

No. 702,635.

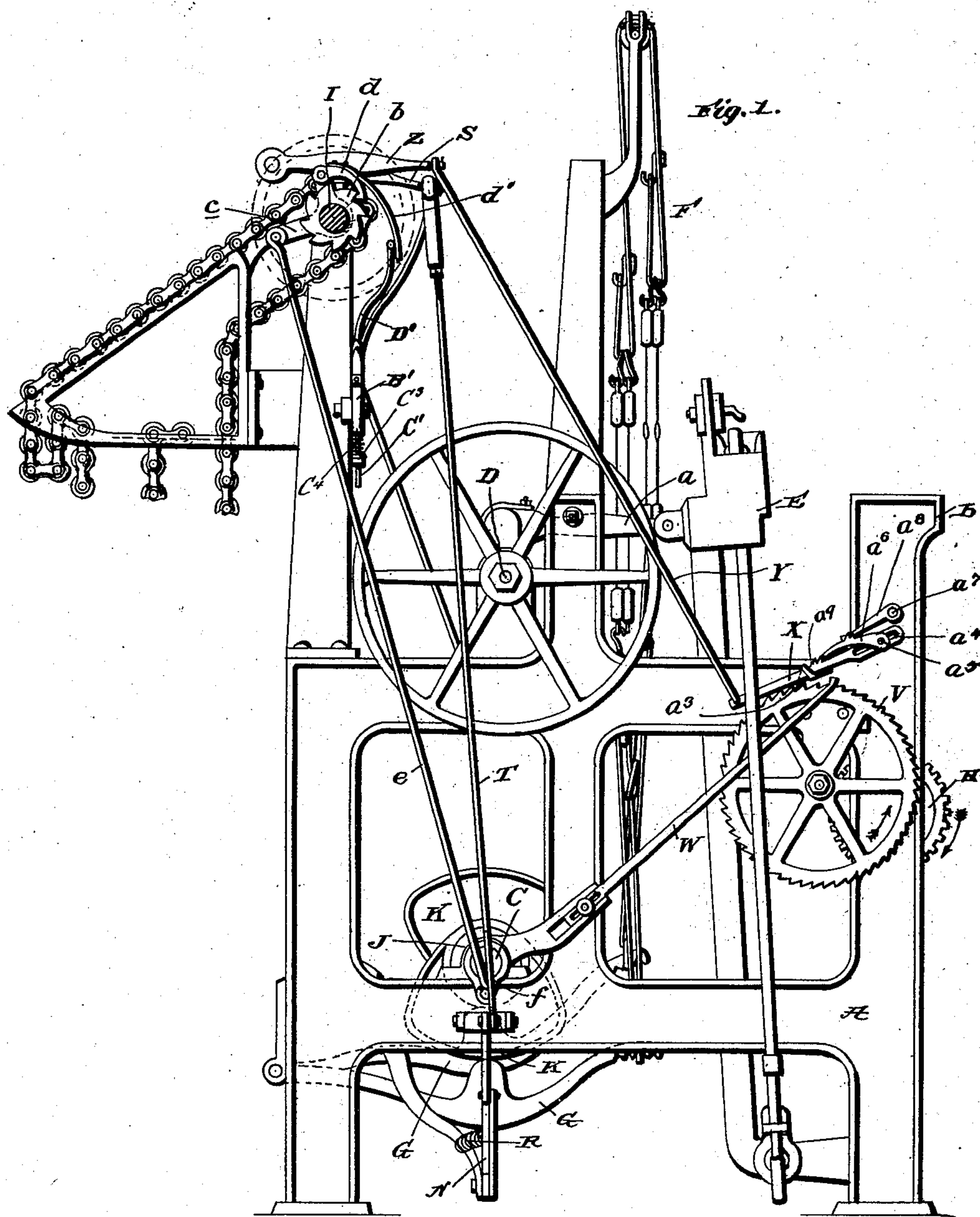
Patented June 17, 1902.

G. W. CUMNOCK & F. E. WARREN.  
LOOM FOR WEAVING BORDERED FABRICS.

(Application filed June 8, 1898.)

(No Model.)

5 Sheets—Sheet 1.



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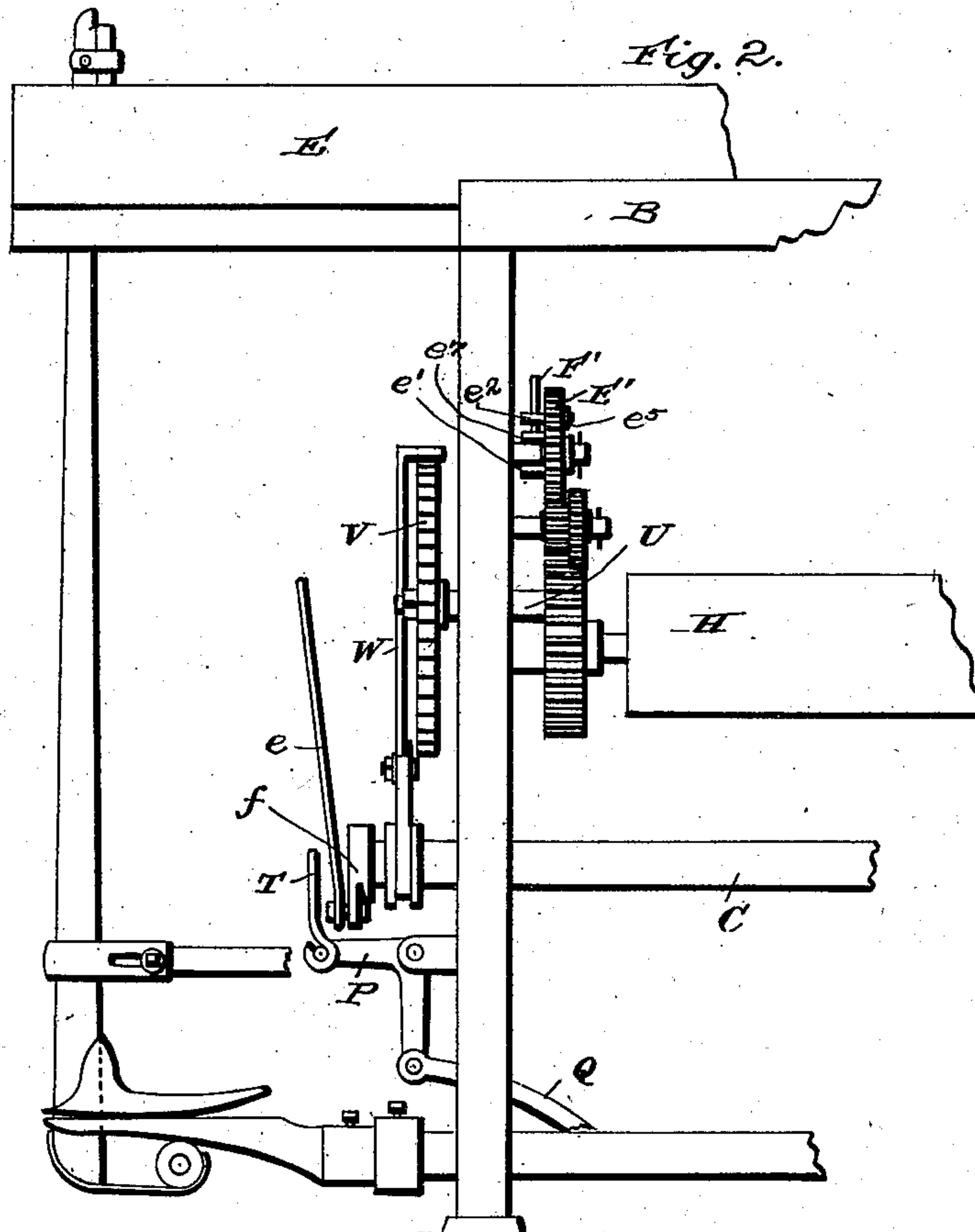
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5 Sheets—Sheet 2.



Witnesses:

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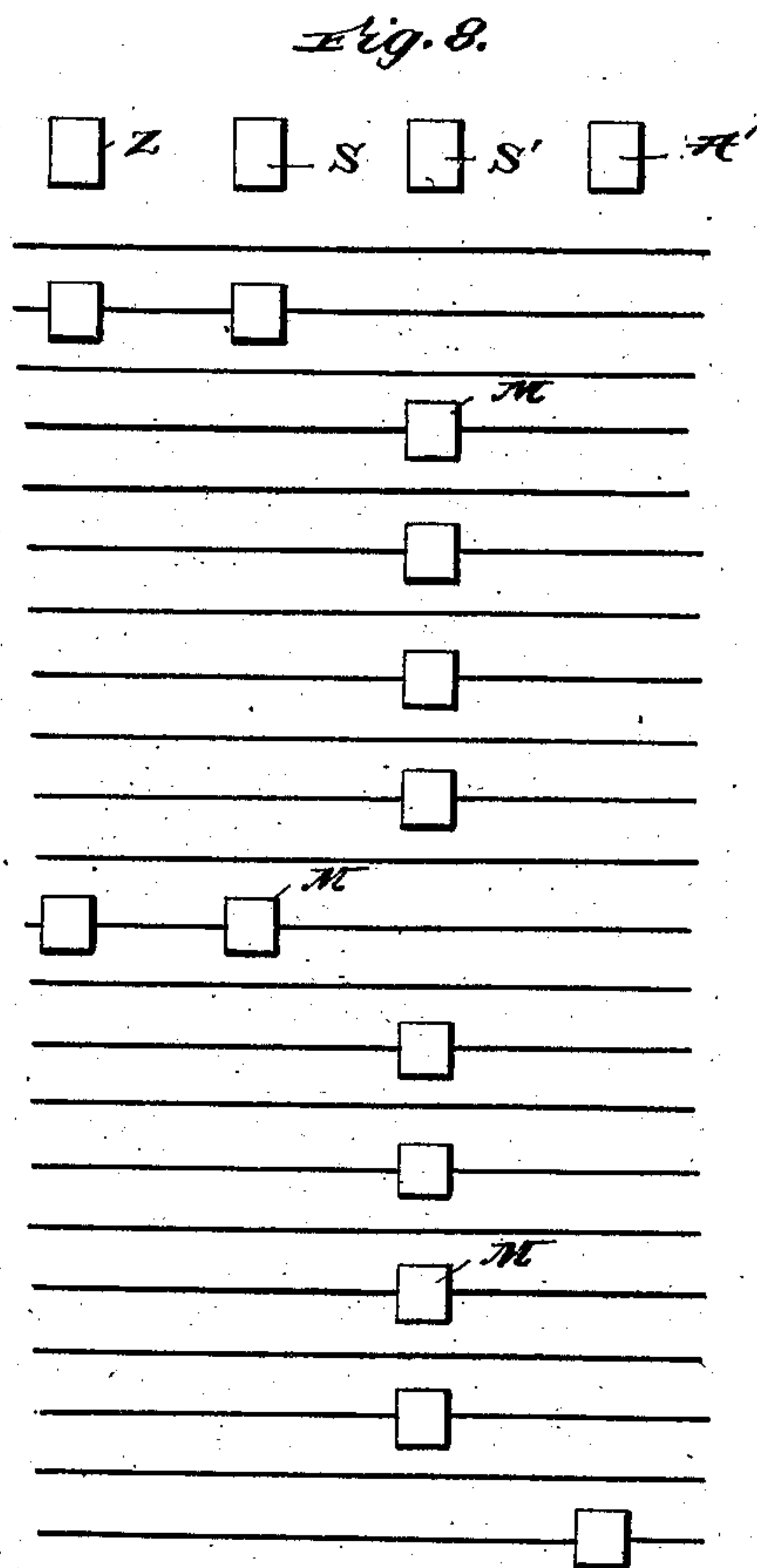
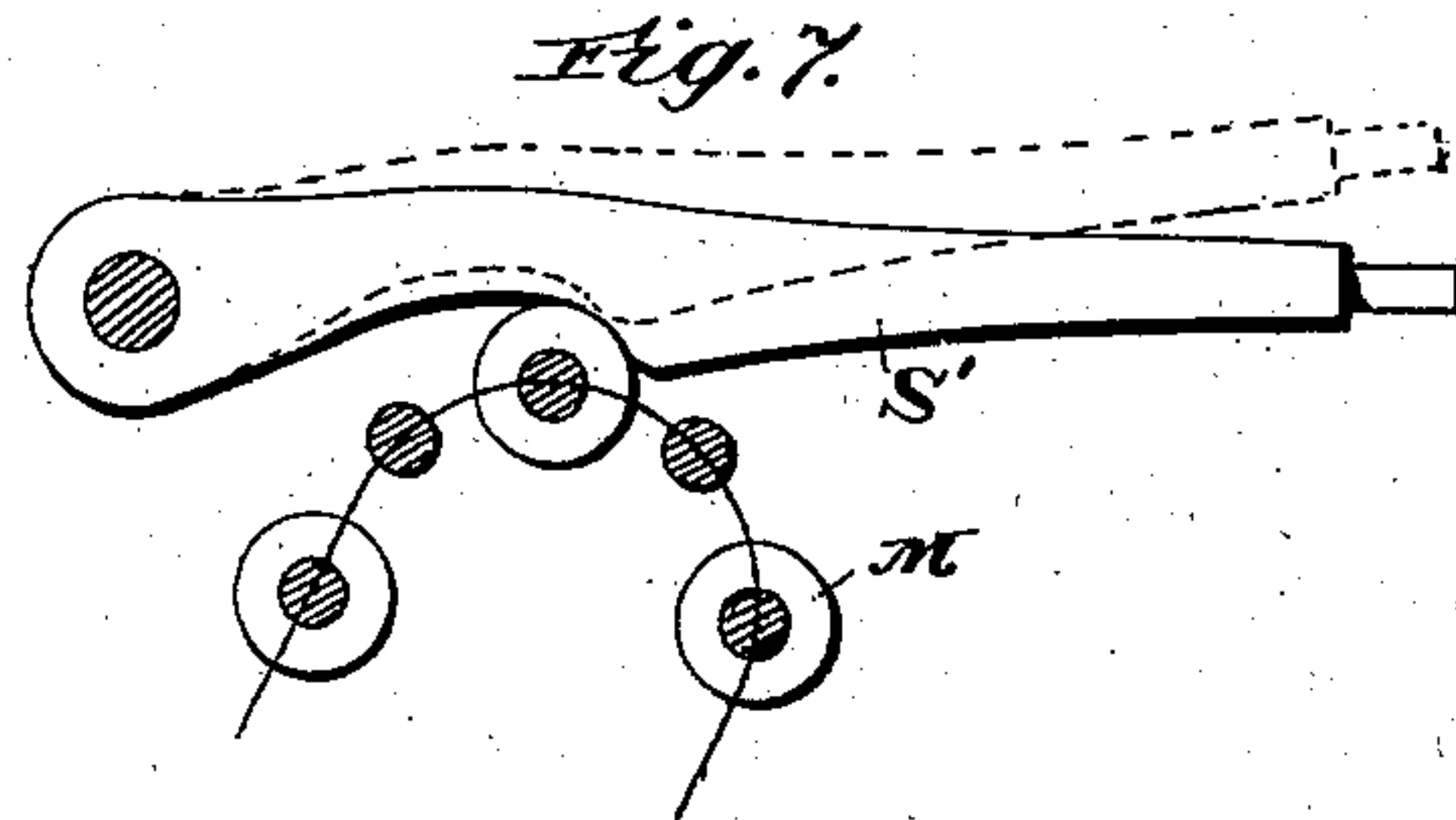
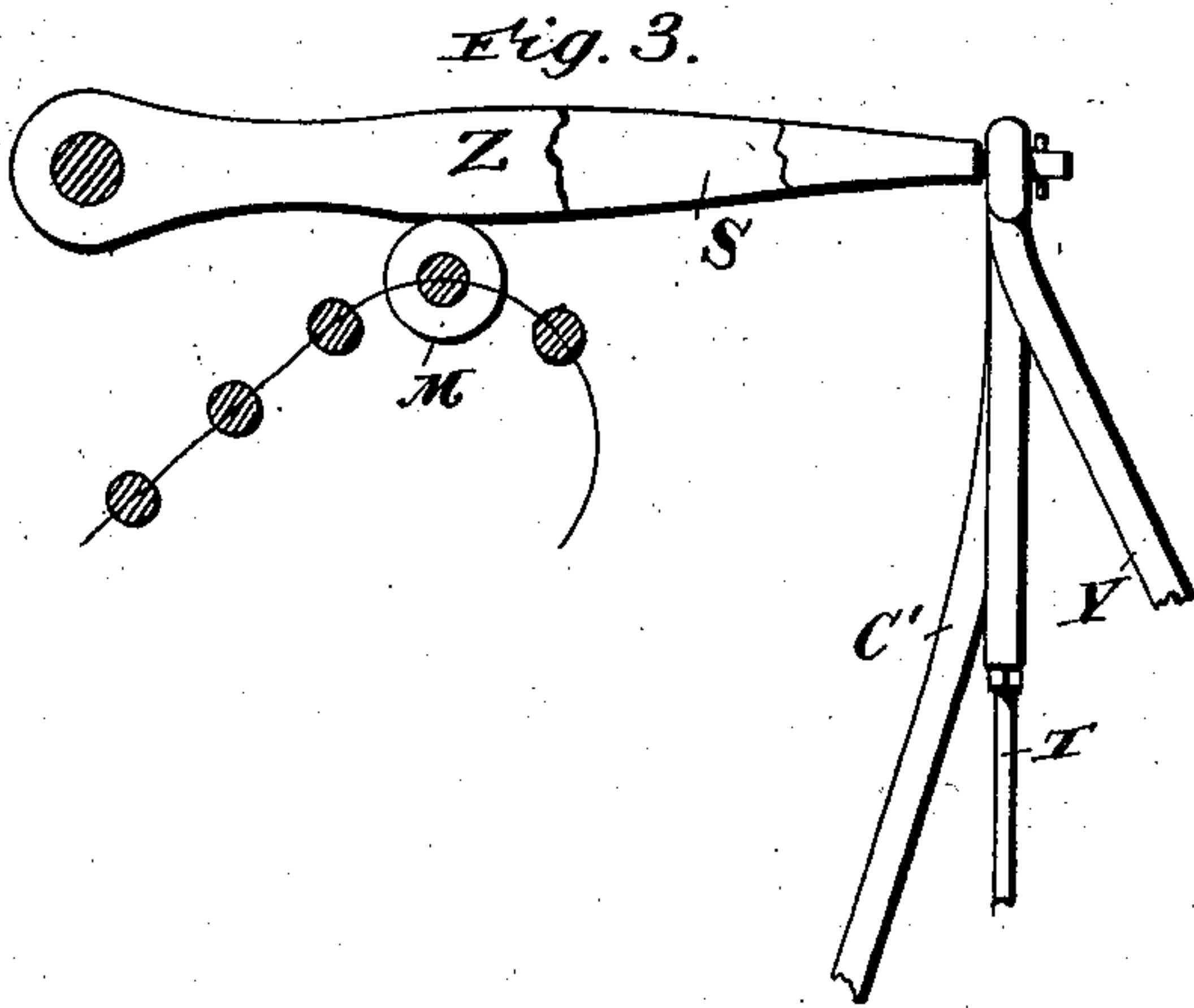
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5 Sheets—Sheet 3.



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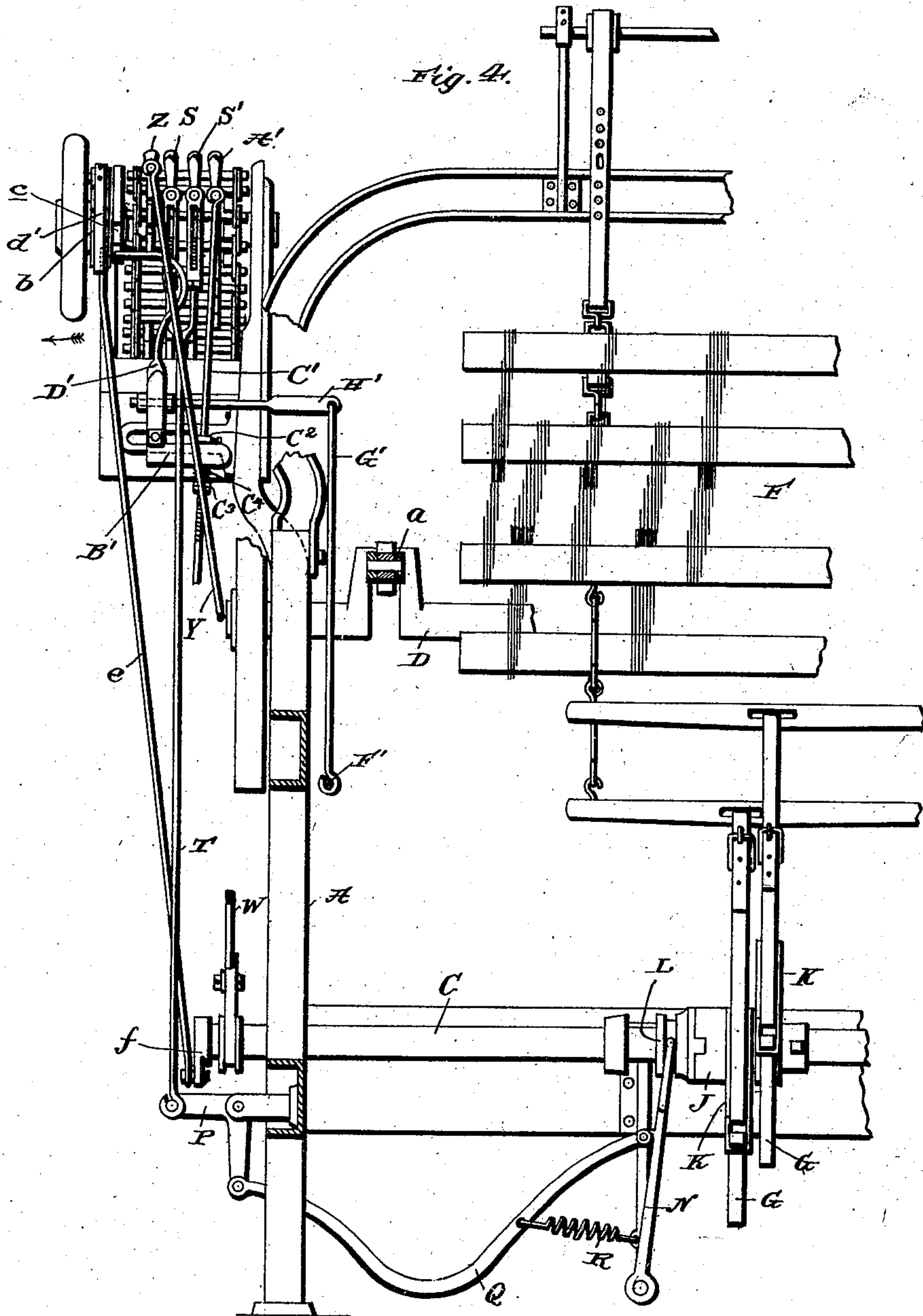
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5 Sheets—Sheet 4.



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5 Sheets—Sheet 5.

Fig. 5.

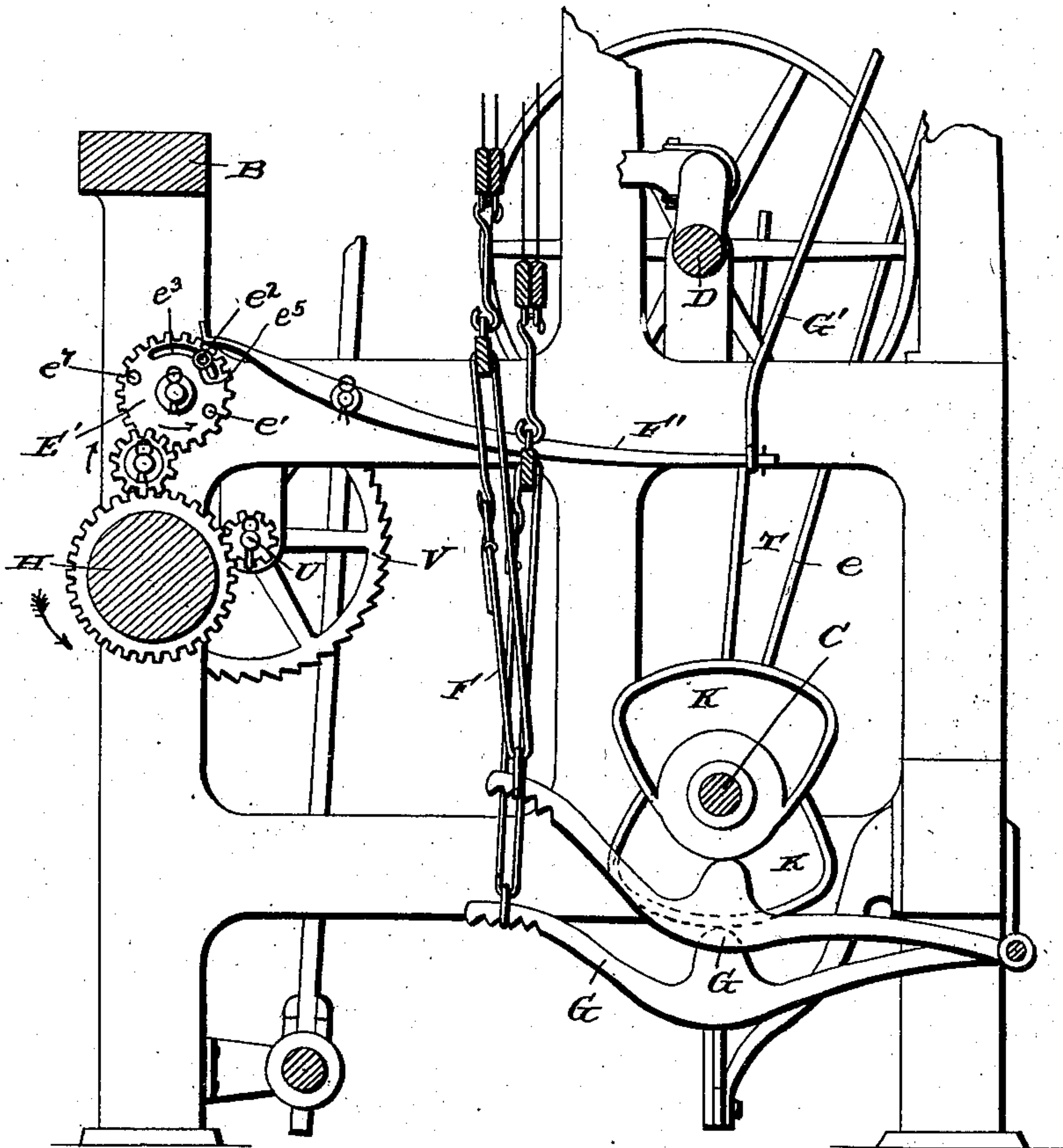
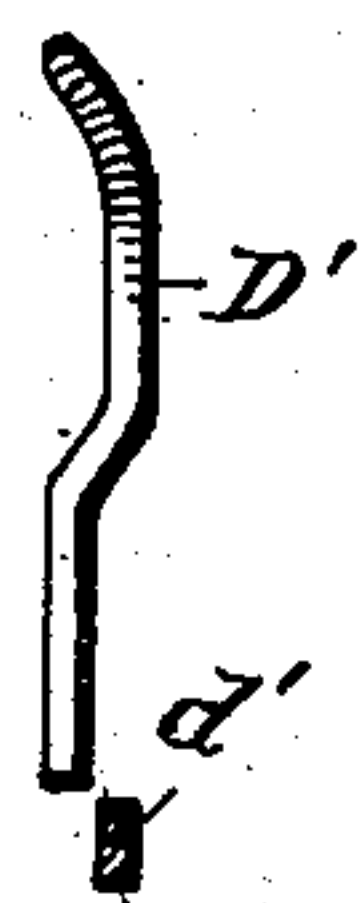


Fig. 6.



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# UNITED STATES PATENT OFFICE.

GEORGE W. CUMNOCK AND FRED E. WARREN, OF WOONSOCKET, RHODE ISLAND, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO THE PARKER MILLS, OF FALL RIVER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## LOOM FOR WEAVING BORDERED FABRICS.

SPECIFICATION forming part of Letters Patent No. 702,635, dated June 17, 1902.

Application filed June 8, 1898. Serial No. 682,867. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE W. CUMNOCK and FRED E. WARREN, citizens of the United States, residing at Woonsocket, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Looms for Weaving Bordered Fabrics, of which the following is a specification.

Our invention relates to looms, and contemplates the provision of a plain loom with simple, easy-operating, and efficient means whereby the harness may be caused to run and dwell at predetermined times to put in tape effects and the cloth-roll may be stopped and the harness caused to dwell at suitable intervals to form what is known as the "cord" effect.

The invention is designed more particularly for weaving borders and fancy designs upon cotton, woolen, and other fabrics, and it will be fully understood from the following description and claims when taken in conjunction with the accompanying drawings, in which—

Figure 1 is an end elevation of a plain loom equipped with our improvements. Fig. 2 is a detail front view of a portion of the loom. Fig. 3 is a detail view of a portion of the pattern-chain and fingers designed to be simultaneously engaged by tappets or rolls thereof. Fig. 4 is a detail longitudinal section of the loom. Fig. 5 is a transverse section of the same. Fig. 6 is a detail horizontal section illustrative of the manner in which the arm of the pawl for transmitting motion to the pattern-shaft is engaged by the tappet to disengage the pawl and render the pattern-shaft idle. Fig. 7 is a detail view of a portion of the pattern-chain and finger designed to be engaged by certain tappets or rolls thereof. Fig. 8 is a diagrammatic view illustrative of the arrangement of the tappets of the pattern.

In the said drawings similar letters designate corresponding parts in all of the several views, referring to which—

A is the loom-frame. B is the breast-rail. C is the cam-shaft. D is the crank-shaft. E is the lay, connected by pitman *a* with the crank-shaft, so as to be vibrated therefrom. F is the

harness. G represents treadles connected with the harness after the usual manner. H is a cloth-roll, and I is a pattern-chain shaft, which gains its motion from the cam-shaft through the medium of the ratchet *b*, fast on the pattern-chain shaft, a bell-crank lever *c*, loose on said shaft and carrying a pawl *d*, and a rod *e*, connecting a crank *f* on the cam-shaft and the lever *c*. These parts may all be of the construction common to plain looms or any other suitable construction, and when desired any suitable pattern other than a chain-pattern may be employed without departing from the scope of our invention, although the chain-pattern is preferred.

When the parts are of the construction common to plain looms, it follows that the cam-shaft C will make one revolution and effect two sheds incident to two revolutions of the crank-shaft D and two picks of the shuttle.

Loosely mounted on the cam-shaft C is a hub J, carrying cams K, arranged to engage the treadles G, and splined on the same shaft is a sleeve L. This sleeve L has a clutch-face adapted to engage a complementary clutch-face on the hub J, whereby it will be seen that when the sleeve L is in engagement with the hub J the cams will turn with the shaft and the harness will be actuated, while when the sleeve is disengaged from the cam-hub the cams will be idle and the harness will dwell. From this it follows that the sleeve L may with propriety be broadly designated a "stop-motion" device. For the purpose of causing the harness to dwell at certain times, according to the run of the pattern-chain, we employ in conjunction with the pattern-chain and sleeve L the controlling mechanism better illustrated in Figs. 1, 3, and 4. This clutch-controlling mechanism comprises a lever N for shipping the sleeve J in and out of engagement with the cam-hub L, a bell-crank lever P, a pitman Q, connecting the bell-crank lever and the lever N, a spring R, connected to said pitman and the frame and having for its purpose to normally hold the sleeve L in engagement with the cam-hub J, fingers S S', arranged to be engaged by tappets of the pattern-chain, and a rod T, connected at one end to the bell-crank lever



and having its opposite end bifurcated and connected to the fingers  $S S'$ , as best shown in Fig. 4. By reason of this construction when either one of the fingers or finger-levers  $S S'$  is engaged and raised by a tappet of the pattern-chain the sleeve  $L$  will be disengaged from the cam-hub  $J$ , and in consequence said cam-hub and the harness which gains its motion from the cams thereon will be caused to dwell. The duration of the dwell of the harness corresponds to the length of time the finger  $S$  or  $S'$  is held in its raised position, and when the finger is released the spring  $R$  will throw the sleeve  $L$  into engagement with the cam-hub  $J$  and the operation of the harness will be resumed. The fingers  $S S'$  are of different shapes, so that one will remain in engagement with and be held in its raised position by the respective tappets of the pattern-chain when said chain is in motion longer than the other will remain in engagement with and be held in its raised position by its respective tappets of the moving pattern-chain. For instance, the finger  $S$  is so shaped that a tappet on the pattern-chain followed by an empty bar will in passing beneath it keep it raised and the sleeve  $L$  out of engagement with the cam-hub  $J$  sufficiently long to enable the loom to weave a number of picks—say four—in one shed, and the finger  $S'$  is so shaped, as shown in Fig. 7, that a tappet on the pattern-chain followed by an empty bar will in passing beneath it keep it raised and the sleeve  $L$  disengaged from the hub  $J$  long enough to enable the loom to weave a less number of picks—say two—in one shed. The fingers  $S S'$  are never simultaneously raised by tappets of the pattern-chain, and hence a single rod  $T$  with a bifurcated upper end may be employed to connect the two fingers with the bell-crank lever  $P$  in the manner described.

Connected by suitable gearing with the cloth-roll  $H$ , as best shown in Fig. 5, is a shaft  $U$ , bearing the take-up ratchet-wheel  $V$ , in conjunction with which ratchet-wheel the usual actuating-pawl  $W$  and gravitating pawl  $X$  are employed. The pawl  $X$  has a toe  $a^3$  to engage the teeth of the ratchet-wheel  $V$  and is provided adjacent to its rear end with a slot  $a^4$ , which receives a stud  $a^5$  on the frame  $A$ . At its upper side said pawl  $X$  has teeth  $a^9$ , which are designed for the engagement of a pawl  $a^6$ , pivotally mounted on the stud  $a^5$ . This latter pawl  $a^6$  is loosely connected to an arm  $a^8$ , fixed on a rock-shaft  $a^7$ . The pawl  $X$ , pawl  $a^6$ , and arm  $a^8$  are of the ordinary construction, and the shaft  $a^7$ , carrying the said arm  $a^8$ , is designed to be connected in the usual manner with the well-known thread-controlled mechanism. (Not shown.) The pawl  $a^6$  normally engages a tooth of pawl  $X$ , and thereby holds said pawl  $X$  against endwise movement and enables it when in engagement with the wheel  $V$  to hold said wheel against retrograde movement. In the event of the thread breaking the thread-con-

trolled mechanism (not shown) operates in the usual manner to raise the pawl  $a^6$  out of engagement with pawl  $X$  and permits said pawl  $X$  to slide back, which results in a stoppage of the taking up of the cloth on roll  $H$ . When the thread is mended, the thread-controlling mechanism is returned to its normal position and the pawl  $a^6$  is reengaged with a tooth of the pawl  $X$ .

The pawl  $X$  is connected by a rod  $Y$  with a finger  $Z$ , which is arranged to be engaged by certain tappets of the pattern-chain.

The actuating-pawl  $W$  moves the wheel  $V$  the distance of one tooth in the direction of the arrow in Fig. 1 incident to each rotation of the cam-shaft  $C$ , and the pawl  $X$  in the position shown holds the wheel against retrograde movement. The cloth-roll  $H$  being connected by gearing with the wheel  $V$  is turned in the direction indicated by arrow and takes up the cloth thereon. When, however, the pawl  $X$  is raised out of engagement with the teeth of wheel  $V$ , the operating-pawl  $W$ , while continuing to reciprocate, will remain in engagement with a single tooth and will not turn the wheel  $V$  and the cloth-roll in the direction indicated. This is due to the fact that when the pawl  $X$  is disengaged from the teeth of wheel  $V$  the tension of the cloth acts to turn the roll  $H$  in the direction opposite to that indicated by arrow and causes the ratchet-wheel  $V$  to move back with each rearward stroke of the operating-pawl  $W$ , with the result that said pawl  $W$  remains in engagement with a single tooth of said wheel and is not able to rotate the same in a forward direction.

It will be seen from the foregoing that the pawl  $X$  constitutes and may with propriety be broadly denominated a "cloth-roll stop-motion device."

The position of the pawl  $X$  with respect to the ratchet-wheel  $V$  is controlled by the finger  $Z$  with which the pawl is connected, as stated, and the pattern-chain. The finger  $Z$  is shaped like the finger  $S$ , and tappets are arranged on the pattern-chain to simultaneously engage and raise the said fingers. It follows from this that the elevation of the finger  $S$  and the stoppage of the harness caused thereby will correspond in duration to the elevation of the finger  $Z$  and the suspension of the taking up of the cloth resulting therefrom.

For the purpose of governing the stop-motion to the pattern-chain shaft a finger  $A'$ , which is arranged to be engaged by tappets of the pattern-chain, is employed in conjunction with a bell-crank lever  $B'$ , (see Figs. 1 and 4,) with which it is connected by a rod  $C'$ , the said bell-crank lever being provided with a tappet  $D'$ , arranged to engage an arm  $d'$  on the pawl  $d$ , and the said tappet being arranged so as to enable it to move in a plane at right angles to the arm  $d'$  of the pawl. By reason of this construction when the finger  $A'$  is lifted by a tappet of the pattern-



chain the lever B' will be rocked in the direction indicated by arrow in Fig. 4, and its tappet D', moving at the side of and engaging the arm d' of pawl d, will raise said pawl out of engagement with the ratchet-wheel b, and thereby prevent the transmission of motion from the crank c to the ratchet b and render the shaft l and the pattern-chain idle. It will be readily seen from this that the arm d' of pawl d forms a stop-motion device.

As best shown in Fig. 4, the rod C takes loosely through an opening in the lower arm of the bell-crank lever B' and is provided below the same with a threaded portion. Above the lower arm of said lever B' the rod C' is provided with a collar C<sup>2</sup>, and below said arm on its threaded portion the rod is provided with a nut C<sup>3</sup>, between which and the arm of lever B' is interposed a coiled spring C<sup>4</sup>. This construction enables the rod C' to move the lever B' in the direction of the arrow in Fig. 4 when the finger A' is raised and yet permits of the said lever B' being moved in a direction opposite to that indicated by the arrow without the movement of the rod C'.

A resumption of the rotation of the pattern-chain shaft I is effected at the proper time through the medium of the following agency: E' (see Fig. 5) is a wheel connected by gearing with the cloth-roll H and having one or more lateral lugs e' e<sup>2</sup> and an adjustable lateral lug e<sup>3</sup>. F' is a lever having one arm arranged to be engaged by the said lugs, and G' is a rod connecting the other arm of the lever F' and an arm H' on the bell-crank lever B'. When the gear-wheel E' is rotated by the cloth-roll H and interposed gearing and one of the lugs engages the lever F', the lever F' and the bell-crank lever B' will be rocked in the direction opposite to that indicated by arrow in Fig. 4, and in consequence the tappet D' will release the pawl d and permit it to fall into engagement with the ratchet b and through the medium of said ratchet rotate the shaft I when the lever c is rocked, as before described. When the lever B' is rocked in the direction opposite to that indicated by arrow in Fig. 4, it moves with respect to rod C' and releases the pawl d, and thereby effects the resumption of movement of the pattern-chain. Such movement of the pattern-chain carries the tappet that raised and held the finger A' in its raised position out of engagement with said finger and enables the same and the rod C' to resume their normal positions.

The lug e<sup>2</sup> of the wheel E' is arranged in a curvilinear slot e<sup>3</sup> in the wheel between the fixed lugs e' e<sup>2</sup> and is adjustably secured in position by a nut e<sup>5</sup>. From this it follows that the lug e<sup>2</sup> may, when desired, be adjusted with respect to the lugs e and e<sup>2</sup>.

The fingers Z S are designed, as stated, to be simultaneously raised by tappets of the pattern-chain, the finger Z being shown as raised and the finger S as depressed in Fig.

1 simply to illustrate the connection of the rod T to said finger S.

The general operation of the machine is as follows: The loom is started with a tappet on the pattern-chain below the finger A', and thereby the pattern-chain is at rest. The fingers Z S S' are in their lower positions, and as a result the loom will weave plain—that is, one pick to each shed—until after the lug e<sup>2</sup> engages and rocks the lever F'. When the lever F' is rocked by the lug e<sup>2</sup>, a resumption of movement of the pattern-chain will be effected through the medium of the mechanism described, and after the pattern is set in motion tappets arranged on a common bar of the pattern-chain will simultaneously engage and raise the fingers Z S, and thereby stop the taking up of cloth and suspend movement of the harness and enable the loom to weave a number of picks—four picks for instance—in one shed. This will put in a cord effect. After the tappets on a common bar of the chain pass out of engagement with the fingers Z S tappets arranged on alternate bars of the chain in the same plane as the finger S' will come into play, and in consequence the loom will be caused to weave two picks in one shed and one pick in one shed alternately. This will put in a stripe or tape effect. The putting in of the stripe or tape effect will be followed by the fingers Z S being again raised by two tappets on a common bar of the pattern-chain to put in a second cord effect. The putting in of the said second cord effect will be followed by the finger A' being engaged and raised by a tappet of the pattern, and in consequence of this movement of the pattern will be suspended and the loom caused to weave plain. The plain weaving will continue until the lever F' is rocked by the lug e<sup>2</sup> of wheel E' and until the fingers Z S are raised by tappets on a common bar of the pattern-chain, when the operation described will be repeated. The described operation will also be repeated subsequent to the rocking of the lever F' by the lug e<sup>2</sup>.

By virtue of the development of the pattern shown in Fig. 8 and the employment of the three lugs e<sup>2</sup>, e<sup>3</sup>, and e' on the wheel E' the loom is enabled to weave three fancy designs, the said designs being separated by plain weaving and respectively comprising a cord effect, a stripe or tape effect, and a second cord effect in the order named. The lug e<sup>2</sup> being adjustable it follows that the first cord effect of the second design may be put in midway between the second cord effect of the first design and the first cord of the third design or may be put in at a point nearer to the second cord effect of the first design than to the first cord effect of the third design, or vice versa, as desired.

We do not desire to be understood as confining ourselves to the three lugs on the wheel E', as the number of lugs may be increased or diminished at pleasure. We also do not wish to be understood as confining ourselves



to the use of an adjustable lug, although we prefer to employ the same for the reason stated.

It will be appreciated that by reason of our improvements the loom is enabled to put corded or tape effects in goods woven in one color quite as well as those looms which embrace fancy heads and drop-boxes. It will also be appreciated that our improvements when embraced in a plain loom do not affect the ordinary running of the loom, and therefore our improved loom is materially advantageous as compared with looms having drop-boxes, because the lifting of the boxes adds greatly to the power required to drive the loom and the necessary instantaneous movement of said boxes causes severe shocks. An expert weaver is not required to run our improved loom, as all the pattern-chains are made and placed in the loom by the designer and do not require any manipulation until it is desired to change the design.

Having thus described our invention, what we claim is—

1. In a loom, the combination of a cam-shaft, cams loosely mounted on said shaft and having a clutch-face, the harness operated by the cams, a sleeve arranged to slide on and turn with the shaft and having a clutch-face adapted to engage that of the cams, a pattern, a drive-shaft therefor, a finger arranged to be engaged by tappets of the pattern and connected with the sleeve-clutch member, a spring for normally holding the sleeve in engagement with the cams, a crank on the cam-shaft, a pattern-shaft, a ratchet-wheel fixed on the pattern-shaft, a lever loose on the pattern-shaft and connected with the crank of the cam-shaft, a pawl on the lever having an arm, a second finger arranged to be engaged by tappets of the pattern, and a bell-crank lever connected with said second finger and having a tappet arranged to engage the arm of the pawl, substantially as specified.

2. In a loom, the combination of a cam-shaft, cams loosely mounted on said shaft and having a clutch-face, a harness operated by the cams, a sleeve arranged to slide on and turn with the shaft and having a clutch-face adapted to engage that of the cams, a pattern, a pattern-shaft, one or more fingers arranged to be engaged by tappets of the pattern and connected with the sleeve-clutch member, a spring for normally holding the sleeve in en-

gagement with the cams, a crank on the cam-shaft, a ratchet-wheel fixed on the pattern-shaft, a lever loose on the pattern-shaft and connected with the crank of the cam-shaft, a pawl on the lever having an arm, a second finger arranged to be engaged by tappets of the pattern, a bell-crank lever connected with said second finger and having a tappet arranged to engage the arm of the pawl, and also having a lateral arm, mechanism for taking up the cloth as it is woven, and devices connected with the lateral arm of the bell-crank lever and operated by the take-up mechanism for releasing the pawl, substantially as specified.

3. In a loom, the combination of a harness, a shaft, a driving connection from the shaft to the harness for actuating the latter; said connection comprising a harness-stop-motion device, a pattern, suitable means controlled by the pattern for moving the stop-motion device and causing the harness to dwell, mechanism intermediate of the shaft and the pattern for operating the pattern; said mechanism comprising a pattern-stop-motion device controlled by the pattern, mechanism for taking up the cloth as it is woven comprising a ratchet-wheel, a dog actuated by the shaft for rotating the ratchet-wheel, a gravitating pawl arranged to engage the ratchet-wheel, means operated by the pattern for disengaging said pawl from the ratchet-wheel, and mechanism controlled by the take-up mechanism for releasing the stop-motion device of the pattern-operating mechanism, substantially as specified.

4. In a loom, the combination of the harness, a shaft, a driving connection from the shaft to the harness for actuating the latter; said connection comprising a stop-motion device, a pattern provided with tappets, fingers arranged to be alternately engaged by different tappets of the pattern, and a connection common to the two fingers interposed between said fingers and the stop-motion device, substantially as specified.

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

GEORGE W. CUMNOCK.  
FRED E. WARREN.

Witnesses:

H. A. COOK,  
E. L. ROY SPAULDING.