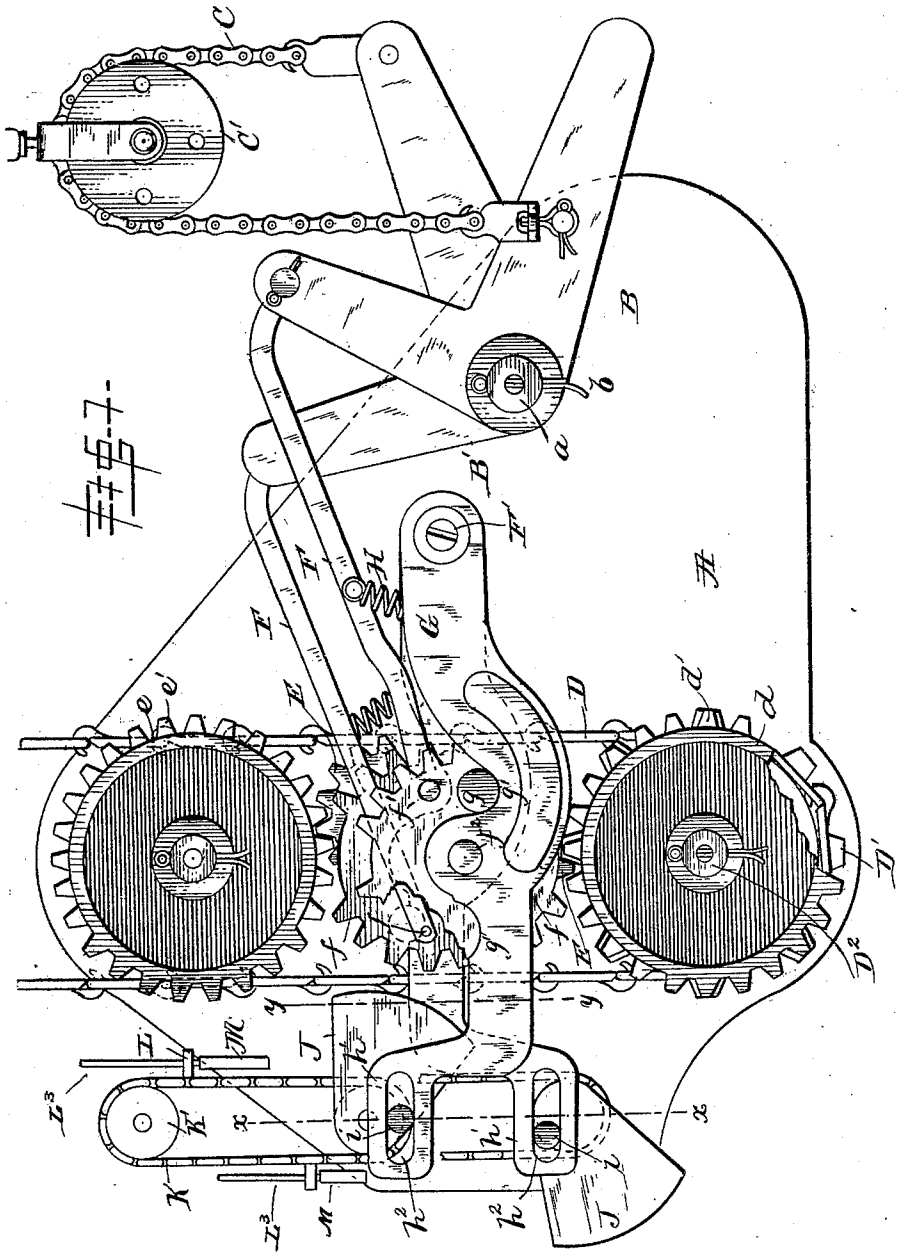
(No Model.) 2 Sheets—Sheet 1.

A. INSINGER.

SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

No. 473,507. Patented Apr. 26, 1892.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

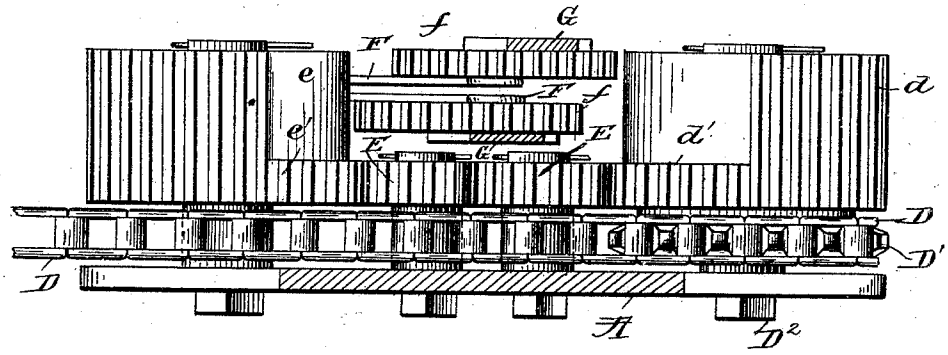


Fig. 3.

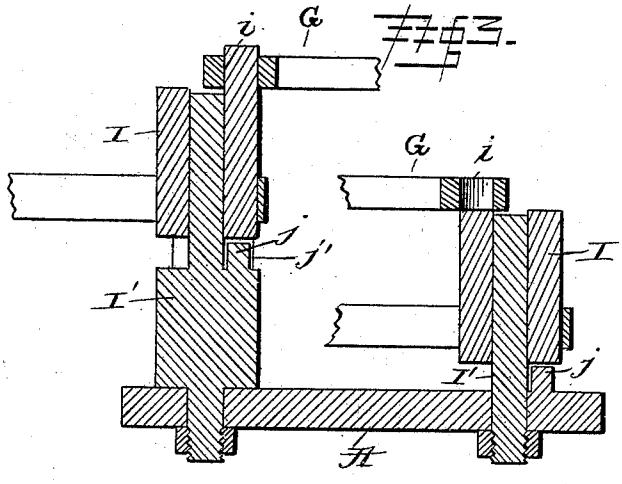


Fig. 4.

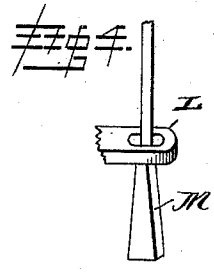
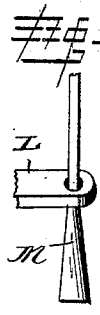


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

ALFRED INSINGER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO BAKER LA RUE, OF SAME PLACE.

SHUTTLE-BOX-OPERATING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 473,507, dated April 26, 1892.

Application filed June 1, 1891. Serial No. 394,721. (No model.)

To all whom it may concern:

Be it known that I, ALFRED INSINGER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Shuttle-Box-Operating Mechanism for Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in looms, and it is designed more especially as an improvement upon mechanism for shifting the shuttle-boxes and harness-frames of looms of the class of shifting mechanism shown in the Patent No. 134,992 to Knowles, dated January 21, 1873.

It has for its objects, among others, to simplify and improve upon the devices employed in such class of mechanism for moving the vibrator-levers and holding them in position after they have been moved. I provide a crank working in a slot of the vibrator-lever and operated by connection with the jacquard in such a manner that as it is revolved in one direction or the reverse for about a half-revolution it first effects the desired shifting of the vibrator-lever, and then automatically locks the said lever in position. This crank may be, and preferably is, held in the position into which it has been turned by a weight, which is connected therewith and is thrown over beyond the center, on which the crank rotates each time the crank is actuated by the movement of the jacquard, stops being provided to prevent the crank from going too far. I dispense with pattern-chains such as ordinarily are employed to operate the vibrator-levers, simplify the construction, render it more positive and certain in its action, and, being of few parts, it is not liable to get out of order. As the movement of the griff of the jacquard and of the hooks of the latter when engaged with the griff is greater than is necessary to operate the crank in engagement with the vibrator-lever, as aforesaid, and in order that the said crank shall be moved only a semi-revolution or approximately that distance, I provide simple means to permit of lost motion, whereby the jacquard shall be allowed to proceed for a part of its movement before it operates the crank.

In the accompanying drawings I have shown what at this time presents itself as the simplest and best means for carrying out this part of the invention; but the same is capable of various modifications without departing from the spirit thereof or sacrificing any of its advantages. The means shown and hereinafter described has proved in practice to be most efficient for the purpose for which it is intended.

While I prefer to apply my invention to use in connection with mechanism for shifting the shuttle receiving and holding parts of a loom, the main features thereof are applicable to use in mechanism for shifting the harness-frames of looms.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a front view, on an enlarged scale, of sufficient of a loom to illustrate my invention. Fig. 2 is a section on the line $y\ y$ of Fig. 1. Fig. 3 is a section on the line $x\ x$ of Fig. 1. Fig. 4 is a detail showing the plunger and its co-operating lug. Fig. 5 is a detail view showing a modified form of lug and plunger.

Like letters of reference indicate like parts throughout the several views in which they occur.

As the novelty in the present instance resides in certain novel features of construction, which co-operate with the features common to all looms of this class and well known to every one in the art, it has been deemed unnecessary to show any more of the parts of the loom than those with which my improvement is closely related. It will therefore be understood that such parts of a loom as are not shown or described herein may be of any of the known or approved forms of construction.

Referring now to the details of the draw-

ings by letter, A designates a portion of the loom-framing, and *a* is a stud or shaft projecting therefrom and upon which the bell-crank levers B and B′ are fulcrumed at the angle thereof, the said levers being detachably held thereon in any suitable manner—as, for instance, by a spring-key *b* of ordinary construction, as shown in Fig. 1, and being separated by washer *a*. These levers are arranged in different vertical planes, as seen in Fig. 1, and C is a chain connected to the horizontal arms of the levers at different distances from the fulcrum, as shown in Fig. 1. This chain passes over a floating pulley or wheel C′, which in practice is suitably connected with the movable shuttle carrying part of the lathe or batten. (Not shown.) The part connected with the pulley or wheel C′ may be constructed and arranged in any desired manner upon or with relation to the other parts of the loom. If desired, the connections with and extending from the said pulley or wheel may be as in United States Patent No. 221,239, or as in United States Patent No. 231,153.

D is a driving-chain, or it may be a band or belt, deriving its motion through the medium of suitable connection with the operating-shaft of the loom or otherwise, and this chain passes around a sprocket-wheel D′, mounted on a stud, shaft, or axle D^2, and on the same shaft or axle are the cylinder-gear *d* and spur-gear *d′*, as seen best in Fig. 2, said sprocket-wheel being preferably cast integral with said cylinder-gear. Arranged in line with the cylinder-gear *d* is the cylinder-gear *e*, having spur-gear *e′*, as also seen in Fig. 2.

E are intermediate gear-wheels meshing with the spur-gears *d′* and *e′* and with each other and mounted on suitable stud shafts or axles secured to the frame A. These wheels serve to communicate rotation to the upper cylinder-gear *e* from the lower cylinder-gear *d*.

Pivotally connected with the upper ends of the levers B and B′ are the arms F, the other ends of which are eccentrically connected at *f′* with the crank-gears *f*, as seen in Figs. 1 and 2. Each of these gears *f* is pivoted on a pin or axle f^2, which is carried by one of the levers G, the said levers being pivoted or fulcrumed at one end on a common shaft F′, as seen in Fig. 1, but being arranged to be actuated independently of each other, as will hereinafter be made apparent. The crank-gears are provided each with a crank or eccentric pin *g*, as shown clearly in Fig 1, and the levers G are each provided with two stop notches or depressions *g′*, one on each side of the pivot of the crank-gear *f*, as seen in the same figure, into which notches or depressions the said pins enter as the crank-gears are rotated, as will hereinafter appear. Each arm F is connected with its nearest lever G by a spring H, as shown in Fig. 1, the said springs serving by their tension to hold the pins *g* in the notches of the levers G and also operating the arms *f* to insure the completion of each semi-rotation of the crank-gears by turning the latter until their crank-pins *g* enter the notches *g′* on one side or the other of the pivots of the crank-gears. The free ends of the levers G—those farthest from their fulcrums—are bent at substantially right angles to the length thereof and then horizontally, as shown at *h′*, and the horizontal portion of each of the said levers is provided with an elongated slot h^2. (Shown more clearly in Fig. 1.) In the slots h^2 are designed to work the crank-pins *i*, carried by the sleeves or collars I, which are mounted loosely upon stud-shafts I′, the latter being held in the framing of the loom, as seen in Fig. 3, in any suitable manner—as, for instance, by having their free ends threaded and provided with nuts engaging the same outside the frames, as shown in said Fig. 3. These sleeves or collars are provided with segmental or other form of weights J, applied eccentrically thereto, and suitable stops are provided for the purpose of limiting the movement of the sleeves to approximately half a revolution thereof in each direction. I have devised a simple form of stop for this purpose, which is shown in detail in Fig. 3, and consists of a pin or other projection *j* on the framing or fast to a portion of the shaft on which the said sleeve turns, as seen in said Fig. 3, and an engaging lug or stop *j′* on the sleeve, the said parts being so arranged relatively to each other that each time the sleeve is actuated to rotate the same the stops will engage with each other at the end of a half-revolution or approximately a half-revolution of the sleeve and prevent the sleeve from going any farther, the sleeve being held in its new position by the weight J, which is thrown over past the center on which the sleeve turns each time the sleeve is partially rotated. The stops and weights coact in holding the crank-carrying sleeves and the levers G in each of the positions into which they are moved.

The sleeves I are operated from the jacquard in the following manner: To each sleeve an endless chain, belt, or band K is connected, which passes around a suitable supporting-pulley K′, suitably journaled above the sleeve. The said chain, belt, or band is intended to receive its movements through intermediate connections from the jacquard. Inasmuch as the movement of the griff of the jacquard and of the parts engaged therewith and moved thereby is greater than that required to move the crank-carrying sleeves to the desired extent, it is necessary to make provision for the difference in the extent of the movement of the parts. To this end I make provision for lost motion at a suitable point between the hooks of the jacquard and the endless chain, belt, or band. I have shown in Figs. 1, 4, and 5 of the drawings one convenient and efficient means of accomplishing this result. In the said figures the chain is provided with lugs L, which may be slotted, as shown in Fig. 4, or formed with round openings or per-

forations, as shown in Fig. 5, and through the slots or the perforations of the lugs pass plungers M, which are connected by connections L^3 with the hooks of the jacquard, the said plungers being made thin or tapered at their upper ends or for a part of their length, so as to permit them to be drawn upward through the slots or perforations for a part of their length before the enlarged lower portion thereof engages with the lugs to move the chains, as will be understood more fully by reference to Figs. 4 and 5, where these parts are shown on an enlarged scale. I have also in practice heretofore operated the sleeves by straps, which have been made sufficiently slack to permit of a sufficient amount of lost motion.

The operation is simple and apparent, and a detailed description thereof is not deemed necessary. The turning of the sleeves with their cranks shifts the levers either up or down, and the levers will be held locked in their new positions. The weights serve an important function. They hold the parts in their position without extraneous means. They serve to balance the parts, and they aid in the movement of the parts after they receive their initial impulse.

The construction which constitutes the present invention is simple, cheap, and can be applied to any and all forms of looms where the box or change motion is operated by jacquard or chain.

The construction shown and described is capable of various modifications without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as new is—

1. The combination, with the vibrator-levers, of partially-rotatable cranks adapted to actuate said levers, substantially as specified.

2. The combination, with the vibrator-levers slotted at their free ends, of partially-rotatable sleeves carrying crank-pins engaging said slots, the said sleeves being provided with means for holding them in the positions into which they are rotated, substantially as set forth.

3. The combination, with the vibrator-levers, of the partially-rotatable sleeves carrying balance-weights and crank-pins to actuate the levers and connected means whereby the said sleeves may be rotated from the jacquard, as set forth.

4. The combination, with the vibrator-levers provided with slots at their free ends, of the partially-rotatable sleeves carrying crank-pins working in the slots of the levers and connected means whereby said sleeves may be actuated from the jacquard with lost motion permitting partial movement of the jacquard before the said sleeves are actuated, as and for the purpose specified.

5. The combination, with the partially-rotatable sleeves, of the chains or bands for rotating said sleeves, provided with lugs and plungers and working for a portion of their movement loosely through the lugs, substantially as specified.

6. The combination, with the vibrator-lever and the partially-rotatable crank-carrying sleeve for actuating the same, of the chain or band provided with a lateral lug having an opening therein and the plunger working through said opening, said plunger being of such relative size for a portion of its length as to move through the opening of the lug without engaging the same, substantially as and for the purpose specified.

7. The combination, with the vibrator-lever having a horizontally-slotted free end, of the partially-rotatable sleeve carrying a crank-pin working in the slot of the lever and a segmental weight, the chain or band for actuating the sleeve, a lug having an opening therein carried by the chain or band, and a plunger having a reduced or tapered portion working loosely through the opening of the lug, substantially as specified.

8. The combination, with the cylinder-gears, the bell-crank lever, and the pivoted vibrator-lever provided with stop-notches on its upper edge on opposite sides of the pivot of the crank-gear, of the crank-gear rotatably held on the vibrator-lever and carrying a stop-pin adapted to enter said notches, the arm connected with the bell-crank lever and pivotally connected with the crank-gear, and a spring connecting the said arm with the vibrator-lever and serving to draw the stop-pin into the notches, as set forth.

In testimony whereof I affix my signature in presence of witnesses.

ALFRED INSINGER.

Witnesses:

CHAS. M. LUKENS,

N. A. PARSONS,

CHAS. K. LUKENS.