(No Model.)

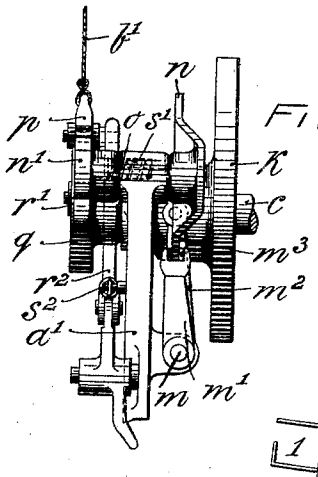
2 Sheets—Sheet 1.

C. H. KNOWLTON & B. F. MEYER.

SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

No. 503,543. Patented Aug. 15, 1893.

FIG: 3.



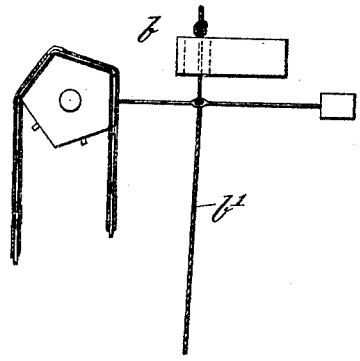
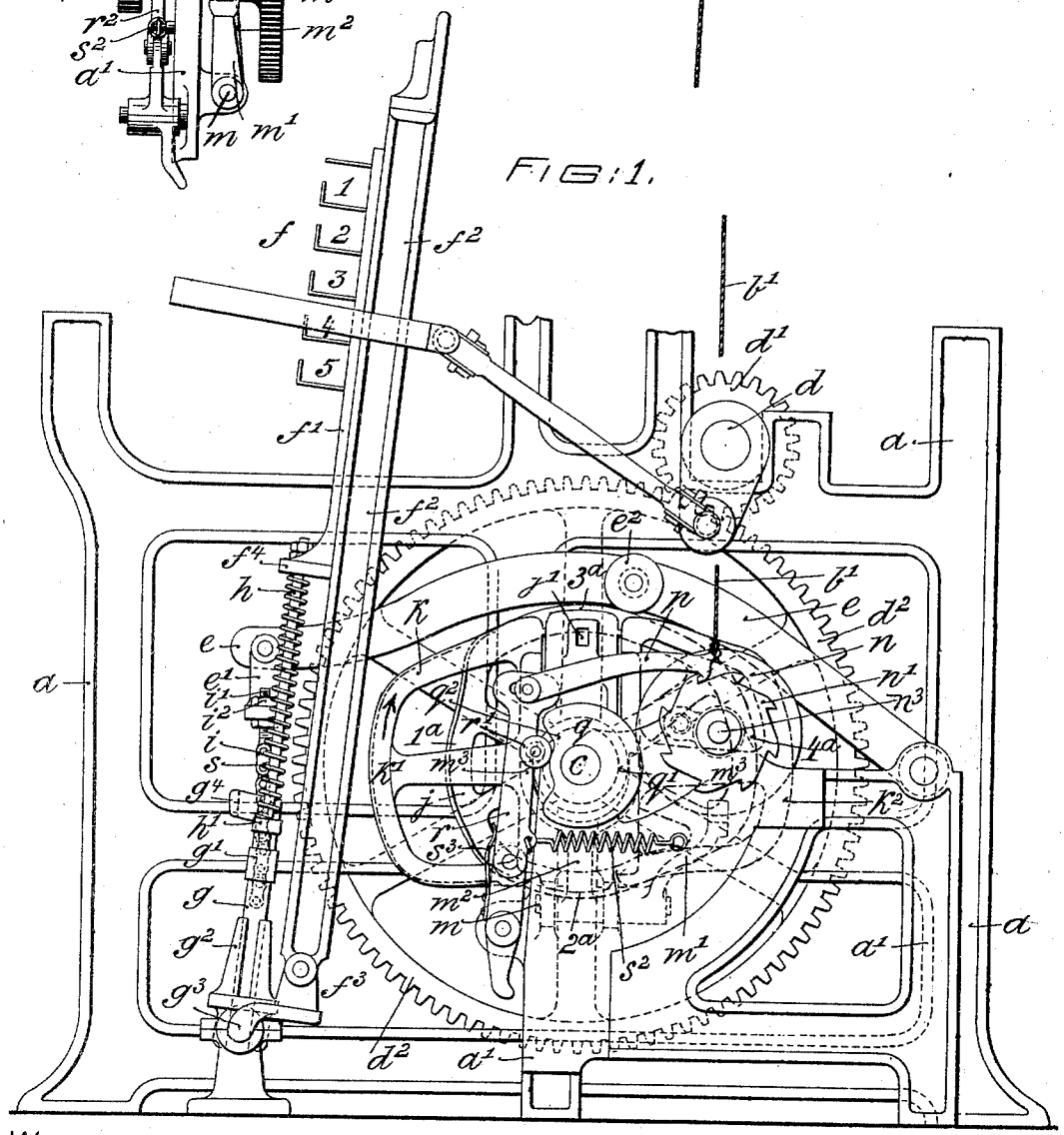


FIG: 1.



WITNESSES:
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Richard C. Maxwell.

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BY J. Walter Douglass.
ATT'Y.

(No Model.) 2 Sheets—Sheet 2.

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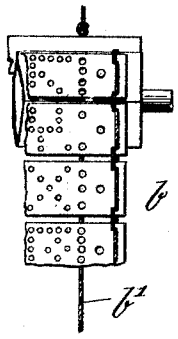
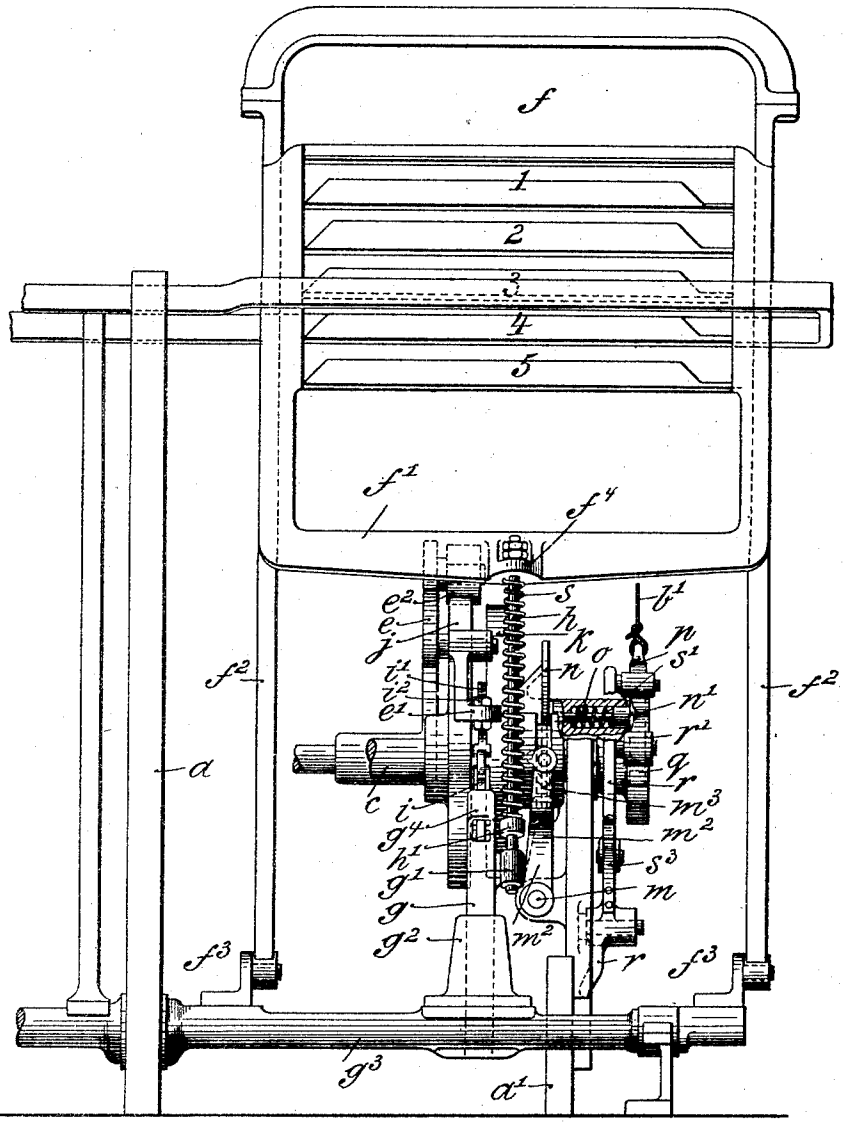


FIG: 2.



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UNITED STATES PATENT OFFICE.

CHARLES H. KNOWLTON AND BENJAMIN F. MEYER, OF CAMDEN, NEW JERSEY, ASSIGNORS TO THE M. A. FURBUSH & SON MACHINE COMPANY, OF SAME PLACE.

SHUTTLE-BOX OPERATING MECHANSIM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 503,543, dated August 15, 1893.

Application filed April 22, 1893. Serial No. 471,425. (No model.)

To all whom it may concern:

Be it known that we, CHARLES H. KNOWLTON and BENJAMIN F. MEYER, citizens of the United States, residing at the city of Camden, in the county of Camden and State of New Jersey, have jointly invented certain new and useful Improvements in Shuttle-Box-Operating Mechanism for Looms, of which the following is a specification.

Our invention relates to looms and more particularly to shuttle box motion mechanism therefor.

The principal objects of our invention are first, to provide a simple, durable, efficient and comparatively inexpensive shuttle box motion for looms; second, to control the devices that operate to drive intermediate mechanism adapted to slide a rotating cam upon its axis into and out of position for calling up shuttle boxes by means of a Jacquard needle and cards, whereby said cam may be brought into action through the instrumentality of said intermediate mechanism after the completion of any required number of picks or shots of the loom; and third, to construct said driving devices for operation in such manner that they are adapted to yield and avoid breakage in the event of the improper timing of the operations of the loom.

Our invention consists of a shuttle box motion for looms comprising a lever for calling up shuttle boxes, a rotating cam adapted to be slid into and out of range of said link lever, mechanism for sliding said cam, a reciprocating pawl for actuating said mechanism, and a Jacquard tail controlling said pawl and dictating the movements of the cam; and our invention further consists of the improvements in shuttle box motions for looms hereinafter fully described and claimed.

The nature, characteristic features and scope of our invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof; and in which—

Figure 1, is an elevational end view of portions of a loom and Jacquard machine, showing shuttle box motion mechanism embodying features of our invention in application thereto. Fig. 2, is a front elevational view of certain of the parts shown in Fig. 1; and Fig. 3, is a view illustrating details of construction and taken from the right hand side of Fig. 1.

In the drawings a and a', are portions of the frame-work of a loom and b, is a portion of a Jacquard machine carried by the frame work a, and operated in the usual or in any required manner.

c, is a counter-shaft driven by the main-shaft d, through the instrumentality of suitable gears d' and d^2.

e, is a lever pivoted at one extremity to the frame-work a', and provided at its free extremity with a buckle e'.

f, is a series of shuttle boxes, in the present instance five, mounted in a frame f', afforded a range of upward and downward movement on ways f^2, hinged near the base of the loom, as shown at f^3.

g, is a traveler provided with a socket g', and afforded a range of movement in guides g^2, carried by a shaft g^3, located at the lower portion of the front of the loom.

h, is a rod supported at one of its extremities by a lug f^4, projecting from the frame f', and having its other extremity afforded a range of play in the socket g'.

s, is a spiral spring encircling the rod h, and having one of its extremities in contact with the lug f^4, and the other of its extremities in contact with a collar h', attached to the rod h.

i, is a chain having one of its extremities attached to the traveler g, and the other of its extremities attached to the buckle e', by means of a screw i', and nuts i^2, so that the length of the chain i, may be readily adjusted in order to regulate the position of the shuttle-boxes.

g^4, is a loop or guard carried by the traveler g, and adapted for the accommodation of the chain i. When the lever e, is rocked upward the chain i, causes the traveler g, to be shifted in a similar direction, and this motion of the traveler is imparted to the frame f', and shuttle boxes f through the intervention of the spring s. Ordinarily the spring s, does

not yield. However, if the frame f', should from any cause become jammed, the spring s, would yield and thus prevent accidental injury to or breakage of the moving parts. When the lever e, is rocked downward the frame f', shuttle boxes f, and traveler g, are permitted to descend under the influence of gravity.

j, is a cam keyed to the shaft c, and provided with portions 1^a, 2^a, 3^a and 4^a, adapted to contact with a roller e^2, carried by the lever e, in order to rock the latter, and thus bring the shuttle boxes 1, 2, 3 and 4 into operative position in the following order, to-wit: 1, 2, 4, 3 as illustrated in Fig. 2; and by the operation of the cam j, this order would be repeated indefinitely.

k, is a sectional shuttle box cam having the hub section thereof loosely mounted upon the shaft c, and provided with openings through which pins j', on the cam j, project. These pins j', serve to impart rotary motion to the shuttle box cam k, and also afford the same freedom of movement in the direction of the lengths of the shaft c.

The mechanism for shifting the cam k, comprises a rock-shaft m, supported in bearings on the frame-work a', and provided with two fast radial arms m' and m^2, whereof one m^2 is provided with a shipper fork m^3, engaging a groove in the hub section of the shuttle box cam k, and whereof the other m' is bifurcated for the reception of a dish-shaped cam n, Fig. 3, keyed to a shaft n^3 provided with a ratchet wheel n'.

o, is a pin working in an aperture or chamber in the frame a', and having its head maintained under the influence of a spring s', in frictional contact with the inner face of the ratchet-wheel n', Figs. 2 and 3, whereby accidental retrograde motion of the ratchet-wheel and dish-shaped cam n, is prevented.

p, is a pawl attached to one of the tails b', of the Jacquard machine b, and adapted to mesh with the ratchet-wheel n', in order to cause the cam n, and rocker arms m' and m^2, to shift the cam k, into range of the lever e, and to work clear of the ratchet-wheel n', in order to permit the cam k, to remain at rest.

q, is a cam keyed or otherwise secured to the counter-shaft c, and having a high part q', and a low part q^2.

r, is a jointed lever pivoted at one of its extremities to the frame-work a', and provided intermediate of its ends with a roller r', held normally in range of the high and low portions of the driving cam q, by means of springs s^2 and s^3. The upper extremity of this lever r, is slotted for the reception of the pivot post of the pawl p, so that this pivot post may be adjusted and then clamped to place in order to increase or diminish the throw of the pawl. Ordinarily the driving-cam q, rocks the lever r, and thus reciprocates the pawl p. However, if the movement of the parts become for any reason improperly timed, the springs s^2 and s^3, may yield and thus permit the lower end of the upper section of the lever r, to be pushed outward by the high part q', of the cam, whereby the pawl p, is permitted to remain at rest. The high or operative sections k' and k^2, of the sectional cam k, are bolted or otherwise secured to the hub section thereof, and are adapted to be shifted by means of the dish-shaped cam n, and rocker arms m' and m^2, into range of the roller e^2, thus causing the lever e, to call up the shuttle box 5, instead of the shuttle boxes 1 and 4, as would occur by the ordinary operation of the cam j. One of the high sections k' or k^2, may be dispensed with, in order to cause the shuttle box 5, to be substituted for only one of the shuttle boxes 1 and 4, as may be required, and in this connection it may be remarked that the high sections k' and k^2, may be readily detached from and applied to the hub section without disconnecting or otherwise disturbing the rocker arms m' and m^2, and their accessories. Moreover, the pawl p, is subject to the dictation of the Jacquard machine b, as has been already explained, so that the shuttle box cam k, may be shifted under the influence of the cam n, after any required number of picks or shots have been completed, by cutting the succeeding Jacquard card or cards in such manner that the tail b', is permitted to lower the pawl p, into action, or the shuttle box cam k, may be permitted to occupy the same position for any required number of picks by cutting the cards corresponding to these picks in such manner that the tail b', lifts the pawl p, out of action before the lever r, commences its stroke.

The mode of operation of the hereinbefore described shuttle box motion is, as follows:— The positively driven shaft d, causes the various well known parts of the loom to shed the warp, work the picker sticks, beat up the wefts and actuate the Jacquard machine b, and its cards in the usual and well understood manner, and also imparts rotary motion to the shaft c. The rotation of the shaft c, is imparted to the cam j, and the high parts 1^a, 2^a, 4^a and 3^a of the latter, contact with the roller e^2, and thus cause the lever e, to call up the shuttle boxes 1, 2, 3 and 4 in the following order 1, 2, 4, 3. The rotation of the cam j, and shaft c, is imparted to the cam q, and the latter operates to vibrate the lever r and pawl p. The position of the pawl p, is dictated by the Jacquard machine b, and cards, as has been fully explained, and whenever it becomes necessary or desirable to call up the shuttle box 5, the cards are cut or prepared in such manner that the rail b' permits the pawl b, to assume its operative position in range of the ratchet-wheel n'. Under these circumstances the pawl p, imparts motion to the dish-shaped cam n, and the latter operating through the instrumentality of the rocker-arms m' and m^2, shifts the cam k, into range of the roller e^2, and the high section or sections of the cam k, engage the roller e^2, and thus cause the lever e, to call up the shuttle

box 5, instead of the shuttle boxes 1 or 4, or both of them according as one or two high sections are employed.

It will be obvious to those skilled in the art to which our invention appertains, that modications may be made in details without departing from the spirit thereof. Hence we do not limit ourselves to the precise construction and arrangement of parts hereinbefore explained and illustrated in the drawings.

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

1. A shuttle-box motion for looms, comprising a lever for calling up shuttle boxes, a rotating cam adapted to slide into and out of range of said lever, mechanism operated from the main shaft of the loom and adapted to slide said cam, a reciprocating pawl for actuating said mechanism, and a Jacquard tail for lifting said pawl into and out of action, substantially as and for the purposes set forth.

2. A shuttle box-motion for looms comprising a lever for calling up shuttle boxes, a rotating cam adapted to slide into and out of range of said lever, mechanism for sliding said cam, and a reciprocating pawl for actuating said mechanism, substantially as and for the purposes set forth.

3. A shuttle box-motion for looms, comprising a lever for calling up shuttle boxes, a positively driven shaft, a rotating shuttle box cam adapted to slide endwise of said shaft into and out of range of said lever, a cam and rocker-arms operated by said cam for shifting said shuttle box cam, pawl-and-ratchet connections for controlling the movement of the latter cam, and a Jacquard tail for throwing said pawl-and-ratchet connections into and out of action, substantially as and for the purposes set forth.

4. A shuttle box motion for looms, comprising a lever for calling up shuttle boxes, rotating cams, whereof one is disposed in range of said lever and the other is adapted to slide on its axis into and out of range thereof, mechanism for sliding said cam into and out of range of the lever, a reciprocating pawl for actuating said shifting mechanism, and a Jacquard tail for lifting said pawl into and out of action, substantially as and for the purposes set forth.

5. A shuttle box-motion for looms, comprising a lever for calling up shuttle boxes, a positively driven shaft, a rotating shuttle-box cam adapted to slide endwise of said shaft into and out of range of said lever, a second cam and rocker-arms operated by said cam for shifting said shuttle-box cam, a pawl and a ratchet-wheel for driving the second cam, a Jacquard tail for controlling said pawl, and a spring controlled jointed lever and a cam for actuating said pawl, substantially as and for the purposes set forth.

6. A shuttle box-motion for looms, comprising a lever for calling up shuttle boxes, a positively driven shaft, a shuttle-box cam rotated by said shaft and adapted to slide endwise thereof into and out of range of said lever, a second cam and rocker-arm operated by said cam for shifting said shuttle-box cam, a pawl and a ratchet wheel for driving the second cam, a spring controlled lever and cam for actuating said pawl, and means for adjusting the pivot post of the pawl in respect to said lever, substantially as and for the purposes set forth.

7. A shuttle box-motion for looms, comprising a lever for calling up shuttle-boxes, a rotating cam adapted to slide into and out of range of said lever, mechanism for sliding said cam, a reciprocating pawl and ratchet wheel for actuating said mechanism, and a spring controlled pin having its head in frictional contact with the ratchet-wheel, substantially as and for the purposes set forth.

8. A shuttle box-motion for looms, comprising a frame having a lug, a series of shuttle boxes mounted in said frame and afforded a range of upward and downward movement, a traveler working in ways and provided with a socket, a rod working in an opening in the lug attached to said frame and guided by said socket, a collar attached to said rod and disposed in range of the traveler, a spring interposed between the collar and frame, a chain, a pivotal lever attached to the traveler by said chain, rotating cams, whereof one is in range of said lever and the other is adapted to be moved into and out of range thereof, mechanism operated by the main shaft of the loom and adapted to slide the movable cam on its axis, and a Jacquard tail for throwing said mechanism into and out of action, substantially as and for the purposes set forth.

9. A shuttle box-motion for looms, comprising a frame having a lug, a series of shuttle boxes mounted in said frame and afforded a range of upward and downward movement, a traveler working in ways and provided with a socket, a rod working in an opening in the lug attached to said frame and guided by the socket, a collar attached to said rod and disposed in range of the traveler, a spring interposed between the collar and frame, a chain, a pivotal lever attached to the traveler by said chain, a buckle for adjusting said chain so as to regulate the position of the shuttle boxes, rotating cams, whereof one is in range of said lever and the other is adapted to be moved into and out of range thereof, mechanism operated by the main-shaft of the loom and adapted to actuate the movable-cam, and a Jacquard machine for throwing said mechanism into and out of action, substantially as and for the purposes set forth.

In witness whereof we have hereunto set our signatures in the presence of two subscribing witnesses.

CHARLES H. KNOWLTON.
BENJAMIN F. MEYER.

Witnesses:
THOMAS M. SMITH,
RICHARD C. MAXWELL.