

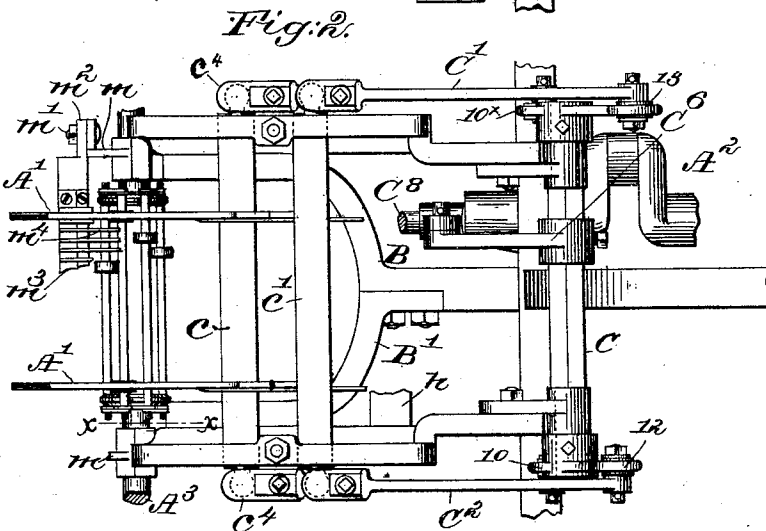
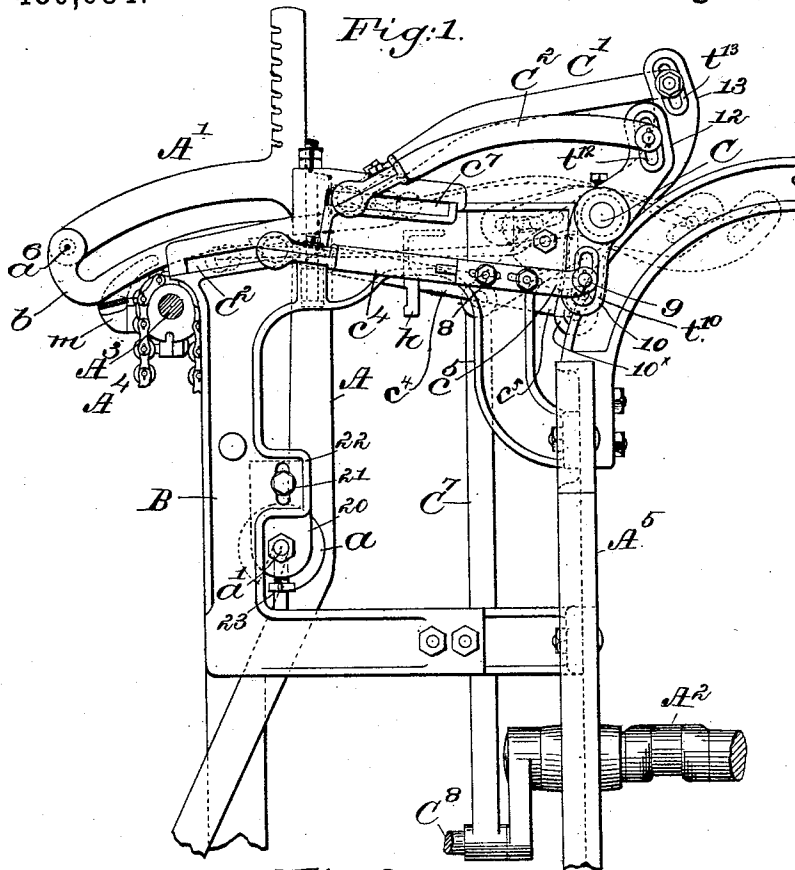
(No Model.)

2 Sheets—Sheet 1.

H. WYMAN & J. A. CLARK.
LOOM.

No. 480,684.

Patented Aug. 9, 1892.



Witnesses.
Edward F. Alley
Louise M. Jewell

Inventors.
Horace Wyman
John A. Clark
by Lewisby Gregory

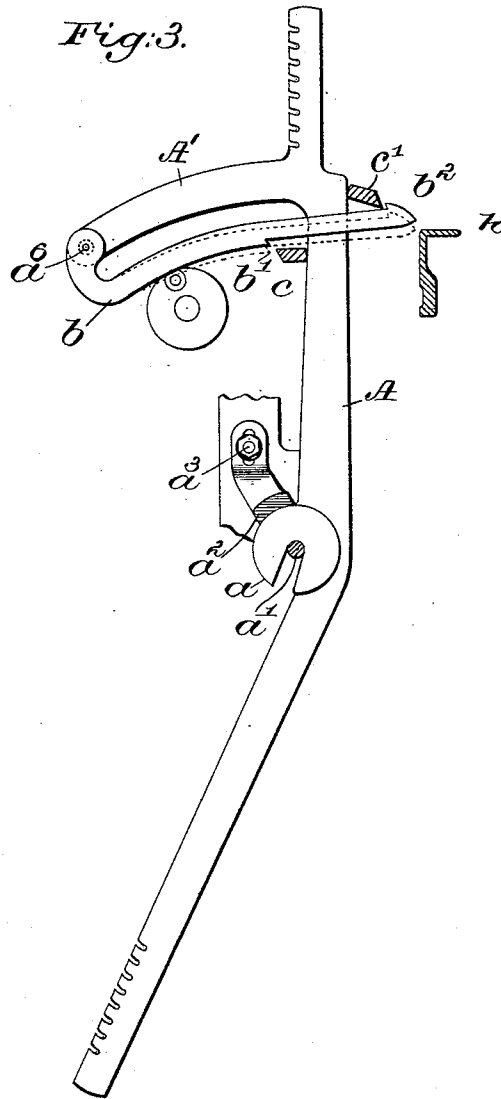
(No Model.)

2 Sheets—Sheet 2.

H. WYMAN & J. A. CLARK.
LOOM.

No. 480,684.

Patented Aug. 9, 1892.



Witnesses.
Edward F. Allen.
Louis McGuire

Inverctons,
Horace Wyman,
John A. Clark,
by Crosby & Son, *printers.*

UNITED STATES PATENT OFFICE.

HORACE WYMAN AND JOHN A. CLARK, OF WORCESTER, MASSACHUSETTS
ASSIGNORS TO THE CROMPTON LOOM WORKS, OF SAME PLACE.

LOOM.

SPECIFICATION forming part of Letters Patent No. 480,684, dated August 9, 1892.

Application filed February 13, 1892. Serial No. 421,381. (No model.)

To all whom it may concern:

Be it known that we, HORACE WYMAN and JOHN A. CLARK, 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, is a specification, like letters and figures on the drawings representing like parts.

10 This invention has for its object to improve that class of loom shown in United States Patent No. 162,904, it showing upright levers having laterally-extended projections, the outer ends of which support the pivots of the

15 notched jacks, which are engaged either by a lifter or a depressor to move the levers and their connected harness-frames to form sheds. In the loom described in the said patent a jack has at its upper edge nearest its inner

20 end or fulcrum a notch to engage its actuating-bar placed above it, and at the opposite side of the upright lever the jack has at its under edge and nearest its free end another notch, and the engagement of this notch with

25 its actuating-bar below it is effected by gravity. This class of loom has gone largely into use, and in practice when running the loom at high speed it has been found that the jacks at times fail to be caught by the lifter, which

30 results in a mispick or imperfection in the woven pattern. In our efforts to improve this class of loom we have discovered that the loom may be run at even greater speed than ever before attempted or thought possible, and that also without the possibility of a mispick or fault due to failure of the jack to be properly caught when forming the shed. We have been enabled to gain these important advantages by improvements in the construction of the jacks in such manner that the engagement of the notches at the outer or free

35 ends of the jacks with their actuating-bar is effected by the pattern-chain as a positive motion instead of by gravity, as heretofore. It will be obvious that the end of a jack farthest from its center of motion will in a given time travel through a longer distance than will a point on the said jack substantially midway its ends, where is located the elevating-notch.

40 In the loom described in the patent referred

to gravity was depended upon to turn the jack and bring into operative position that one of its notches having the longest distance to travel, while in our invention the positive motion of the pattern-chain is employed to bring into operative position that notch which has the longest distance to travel, and by this change we have found that the loom may be run faster and do better work than with the old form of jack. So, also, by making the elevating-notch at the lower edge of the jack, and the depressing-notch at the upper edge of the jack and farther from the fulcrum of the jack than the lifting-notch, it is possible to place the elevator below the jack instead of, as heretofore, between the upper side of the jack and the lateral projection of the upright lever, this feature being of very considerable importance for the reason that when the elevator is entirely below the jack an upright lever may be quickly removed from the loom in case of accident and without disconnecting the lifter from its actuating devices and removing the same. We have devised a locking-bar to co-operate with and keep the slotted hubs of the upright levers on their fulcrum-rod, and we have provided devices whereby the said fulcrum-rod may be adjusted at will and be locked in adjusted position. In order that the lifter and depressor engaging these jacks to move the upright levers and actuate the usual harness-frames to form sheds may move the said jacks most directly and positively and for the proper distance and with the proper slow points to keep the shed open as long as possible, we have combined with the said upright levers and notched jacks a rock-shaft having arms extended therefrom at opposite sides, and the said rock-shaft arms having connecting-rods attached to the ends of the lifter and depressor are made to occupy a nearly upright position when the shed is evened and a nearly horizontal position when the shed is opened. We have also so shaped that part of the loom-frame for supporting the upright levers that the said frame while made lighter in weight and of less cost is also made stronger and so as to afford more ready access to the said upright levers. We have made one of the

connecting-rods adjustable as to its length to thereby enable the bar connected with it to be adjusted with relation to the upright levers. We have also provided a novel comb-like guide for the jacks, the guide having a series of fingers extended over the pattern-surface to a point near where a projection of the pattern-surface meets the said jacks to distribute them.

- 10 Figure 1 is a partial side elevation of a sufficient portion of a loom of the type referred to to enable our improvements to be understood, the support for one end of the pattern-cylinder being in section in the line *a*, Fig. 2.
- 15 Fig. 2 is a top or plan view of the parts shown in Fig. 1, all but two upright levers being removed to avoid confusion; Fig. 3, a sectional detail showing an upright lever, its supporting-rod, the locking-bar, and lifter and depressor and jack safety-bar being in section.
- 20 Before describing our present improvements we will state that the notched ends of the upright levers *A* will in practice be connected by cording to the upper and lower sides of usual harness-frames, as in said patent, to thus form sheds in the warp when the levers are separated. The crank or lay shaft *A*² and the pattern-shaft *A*³, having a pattern surface or chain *A*⁴, (partially shown,) are and
- 30 may be of any usual or suitable construction and be actuated in any usual manner, as in said patent. The upright levers having open slotted hubs *a* to fit over the lever-fulcrum *a'*, have their hubs so shaped or curved externally (see Fig. 3) as to receive against or very near the circular outer faces of the hubs a locking-bar *a*², adjustably connected at each end to the framework by like set-screws *a*³, extended through slots in ears at each end of the said bar, said screws entering the framework. The projections *A'* at their outer ends receive the pivots or fulcrum-studs *a*⁶ of the jacks *b*, having each a lifting-notch *b'* and a depressing-notch *b*², the notch *b'* being at one side and the notch *b*² at the other side of the said lever, the engaging faces being oppositely arranged, the notch *b'* at the under side of the jack being nearer the fulcrum of the jack than the notch *b*² at the upper side of the jack. In the movement of the jack the part having the notch *b*² at the greater distance from the fulcrum travels over a greater distance than the part of the jack having the notch *b'* which is nearer the fulcrum, and the notch having the greater
- 55 distance to travel before engaging its actuator is the one which in our invention is moved into position positively by the pattern mechanism rather than by gravity, as in the old way. The lifter *c* is located entirely below the jack, leaving the space above the jack and between it and the projection *A'* free and unobstructed.

65 Viewing Fig. 3, it will be seen that the shape of the lever *A* is peculiar, the shape shown being desirable, as it makes room for the working of the lifter below the jacks and between the lever and the pattern-surface. In the old form of lever the fulcrum thereof was

located at or near the center line of the lever; but herein it will be noticed that the hub of the lever *A* is extended from one edge thereof, herein shown as the edge nearest the lifter, and that the slot in the said hub to embrace the fulcrum-wire *a'* is chiefly at one side of the longitudinal center of the lever; or, in other words, if a line be drawn in Fig. 3 from the center of the fulcrum-rod *a'* to substantially the middle of the lever at its upper end said line will fall, especially from the point where the projection *A'* starts from the lever to the said hub outside of or along and substantially parallel to one edge of said lever. This illustration is made to make evident the fact that additional space is left at and along the outer edge of the lever *A* from its hub to the projection *A'* for the lifter to move in. Such new shape obviates extending the projection *A'*, thus adding to the weight of the lever and increasing the area occupied by the working parts of the shed-forming mechanism.

The loom-frame has a jack safety-bar *h* for the outer ends of the jacks, close to or on top of which rest and move the outer or free ends of the jacks *b* as the latter, engaged by the depressor *c'*, are being moved to actuate the levers, to which they are connected, said safety device preventing the slipping off from the depressor of any of the jacks raised quickly and positively by the pattern-surface to be so engaged prior to forming a shed. The distribution of the jacks by the pattern preparatory to forming a new shed is effected about as or while the contiguous faces of the lifter and depressor act against opposite edges of the levers to even the warps and close the shed. To quickly remove a jack under our construction the locking-bar screws *a*³ will be slackened to thereby enable the said bar to be turned back away from the hubs of the levers *A*, and the jacks are then free to be lifted from the rod *a'*, a slight separation of the lifter and depressor enabling the lever to be drawn up out of the loom between them.

The opposite ends of the lifter *c*, extended through inclined slots *c*² and having ball-like heads, (shown in dotted lines, Figs. 1 and 2,) are engaged by like parts *c*⁴ of like connecting-rods *c*⁵, the parts *c*⁴ being longitudinally adjustable by bolts 8 in suitable slots, and the said connecting-rods at their opposite ends are attached adjustably by like bolts 9 to arms 10 10^x at opposite ends of but extended downwardly from a rock-shaft *C*, mounted in suitable bearings in the loom-frame and having attached to and extended upwardly arms 12 13, one arm, as 13, being preferably longer than the other arm 12, the arms 10 at one side the rock-shaft being each shorter than the corresponding arm 10^x at the other side of the center of the said rock-shaft. These upper arms 12 13 have attached to them in an adjustable manner the connecting-rods *C'* *C*², in turn jointed to the opposite ends of the depressor, guided in the slots *c*⁷. The rock-shaft *C* has an arm *C*⁶, to which is jointed the upper end of

a link or connecting rod C^7 , jointed at its lower end to a suitable crank or crank-pin C^8 of the lay or crank shaft A^2 . The pattern surface or chain is supposed to and may be of any usual construction, and in practice the shaft A^3 thereof may be actuated in any usual manner. In this present instance of our invention the bearings for the pattern-surface shaft A^3 have ears m , one of which ears is shown fully in Fig. 2, the said ears, as shown, receiving through them bolts m' , which confine to the ears m^2 the finger-bar m^3 , having attached to its upper end, as herein shown, the series of fingers m^4 , which latter are extended upward and forward between the jacks at a point quite near the pattern-surface, said comb-like guide acting to prevent any lateral movement under strain of the jacks or levers.

The peculiar location of the notches of the jacks, as described, and the positive movement given to that notch which has the greater distance to travel constitutes an important part of our invention; but it is not intended herein in all instances to limit our invention to the exact means shown for actuating the lifter and depressor or to the exact form of pattern-surface shown, as the same may be varied and other known or suitable devices may be used without departing from our invention.

The fulcrum-rod a' , which sustains the hubs of the levers A , is mounted in stands 20, attached by suitable bolts 21 to ears 22 of the framework, each ear having a slot, through which are extended the bolts 21, said slots permitting the vertical adjustment of the stands 20 by rotating in one or the other direction the foot-screws 23, the bolts 21 clamping the stands in adjusted position. These devices form a very simple means for supporting and adjusting the fulcrum for the levers.

The slots in the arms 10, 10^x, 12, and 13, in which are located the stud-bolts, which serve to pivotally attach the connecting-rods for moving the actuating-bars $c c'$ or "lifter" and "depressor," as they are sometimes called, are in arcs of circles substantially concentric to the center lines of the actuating-bar when the latter are in the position shown in the drawings, the bars being in contact with the levers to even them. By reason of these slots (marked t^{10} , t^{12} , t^{13} , &c.) the studs referred to as located in said slots may in this position of the bars $c c'$ be adjusted toward or from the rock-shaft C to accommodate for any desired opening of the shed and yet have the levers evened properly.

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

1. A harness-lever provided at one edge with a projecting arm, a jack pivotally mounted on said arm and provided at its under side nearest its pivot with a notch and at its up-side yet farther from its pivot with a second notch, combined with actuating-bars acting as a lifter and a depressor, respectively, and a pattern-surface to effect positively the rais-

ing of the jack to place its notch farthest from the pivotal point in position to be engaged by the actuating-bar acting as a depressor, substantially as described.

2. A harness-lever provided at one edge with a projecting arm, a jack pivotally mounted on said arm and provided at its under side nearest its pivot with a notch and at its upper side yet farther from its pivot with a second notch, combined with actuating-bars acting as a lifter and a depressor, and a pattern-surface, the raising of the jack to place its notch farthest from the pivotal point in position to be engaged by the actuating-bar acting as a depressor, being effected positively by the pattern-surface, and a jack safety-bar to insure the continuous engagement of the jacks with the depressor during the opening and closing of the shed, substantially as described.

3. In a loom, a harness-lever provided at one edge with a projecting side arm, a jack pivoted upon one end of said projection and extended toward and across the said lever and provided at its under side at one side of said lever with a lifting-notch and at its upper side at the opposite side of said lever with a depressing-notch, a pattern-surface, a lifter located below the said notched jack and at the side of the lever having the pivot of the jack, and a depressor located above said notched jack at that side of the said lever beyond which the free end of the said jack is extended, whereby the jack may be removed without detaching the lifter, substantially as described.

4. In a loom, a harness-lever provided at one edge with a projecting side arm, a jack pivoted upon one end of said projection and extended toward and across the said lever and provided at its under side at one side of said lever with a lifting-notch near the pivot of the jack and its upper side at the opposite side of said lever with a depressing-notch farther from the pivot of the jack, a pattern-surface, a lifter located below the said notched jack and a depressor located above said notched jack at that side of the said lever beyond which the free end of the said jack is extended, a rock-shaft having upwardly and downwardly extended arms, connections between said arms and the lifter and depressor, and guides for said lifter and depressor, substantially as described.

5. In a loom, a harness-lever provided at one edge with a projecting side arm, a jack pivoted upon one end of said projection and extended toward and across the said lever and provided at its under side at one side of said lever with a lifting-notch near the pivot of the jack and at its upper side at the opposite side of said lever with a depressing-notch farther from the pivot of the jack, a pattern-surface, a lifter located below the said notched jack and projecting side arm, and a depressor located above said notched jack at that side of the said lever beyond which the free end

of the said jack is extended, a rock-shaft having upwardly and downwardly extended arms, connections between said arms and the lifter and depressor, guides for the lifter and depressor, and devices to impart to the said rock-shaft a movement to carry the arms from a substantially vertical into a substantially horizontal position, substantially as described.

6. In a loom, a harness-lever provided at one edge with a projecting side arm, a jack pivoted upon one end of said projection and extended toward and across the said lever and provided at its under side at one side of said lever with a lifting-notch near the pivot of the jack and at its upper side at the opposite side of said lever with a depressing-notch farther from the pivot of the jack, a pattern-surface to positively raise the jack to place its depressing-notch in engagement with the depressor, a lifter located below the said notched jack and projecting side arm, and a depressor located above said notched jack at that side of the said lever beyond which the free end of the said jack is extended, a rock-shaft having upwardly and downwardly extended arms, connections between said arms and the lifter and depressor, guides for said lifter and depressor, the connections between the lifter and the arms of the rock-shaft being adjustable in the direction of their length, substantially as described.

7. In a loom, a harness-lever provided at one edge with a projecting arm, a jack piv-

oted upon one end of said arm and extended toward and across the said lever and provided at its under side at one side of said lever with a lifting-notch near the pivot of the jack and at its upper side at the opposite side of said lever with a depressing-notch farther from the pivot of the jack, a pattern-surface to positively raise the jack to place its depressing-notch in engagement with the depressor, a lifter located below the said notched jack and projecting side arm, a depressor located above said notched jack at that side of the said lever beyond which the free end of the said jack is extended, and a rock-shaft having upwardly and downwardly extended arms, the said arms at opposite sides of the longitudinal center of the rock-shaft being of different lengths, substantially as described.

8. The harness-levers having slotted hubs, the loom-frame, the stands to support the fulcrum-rod for the said levers, the fulcrum-rod, and adjusting-screws 23, combined with set-screws 21, to operate substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HORACE WYMAN.
JOHN A. CLARK.

Witnesses:

JUSTIN A. WARE,
SAMUEL B. SCHOFIELD.