(No Model.)

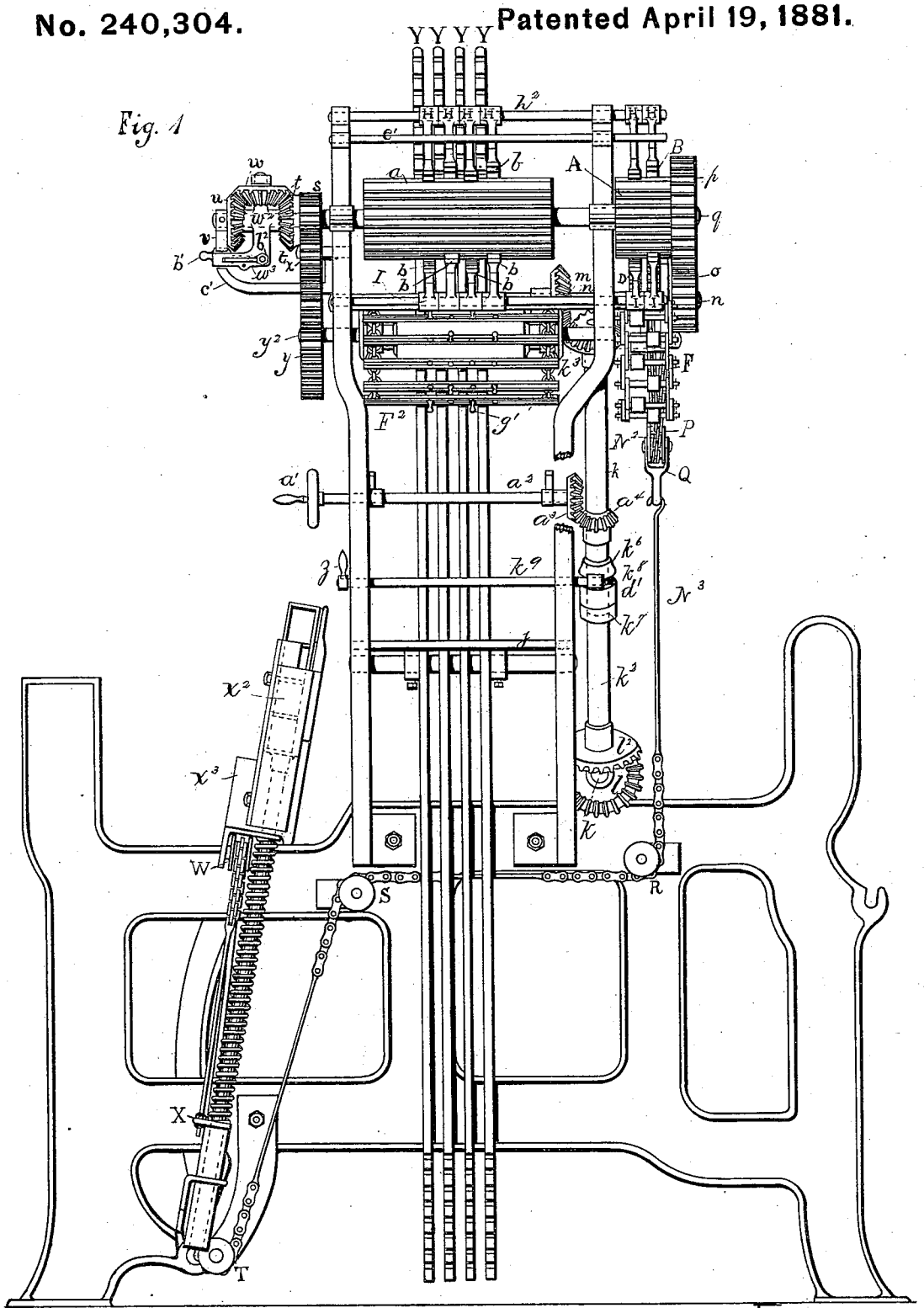
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G. CROMPTON.

Loom.

No. 240,304. Patented April 19, 1881.

Fig. 1



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G. CROMPTON.

Loom.

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Fig 2

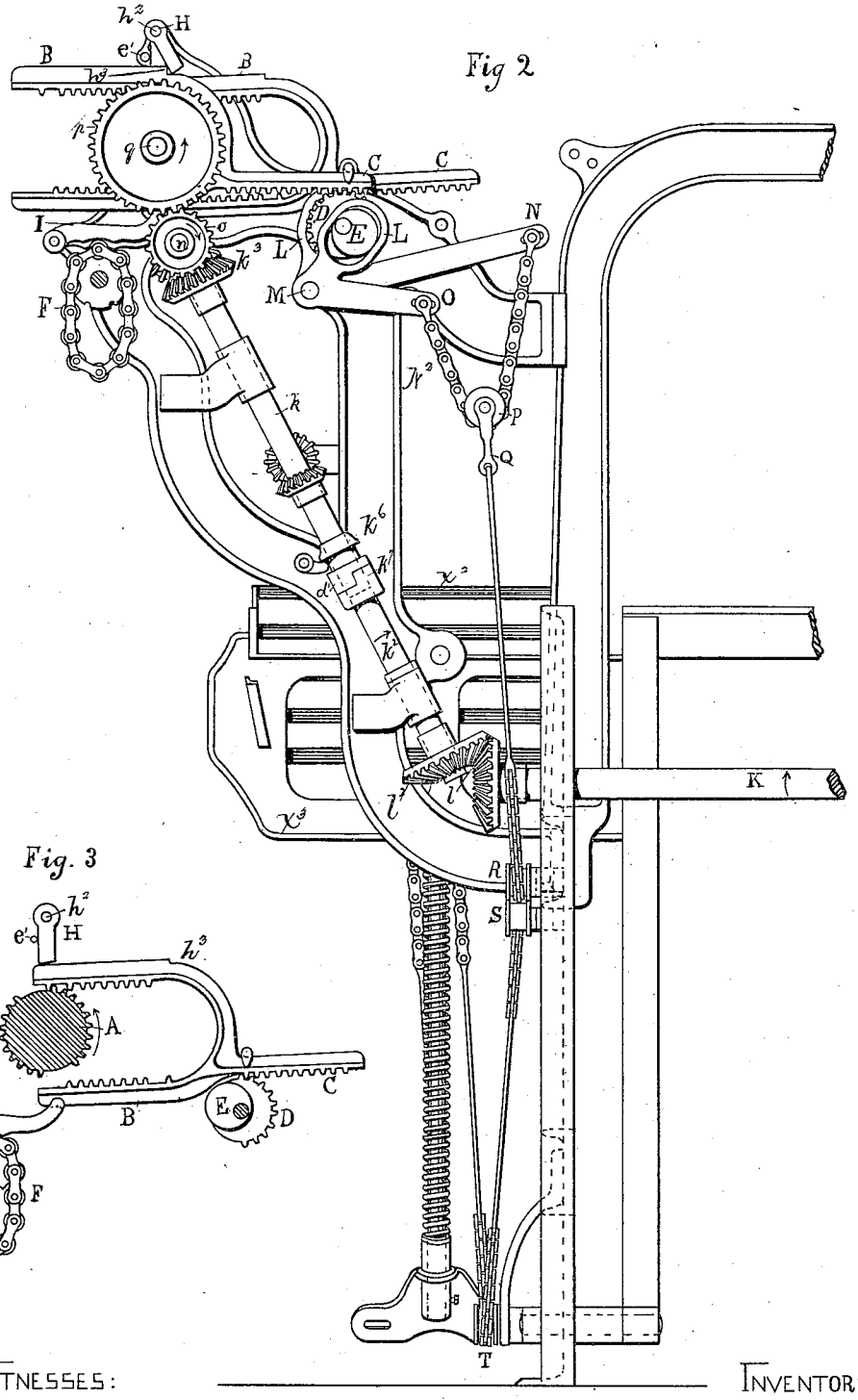


Fig. 3

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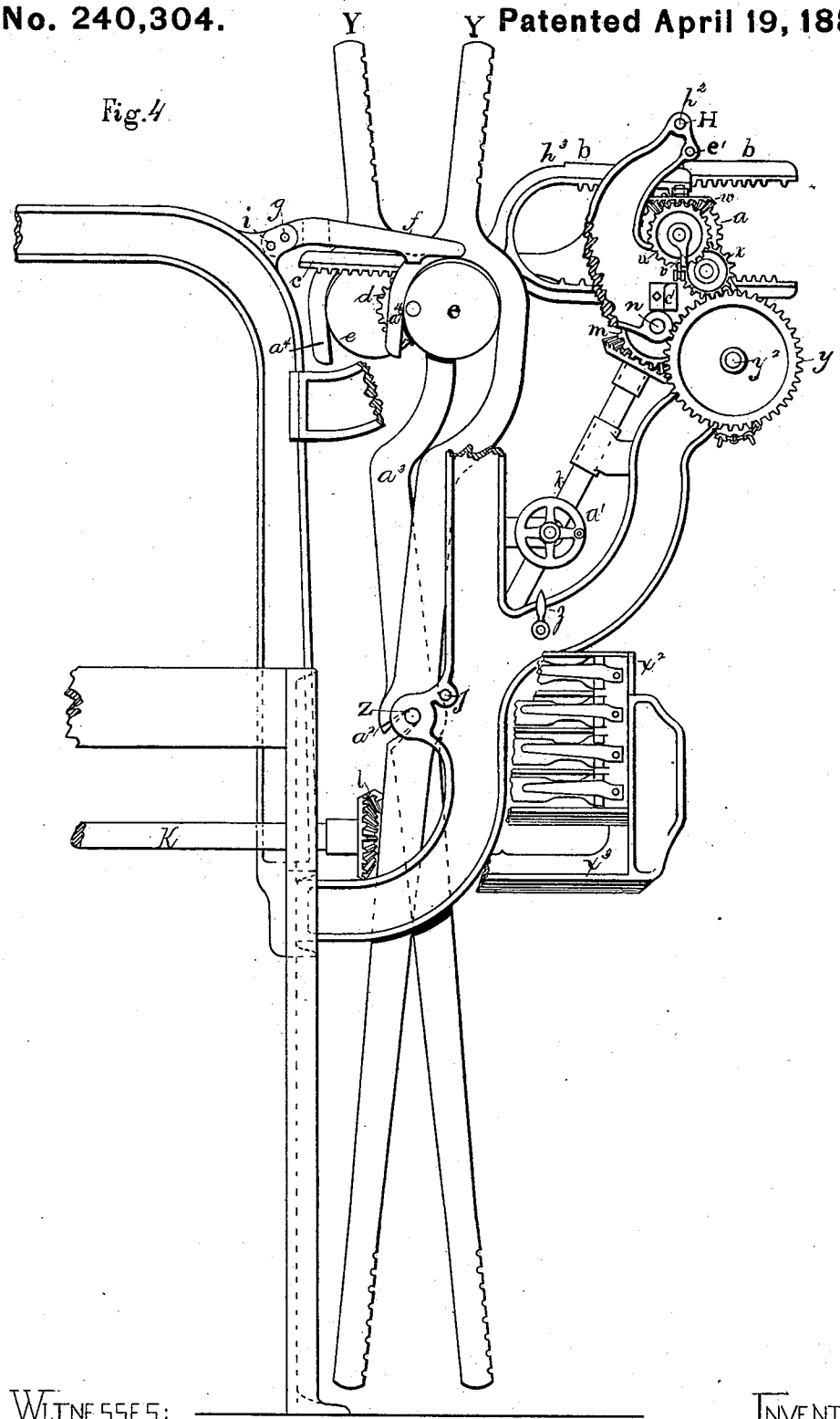
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G. CROMPTON.

Loom.

No. 240,304. Patented April 19, 1881.

Fig. 4



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Loom.

No. 240,304. **Patented April 19, 1881.**

Fig. 5

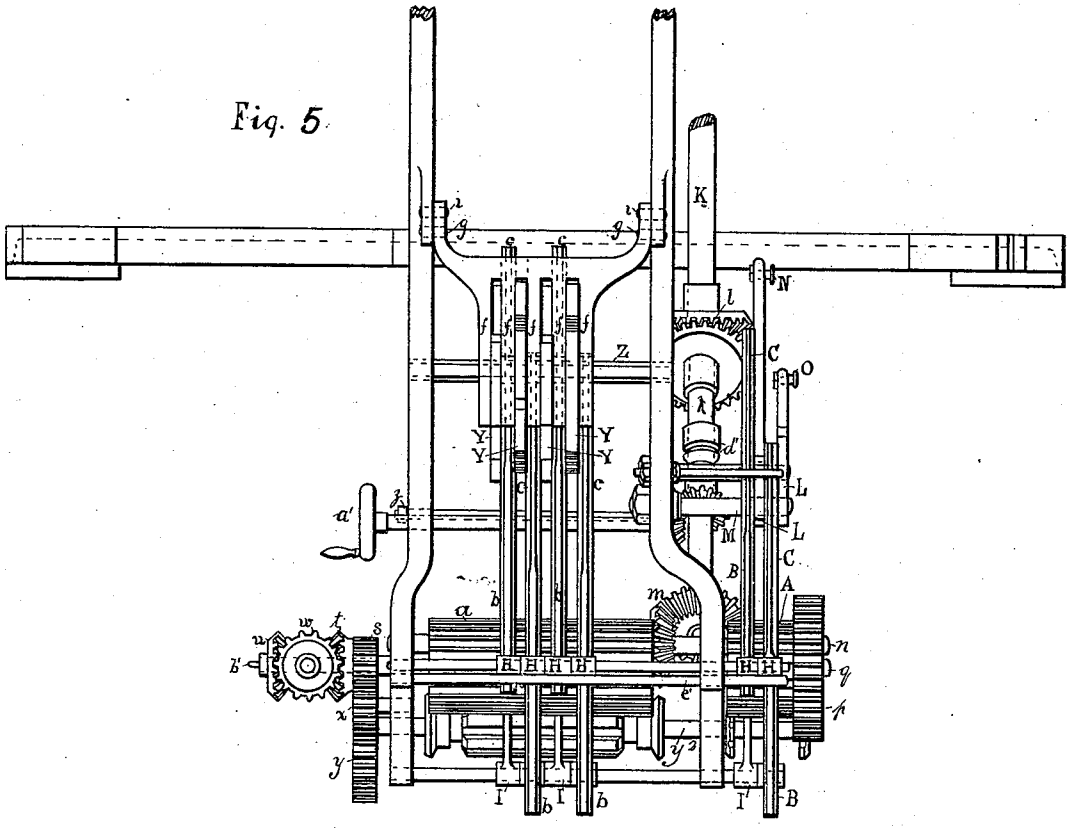


Fig. 6

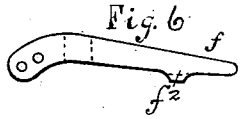


Fig. 7

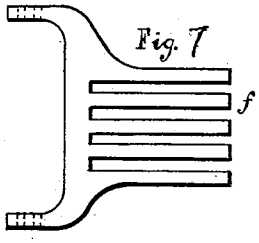


Fig. 8

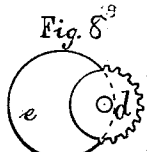


Fig. 9

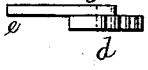


Fig. 10

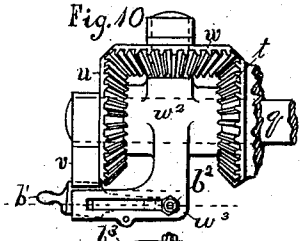
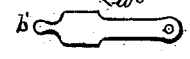


Fig. 11



Fig. 12



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UNITED STATES PATENT OFFICE.

GEORGE CROMPTON, OF WORCESTER, MASSACHUSETTS.

LOOM.

SPECIFICATION forming part of Letters Patent No. 240,304, dated April 19, 1881.

Application filed July 16, 1880. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CROMPTON, of Worcester, county of Worcester, State of Massachusetts, have invented an Improvement in Looms, of which the following description, in connection with the accompanying drawings, forming a part thereof, is a specification.

This invention in looms relates to improvements in the shed-forming and shuttle-box-operating mechanisms, as will be hereinafter more fully described.

Figure 1 is an end view of a loom containing my improvements; Fig. 2, a rear side elevation of Fig. 1; Fig. 3, a detail, showing one of the triple-racked jacks and devices directly cooperating therewith to move it. Fig. 4 is a front elevation of Fig. 1. Fig. 5 is a top or plan view of Fig. 1, the shuttle-boxes and lay being omitted. Figs. 6 and 7 are side and top views of the comb or guide for the heddle-levers. Figs. 8 and 9 are side and edge views of one of the eccentrics and connected toothed gear employed for actuating the heddle-levers; and Figs. 10 to 12 are details, showing on a larger scale the devices instrumental in reversing the pattern-chain.

A is a toothed cylinder, making a semi-revolution for each revolution of the crank-shaft.

B is a triple-racked jack, which is engaged with and moved backward and forward by the toothed cylinder as the pattern-chain F and the interposed finger I may direct. At one end of this triple-racked jack is a single rack, C, which meshes with a semi-gear, D, and causes the eccentric E, attached thereto, to make a half-revolution in one or the other direction, whenever the rack C is moved in one or the other direction, such half-revolution taking place during the time occupied by the crank-shaft in making one complete rotation. For the shuttle-box mechanism there are two sets of these triple-racked jacks, semi-gears, and eccentrics, and these two eccentrics each operate in yokes L L, formed in levers N O, mounted on a stud, M. The horizontal arms of these levers N O are of different lengths, and have their ends connected by means of a chain, N^2. The carrier-pulley P, resting in the bight of this chain, is mounted in a yoke, Q, which is connected to the drop-boxes x^2 by a jointed or chain connection, N^3, which passes under a carrier-pulley, R, over a similar pulley, S, under the pulley T, and over pulley W, carried by the lay x^3, after which the end of the said connection is joined at X with the shuttle-box rod, all as usual.

The parts being thus constructed and connected, it will be seen that during one-half of a revolution of the toothed cylinder, if the upper limb of a double-racked jack becomes engaged, it will be drawn forward, causing the single rack C to give a semi-revolution to the semi-gear in mesh with it and to its connected eccentric E, and elevate the opposite end of the lever, as shown, by the lever N, to the position shown in Fig. 2. The motion given by the eccentric E to the lever O, having the short horizontal arm, is equal to the motion of one box—that is to say, the distance from the shelf of one cell to the shelf of the next cell in the series of shuttle-boxes. The horizontal arm of the other lever, N, double the length of the short lever O, when moved, will actuate the series of shuttle-boxes the distance of two cells. When the two horizontal arms are up, their united downward movement will lower the boxes the distance of three cells of the series of shuttle-boxes, and when they are both down their united upward movement will raise the boxes three cells—that is, from the first to the fourth, or vice versa. When it is necessary to lower the boxes one cell only, and the levers are in the positions shown at Fig. 2, the short lever O, being at its lowest position, cannot be lowered at all; but if the long lever N, which has a range of two cells, is lowered and the short lever is raised, the effective movement is only one cell. Reverse the position of these levers, and the same movement would raise the distance of one cell. It will thus be perceived, by this movement of the triple-racked jacks, eccentrics, and levers N O, that any of the series of four boxes can be brought into line with the race of the lay at will. It will also be observed that the apparatus shown is for working the drop-boxes at one end of the loom only.

By duplicating the series of parts herein shown and making connection with shuttle-boxes at the other end of the lay, the boxes at that end can be operated independently from those already shown.

The mechanism for operating the usual har-

ness-frames (not shown) to form sheds is as follows:

The upright heddle-levers Y, notched at bottom and top, as usual, are slotted diagonally at a^2, near their centers, (see Fig. 4,) to be readily fitted to the fulcrum-pin Z, about which the said levers turn. Each heddle-lever, near its upper end, is offset at a^3, and bent or cast to form a yoke to embrace an eccentric, e, connected with a semi-gear, d, which is engaged and revolved in first one and then in the other direction by the rack c at the rear end of the triple-racked jacks b, moved at the proper times by the toothed cylinder a, placed between forked ends of the said jacks. The eccentrics e are rotated in one and then the other direction within the yokes of the heddle-levers by triple-racked jacks b, which vibrate the said heddle-levers positively in one and then in the other direction, to raise and lower the usual harness-frames (not shown) connected therewith, as in my United States Patent No. 177,323.

The length of the curved or offset part of the yoke from its upper end to the point a^3, and the distance between the end of the arm a^4 of the yoke and the side of the yoke, will preferably be sufficient to permit the passage of the eccentric e between the end of the arm a^4 and the curved part of the heddle-lever when the slotted part a^2 of the said lever is lifted from its fulcrum Z, as it may be when it is desired to remove a heddle-lever and replace it with a new one, as is at times necessary. To so remove a heddle-lever, it is necessary to first withdraw the long pin or rod j from against one edge of the lever near the fulcrum Z, and then withdraw the guide-locking rod or bolt i, to permit the heddle-lever guide f, made like a comb, (see Figs. 6 and 7,) and pivoted at g, (see Fig. 4,) to be elevated. The pins or bolts having been withdrawn and guide f elevated, the racked jack of the heddle-lever to be withdrawn may be lifted, leaving the heddle-lever free to be drawn upward out of the machine. The upper ends of the heddle-levers, placed in the slots of the guide f, are properly guided to insure their correct position with relation to the eccentrics operating them. The fingers of the guide f have projections f^2, to bear on the rearmost racked arms of the racked jacks and hold them down in contact with the semi-gears referred to.

The crank-shaft K, having on it the bevel-gear l, engages the bevel-gear l^2 on and drives the two-part shedding-shaft $k\ k^2$, having at its upper end a gear, k^3, in gear with the gear m on the shaft n.

The clutch $k^6\ k^7$ is substantially the same as in my Patent No. 177,323, and is operated by the finger k^8, shaft k^9, and hand-lever z, to permit the upper part, k, of the said two-part shaft to be moved, when desired, by the hand-operated shaft a^2, having bevel-gear a^3, to engage the bevel-gear a^4, fixed on the part k of the said shedding-shaft, the said part k thus moved turning with it the pattern surfaces or chains and the toothed cylinders a A, as hereinafter described, making sheds while the crank or lay shaft K is at rest.

The shaft n has at one end of it a gear, o, (see Figs. 1 and 2,) which engages the pinion p, fast on the shaft q, on which are mounted the two toothed cylinders A a, which operate the jacks. This shaft q has secured to its opposite end the bevel-gear u, having at its back a projection, v.

The bevel-gear u is in gear with a bevel-gear, w, on a stud of a sleeve or collar, w^2, loose on the shaft q, the sleeve having a projecting arm, w^3, on which, at b^2, is pivoted a lever, b', against which bears a spring, b^3. (See Figs. 1, 10, and 11.)

On the shaft q is placed loosely the pinion s, having secured to its side the bevel-gear t, which is engaged by the bevel-gear w. The pinion s gears with the intermediate x, and the latter with the toothed gear y on the shaft y^2, provided with the usual notched wheels or drums, to receive and move the usual shuttle-box and shed-forming pattern surfaces or chains, F and F^2.

When the shaft q is being moved in the regular direction for weaving, the lever b' is lifted, so that the projection v strikes against it, as in Fig. 10, causing the sleeve w^2 and gear w to be rotated with the gear u, the gear w, which does not turn about its own pivot, then acting to turn the gear t, pinion s, intermediate x and toothed wheel y, and pattern surfaces or chains F F^2 forward. If the lever b' is lowered so that it does not engage with the projection v, but does bear against the stop c', connected with the loom-frame, (see Fig. 4,) rotation of the shaft q will turn gear u, causing it to turn the gear w about its stud, and the gear w so moved will turn the gear t in an opposite direction, and with it the connected pinions and wheels $s\ x\ y$, and reverse the direction of movement of the pattern chains or surfaces, while the toothed cylinder continues to move only in one direction.

Teeth are omitted from the racks of the triple-racked jacks and from the toothed cylinders for the purpose described in my application filed June 7, 1880, to which reference may be had.

Each triple-racked jack B or b rests on a finger, such as shown at I, Figs. 2 and 3, each finger resting on one or the other of the pattern chains or surfaces F F^2 under it.

When a roll of a pattern-chain elevates a finger, I, to lift the jack above it and place its lowermost rack in position to be engaged by the toothed cylinder, the jack so lifted must be in its most forward position, as shown by the first jack, B, in Fig. 2, and immediately above it the pendent or pivoted jack-holder H, pivoted loosely on rod k^2, must be off the shoulder k^3, as in Fig. 2, when the toothed cylinder, turning in the direction of the arrow near it in Fig. 3, will move the jack backward, the jack-holder then sliding on the raised part of the jack between the shoulder k^3 and its front end. When the jack has been fully moved backward its rack-teeth run out of gear with the toothed cylinder, as in my application filed June 7, 1880,

before referred to; and when a bar of the pattern surface or chain unprovided with a roll, pin, or projection comes under the said finger I it drops and permits the triple-racked jack to fall and place the rack-tooth of its upper arm in engagement with the toothed cylinder to move it, as in Fig. 3, the pendent jack-holder H, by its own gravity, then following the jack and assuming a vertical position, as in said figure. As the jack is moved forward by the toothed cylinder the said jack-holder keeps the upper arm of the jack down firmly in contact with the toothed cylinder, for the jack-holder cannot swing forward, because of the stop e'; but after the jack has been moved fully forward, as in Fig. 2, the jack-holder will pass beyond the shoulder h^3, where it will hang loosely, the said shoulder and the rounded part of the jack next back of it being so made and located as to leave a sufficient space below the said holder H and between it and the jack to permit the latter to be again lifted into engagement with the under side of the toothed cylinder.

When it is desirable to reverse the pattern mechanisms by power from the shaft K while the vertical shaft remains clutched therewith, as when weaving, the lever b' will be lowered from engagement with the projection v of the gear u and be placed against the stop c', after which movement of the loom in the regular way will turn shaft k k^2 and the train of gearing connected with it, including gear s and intermediate x, as before described, and reverse the pattern-surfaces, for the purpose of discovering lost picks and for other purposes.

There is a jack-holder, H, for each jack B b, and by the said holders and fingers I the racked arms of the forked parts of the jacks are positively held locked in engagement with the toothed cylinders moving them, both when the jacks are being moved forward and backward.

The pattern-chain F^2 for the harness-operating mechanism is composed of a series of bars linked together or connected at each end with a chain in any usual manner.

In Fig. 1 I have shown a pattern-chain, which, as it forms the subject-matter of an application for United States patent, filed March 18, 1881, I do not herein specifically describe or claim.

I claim—

1. The toothed cylinder, means to operate it, two triple-racked jacks embracing the said toothed cylinder, two eccentrics, and means to connect the eccentrics operatively with the said jacks, combined with the two shuttle-box levers, provided with yokes to receive the said eccentrics, and with a series of at least four shuttle-boxes, and suitable intermediate connections between the shuttle-boxes and shuttle-box levers, substantially as described.

2. The toothed cylinder, the racked jacks provided with shoulders h^3 and a pattern surface or chain, and means to operate the cylinder and chain and raise and lower the jacks, combined with the pendent jack-holders H, adapted to bear upon the jacks, substantially as and for the purpose described.

3. The combination of a series of slotted heddle-levers provided with yokes, and a fulcrum, Z, with a series of eccentrics, a series of gears, and means to move the gears, the slots and yokes of the levers permitting the heddle-levers to be lifted off their fulcra and removed from the eccentrics, substantially as and for the purpose described.

4. The series of upright open-yoked heddle-levers, slotted at a^2, and the fulcrum Z, the pivoted guide f, the eccentrics placed in the yokes, the triple-racked jacks and connections between them and the eccentrics, and the toothed cylinder and means to move it to actuate the jacks, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE CROMPTON.

Witnesses:

GEORGIETTA CROMPTON,

MARY C. CROMPTON.