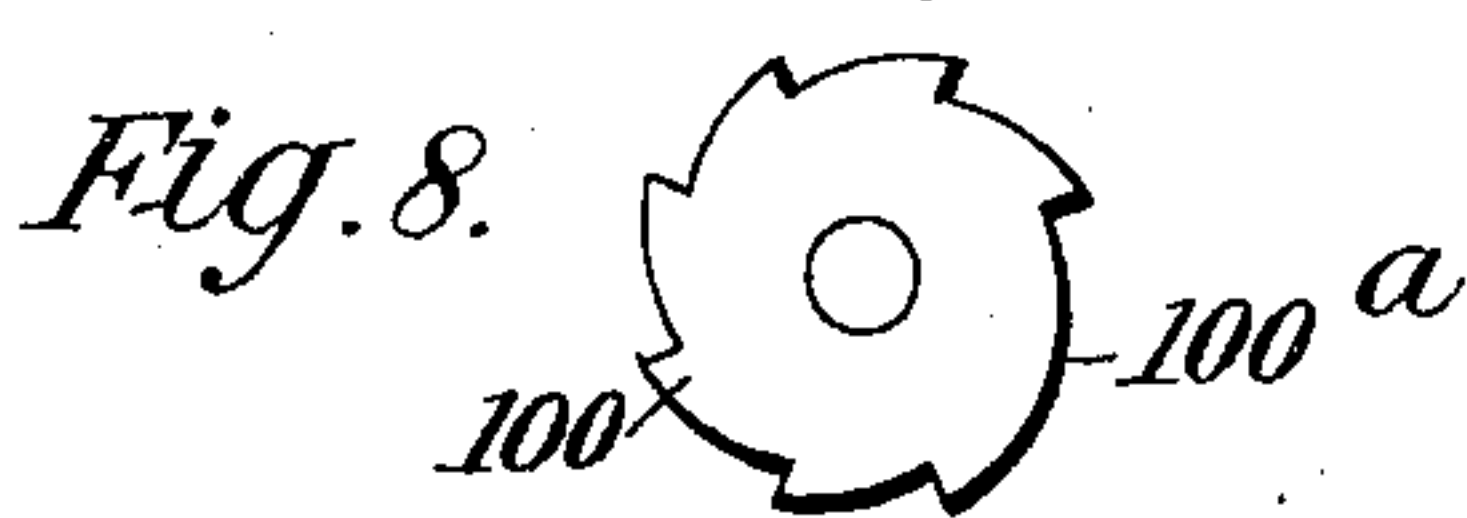
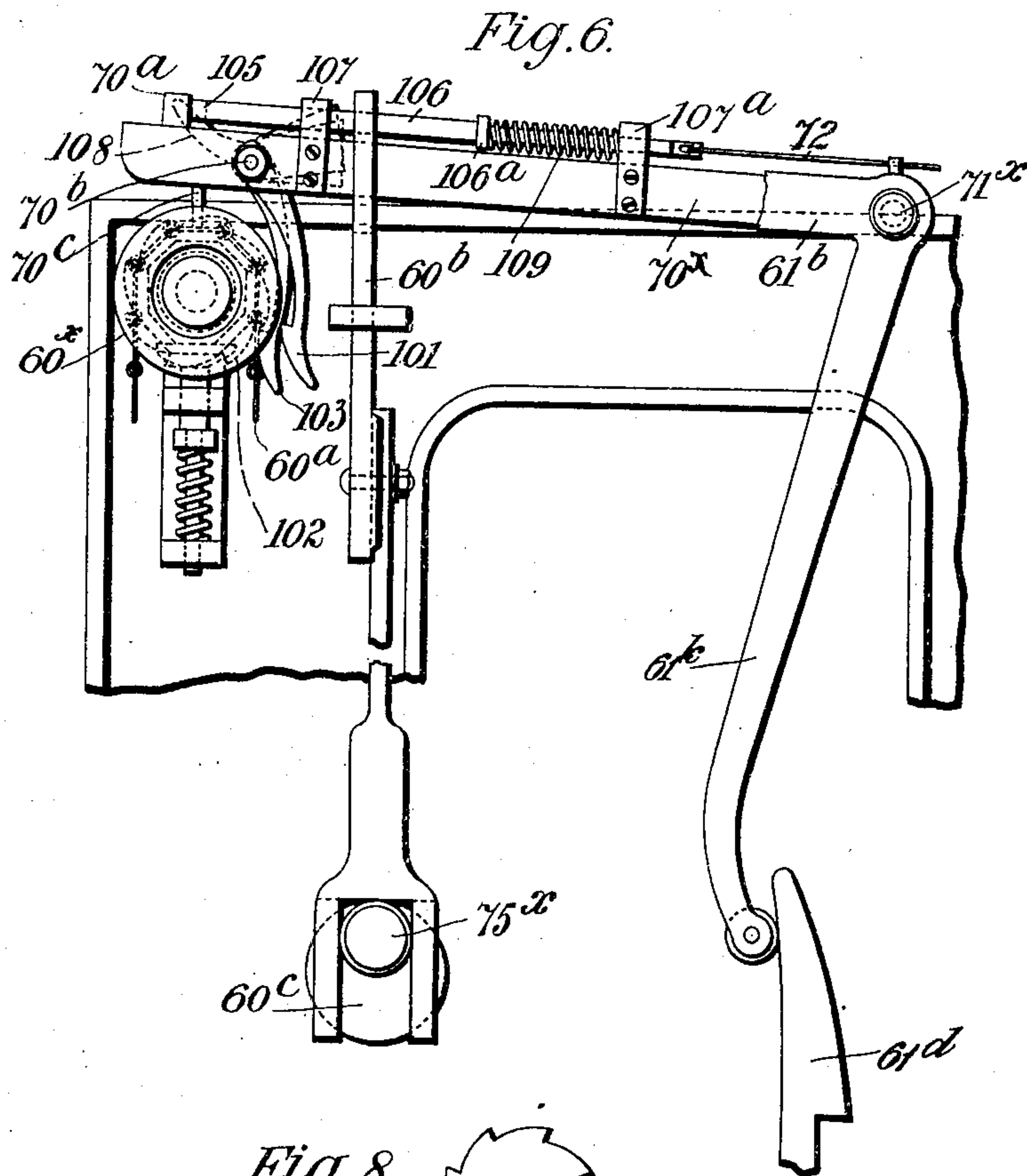
INVENTORS.  
*A. E. Walker, A. Walker,*  
*and George Walker*  
*by Wilkinson & Fisher*  
*Attys.*



A. E., A. & G. WALKER.  
WEFT REPLENISHING MECHANISM FOR LOOMS.

APPLICATION FILED JAN. 26, 1903.

5 SHEETS—SHEET 4.



WITNESSES.  
*Stephen Kinsto.*  
*W. Mac. Dowell*

INVENTORS.  
*A. E., A. & G. Walker*  
*By Wilkinson & Fisher*  
*their attorneys.*

No. 796,882.

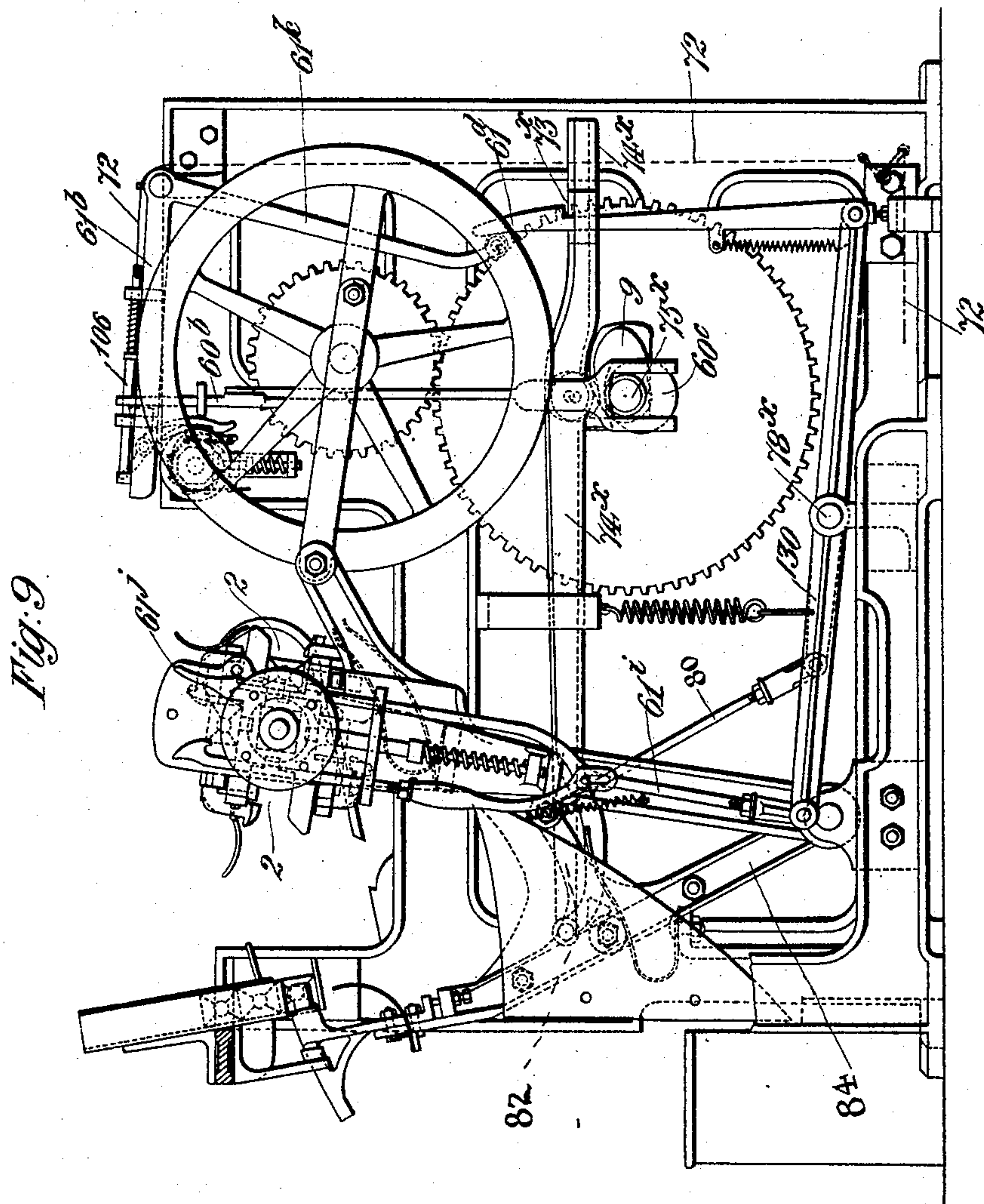
PATENTED AUG. 8, 1905.

A. E., A. & G. WALKER.

# WEFT REPLENISHING MECHANISM FOR LOOMS.

APPLICATION FILED JAN. 26, 1903.

5 SHEETS—SHEET 5.





# UNITED STATES PATENT OFFICE.

ALBERT EDWARD WALKER, ARTHUR WALKER, AND GEORGE WALKER,  
OF NORWOOD GREEN, NEAR HALIFAX, ENGLAND.

## WEFT-REPLENISHING MECHANISM FOR LOOMS.

No. 796,882.

Specification of Letters Patent.

Patented Aug. 8, 1905.

Application filed January 26, 1903. Serial No. 140,619.

*To all whom it may concern:*

Be it known that we, ALBERT EDWARD WALKER, ARTHUR WALKER, and GEORGE WALKER, subjects of His Majesty the King of Great Britain, residing at Norwood Green, near Halifax, England, have invented a certain new and useful Improvement in Weft-Replenishing Mechanism for Looms, of which the following is a specification.

This invention relates to weft-replenishing mechanism for looms; and it consists of a weft-thread detector which communicates motion imparted to it by a reduction of weft on the bobbin to a secondary controlling device of the weft-replenishing mechanism.

In the accompanying drawings, Figure 1 is a side elevation showing a part of a continuous or automatic loom having the bobbin-detecting device applied thereto. Fig. 2 is a side elevation, partly in section, on an enlarged scale, of such bobbin-detecting device, showing also a part of a shuttle. Fig. 3 is a plan of Fig. 2. Fig. 4 is an end elevation of a safety device employed with the above, but shown separately therefrom, insuring for the correct position of the shuttle in the shuttle-box. Fig. 5 is a plan of same. Fig. 6 is a side elevation of such parts of a loom-frame as are necessary to show the secondary controlling device referred to, the arm 61<sup>b</sup> being broken away. Fig. 7 is a plan of such controlling device, the arm 61<sup>b</sup> shown in its entirety. Fig. 8 is a view of a ratchet-wheel hereinafter referred to, and Fig. 9 is a side elevation of a loom to show the weft-replenishing mechanism.

The apparatus forming our invention may be applied to any suitable form of continuous or automatic loom, but is particularly applicable to the loom forming the subject of United States Letters Patent No. 738,644, dated September 8, 1903.

The apparatus consists of a detecting device which acts upon the bobbin in the shuttle-box at a point some distance from the end of the bobbin for detecting the reduction or absence of yarn at this point, such device operating, when put into action, the secondary controlling device, which can delay the action of the detecting device for changeable periods, according to the thickness of yarn on the bobbin, in order that it may delay the actual supplying of a new bobbin by the automatic feeding apparatus until the yarn on the bobbin is used

up to the limit desired, when such bobbin is put out of use.

The detecting device consists of a short arm 35, rotatably carried on a vertical stud 37, fixed on the front frame 30 of the loom opposite the receiving shuttle-box 31 and adjustably holding by a set-screw 36 the end 38 of a horizontal rod 29, the free swinging end 40 of said rod being supported in the slot 41 of the support or bracket 43, carried by the frame, and which slot 41 has a set-screw 42 to adjust the position of rod 39. About the middle of said rod is a bracket 46, which is carried by and is adjustable in an enlarged part 44 of the rod 39, and at the swinging end is a cord or flexible connection 70 to a crank 71, pivoted to the frame 30, the other end of said crank carrying a cord 72, which passes through suitable connections across the loom to the operating-rod 106 of the card-motion forming the secondary controlling device, as shown in Figs. 6 to 8. The rod 39 also carries a spring 74, connected to the frame for retaining the rod.

The adjustable bracket 46 carries a pin 47, on which are loosely mounted fingers 49 and 50, and above the pin 47 a pin 48, on which is loosely mounted a lever 51. The finger 49 is a depending one and has a shoulder 52 above its pivoting-point and an extension 57 at the rear of pin 47, to which is attached a light spring 58, the other end of which may be connected to the set-screw 45, which adjusts the position of the bracket 46 in the part 44. The second finger 50 may be termed the "detecting-finger," and has a foot-like end 59 and a cross-piece 53 over its pivoting-point, which bears against the shoulder 52 of the finger 49, and also a curved extension 54, which bears against an adjusting-screw 55, carried by a turned-up extension 56 of the lever 51. A light spring 61 is employed for attaching the fingers 49 and 50 together. The lever 51 has a notched end 60, which is capable of engaging a normally vibrating lever 62 through a plate 67 through a slot in which it passes and which is capable of adjustment to the level of lever 51.

By the above construction the fingers and lever 49, 50, and 51 are capable of movement independently of one another, but are also capable of movement together, as will be hereinafter described.

In operation, the detecting-finger 50 is set



so that the front 32 of the shuttle-box 31 passes under it as the lay or going part 34 of the loom approaches its most forward position, at which point the shuttle 33 is brought under the finger, and by reason of the lay striking the finger 49 and forcing it back the finger 50 is caused to fall and bring its foot-like end 59 upon the yarn 68 on the bobbin 69, such movement of the detecting-finger being caused by the tension of the spring 61. This movement will, through the curved end 54, adjusting-screw 55, and extension 56, give a slight rise to the lever 51 at its free end, without, however, causing it to engage the plate 67. This action is repeated each time the shuttle comes into the shuttle-box until the yarn begins to be withdrawn from the bobbin at the point where the detecting-finger rests, when the latter will be caused to have an increased fall at every movement until such fall results in raising the end of lever 51 into contact with the plate 67 of the actuating-lever 62, which, like the weft-fork mechanism of a loom, has a constant reciprocating action, for which purpose it is pivoted on a stud 63, Fig. 1, and has a cranked part 64, which is acted on by a cam 65 from the tappet-shaft 66. This results in the lever 62 pulling the lever 51 and partly rotating the whole apparatus on its pivot-stud 37, with the result that the movement of the rod 39 so swung will be transmitted, through the cord 70, crank 71, cords 72, and cranks 73, to the rod 106 of the card-cylinder of the secondary controlling device hereinafter described, which will, according to the position of the perforated cards upon it, bring into operation the weft-replenishing mechanism, consisting in the case of the loom previously referred to of the shuttle-box-turning mechanism and shuttle-feeding device. The restoration of the parts is effected by the spring 58, which by pulling on the extension 57 of finger 49 will, through the shoulder 52 and cross-piece 53, raise the foot 59 of finger 50 out of the shuttle 33, so that it is clear of same. This movement of finger 50 moves the curved extension 54 slightly away from the adjusting-screw 55, thus enabling the lever 51 to drop and disengage from the lever 62 when the latter comes forward again, whereupon the spring 74 will restore the rod 39 to its normal position.

It may happen that the shuttle on its entry into the shuttle-box for various reasons does not occupy the same longitudinal position on each occasion by reason of its being driven in too far, and thus may prevent the detecting-finger coming down upon the selected part of the bobbin. To insure the desired position of the bobbin, the frame 30 has screwed to it at 76 a curved arm 75, projecting therefrom, as shown in Figs. 1, 4, and 5, the end of which enters an opening in the side of the shuttle-box as it comes up and presses against the

picker 77, thus restoring it and the shuttle to their correct positions in case said picker has been forced back farther than the position which it should occupy. The arm 75 is slotted, as shown, to enable it to be positioned by the screw 76. In this way the position of the shuttle in the box is justified in each forward movement of the going part if it has been driven in too far.

The secondary controlling device and the weft-replenishing mechanism operated by the above may be briefly described as follows, reference being had to Figs. 6 to 9. The first part of the device consists of a shuttle-changing mechanism put into operation by plates and chains or lags or their equivalent actuated by an intermittently-operated card-cylinder, and its object is to provide simple means to put the cylinder into operation at will or when the shuttle requires changing. There are two ratchet-wheels on the cylinder and two pawls or hooks to engage these ratchet-wheels. The pawls are pivoted to an arm or lever, which is vibrated in the ordinary way by a cam and lifting rod. One pawl is normally prevented from engaging its ratchet-wheel by a removable stop-piece, and the other ratchet-wheel has a blank space in it. Consequently each time the pawl meets this space in the ratchet-wheel the cylinder remains stationary until the said stop-piece is moved sufficiently to allow the other pawl to engage its ratchet-wheel and operate the cylinder. The plates or lags are so arranged that the first movement of the cylinder after it has been stationary brings into active position the particular plate or lag provided to put the shuttle-changing mechanism in operation. The said stop-piece may consist of a rod normally held by a spring in such a position that it engages the pawl or an arm thereon, thereby holding the pawl away from the ratchet-wheel and preventing it engaging the teeth. Referring to the drawings, upon the card-cylinder 60<sup>x</sup> we affix the two ratchet-wheels 100 and 102. The driving ratchet-wheel 100 is operated by the pawl 103, and the ratchet-wheel 102 or starting-ratchet is operated by the pawl 101. Both pawls are pivoted on the stud 70<sup>b</sup>, fixed in the lever 70<sup>x</sup>, which works on the fulcrum-rod 71<sup>x</sup>. The lever 70<sup>x</sup> rises and falls by means of the usual lifting-rod 60<sup>b</sup> and cam 60<sup>c</sup>, fixed upon the end 75<sup>x</sup> of the shaft 66 opposite to the cam 65, the detector-cam 65 being at one end and the card-motion cam 60<sup>c</sup> at the other. The employment of two ratchet-wheels is for the purpose of allowing the cylinder 60<sup>x</sup> to make only one rotation after each actuation of the cord 72, which controls the mechanism. This object is attained by omitting one tooth at the point 100<sup>a</sup> from the driving-ratchet 100, Fig. 8, and by keeping the pawl 101 normally out of action with the starting-ratchet 102. The pawl 101 is kept out of action with its ratchet 102 by the finger 108 on the said



pawl being engaged by the projection 105 at the end of the sliding rod 106, which rod is mounted in the slide-bearings 107 and 107<sup>a</sup>, fixed in the lever 70<sup>x</sup>. The sliding rod 106 is pressed toward and bears upon the finger 108 on the pawl 101 by the spiral spring 109 on the rod, the spring being compressed between the collar 106<sup>a</sup> and the bearing 107<sup>a</sup>. The stud 70<sup>a</sup> on the lever 70<sup>x</sup> limits the movement of the rod 106 when submitted to the action of the spring 109 and defines the extent of movement of the projection 105 over the finger 108. To the rear end of the sliding rod 106 the cord 72 is attached, which is guided round to the front of the loom, as previously described. When the cord is pulled, the sliding rod 106 is drawn backward and the pressure of the projection 105 upon the finger 108 of the pawl 101 is removed, and the pawl 101 thereby allowed by its weight to fall upon the starting-ratchet 102. Then immediately upon the rising of the cam 60<sup>c</sup> the cylinder 60<sup>x</sup> is put into action and turned over the space 100<sup>a</sup>, where the tooth is omitted in the ratchet-wheel 100. The rotation of the cylinder 60<sup>x</sup> is then taken up by the driving-ratchet 100 and continued by it until the space of the missing tooth again arrives under the pawl 103, when the cylinder comes to rest, the said pawl at each rise of the cam 60<sup>c</sup> passing ineffectively over the space of the missing tooth, the pawl 101 having been previously withdrawn from contact with the starting-ratchet 102 when the tension upon the cord was released. The cylinder 60<sup>x</sup> is perforated or carries upon it perforated cards into which perforations the pins 61<sup>c</sup> and 70<sup>c</sup>, fixed on the levers 61<sup>b</sup> and 70<sup>x</sup>, respectively, fall. The perforations can be arranged to cause the levers 61<sup>b</sup> and 70<sup>x</sup> to operate at any desired intervals during the period of the rotation of the cylinder 60<sup>x</sup>. The lever 61<sup>b</sup> brings into operation the shuttle-box-turning lever, and the lever 70<sup>x</sup> the shuttle-feeder-vibrating lever 84 of the weft-replenishing mechanism shown in Fig. 9. When the horizontal arm of the lever 61<sup>b</sup> falls, through its cranked end 61<sup>k</sup> it moves the lever 61<sup>d</sup> outwardly, so that its hooked end is engaged by the lever 74<sup>x</sup>, vibrated by the cam 9, carried on the end 75<sup>x</sup> of the shaft 66, the hooked end of the lever 61<sup>d</sup>, as illustrated in Fig. 9, passing through the slot 73<sup>x</sup> of the lever 74<sup>x</sup>. This movement rocks the lever 130 on its pivot 78<sup>x</sup> and by pulling down the rod 61<sup>i</sup> operates, through the hooked end 61<sup>j</sup>, the rotary shuttle-box 2, so that its compartments are turned over to bring a full shuttle into position. In substantially a similar manner the lever 70<sup>x</sup> operates the shuttle-feeder-vibrating lever 84 (forming no part of the present invention, hence the shuttle-feeder mechanism is not specifically described) through the rod 80, connecting an arm or bracket 82 on the feeder-vibrating lever with a pivoted arm corre-

sponding to the arm 130 and lying to one side thereof, the said arm corresponding to the arm 130 being connected at its other end with a latch-arm corresponding to the lever 61<sup>d</sup> and similarly operating through the slot 73<sup>x</sup> of the lever 74<sup>x</sup>, it being understood that this latch-arm is operated by suitable means, (operated by the lever 70<sup>x</sup>), as before described with reference to the operation of the arm 61<sup>d</sup>.

What we claim is—

1. In an automatic loom, the combination with a detecting device comprising a presser-foot adapted to act on the bobbin, of a secondary controlling device comprising card mechanism, a weft-replenishing mechanism connected to the latter and connections between such detecting device and the secondary controlling device by which such secondary device is put into operation before the complete exhaustion of a bobbin to operate the weft-replenishing mechanism.

2. In an automatic loom, and in combination, a detecting-finger comprising a part adapted to act on the bobbin, a pivoted rod carrying such part, a notched lever, connecting means between such detecting-finger and the lever, an actuating-lever for engaging such notched lever and pulling same when the two are in engagement, a secondary controlling device comprising card mechanism and means connecting such pivoted arm with the secondary controlling device whereby the latter can be operated to operate the weft-replenishing mechanism.

3. In an automatic loom, and in combination, a detecting-finger comprising a part adapted to act on the bobbin, a depending finger adapted to be acted on by the going part to depress said finger, a pivoted rod carrying both said parts, a notched lever, connecting means between such detecting-finger, depending finger and the lever, an actuating-lever for engaging such notched lever and pulling same when the two are in engagement, a secondary controlling device comprising card mechanism, and means connecting such pivoted arm with the secondary controlling device whereby the latter can be operated to operate the weft-replenishing mechanism.

4. In an automatic loom, the combination with the frame, of a stud thereon, a detecting-finger pivotally carried by such stud, an open-topped shuttle, a depending finger also pivotally carried by the stud, and in line with, and adapted to be acted on by the going part, a spring connecting said fingers and means for carrying said parts, the arrangement enabling the detecting-finger to first pass over the top of the shuttle and then to be brought into contact with the bobbin therein, as the going part strikes the depending finger, and to leave said bobbin as the going part recedes therefrom.

5. In an automatic loom, and in combination, a detecting-finger, comprising a part



adapted to act on the bobbin, a depending finger, adapted to be acted on by the going part, a pin on which such parts pivot, a spring connection between said fingers, an extension carried by the depending finger, a spring connected to same to restore the finger, a part carried by the detecting-finger and a part carried by the depending finger adapted to be brought into engagement when the depending finger is restored, a further part carried by the detecting-finger, a notched lever, means for pivotally carrying same, a part carried thereby with which the last-named part carried by the detecting-finger can engage, an actuating-lever for engaging said notched lever when the detecting-finger assumes a certain position, and means for carrying all the parts except the actuating-lever so that they may be swung when the latter engages the notched lever.

6. In an automatic loom, and in combination, a detecting-finger 50 a depending finger 49 a spring connection between same, a pin 47 on which both are pivoted, a shoulder 52 on the depending finger, a cross-piece 53 on the detecting-finger an extension 57 on the depending finger, a spring for normally pulling same down, an extension 54 on the detecting-finger, a notched lever 51 a part carried by same with which the extension can engage, means for pivotally carrying said lever and a pivoted rod 39 for carrying all said parts.

7. In an automatic loom the combination with a detecting-finger comprising a part adapted to act on the bobbin, a notched lever, and an actuating-lever adapted to engage same

according to the position of the notched lever, of a rod 39 for carrying all of said parts except the actuating-lever, means for pivotally carrying said rod, a secondary controlling device comprising card mechanism, an automatic weft-replenishing mechanism operated by same, and a flexible connection between such rod 39 and the secondary controlling device.

8. In an automatic loom, the combination with a detecting-finger comprising a part adapted to act on the bobbin, an arm carried by the frame of the loom, and projecting therefrom, and a shuttle-box having an opening in same into which said arm is adapted to project and to strike the picker therein and thereby position the shuttle if it has been driven too far into the box.

9. In an automatic loom, the combination with a detecting-finger comprising a part adapted to act on the bobbin, a curved arm carried by the frame of the loom, and projecting therefrom, a shuttle-box having an opening in same into which the curved part of the arm is adapted to project and to strike the picker therein, and thereby position the shuttle if it has been driven too far into the box.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

ALBERT EDWARD WALKER.  
ARTHUR WALKER.  
GEORGE WALKER.

Witnesses:

WILLIAM SCRUTON,  
GEO. G. IARN.