

No. 637,695.

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

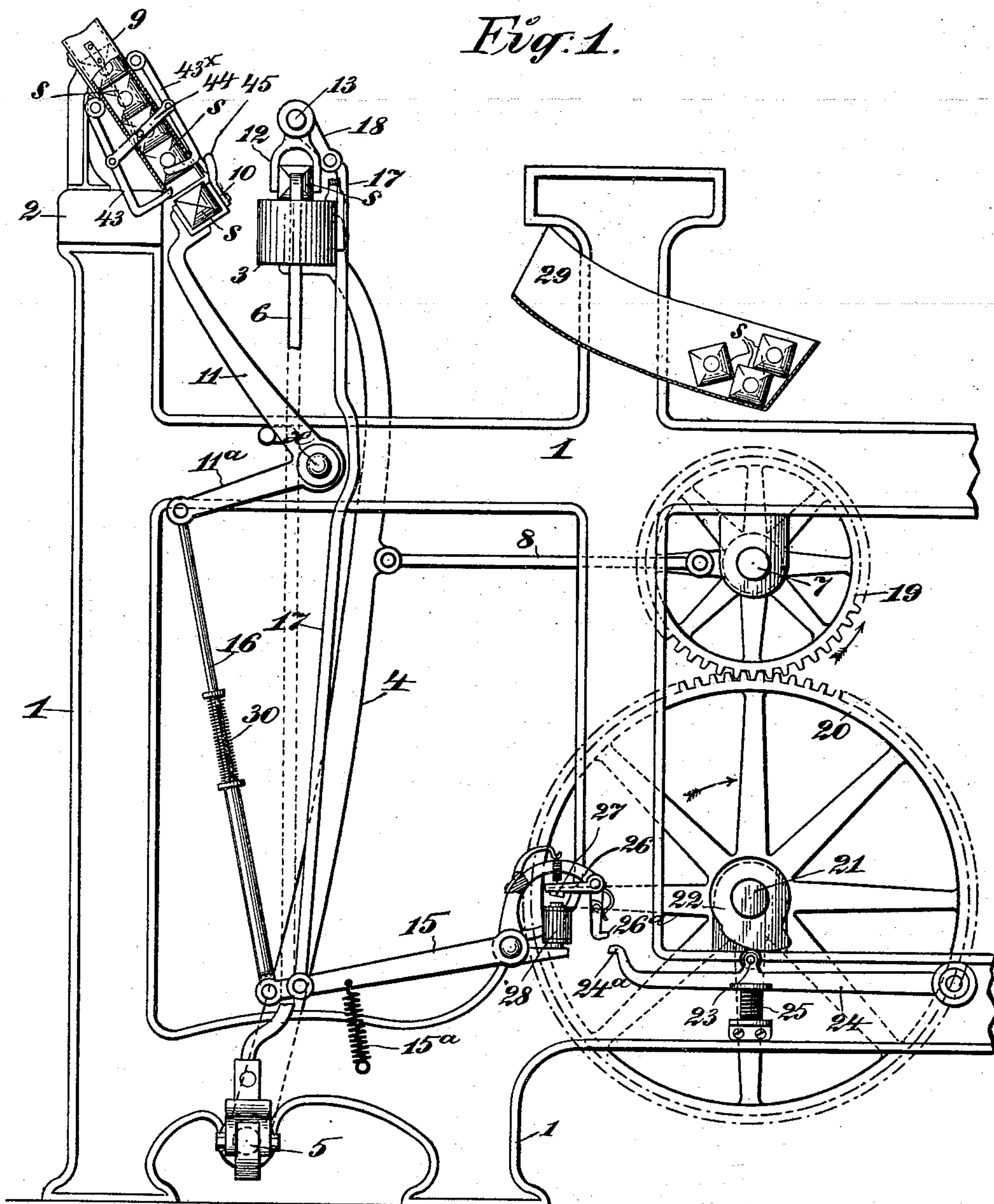
Patented Nov. 21, 1899.

(Application filed Aug. 10, 1899.)

(No Model.)

4 Sheets—Sheet 1.

*Fig. 1.*



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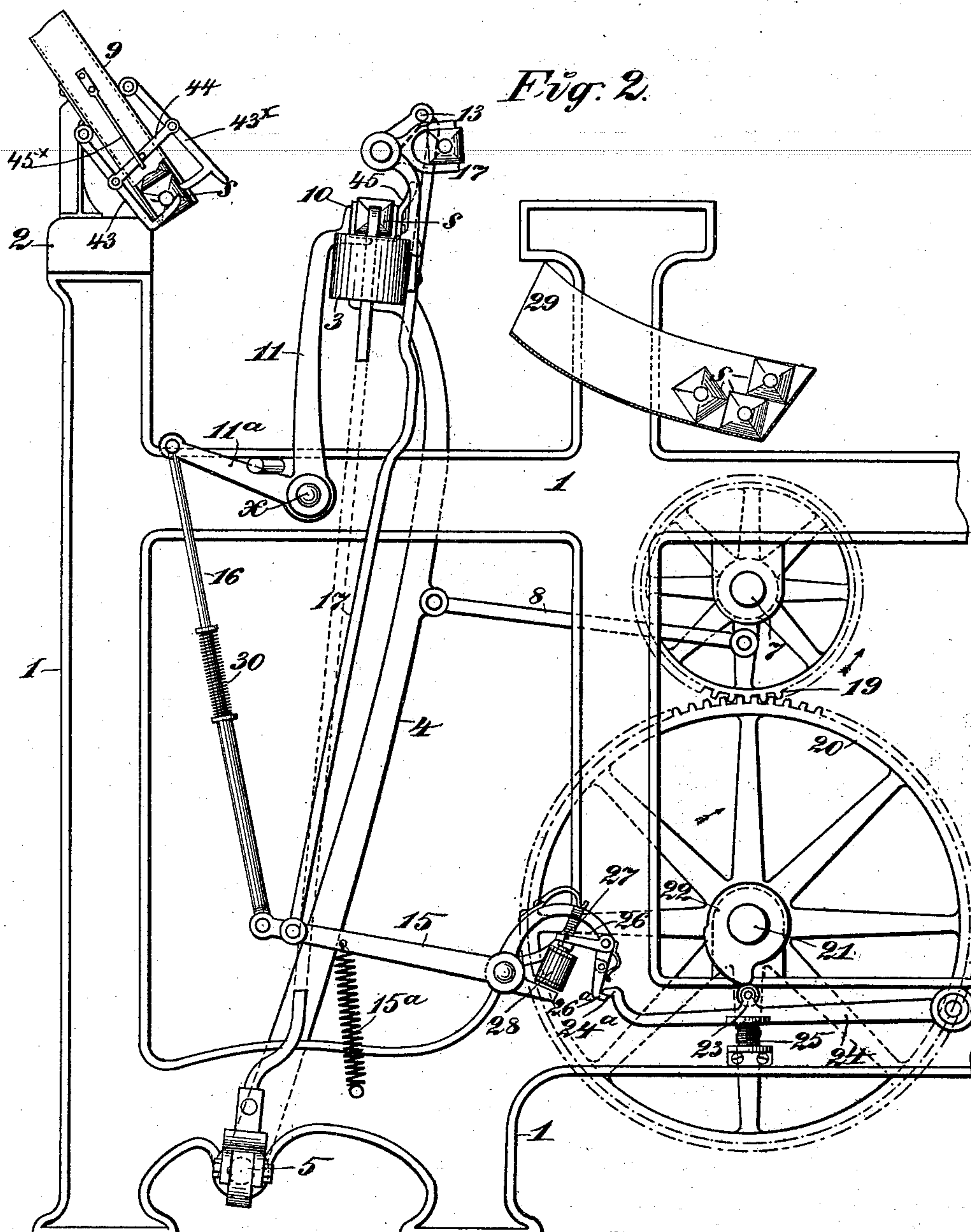
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**Patented Nov. 21, 1899.**

(No Model.)

**4 Sheets—Sheet 2.**



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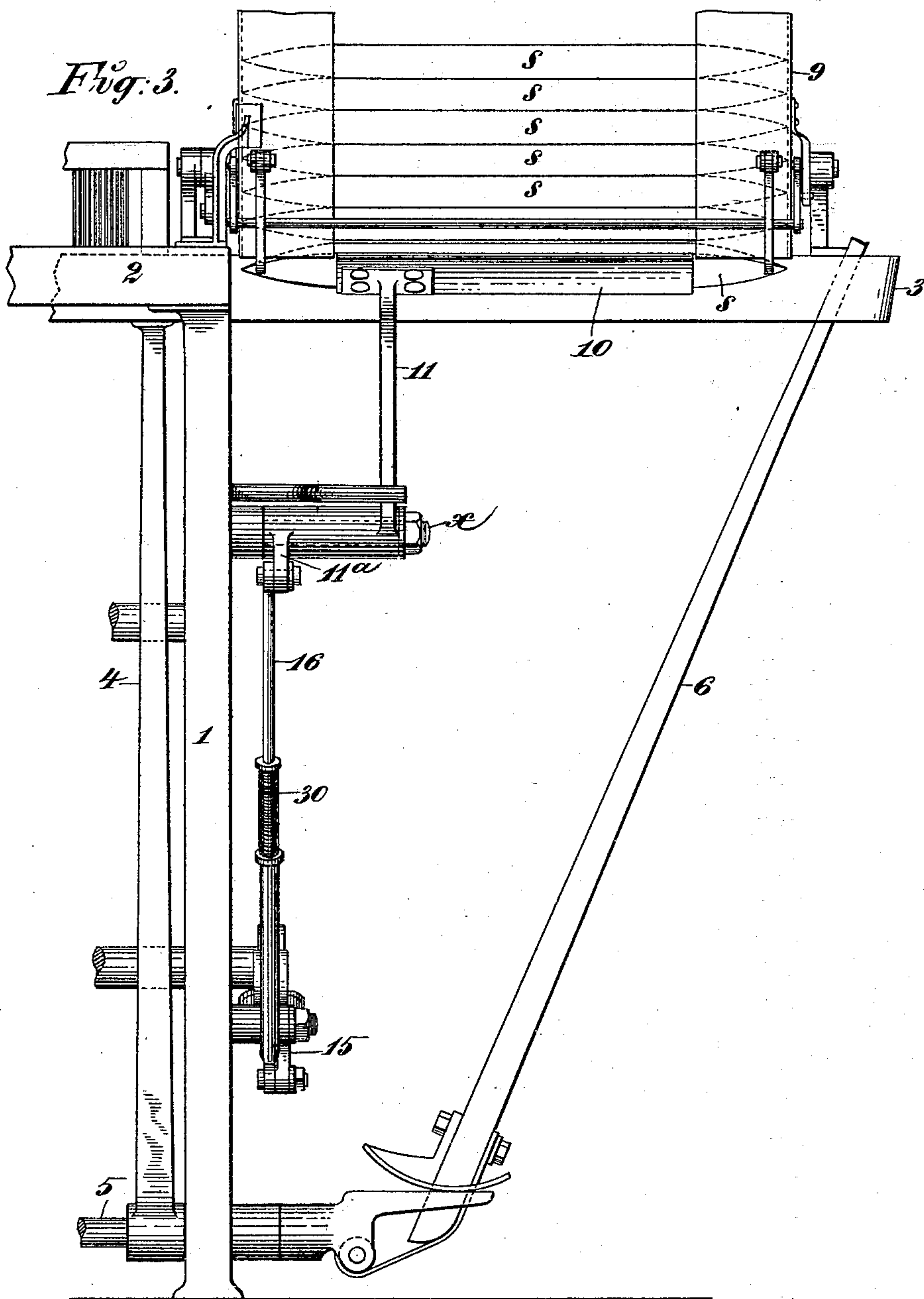
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4 Sheets—Sheet 3.



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4 Sheets—Sheet 4.

Fig. 4.

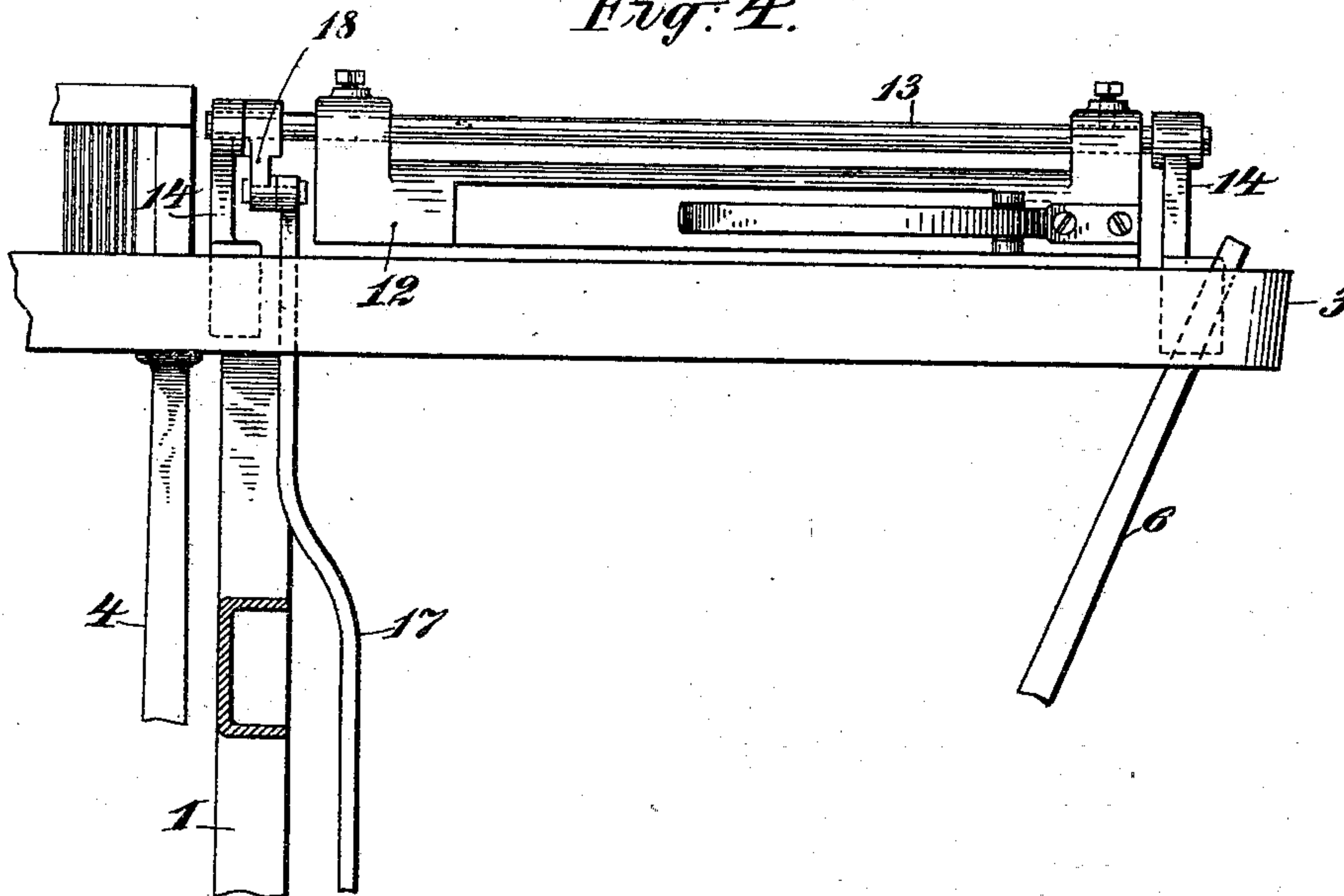


Fig. 5.

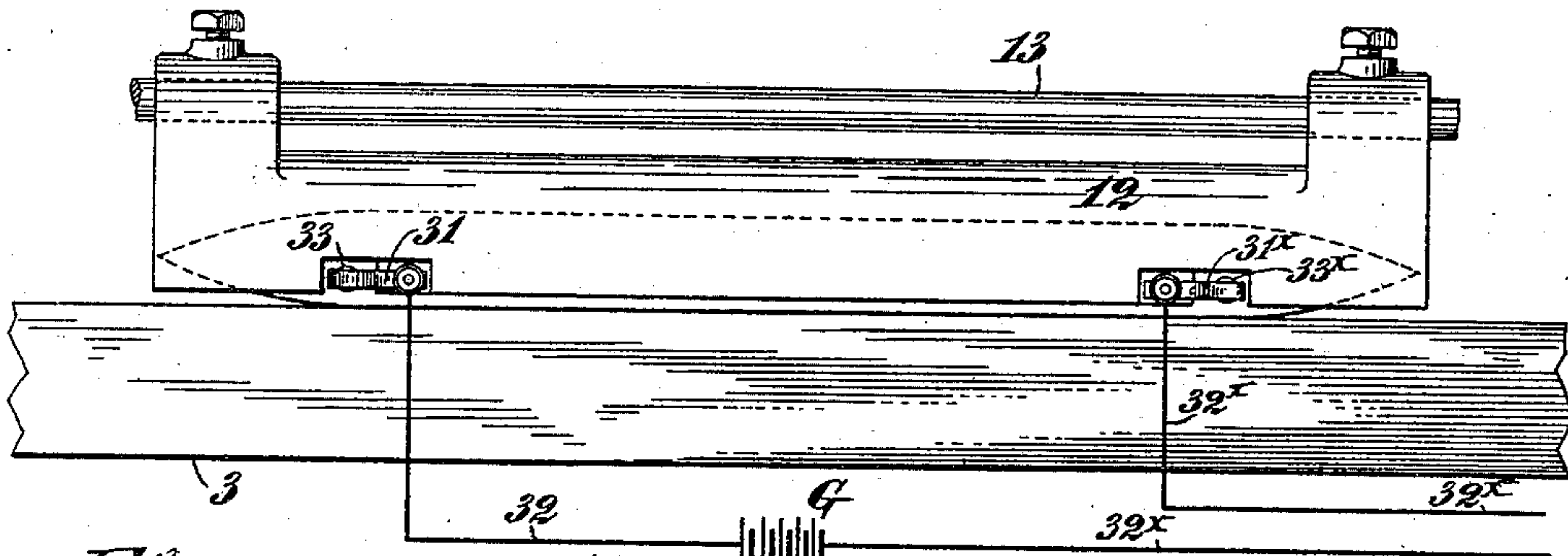


Fig. 6.

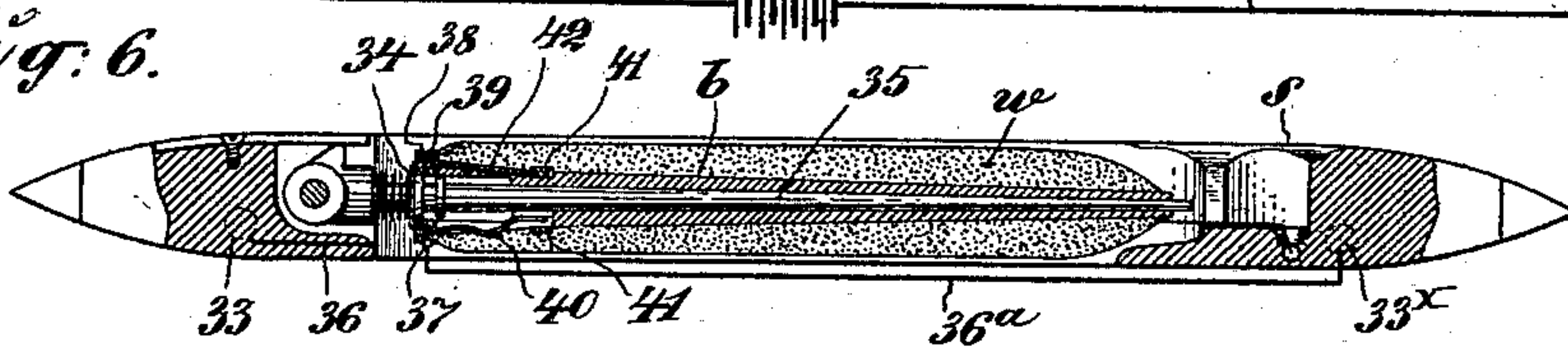
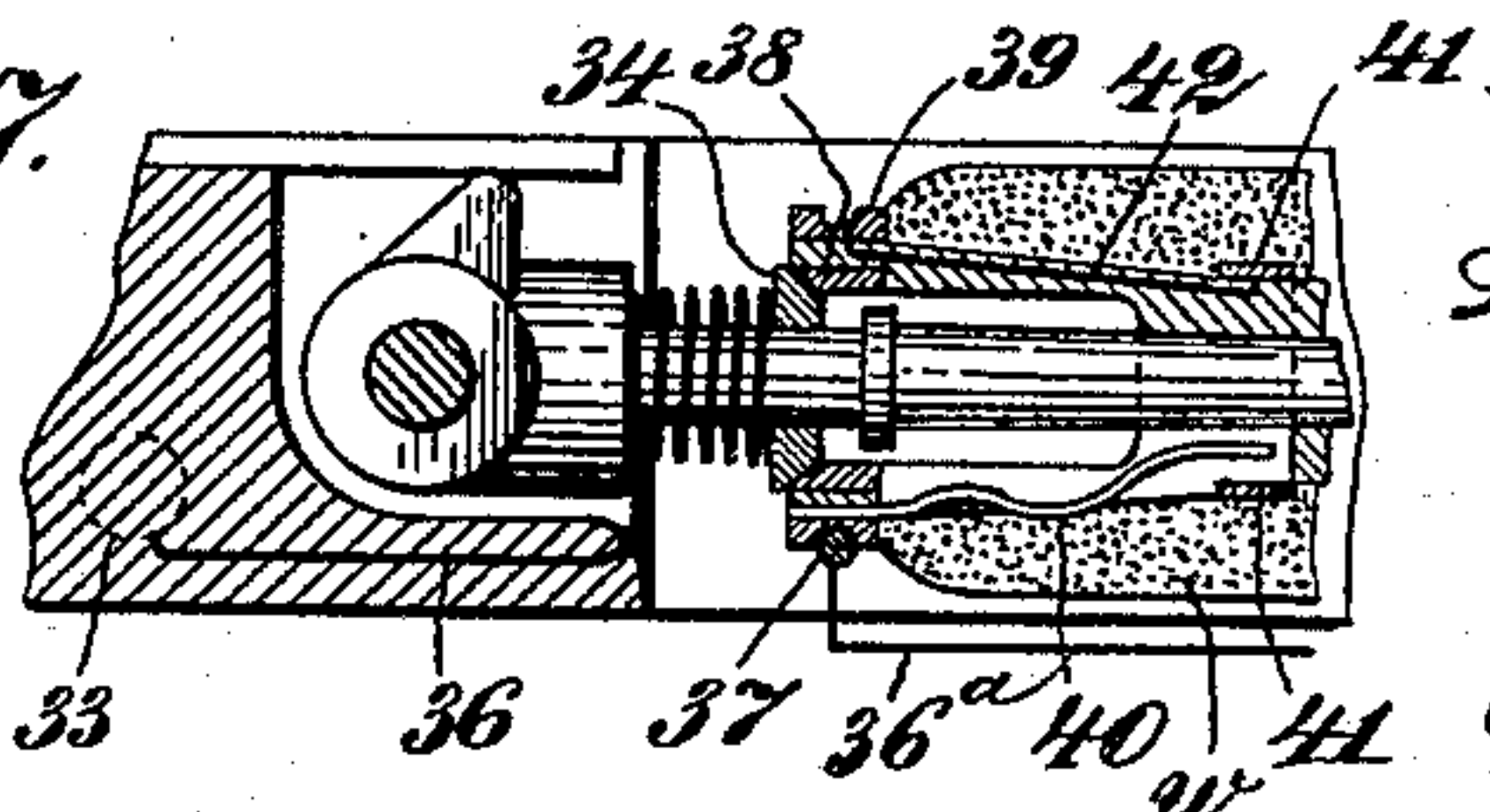


Fig. 7.



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# UNITED STATES PATENT OFFICE.

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## LOOM.

SPECIFICATION forming part of Letters Patent No. 637,695, dated November 21, 1899.

Application filed August 10, 1899. Serial No. 726,756. (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 means for supplying weft thereto as required automatically and without stopping the loom.

15 In the construction herein illustrated the operation of supplying a full shuttle to the loom is in some respects similar to that illustrated in our pending application, Serial No. 724,385, filed July 19, 1899, in the respect that there is a shuttle-placer operated by a  
20 cam on the loom and a displaceable shuttle-box on the lay; but in the present case the controlling electric circuit is closed by the entry of the shuttle into the displaceable shuttle-box and not by its entry into the box at  
25 the opposite side of the loom.

In its general construction and mode of operation the invention as herein illustrated comprises a shuttle-magazine on a stationary part, usually the loom-frame, with a delivery-  
30 outlet, a vibrating placer adapted to receive a shuttle from the magazine and carry it to the lay, where it is held until the shuttle is picked to the opposite side of the loom, a laterally-displaceable open-bottomed shuttle-  
35 box on the lay at the side next to the magazine, which box when displaced throws out the exhausted shuttle, a cam which operates these parts, and an electric circuit and electromagnet controlling the operation of the  
40 parts, this circuit having a break within the shuttle which is held open by the weft and closes when the bobbin or other weft-holder in the shuttle is nearly or quite denuded of weft.

45 In the accompanying drawings, which illustrate an embodiment of the invention, Figure 1 is a side elevation of a loom provided with our improvements and showing the positions of the parts under normal conditions, and  
50 Fig. 2 is a similar view showing the positions of the parts when the shuttles are being

changed. Fig. 3 is a front elevation of one side of the loom. Fig. 4 is a front elevation of the lay and the displaceable shuttle-box thereon. Fig. 5 is a side elevation, on a larger  
55 scale, of the displaceable shuttle-box, showing the electrical connections. Fig. 6 is a sectional view of the shuttle, showing the electrical connections therein; and Fig. 7 is an enlarged sectional view of one end thereof. 60

1 is the loom-frame, and 2 the breast-beam thereof. 3 is the lay, and 4 is one of the lay-swords. 5 is the swing-rail. 6 is one of the picker-sticks. 7 is the crank-shaft, from which the lay is vibrated, and 8 is the connecting-rod between said crank and the lay. 65 All of the above parts are or may be constructed substantially as in ordinary looms.

The shuttle-magazine 9 is mounted on the breast-beam or some other fixed part and has  
70 a delivery to the placer 10 when the latter is in its normal position of rest at or under the magazine. The placer is or may be in the nature of a trough with a bottom and two sides and is carried by supporting-arm 11, 75 pivotally mounted at  $x$  on the loom-frame. The displaceable shuttle-box 12 is suspended from above on a shaft 13, mounted to rock in brackets 14 on the lay.

15 is a lever which operates the placer 10 80 and shuttle-box 12 substantially simultaneously. To operate the placer, a connecting-rod 16 couples the lever 15 with a branch arm 11<sup>a</sup> on the supporting-arm 11 of the placer, and to operate the shuttle-box a connecting-rod 17 couples the lever 15 with an arm 18 85 on the rock-shaft 13. The lever 15 is operated by mechanism similar to that shown in our above-named application—that is to say, a toothed wheel 19 on the shaft 7 gears with 90 another wheel 20 of twice its diameter, this wheel 20 being fixed on a cam-shaft 21, on which is a cam 22 of the proper form. This cam 22 bears on a stud 23 on a lever 24, which is held up to the cam by a spring 25. At 95 each two vibratory movements of the lay the cam 22 depresses the lever 24 and the spring elevates it when the cam shall have passed. The free end or tip 24<sup>a</sup> of the lever 24 normally plays close to a hook 26<sup>a</sup> on one arm of 100 an elbow-shaped armature-lever 26, pivotally mounted on the lever 15 and bearing the



armature 27 of an electromagnet 28, carried by the lever 15. When the magnet 28 is excited, the hook 26<sup>a</sup> on the armature-lever is projected out into the path of the end 24<sup>a</sup> of the lever 24, and during the downward movement of this lever, which is effected by the cam 22, the lever 15 is rocked, thus operating the placer 10 and the vibrating shuttle-box 12. Taking the normal condition of the loom as seen in Fig. 1, where there is a shuttle S in the shuttle-box and another in the placer ready to be shifted into line with the raceway on the lay, the lay first recedes to the picking-point, when the shuttle in the box 12 is picked to the opposite side of the loom. The lay beats up and again recedes. The shuttle at the opposite side, which we will suppose to be now nearly exhausted, is picked across and enters the shuttle-box 12. This entry closes the controlling electric circuit. The magnet 28 is excited and attracts its armature, thus putting the hook 26<sup>a</sup> into the path of the tip or hook 24<sup>a</sup> on the cam-lever 24. The cam 22 should be so set that at this moment the lever 24 will be elevated and just ready to engage the hook 26<sup>a</sup>, and as the lever 24 descends the lever 15 will be rocked, thus bringing the parts to the position seen in Fig. 2—that is to say, while the lay is advancing to the beating-up point the placer 10 will move toward the lay and the shuttle-box 12 will be swung out of the way, discharging the exhausted shuttle into some suitable tray or receptacle 29. The placer must reach and occupy the position on the lay ordinarily occupied by the shuttle-box 12 by the time the lay shall have receded to the picking-point, and at this point the shuttle in the placer will be picked to the opposite side of the loom. As soon as the picker-stick shall have withdrawn the cam passes, the lever 15 is freed, the spring 15<sup>a</sup> of said lever retracts it, and through this lever and the connecting-rods 16 and 17 the placer is returned to its normal position and the shuttle-box 12 also returned to its position on the lay. The shuttle-box has or may have a spring to assist in returning it to its normal position on the lay. The loom now operates again in the usual manner until the weft in the shuttle in play becomes again nearly exhausted, when the operation is repeated.

Preferably the rod 16 is made telescopic and is furnished with an extension-spring 30, which permits the rod to be lengthened slightly. The purpose of this is to compensate for the slight difference in the curvature between the paths of the lay and the placer, but we do not consider it an essential.

The electrical connections at the shuttle-box (seen in Fig. 5) and in the shuttle (seen in Fig. 6) are not new in this application, being substantially the same as those illustrated in our pending application, Serial No. 725,219, filed July 27, 1899. On the side of the shuttle-box 12 are mounted two spring-contacts 31 and 31<sup>x</sup>, which form terminals of an outer

operative open electric circuit composed of suitable conductors 32 32<sup>x</sup>, which includes the magnet 28 and any generator G. When the shuttle S enters the shuttle-box, metal contact-plates 33 and 33<sup>x</sup> on its sides come into electrical contact, respectively, with the terminals 31 and 31<sup>x</sup>. The plate 33 is connected electrically by a conductor 36 with a sliding metal ring 34, loose on the spindle 35, which latter is hinged in the shuttle, and the plate 33<sup>x</sup> is connected electrically through a suitable conductor 36<sup>a</sup>—for example, with a metal cross rod or piece 37 in the shuttle. The bobbin *b*, carrying the weft *w*, is slipped onto the spindle 35 and the latter folded down into the shuttle, when an inner metal ring 38 in the butt of the bobbin comes into electrical contact with the ring 34 and through it with the plate 33, while another exteriorly-situated grooved ring 39 on the bobbin comes into contact with the rod 37 and through it with the plate 33<sup>x</sup>. In a slot in the bobbin is situated an outwardly-curved spring-contact 40, which is connected electrically with the ring 38, and its free end tends by the resiliency of the spring to contact with a contact piece or ring 41 on the bobbin, this latter ring being connected electrically by any suitable conductor 42 with the outer ring 39 on the bobbin. The weft *w*, overwrapping the curved spring-contact 40, holds it forcibly out of contact with the piece 41, and thus maintains a break in the circuit until the weft on the bobbin is nearly exhausted. We do not herein claim this particular construction of the electrical devices within the bobbin, and other similar devices may be employed in lieu thereof.

When the placer 10 moves out to the lay 3, an automatic stop device is employed to prevent the shuttles from falling out of the magazine. As herein shown, this device is an escapement similar in principle to that illustrated in our pending application, Serial No. 721,802, filed June 26, 1899, and it comprises two pairs of hooks 43 and 43<sup>x</sup>, which are situated at opposite sides of the magazine and connected by a link 44, so that when one pair of hooks moves in under the conical ends of a shuttle the other pair is pressed back. The pair 43 take under the bottom shuttle in the magazine and the pair 43<sup>x</sup> under that next above. A spring 45<sup>x</sup> tends to press the pair 43 in under the bottom shuttle, as seen in Fig. 2; but when the placer 10 moves back to its position under the magazine a projection 45 thereon engages the pair of hooks 43<sup>x</sup> and presses them back, thus allowing the lowermost or bottom shuttle to drop into the placer. This position of the parts is seen in Fig. 1. We do not broadly claim this stop device, nor do we limit ourselves to one of this specific construction.

It will be understood that the weft-threads from the several shuttles in the magazine will be led out and secured at some convenient point, as is usual in this class of devices.



For example, as shown in our pending application, Serial No. 724,745, filed July 22, 1899. We have not deemed it necessary to illustrate this known feature herein.

5 We have shown a simple and known form of magazine 9, but we do not, of course, restrict ourselves to this special form. Any known form of magazine may be used.

10 Having thus described our invention, we claim—

1. A mechanism for supplying weft as needed to a loom, comprising a magazine, a shifting placer for carrying a shuttle from the magazine to the lay, a suspended swinging shuttle-box on the lay, mechanism for operating said placer and shuttle-box, and an open, operating electric circuit, including a generator and electromagnet, said circuit controlling the times of operation of said placer and shuttle-box and having in it a break, the closure of which is controlled by the weft in the shuttle in play.

2. A mechanism for supplying weft as needed to a loom, comprising a magazine, a suspended shuttle-box on the lay and open at its bottom for the discharge of the exhausted shuttle, a cam rotating synchronously with the movements of the lay, a lever operated by said cam, operative mechanism between said lever and the placer and shuttle-box for shifting the latter at proper times, and an open electric circuit controlling the times of operation of said operative mechanism, said circuit including a generator and electromagnet and having in it a break, the closure of which is controlled by the weft in the shuttle in play.

3. A mechanism for supplying weft as needed to a loom, comprising a magazine, a suspended shuttle-box on the lay, and open at its bottom, for the discharge of the exhausted shuttle, mechanism for imparting vibrating movements to the said box, a shifting placer for carrying a shuttle from the magazine to the lay mechanism for imparting vibrating movements to said placer simultaneously with those of the shuttle-box, and means for controlling the movements of the placer and shuttle-box, said means being in turn governed by the degree of exhaustion of the weft in the shuttle in play.

4. In a weft-supply mechanism for looms, the combination with a magazine to contain the full shuttles, a vibratable placer 10, to carry the shuttles from the magazine to the lay, the arm 11, carrying said placer and having a branch 11<sup>a</sup>, the vibrating shuttle-box 12, suspended in brackets on the lay, the arm 18, for operating the shuttle-box, the lever 15, and the rods connecting this lever respectively with the arms 11<sup>a</sup> and 18, of the cam, rotating synchronously with the movements of the lay, mechanism between said cam, and the lever 15, whereby the cam operates the latter at proper times, and electrical means controlling the last-named mechanism substantially as set forth.

5. A weft-supplying mechanism for looms, comprising a magazine for weft-carriers, a shiftable placer for taking a weft-carrier from the magazine to the lay, a laterally-vibratable shuttle-box on the lay, mechanisms for operating said placer and shuttle-box, and means for controlling the times of operation of said mechanisms.

6. A loom having a laterally-vibratable shuttle-box, mechanism for vibrating said shuttle-box to take in a fresh supply of weft, mechanism for supplying weft as required, and an open electric circuit, including a generator and electromagnet, said circuit controlling the times of operation of said mechanisms and having in it a break, the closure of which is controlled by the weft in the shuttle in play.

7. In a mechanism for supplying weft as needed to a loom, a magazine, a placer, a suspended shuttle-box on the lay and open at its bottom for the discharge of the exhausted shuttle, a cam rotating synchronously with the movements of the lay, a lever operated by said cam, and operative mechanism between said lever and the placer and shuttle-box for shifting the latter at proper times.

8. In a loom, the combination with the vibrating lay, of a shuttle-box suspended on the lay and open at the bottom for the discharge of the shuttle, and mechanism for imparting lateral vibrations to said box, substantially as and for the purposes set forth.

9. A mechanism for supplying weft or filling to a loom as required, comprising a magazine, a shifting placer for carrying a supply of weft from the magazine to the loom's picking-point, a suspended, swinging shuttle-box, mechanism for operating said placer and shuttle-box, and means for controlling the time of the operation thereof, said means consisting of an electric circuit including an electromagnet, the closure of said circuit being controlled by the weft or filling in the shuttle in play.

10. A mechanism for supplying weft or filling to a loom as required, comprising a magazine, a shifting placer for carrying a fresh supply of weft or filling, to replace that exhausted, to a position in the loom to be picked through the warp-shed, a suspended, swinging shuttle-box, mechanism for operating said placer and shuttle-box, and means for controlling the time of the operation thereof, said means consisting of an electric circuit extending from an electric magnet into a shuttle, and said circuit being held open by the presence and adapted to close by the substantial absence of the weft or filling in the shuttle in play.

11. A loom having the following instrumentalities, namely: a suspended shuttle-box, a shifting shuttle-placer which is adapted to receive a shuttle or weft-carrier and place the same in position in the loom to be picked through the warp-shed, mechanism for moving said shuttle-box and placer to their nor-



mal positions, and means for controlling the time of the operation thereof, said means consisting of an electric circuit, including an electromagnet, the closure of said circuit being controlled by the weft or filling in the shuttle in play.

12. A loom having the following instrumentalities, namely: a suspended shuttle-box, a shifting shuttle-placer which is adapted to receive a shuttle or weft-carrier and place same in position in the loom to be picked through the warp-shed, mechanism for moving said shuttle-box and placer and returning same to their normal positions, and means for controlling the time of the operation thereof, said means consisting of an electric cir-

cuit extending from an electromagnet into the shuttle, and 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.

In witness whereof we have hereunto signed our names in the presence of the subscribing witnesses.

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FREDERIC E. KIP.

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Witnesses for Frederic E. Kip:

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