

(No Model.)

W. WATTIE & G. F. HUTCHINS.  
SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

No. 551,104.

Patented Dec. 10, 1895.

Fig. 1.

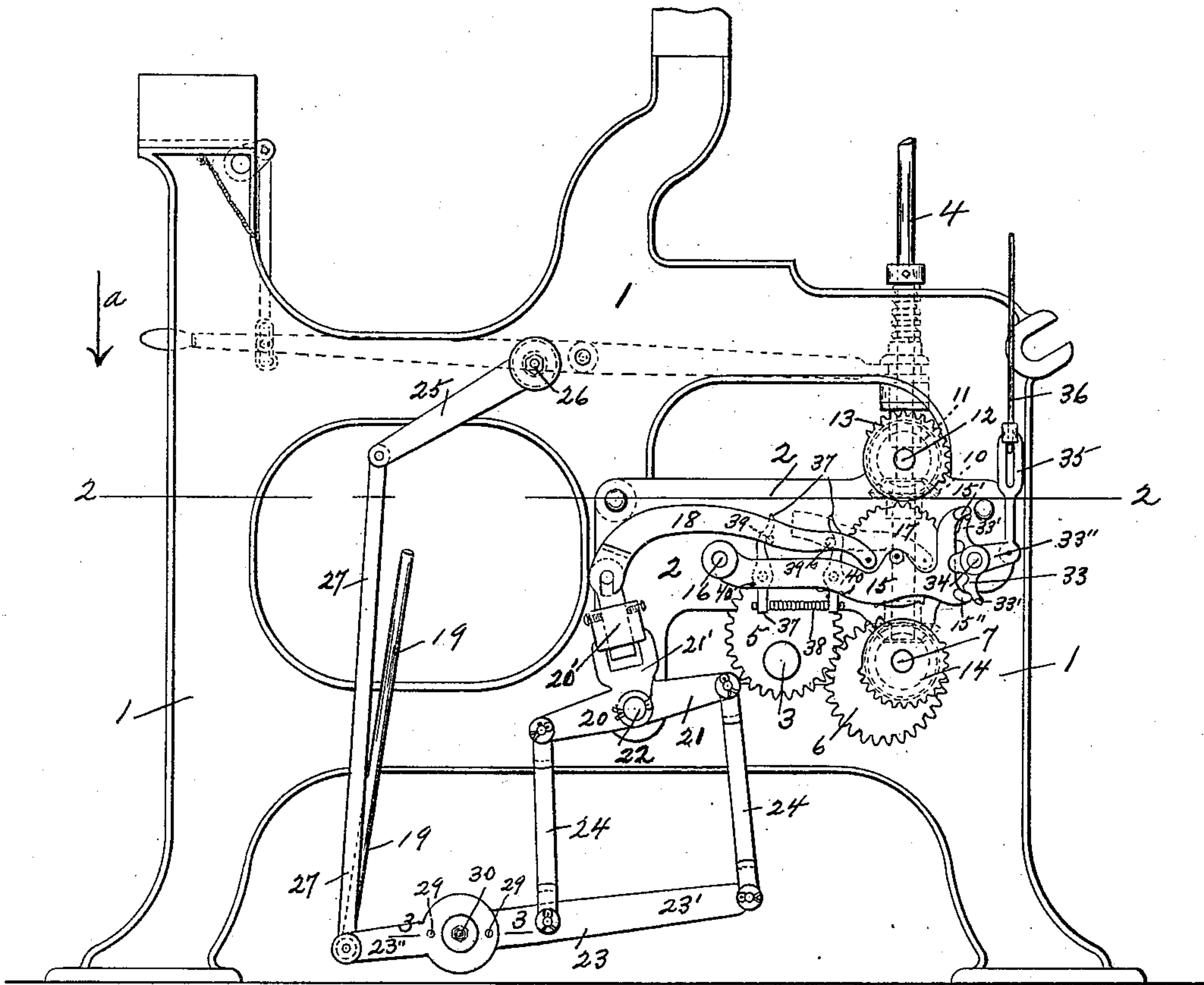


Fig. 2.

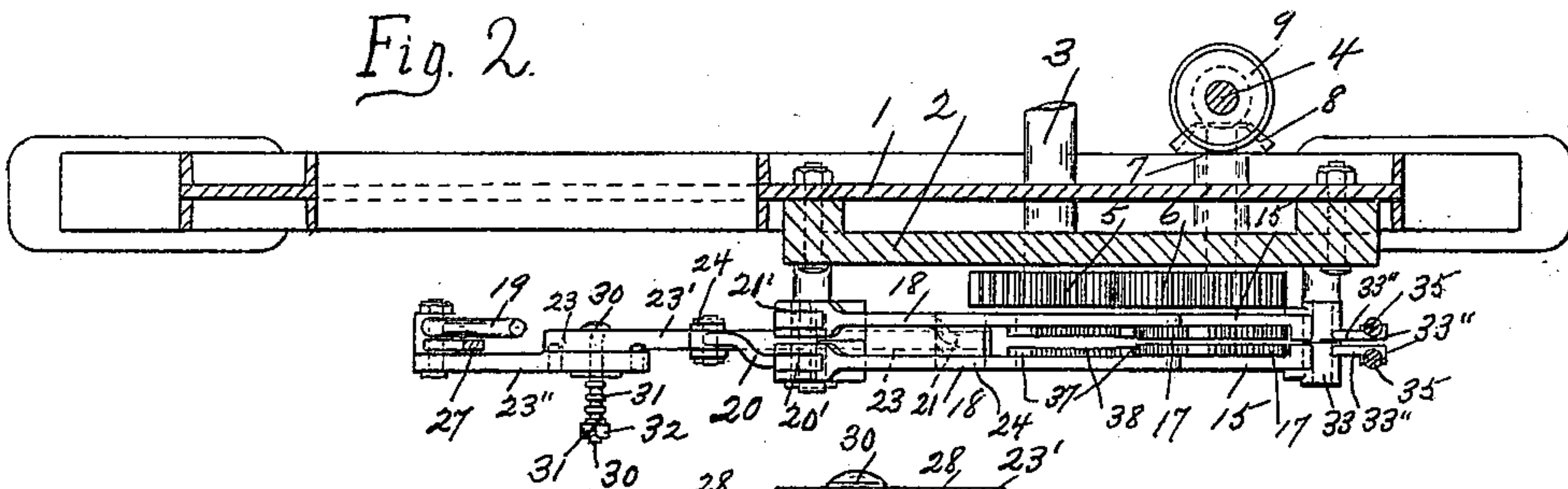
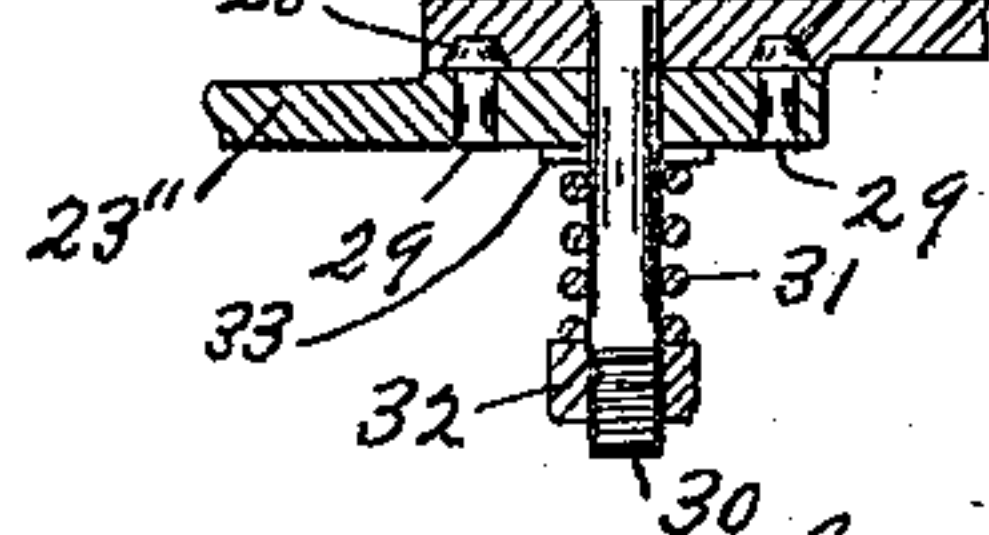


Fig. 3.



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# UNITED STATES PATENT OFFICE.

WILLIAM WATTIE AND GEORGE F. HUTCHINS, OF WORCESTER, MASSACHUSETTS, ASSIGNORS TO THE KNOWLES LOOM WORKS, OF SAME PLACE.

## SHUTTLE-BOX-OPERATING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 551,104, dated December 10, 1895.

Application filed November 25, 1893. Serial No. 491,954. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM WATTIE and GEORGE F. HUTCHINS, citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Shuttle-Box-Operating Mechanism for Looms; and we do hereby declare that the following is a full, clear, and exact description of the invention, which, in connection with the drawings making a part of this specification, will enable others skilled in the art to which our invention belongs to make and use the same.

Our invention relates to looms for weaving textile fabrics, and more particularly to looms for weaving gingham, &c., in which the shuttle-boxes are generally arranged four to one or seven to one—that is, four movable shuttle-boxes at one end of the lay and one stationary shuttle-box at the other end of the lay, or seven movable shuttle-boxes at one end of the lay and one stationary shuttle-box at the other end of the lay.

Our improvements are applied to and combined with the box-shifting mechanism of the description set out in United States Letters Patent No. 134,992, dated January 21, 1873, consisting of the upper and lower cylinder-gear, the vibrator-gears, the vibrator-levers, and the vibrator-connectors to the lever for operating the shuttle-box lifter-rod.

In carrying out our invention the box-shifting mechanism is arranged at the lower part of the loom at the rear right or left hand end thereof, and over said mechanism is arranged a multiplier mechanism, which is not shown in the drawings and forms no part of our present invention.

The multiplier mechanism may be of the description shown and described in United States Letters Patent No. 413,369, dated October 22, 1889.

The indications of the box-pattern chain are communicated through levers and connecting-links to the mechanism shown in the drawings for shifting the shuttle-boxes, as will be hereinafter described.

The object of our invention is to improve upon the construction of the box-shifting

mechanism in looms for weaving gingham, &c., as now ordinarily made, and more particularly to provide improved means for positively locking the vibrator-levers independently in their raised or lowered position, and also means for locking the vibrator-connectors and coupling the same and the vibrator-gears connected therewith to the vibrator-levers to prevent any accidental movement of the same after the rotation of the vibrator-gears.

Our invention consists in certain novel features of construction and operation of our improvements as applied to the shuttle-box-shifting mechanism, as will be hereinafter fully described.

Referring to the drawings, Figure 1 is a right-hand end elevation of a loom side with sufficient portions of the box-shifting mechanism and operating parts thereof shown to illustrate the nature of our improvements. Fig. 2 is a cross-section on line 2 2, Fig. 1, looking in the direction of arrow *a*, same figure; and Fig. 3 is, on an enlarged scale, a sectional detail on line 3 3, Fig. 1.

In the accompanying drawings, 1 is the loom side; 2, a plate bolted thereto, on which are supported portions of the box-shifting mechanism.

3 is the bottom shaft, and 4 the upright shaft, which drives the box-pattern-chain shaft (not shown) at the top of the loom.

The upright shaft 4 is driven through the elliptical gear 5, fast on the bottom shaft 3, which meshes with and drives the elliptical gear 6, fast on the lower cylinder-gear shaft 7. On the opposite end of said shaft 7 is a bevel-gear 8, (see Fig. 2,) which meshes with and drives a bevel-gear 9, fast on the lower end of the upright shaft 4, all in the usual way. Also fast on the shaft 4, above the bevel-gear 9, is a bevel-gear 10, (see dotted lines, Fig. 1,) which meshes with and drives a bevel-gear 11, fast on the upper cylinder-gear shaft 12, carrying the upper cylinder-gear 13, fast thereon.

The lower cylinder-gear 14 is fast on the lower cylinder-gear shaft 7.

Between the upper cylinder-gear 13 and the lower cylinder-gear 14 are arranged the



two vibrator-levers 15, pivoted at their inner ends on a pin 16 on the plate 2. Said vibrator-levers 15 carry the two vibrator-gears 17, which are supported and adapted to rotate thereon in the usual way. The vibrator-connectors 18 are pivoted at one end on the vibrator-gears 17, at one side of the axis of said gears, and are connected at their other end with the mechanism which operates the shuttle-box lifter-rod.

All of the above parts are of substantially the same construction and combined together in the same way as in the shuttle-box-lifting mechanism shown and described in the Letters Patent, No. 134,992, above referred to, in which said mechanism is arranged at the top of the loom in that portion called the "head."

The box-shifting mechanism shown in the drawings is adapted to be applied to and used on a loom in which there are four movable shuttle-boxes at one end of the lay and one stationary shuttle-box at the other end.

The mechanism intermediate the vibrator-gear connectors 18 and the box lifter-rod 19 is of well-known construction and operation, and consists of two angle-levers 20 and 21, fulcrumed on a pin 22, with the upright arm 20' of the lever 20 adjustably connected with one vibrator-connector 18 and the upright arm 21' of the other lever 21 adjustably connected with the other vibrator-connector 18 in the usual way. A lever 23 is pivotally connected with the two levers 20 and 21 by two parallel connectors 24, and also with the lower end of the box lifter-rod 19, on the top of which are supported the shuttle-boxes (not shown) in the usual way.

A connector 27 connects the front end of the lever 23 to the arm 25, loose on a stud 26, fast in the loom side 1. A spiral spring (not shown) is mounted on the stud 26 with one end thereof attached to the arm 25 and the other end to some stationary point, and acts to raise the arm 25, and, through connector 27, the lever 23, to help support the shuttle-boxes on top of the lifter-rod 19 and take the weight thereof off the vibrator-levers 15 in the usual way.

The lever 23 is in this instance made in two parts 23' and 23'', and the adjoining ends of said parts are attached together, as shown in Fig. 3, so as to form a yielding or give-way joint in said lever, which, as long as the loom operates in the proper way, will remain rigid, but in case a shuttle fails to box, &c., will yield, causing the part 23' to move on the part 23'' at its point of connection therewith, thus preventing any injury to the box-shifting mechanism.

The give-way joint between the parts 23' and 23'' of the lever 23 is preferably made as shown in Fig. 3. One of the parts, as 23', is provided with two tapering recesses 28, into which extend the tapering heads of pins 29, secured in the part 23''. A bolt 30 extends through the two parts 23' and 23'' and makes

a joint connection between the parts. A stiff coil-spring 31 is supported on the outer end of said bolt, between the adjustable nut 32 and a washer 33 thereon, and acts to hold the two parts 23' and 23'' together, with the tapering ends of the pins 29 extending into the recesses 28, as shown in Fig. 3, and said spring 31 is of sufficient strength to hold said parts together and cause the lever 23 to act as a single lever during the ordinary operation of the loom.

In case the box-lifting rod 19 is prevented from moving by reason of a shuttle extending out from its box, or for any other reason, then as the box-shifting mechanism continues to operate, the pins 29 will be forced out of the recesses 28, and the part 23' of the lever 23 will be moved on the other part 23'', through the pivot-pin 30, without any injury to said mechanism.

Returning now to the vibrator-levers 15, the outer free ends of said vibrator-levers, instead of being made in the usual way, to be engaged and held by the locking-arm, are provided with projecting surfaces 15' and 15'', adapted to be engaged by the cam-surfaces 33' on the lock-lever 33, centrally pivoted at 34 on the plate 2. The outwardly-extending arm 33'' of each lock-lever 33 is pivotally connected with the links 35, adjustably connected to the lower end of the connectors 36, leading to the levers (not shown) which are acted on by the box-pattern chain.

When the two connectors 36 are moved upward, by the operation of the pattern-chain, the lock-levers 33 are moved on their pivot-points, and the lower cam-surfaces 33' are moved away from the lower projecting surfaces 15'' of the levers 15, and the upper cam-surfaces 33' are moved in under the upper surfaces 15' of the levers 15, as shown in Fig. 1, to positively move up said levers 15, and to cause the vibrator-gears 17 to engage the upper cylinder-gear 13, and said levers 15 are locked in their raised position by the lock-levers 33.

When the rolls on the box-pattern chain pass from under the levers connected with the connectors 36, the lock-levers 33 move on their pivot-points, and the upper cam-surfaces 33' thereof move outwardly away from the upper surfaces 15' of the levers 15, and the lower cam-surfaces 33' move inwardly into engagement with the lower surfaces 15'' of the levers 15, which levers drop down from gravity, carrying the vibrator-gears 17 with them, to mesh with the lower cylinder-gear 14, and lock said levers 15 in their lowered position. It will thus be seen that by means of the lock-levers 33, provided with the cam-surfaces 33' thereon, we communicate a positive motion to levers 15 to raise the same, and we provide an independent positive lock for each of said levers 15, both in their raised position, when the vibrator-gears are in engagement with the upper cylinder-gear, and



in their lowered position, when the vibrator-gears are in engagement with the lower cylinder-gear.

It will be understood that one or both of the 5 vibrator-levers 15 are operated by the lock-levers 33 to communicate motion, through one or both of the vibrator-connectors 18, to the mechanism to call the shuttle-boxes, according to the indications of the box-pattern 10 chain, in the ordinary way.

We prefer to combine with each vibrator-lever 15 two upright locking levers or fingers 37, pivotally supported thereon, as shown in Fig. 1, with an expansive spiral spring 38 15 supported between their lower ends to act to move their upper ends toward each other.

The locking-fingers 37 are bent at their upper ends, as shown, and adapted to engage a pin 39 on each of the connector-levers 18. 20 Each pair of locking-fingers 37, in connection with the pin 39 on each connector 18, serves to lock said connector and couple it to the vibrator-lever 15 at each extremity of the movement of said connector, as indicated by full 25 and dotted lines in Fig. 1, so that the vibrator-gears 17, after they have been rotated by the action of the upper or lower cylinder-gear, will be retained in their position and prevented from being moved except at the 30 proper time.

The spring 38 allows the upper ends of each pair of locking-fingers 37 to yield and spread apart, to release the pin 39 from engagement therewith, as the connector-lever 18 is raised 35 and lowered and moved in one direction or in the other by the rotation of the vibrator-gear 17. Stops 40 on the vibrator-levers 15 on the outside of the fingers 37, below their pivot-point, limit the inward motion of said 40 fingers.

From the above description, in connection with the drawings, the operation of our improvements will be readily understood by those skilled in the art.

It will be understood that the details of 45 construction of some of the parts of our improvements may be varied, if desired.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is— 50

1. In a loom, the combination with upper and lower cylinder gears, vibrator gear, vibrator connector, and vibrator lever, provided at its free end with projecting surfaces, as 15' and 15'', of a lock lever, as 33, centrally pivoted, and provided with an outwardly extending arm, as 33'', connected to the lower end of the connector to the pattern surface, and also provided with two cam surfaces, as 33', 55 adapted to engage the projecting surfaces on the vibrator lever, to positively raise said lever and lock the same in its raised position, 60 substantially as set forth.

2. In a loom, the combination with the upper and lower cylinder gears, vibrator gear, 65 and vibrator connector, of the vibrator lever, carrying two spring actuated locking levers or fingers, pivotally supported thereon, with their upper ends adapted to engage with, and be disengaged from a pin on the vibrator connector, to couple or lock said vibrator connector to the vibrator lever and said pin, for the purpose stated, substantially as shown and 70 described.

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