

No. 637,753.

Patented Nov. 21, 1899.

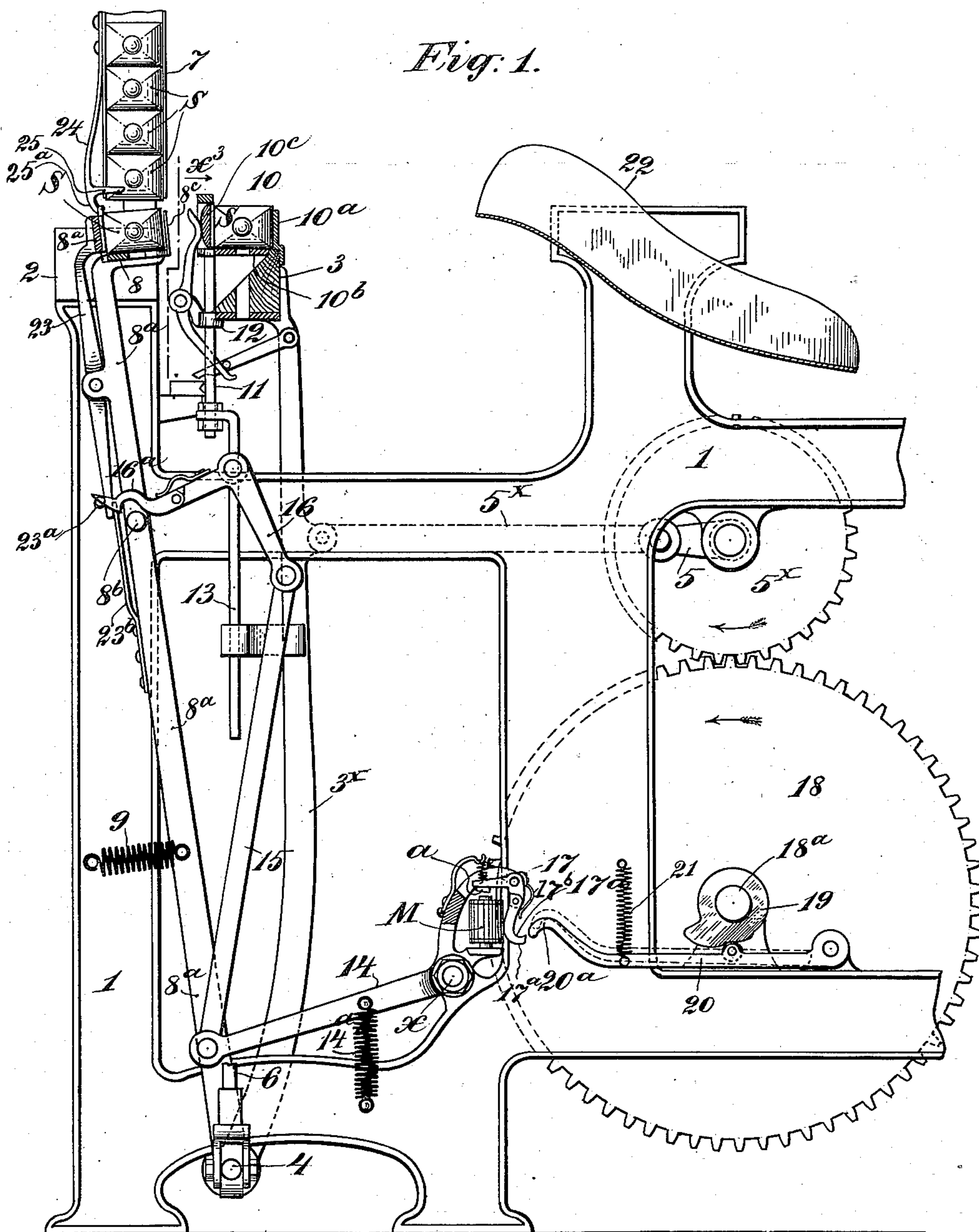
W. H. BAKER & F. E. KIP.

LOOM.

(Application filed July 19, 1899.)

(No Model.)

5 Sheets—Sheet 1.



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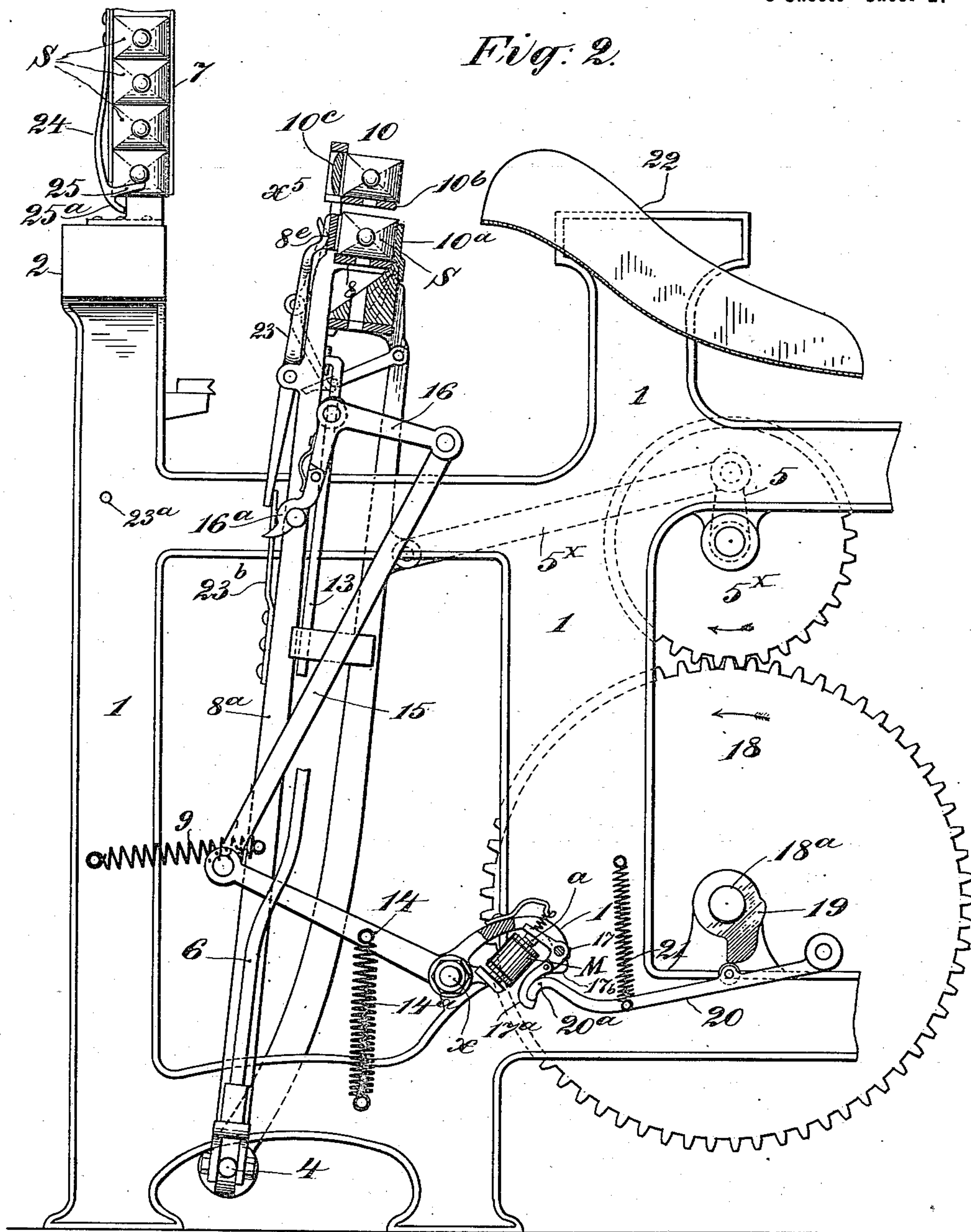
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5 Sheets—Sheet 2.

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Fig. 2.



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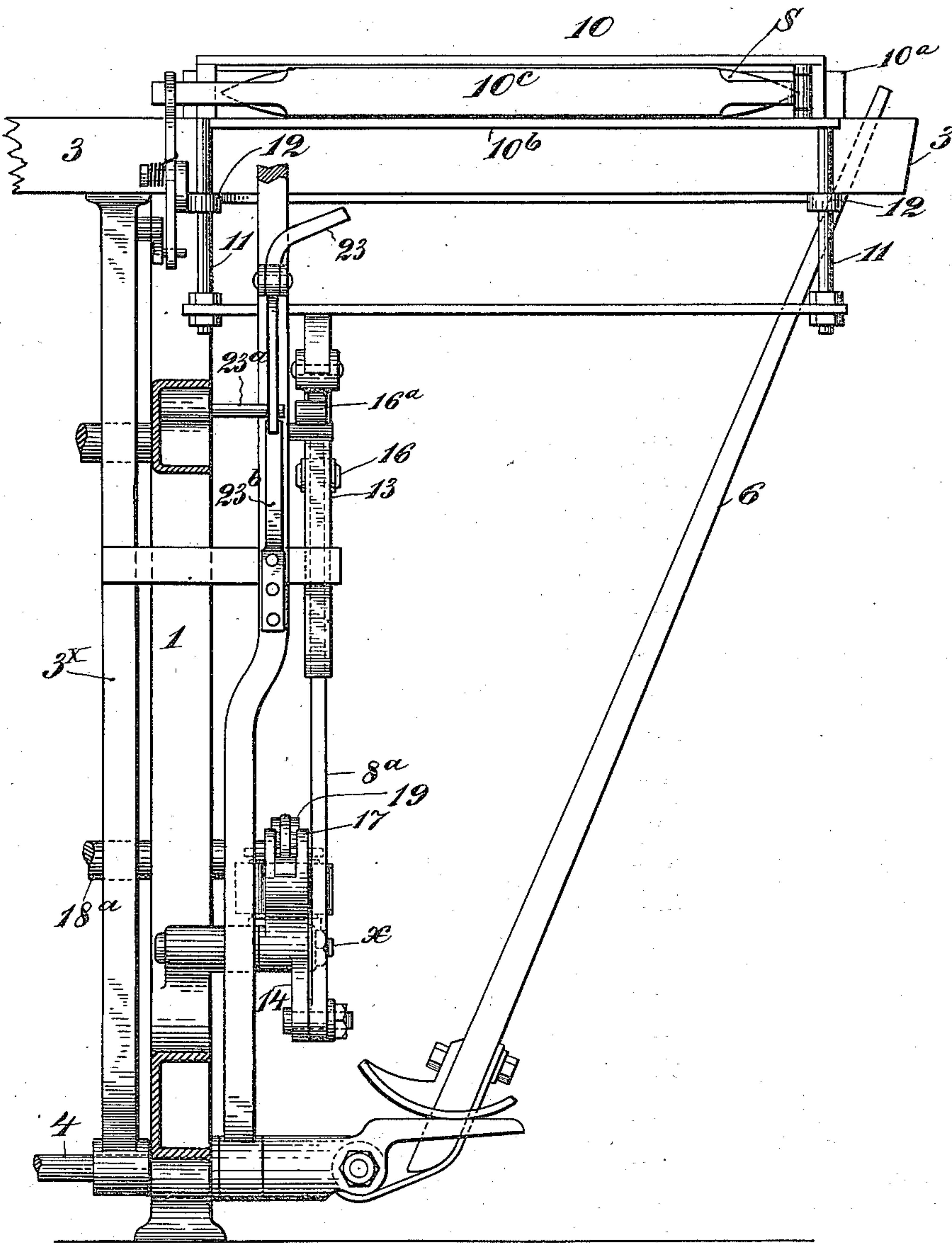
LOOM.

(Application filed July 19, 1899.)

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Fig: 3.



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No. 637,753.

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(No Model.)

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Fig. 4.

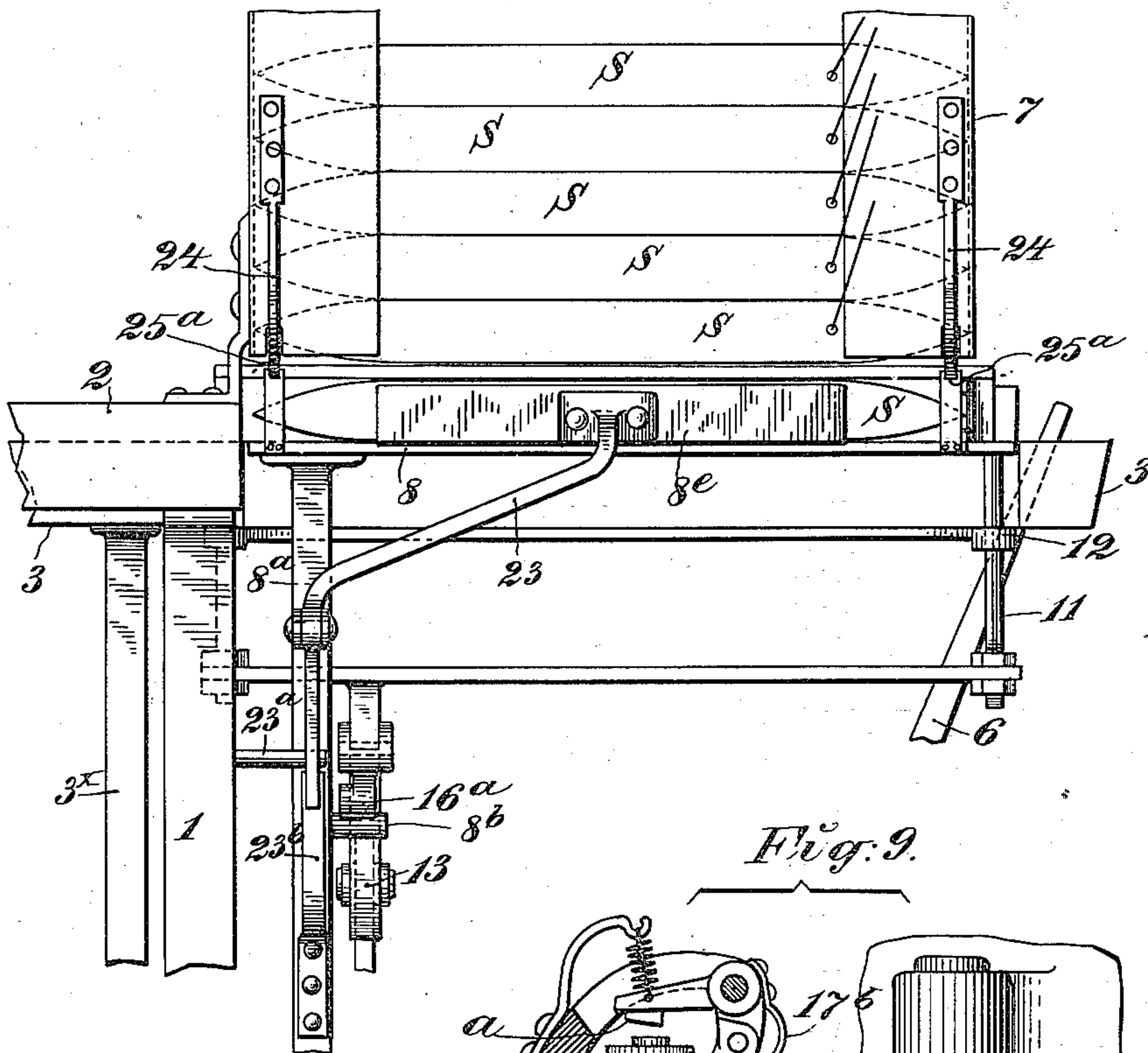


Fig. 9.

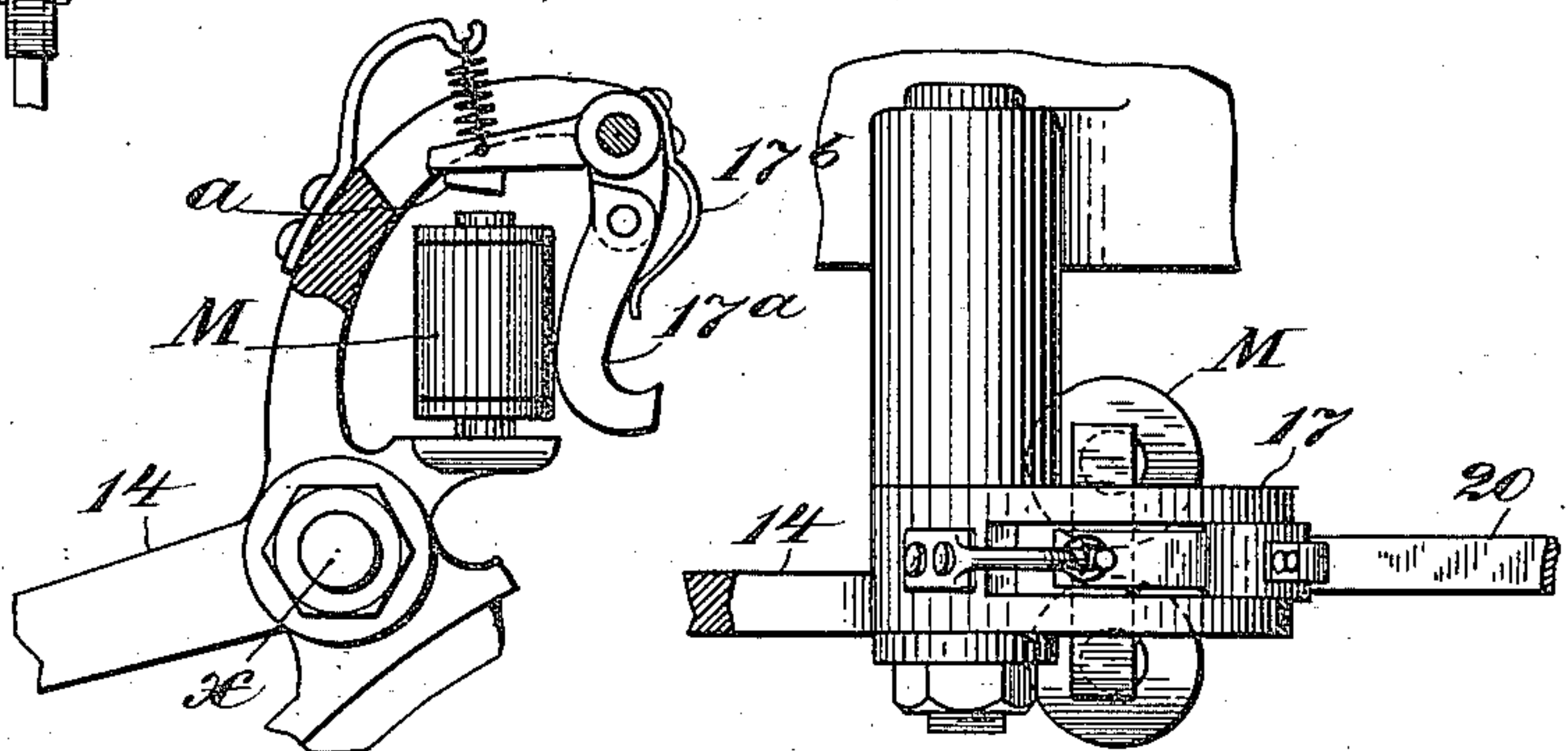
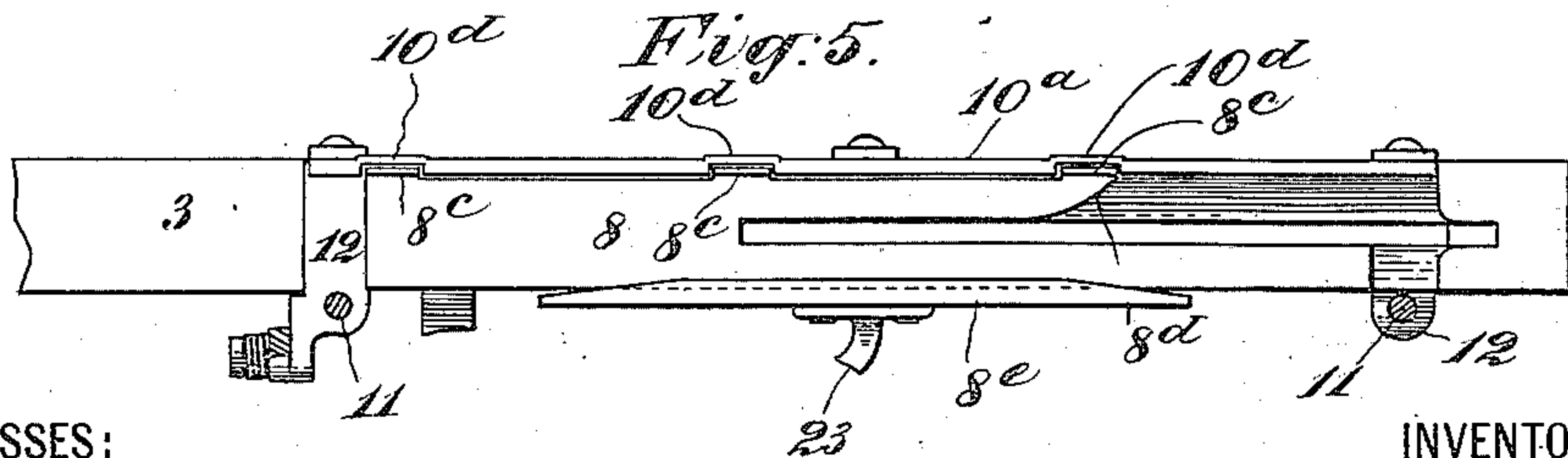


Fig. 5.



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LOOM.

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(No Model.)

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Fig. 6.

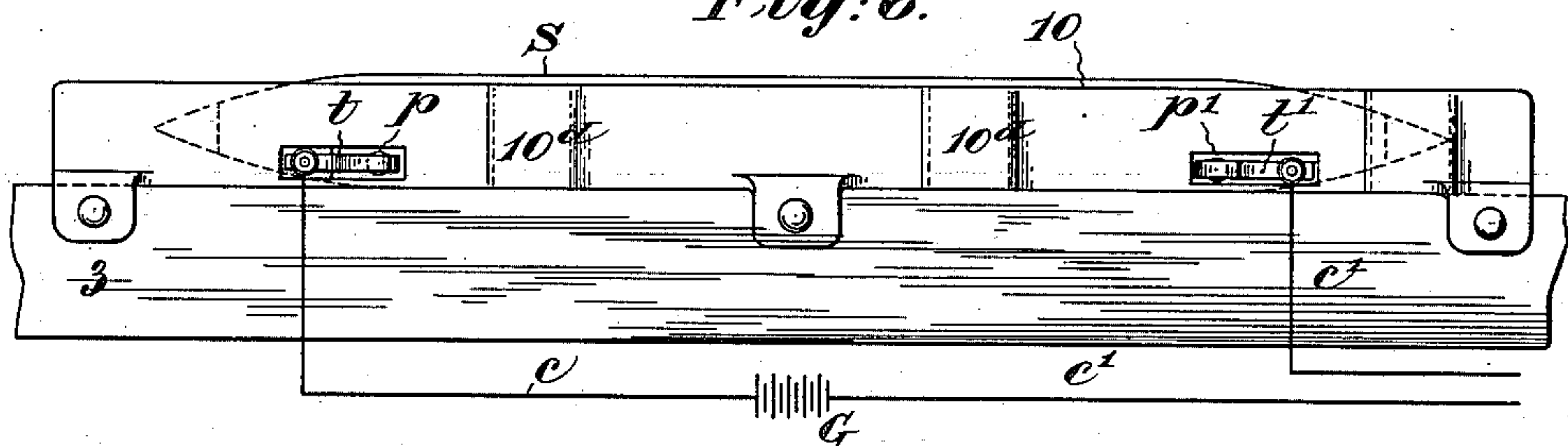


Fig. 7.

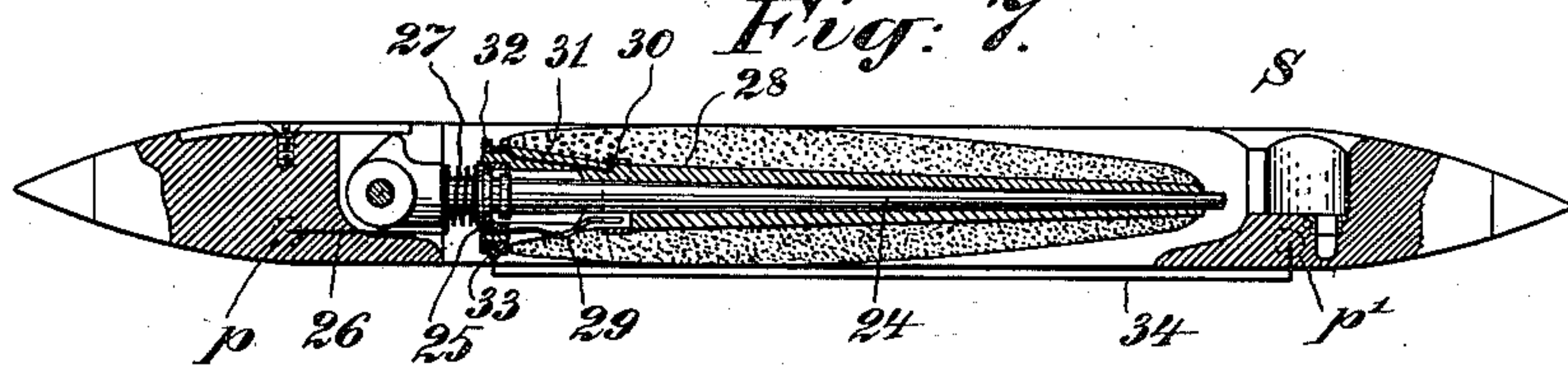
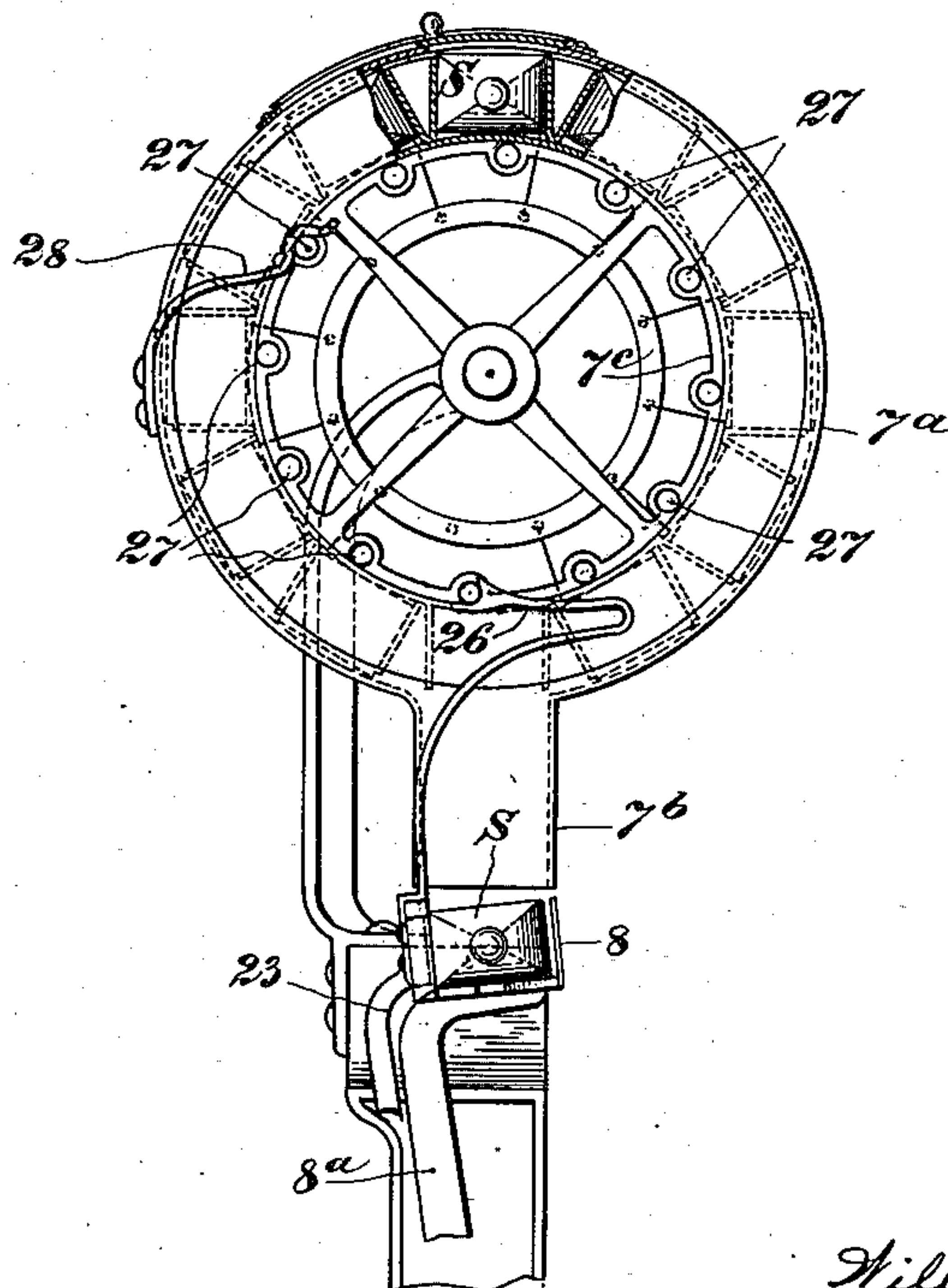


Fig. 8.



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LOOM.

SPECIFICATION forming part of Letters Patent No. 637,753, dated November 21, 1899.

Application filed July 19, 1899. Serial No. 724,385. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. BAKER, residing at Central Falls, Providence county, Rhode Island, and FREDERIC E. KIP, residing at Montclair, Essex county, New Jersey, citizens of the United States, have invented certain new and useful Improvements in Looms, of which the following is a specification.

10 This invention relates to the class of looms provided with mechanism for supplying to the loom, automatically, filled weft-carriers, and which are provided with monitors or detectors which act when the weft in the running-shuttle is nearly or wholly exhausted to set in motion the weft-supplying mechanism.

15 In the construction which forms the object of this invention there is a stationary magazine of some kind for the filled shuttles, a shiftable and displaceable shuttle-box on the lay or batten adapted to be moved from the picking-point to make room for a placer containing a full shuttle, means whereby the said placer or placing-pocket is made to receive a full shuttle from the magazine, mechanism for effecting the shifting of the shuttle-box and placer, and magneto-electric means for detecting the exhaustion of the shuttle in play and for setting in motion said shifting mechanism.

20 One of the features of the invention is the manner of shifting the shuttle-holders when a full shuttle is to be supplied and the exhausted shuttle discharged, and another is the operation of the shifting mechanism from a cam in the loom, which rotates once for each two picks of the loom.

25 In the accompanying drawings, Figure 1 is a side elevation of a part of the loom, illustrating the application of our invention thereto. This view shows the lay or batten in its advanced position, having beaten up, and the shuttle-box and placer in their normal positions. Fig. 2 is a similar view to Fig. 1, but showing the lay receding and the placer in operation to supply a full shuttle. Fig. 3 is a front sectional elevation, the plane of the section being indicated by line x^x in Fig. 1; and Fig. 4 is a front elevation of the magazine and placer, which are omitted from Fig. 3. Fig. 5 is a sectional view showing the placer

in plan, but empty. Fig. 6 is a side elevation of the fixed side of the shuttle-box, showing the electric terminals and circuits. Fig. 7 is a longitudinal sectional view of the shuttle and bobbin with their electrical devices. Fig. 8 illustrates another construction of the magazine. Fig. 9 includes a side elevation and a plan view of the magnet, armature-lever, and adjacent parts on a larger scale than the principal views.

30 Before minutely describing the construction of our weft-supplying mechanism it will be of advantage to point out the general character of the same. The magazine is stationary and delivers the full shuttle at its bottom to a placer or placing-pocket, which moves at the proper time to a position on or over the lay-head simultaneously with the elevation of the shuttle-box to make a place for it. When an exhausted shuttle enters the displaceable shuttle-box, it closes an electric circuit through an operating-electromagnet and thus puts the armature-lever of this magnet into the path of an operating lever or arm to which motion is imparted by a cam on the loom, so that this cam, through said lever and suitable intermediate mechanism, shifts the said displaceable shuttle-box, discharges the exhausted shuttle therefrom, puts the placer in position, and holds it in line with the picker until the full shuttle therein is picked to the opposite side of the loom. The arm then passes and the parts resume their usual or normal position until the shuttle in play is practically exhausted of weft, when the supplying operation is repeated.

35 1 represents generally the frame of the loom, 2 the breast-beam thereof, and 3 the lay or lay-head, carried by the lay-swords 3^x , which latter are fixed below to the swing-rail 4. The lay is vibrated in the usual manner from a crank 5 and connecting-rod 5^x . All of these parts are common, in some form, on looms now in use, as is also the picker-stick 6.

40 The features which embody the present invention will now be described.

45 On the loom-frame is mounted a shuttle-magazine 7, which discharges at the bottom. In the principal views this is an upright magazine of a known form with the shuttles superposed therein. At the delivery-outlet of the

magazine is situated the placing-pocket or placer 8, into which a shuttle S from the magazine is free to fall by gravity. The placer is a sort of trough mounted on an upright arm 8^a, which turns at its lower end on the swing-rail 4 or on some adjacent pivotal axis. A spring 9 of any suitable kind holds the placer in its normal receiving position. On the lay 3 is mounted the shuttle-box 10. This box consists of a stationary part and a movable part. The side 10^a farthest from the magazine is fixed on the loom. The bottom 10^b and the side next the magazine, including the swell 10^c, form a movable part, which is secured to a pair of stems 11, that are guided in suitable keepers 12 on the lay-head. Connected to the stems 11 is an upright guide rod or slide 13, by which the box 10 may be raised and lowered to the proper extent.

The operating mechanism of the placer and shuttle-box will now be described.

On the frame of the loom a lever 14 is fulcrumed at α , and one arm of this lever is coupled by a rod 15 to one arm of an elbow-lever 16, fulcrumed at its elbow on the upright slide 13. The other arm of the elbow-lever is provided with a hook 16^a, which is adapted under certain conditions, to be hereinafter explained, to engage a stud 8^b on the arm carrying the placer 8. On the other arm of the lever 14 is fixed an electromagnet M, the armature α of which is fixed on one arm of an elbow-lever 17, which is provided on its other arm with a hook 17^a. An ordinary armature-spring 17^b holds the armature retracted normally, and a spring 14^a holds the lever 14 in the normal position seen in Fig. 1. The crank-wheel 5^x gears with a wheel 18 of twice its own diameter, and on the shaft 18^a of said wheel is a cam 19, which will of course rotate once while the lay is making two vibratory movements. This cam 19 bears on an arm or lever 20, which may be held up to the cam by a spring 21. This operating arm or lever is vibrated constantly while the loom is in operation, and it bears at its free end a hook 20^a, which plays close to the hook on the armature-lever 17, and when the magnet M is excited and attracts its armature the lever 17 is rocked and its hooked end 17^a put into the path of the hook 20^a. Let us suppose that while the lay is at the picking-point an exhausted shuttle enters the shuttle-box 10 from the opposite side of the loom and through electrical means, to be hereinafter described, completes a circuit through the magnet M. The lay will afterward beat up the shot and start to recede; but before it again reaches the picking-point the cam 19 will depress the lever 20, which will engage the lever 14 and rock it, thus acting through the rod 15 and elbow-lever 16 to elevate the shuttle-box 10 and shift the placer 8 to the position seen in Fig. 2. The exhausted shuttle will be thrown from the open rear side of the shuttle-box and may be caught in a tray or receptacle 22 on the loom-frame. The full shuttle in the

placer 8 will be picked to the opposite side of the loom. The cam 19 now passes, the placer is returned by its spring to its normal receiving position, and the shuttle-box descends to its normal position on the lay. As soon as the shuttle-box is elevated the circuit is broken, and the continued engagement of the lever 20 with the armature-lever 17 will be purely mechanical.

It should be explained that the picker and picker-stick are omitted from Figs. 1 and 2 to avoid obscuring the other parts. The picker-stick plays in a slot in the lay-head and in the bottom of the shuttle-box and also of the placer when the latter is on the lay, as seen in Fig. 2. In Fig. 5 the slots for the picker in the respective bottoms of the placer and shuttle-box are shown. It will be noted in this view that the fixed side 10^a of the shuttle-box has in it recesses 10^d to receive the parts 8^c, forming the corresponding side of the placer. This side of the placer is short, and a part of the bottom of the placer at 8^d is omitted, so that should the placer be permitted to return to its normal receiving position before the picker-stick on its return after the pick is fully home the stick will clear the placer. The opposite side of the placer—that one at the left in Figs. 1, 2, and 5—has a movable side 8^e, which when the placer recedes to its position at the receiving-point under the magazine is moved outward automatically, so as to widen the placer and allow ample room for the shuttle to enter freely from the magazine. This outward movement of the side 8^e may be effected by any convenient means. That herein shown comprises a lever 23, fulcrumed on the arm 8^a, the side 8^e being mounted on the upper arm of said lever. A spring 23^b acts to hold said side pressed in, and a stud 23^a on the loom-frame engages the lever below its fulcrum and presses the side out, as seen in Fig. 1.

To prevent the shuttles from falling out of the magazine when the placer advances, a device is employed in connection with the simple upright form of magazine seen in Figs. 1 and 2. This device consists of springs 24 on the side of the magazine, carrying two fingers 25, which tend to take under the coned ends of the bottom shuttle and support it; but downwardly-projecting branches 25^a on the fingers 25 are engaged by the placer when it recedes, and thus the supporting-fingers are pressed back by the placer and the shuttle allowed to descend into the latter.

Fig. 8 illustrates another form of magazine, which is in most respects like that shown in our pending application, Serial No. 721,802, filed June 26, 1899. It is also illustrated and claimed in our pending application, Serial No. 735,444, filed November 1, 1899, which is a division of the present application. In this magazine 7^a is a fixed casing of drum-like contour, having at its under side a pocket 7^b, open at the bottom to deliver a shuttle to the placer 8.

Within the casing 7^a is a rotatively-mounted drum 7^c, having at its periphery cells to contain the shuttles. At its top the casing is open, so that the shuttle-cells in the drum may be conveniently filled. The shuttle in the lowermost cell of the drum passes down through the pocket, guide, or chute 7^b into the placer. When the placer recedes from the picking position, Fig. 2, to the receiving position, Fig. 1, a latch 26, carried thereby, engages one of a series of studs 27 on the end of the drum 7^c, thus turning it on its axis to an extent sufficient to bring the next shuttle-cell over the placer. When the placer advances, the latch 26 wipes under the stud 27, which it finds in its path. A spring-detent 28 by engaging the studs 27 steadies the drum in its set position.

The electrical devices employed in the shuttle-box, shuttle, and weft-carrier may be like any one of those shown in our several pending applications illustrating electrically-controlled weft-supplying mechanism—for example, Serial No. 721,802, filed June 26, 1899, or Serial No. 723,128, filed July 8, 1899—or it may be like those in our Letters Patent Nos. 633,944 and 633,945, dated September 26, 1899. As shown in Figs. 6 and 7, they consist of the instrumentalities which will now be described. On the side 10^a of the shuttle-box are mounted two spring-terminals *t* and *t'*. These form terminals of an electric circuit comprising the conductors *c c'*, the magnet *M*, and a suitable generator *G*. On the side of the shuttle are two contact-plates *p* and *p'*, which when the shuttle enters the shuttle-box are put into electrical contact with the respective spring-terminals *t* and *t'*. The shuttle has hinged in it a bobbin-spindle 24, on which is loosely mounted a metal ring 25, which is electrically connected by a conductor 26 (through a spring 27 behind the ring) with the plate *p*. The bobbin 28, which slips on the spindle 24 and carries the weft, carries a spring-terminal 29, which has electrical contact with the ring 25 when the bobbin is in place, and this spring-terminal tends by its resiliency to spring outward until its free end is in contact with the inner face of a metal ring or piece 30 on the bobbin. This latter ring is connected electrically by a conductor 31 with a grooved metal ring or piece 32 on the bobbin, and when the bobbin is pressed down in the shuttle the said groove engages a metal rod 33 in the shuttle, which is in turn connected by a conductor 34 with the plate *p'*. The terminal 29 occupies a slot in the bobbin, and when overwrapped by the weft-thread its free end is held out of contact with the ring or piece 30; but when the weft is nearly exhausted the circuit will be closed at this break.

The object in providing the elbow-lever 16 with a hook on its arm to engage the stud 8^b on the placer-arm 8^a is to permit the lay to vibrate normally without carrying the placer with it and to enable the hook on the lever

to engage the stud of the placer at the moment of shifting. It would be feasible, however, to couple the lever 16 permanently to the arm of the placer. Where a hook is employed the cam 19 will be so set as to provide sufficient movement of the hook to engage the stud before the shuttle-box and placer are moved. As the electromagnet *M* will be excited when the exhausted shuttle enters the box 10 from the opposite side at the picking-point and the engagement of the hook 16^a with the stud 8^b must take place at the end of the beating-up movement of the lay, it is desirable to hinge the end of the arm of the lever 16, bearing the hook 16^a, and provide it with a spring, as seen in Fig. 1, thus giving it the form of a spring-latch, so that at the moment the circuit is completed at the picking-point the cam-lever 20 may engage the armature-lever 17 and begin to rock the lever 16. The latch-hook 16^a will then as it approaches wipe over the stud 8^b and snap into engagement with the same.

As the armature-lever 17 will tend to swing or turn about its fulcrum on the lever 14 when the hook on its end is engaged by the hook on the end of the lever 20, it is desirable to employ the construction seen best in Fig. 9, which shows the armature-lever on a larger scale than in the principal views. The hook 17^a is connected to the lever proper by a rule-joint backed by a spring 17^b. This spring normally holds the hook rigid with the lever proper; but when acted upon by the lever 20 the spring 17^b will yield a little, as will be understood.

It may be explained, respecting the placer 8, which is made automatically expansible, that one of the objects sought is to have the same contract when the lay recedes to the picking-point, so as to hold the shuttle snugly; and as we are the first, as we believe, to provide a placer that thus expands and contracts we do not limit ourselves to any specific means and structure for effecting this result. It will be noted also that the placer is full open at its top, so as to receive the shuttle, which drops in from above.

Having thus described our invention, we claim—

1. In a loom, the combination with a stationary shuttle-magazine, of a displaceable shuttle-box, a shiftable shuttle-placer which is movable from the delivery-outlet of the magazine to the picking-point on the lay and adapted to receive and carry a shuttle from the magazine to said picking-point, mechanism for displacing the shuttle-box and replacing it with the said placer containing a full shuttle, mechanism for replacing said placer and box after the full shuttle shall have been picked, and electromagnetic means for controlling the shifting of said placer and shuttle-box.

2. In a loom, the combination with a shuttle-box and capable of an up-and-down movement, a shuttle-magazine on the loom-frame

and having a delivery-outlet at its lower part, a shiftable placer normally situated at the outlet of the magazine and open to receive a shuttle therefrom, mechanism for elevating the shuttle-box and for shifting the placer to the position vacated by the shuttle-box, means for returning the shuttle box and placer to their normal positions after the full shuttle has been picked, and electromagnetic means set in operation by the entry of the shuttle into the displaceable box, for controlling the times of shifting the said placer and shuttle-box.

3. In a loom, the combination with a stationary shuttle-magazine, of a displaceable shuttle-box, a shiftable shuttle-placer which is movable from the delivery-outlet of the magazine to the picking-point and adapted to receive and carry a shuttle from the magazine to said picking-point, a rotating cam in the loom, mechanism between said cam and the placer and shuttle-box, and actuated by said cam, for displacing the shuttle-box and shifting the placer to the position at the picking-point vacated by the former, means for returning the placer and shuttle-box to their normal positions when the operating-cam shall have passed, and electromagnetic means controlling the connection between said cam and the mechanism which shifts the shuttle box and placer.

4. In a loom, the combination with a stationary shuttle-magazine, of a displaceable shuttle-box, a shiftable shuttle-placer which is movable from the delivery-outlet of the magazine to the picking-point and adapted to receive and carry a shuttle from the magazine to said picking-point, a rotating cam in the loom, positive mechanism between said cam and the placer and shuttle-box, whereby the former actuates the latter for displacing the shuttle-box and shifting the placer to the position at the picking-point vacated by the former, means for returning the placer and shuttle-box to their normal positions when the operating-cam shall have passed, and electromagnetic means controlling the connection between said cam and the mechanism which shifts the shuttle box and placer.

5. In a loom, the combination with a weft-supply mechanism, comprising a displaceable shuttle-box, a stationary magazine having a delivery-outlet at its lower part, and a shiftable placer adapted to be shifted from its normal receiving position at the magazine to the position vacated by the shuttle-box, of the rotating cam 19, in the loom, its lever 20, the lever 14, fulcrumed on the loom-frame, the electromagnet carried on one arm of the lever 14, its armature, the armature-lever 17, and its spring, mechanism between the lever 14 and the placer and shuttle-box for shifting these latter when the lever 14 is rocked, an electric circuit including a generator and said magnet, the shuttle, and means carried by the shuttle for closing the circuit through said magnet, whereby when the magnet is excited

and attracts its armature, the armature-lever is put into the path of the lever 20, substantially as set forth.

6. In a loom, the combination with a stationary shuttle-magazine, of a displaceable shuttle-box, a shiftable shuttle-placer which is movable from the delivery-outlet of the magazine to the picking-point and adapted to receive and carry a shuttle from the magazine to said picking-point, the slide 13 carrying the shuttle-box, the elbow-lever 16, fulcrumed on said slide and having one arm adapted to engage the arm carrying the placer, the lever 14, fulcrumed on the loom-frame, the rod 15, coupling the other arm of the elbow-lever to the lever 14, the magnet mounted on the lever 14, its armature and armature-lever, the cam-lever 20, adapted to engage said armature-lever when the magnet is excited, the rotating cam 19, which acts upon the arm 20, an electric circuit including the said electromagnet and having terminals at the shuttle-box, and the shuttle, having in it a circuit with terminals to contact with those on the shuttle-box, said circuit having in it a self-closing break which is held open by the weft in the shuttle, substantially as set forth.

7. In an electrically-controlled weft-supplying mechanism for looms, the combination with an operating-cam, and a hooked lever operated directly by said cam, of the magnet-carrying lever 14, the magnet and its armature, the pivotally-mounted armature-lever on the lever 14, the hook 17^a, pivotally attached to the latter and adapted to be engaged by the hooked cam-lever, and a spring 17^b, to return the hook, substantially as set forth.

8. In a weft-supplying mechanism for looms, the combination with a magazine having a delivery-outlet in its bottom, and a placer situated normally directly under said outlet and in position to receive a shuttle or weft-carrier from said magazine, said placer having a movable side, of means for automatically moving said side outwardly when the placer takes its receiving position under the magazine, whereby the placer is made wider for the reception of the shuttle, substantially as set forth.

9. The vibrating placer 8, having a movable side 8^a, the supporting-arm of the placer, the lever 23, carrying the side 8^a, and fulcrumed on the said drum, the spring 23^b, and the stud on the loom-frame by which said lever is actuated to move said side, all combined and arranged to operate substantially as set forth.

10. The combination with the rotating cam 19, the lever 20, arranged adjacent to said cam and having a hook 20^a at its free end, and means for holding said lever up to the cam, of the lever 14, fulcrumed on the loom-frame, the electromagnet mounted thereon, the armature of said magnet, the armature-lever 17, fulcrumed on the lever 14, and hav-

ing a hook on its free end, said hook being so situated that it is put in the path of the hook on lever 20 when the magnet attracts its armature, the shuttle-box and shuttle-placer, and intermediate mechanism connecting the lever 14 with said box and placer, substantially as set forth.

11. The combination with the vibrating picker-stick, and the upwardly-displaceable shuttle-box, of the vibrating placer having a slot in its bottom to provide a way for the picker-stick, the side of said bottom being cut away at 8^d to permit the placer to return to its receiving position before the picker-stick is fully retracted, substantially as set forth.

12. In a loom, the combination with a stationary shuttle-magazine, of a displaceable shuttle-box, a shiftable shuttle-placer which is movable from the delivery-outlet of the magazine to the picking-point and adapted to receive and carry a shuttle from the magazine to said picking-point, a rotating cam in the loom, mechanism between said cam and the placer and shuttle-box, and actuated by said cam, for displacing the shuttle-box and shifting the placer to the position at the picking-point vacated by the former, means for returning the placer and shuttle-box to their normal positions when the operating-cam shall have passed, an electromagnet, and its armature and lever, controlling the connection between said cam and the mechanism which shifts the shuttle box and placer, an electric circuit including the electromagnet, and having terminals at the shuttle-box, the shuttle-box, having terminal plates to contact with the terminals on the shuttle-box, a weft-carrier in the shuttle, and a circuit in said carrier having its terminals at the plates on the shuttle and a break held open by the weft, substantially as set forth.

13. In a weft-supplying mechanism for looms, the combination with a shuttle-magazine having the delivery-outlet at its lower part, of a shifting placer, fully open at its top to receive the shuttle sidewise from the magazine, means for expanding, and holding said placer expanded while in its normal position at the magazine, and means for contracting, and holding said placer contracted while in its position on the lay, substantially as and for the purposes set forth.

14. A weft-supplying mechanism for looms, having a shifting or reciprocating, open-topped placer, for conveying a full shuttle to the picking-point, and means for automatically expanding and contracting the shuttle-space in said placer, substantially as set forth.

15. In a loom, the combination with a stationary shuttle-magazine, of a displaceable shuttle-box, a shiftable shuttle-placer which is movable from the delivery-outlet of the magazine to the picking-point and adapted to receive and carry a shuttle from the magazine to said picking-point, mechanism for displacing the shuttle-box and replacing it with the said placer containing a full shuttle and

an open electric circuit including an electromagnet, said circuit controlling the time of operation of said mechanism and having in it a break, the closure of which is controlled by the weft in the shuttle.

16. A weft-supplying mechanism for looms having the following instrumentalities, namely, a cam-lever, a rotating cam which operates said lever, an electromagnet, the armature-lever of which is normally adjacent to said cam-lever and adapted to be put in the path of the latter by the excitation of the magnet to thereby operate means for supplying a full shuttle to the raceway of a loom, the said supplying mechanism and an open electric circuit including a generator and said electromagnet, said circuit thus controlling the times of operation of said armature-lever, and having in it a break the closure of which is controlled by the weft of the shuttle in play.

17. In a loom, means for supplying a full shuttle to the raceway of the loom, an operating-lever which actuates said supplying means at proper times, a normally-rotating cam in the loom, a cam-lever normally actuated by the cam, a magnet which, when excited, connects said operating-lever and cam-lever, whereby the latter actuates the former, and an open electric circuit including a generator and said electromagnet, said circuit having in it a break the closure of which is controlled by the weft of the shuttle in play.

18. In a loom, the combination with a weft-supplying mechanism including a shiftable shuttle-box and means for furnishing a new supply of weft in place of that exhausted, of a cam-lever, a rotating cam which operates said lever, an electromagnet, the armature-lever of which is normally adjacent to said cam-lever and adapted to be put in the path of the latter by the excitation of the magnet, to thereby operate mechanism for shifting the shuttle-box and supplying weft, the said mechanism, and an open electric circuit including a generator and said electromagnet, said circuit thus controlling the times of operation of the weft-supplying mechanism, and having in it a break the closure of which is controlled by the weft in the shuttle in play.

19. In a loom, the combination with a weft-supplying mechanism, including a shiftable shuttle-box and means for furnishing a new supply of weft in place of that exhausted, a cam-lever, a rotating cam which operates said lever, an electromagnet the armature-lever of which has two moving parts one of which is normally adjacent to said cam-lever and adapted to be put in the path of the latter by the excitation of the magnet, to thereby operate mechanism for shifting the shuttle-box and supplying weft, the said mechanism, and an open electric circuit including a generator and said electromagnet, said circuit thus controlling the times of operation of the weft-supplying mechanism and having in it a break the closure of which is controlled by the weft in the shuttle in play.

20. In a loom, the combination with a shuttle-magazine, of a displaceable shuttle-box, a shiftable shuttle-placer which is movable from the delivery-outlet of the magazine to the loom's shuttle picking-point and adapted to receive and carry a shuttle or weft-carrier from the magazine to said picking-point, mechanism for moving said shuttle-box and putting said shuttle-placer in position to have a full shuttle picked through the warp-shed, means for returning said shuttle box and placer to their normal positions, and means for controlling the time of the operation thereof, said means consisting of an electric circuit including an electromagnet, the closure of which is controlled by the weft or filling in the shuttle in play.

21. In a loom, the combination with a shuttle-magazine, of a displaceable shuttle-box, a shiftable shuttle-placer which is movable from the delivery-outlet of the magazine to the loom's shuttle picking-point, and adapted to receive and carry a shuttle or weft-carrier from the magazine to said picking-point, and means for moving said shuttle-box and putting said shuttle-placer in position to have a full shuttle picked through the warp-shed, said means consisting of an electric circuit extending from an electromagnet into the shuttle, said circuit being held open by the presence and adapted to close by the substantial absence of weft or filling in the shuttle in play.

22. A loom having the following instrumentalities, namely: a displaceable shuttle-box, a shiftable shuttle-placer, which is adapted to receive a shuttle or weft-carrier and place same in position to be picked through the warp-shed, means for returning said shuttle box and placer to their normal positions, and means for controlling the time of the operation thereof, said means consisting of an electric circuit including an electromagnet, the closure of which is controlled by the weft or filling in the shuttle in play.

23. A loom having the following instrumentalities, namely: a displaceable shuttle-box, a shiftable shuttle-placer, which is adapted to receive a shuttle or weft-carrier and place same in position to be picked through the warp-shed, and means for controlling the time of the operation thereof, said means consisting of an electric circuit extending from an electromagnet into the shuttle, the same being held open by the presence and adapted to close by the substantial absence of weft or filling in the shuttle in play.

In witness whereof we have hereunto signed our names, this 18th day of April, 1899, in the presence of two subscribing witnesses.

WILLIAM H. BAKER.
FREDERIC E. KIP.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.