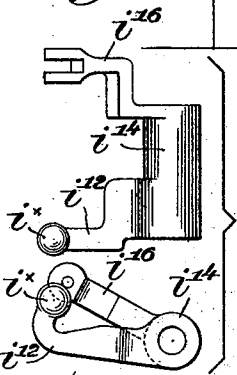


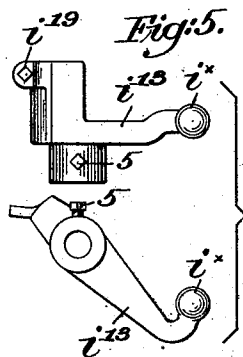
2 Sheets—Sheet 1.

NEEDLE LOOM.

Patented July 30, 1895.



Witnesses.
Fred S. Greenleaf.
Edward F. Allen.



Inventions.
Horace Wyman.
John A. Clark.
by Crosby & Gregory,
attys.

2 Sheets—Sheet 2.

No. 543,821.

Patented July 30, 1895.

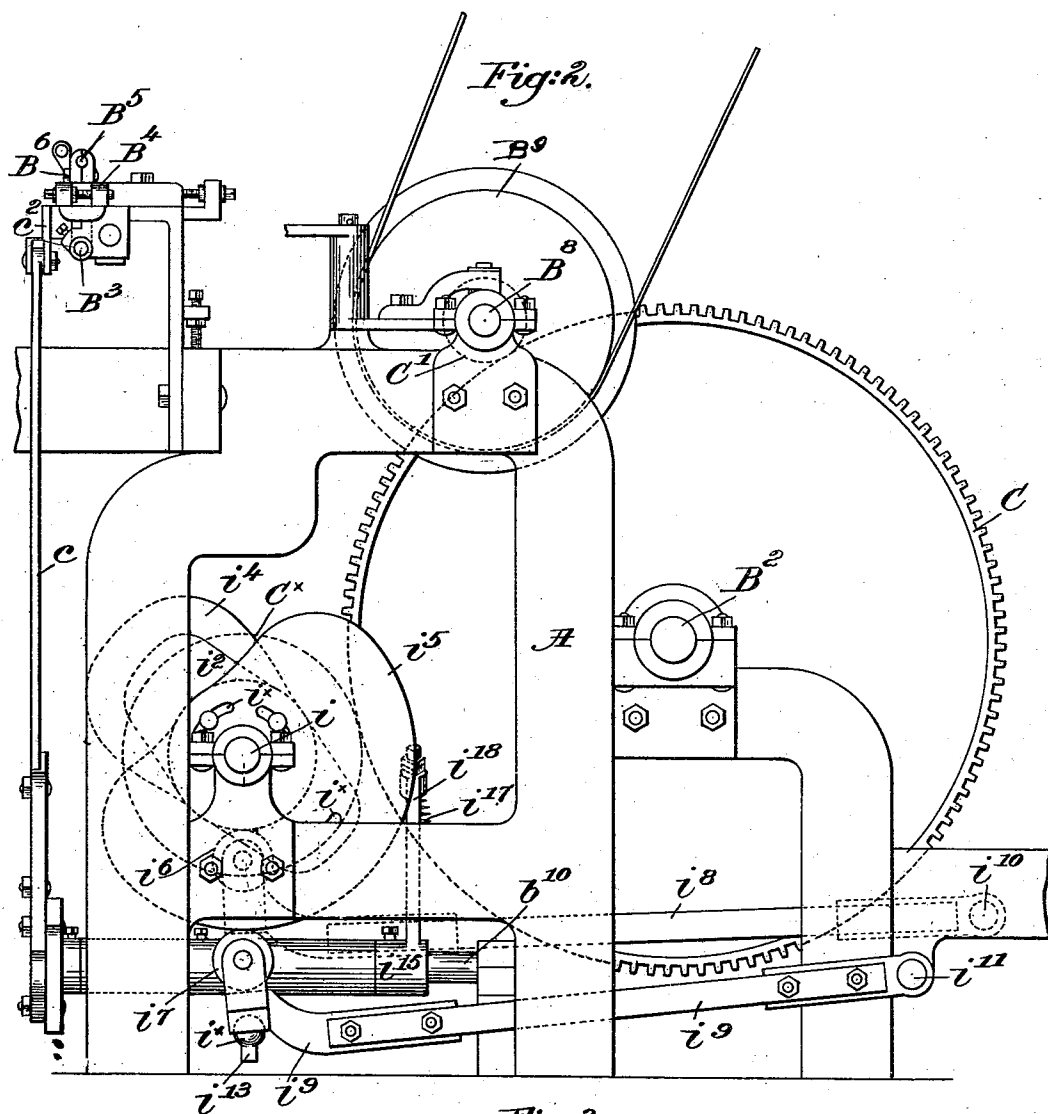
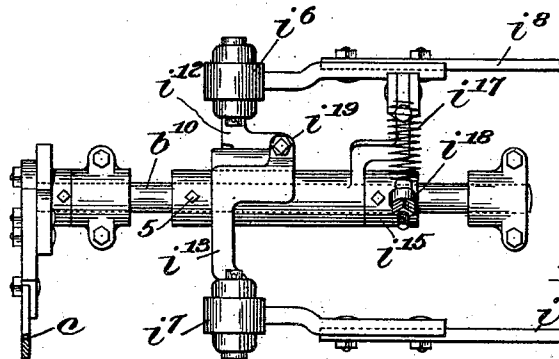


Fig:3.



Witnesses.
Thomas Drummond;
Edward F. Allen.

Inventors,
Horace Wymann
John H. Clark
by Crosby & Gregory,
attys.

UNITED STATES PATENT OFFICE.

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

NEEDLE-LOOM.

SPECIFICATION forming part of Letters Patent No. 543,821, dated July 30, 1895.

Application filed January 7, 1895. Serial No. 534,035. (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 Needle-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.

This invention in looms has reference to the mechanism for inserting the weft or filling threads, and as the invention is particularly adapted for use in connection with a loom having a weft carrier or needle—such, for instance, as is illustrated in United States Patent No. 446,177, dated February 10, 1891, and used in weaving tufted fabrics—we have chosen to illustrate and particularly describe our invention in connection with such loom, it being understood, however, that the said invention is not limited to the exact construction of mechanism shown and described.

One object of our invention is to impart to the needle or weft-inserting device a more certain and positive motion to thereby reduce the recoils or rebounds to a minimum.

Our invention further comprehends what we believe to be a novel guide for the free or pointed end of the weft-inserting needle.

In the drawings, Figure 1, in side elevation, shows a mechanism embodying our invention; Fig. 2, a right-hand end elevation of the parts shown in Fig. 1; Fig. 3, a top or plan view of the roller-arms, Figs. 1 and 2, the cams being omitted; Fig. 4, top and end views of one of the roller-arms and its attached sleeve, and Fig. 5 similar views of the other roller-arm.

Referring to the drawings, the loom-frame A, the guide or rail B³, the sliding carriage B⁴, the weft-carrying needle B⁵, attached to said carriage by the screw B⁶, and adapted to introduce and leave a loop of weft in the warps as the carriage is reciprocated, the guide B⁷ for the point end of the needle, and the power-shaft B⁸, provided with the loose pulley B⁹, adapted to be connected with said shaft by suitable friction devices, are and may be of usual construction and operation, such as illustrated in said Patent No. 446,177, to which reference may be had, like letters and figures representing like parts.

The main or power shaft B⁸, as shown, has

a pinion C' in mesh with and driving a larger toothed wheel C, fast on the cam-shaft B², journaled in suitable bearings in the frame of the loom, said wheel C also meshing with and driving a pinion C^x, fast on an actuating-shaft *i*, journaled in suitable bearings on the frame. Upon this actuating-shaft *i* is made fast a sleeve *i'*, having flanged ends *i*² *i*³, to which are bolted, respectively, the needle-actuating cams *i*⁴ *i*⁵, the fastening-bolts, as shown, passing through slots *i*^x in said flanges to admit of proper relative adjustment of the two cams.

The cams *i*⁴ *i*⁵, shaped as best shown in Fig. 2, act respectively upon the rollers *i*⁶ *i*⁷, journaled in the upturned ends of two roller-carriers shown as levers *i*⁸ *i*⁹, fulcrumed, respectively, at *i*¹⁰ *i*¹¹ on an arm of the frame.

The upturned ends of the carriers or levers referred to are formed to constitute heads, they in the present instance having in their bottoms hemispherical sockets to receive respectively the spherical or ball-like ends *i*^x of the two rocker-arms *i*¹² *i*¹³, the latter made fast by a set-screw 5 in its hub upon a short needle-shaft *b*¹⁰, journaled in suitable bearings in the frame, and the former arm projecting from a sleeve *i*¹⁴ loosely fitting said shaft. (See Fig. 3.) The sleeve *i*¹⁴ is held between the hub of the arm *i*¹³ at one end and the hub *i*¹⁵ of an arm *i*¹⁸ fast upon the shaft *b*¹⁰ at its opposite end.

An arm *i*¹⁶ on that end of the sleeve *i*¹⁴ opposite the rocker-arm *i*¹² is connected by a tension-spring *i*¹⁷ with the arm *i*¹⁸ referred to, said spring therefore constituting a connection between the sleeve and shaft and acting to draw the two toward each other or rotate them in opposite directions to cause their rocker-arms to raise the rollers *i*⁶ *i*⁷ into contact with their respective cams.

A set-screw *i*¹⁹, threaded in an ear of the rocker-arm *i*¹³, acts against the flattened or broadened base of the rocker-arm *i*¹², and serves as a stop to limit the spring-actuated movement of the rocker-arms toward each other and toward their cams.

By means of the set-screw and the spring described all lost motion between the rocker-arms and their rollers and the cams may be taken up or regulated, and a positive movement of the former from the latter obtained.

When the rocker-arm *i*¹² is depressed by

the roller i^6 , it acts through the spring i^{17} and arm i^{18} to also rock the shaft b^{10} in the same direction, and when the rocker-arm i^{18} is depressed by its roller i^7 , it operates directly upon and to rotate the shaft b^{10} in the same direction. Upon the outer end of the shaft b^{10} is fixed the weft or needle lever c , connected by a link c^2 with the needle-carriage B^4 , rocking of the said shaft b^{10} causing positive vibration of the needle-lever and reciprocation of the needle.

The rocker-arm i^{18} is always in operative contact with the cam i^5 ; therefore there can be no appreciable rebound or recoil of the needle-cam c at the end of its outward movement to the right, Fig. 1.

By varying the shapes of the cams i^4 i^5 the movements of the weft-lever and its needle may be varied, but the said cams are always so shaped as to impart a positive rocking movement to the shaft b^{10} without lost motion of any sort.

By journaling the rollers i^6 i^7 in suitable carriers i^8 i^9 , independent of the rocker-arms and shown as fulcrumed about axes parallel with the axis of the actuating-shaft, and connecting the said carriers by ball and socket or other form of universal connection with the rocker-arms for the weft-lever, we are enabled to make both the cams and their co-operating rollers with straight faces—i. e., with the elements of their faces straight and parallel with the axis of rotation—whereas if the rollers were journaled in the rocker-arms either the cam-surfaces or the roller-surfaces would have to be curved to accommodate the rocking movement of the said arms about the axis of the shaft b^{10} , standing at right angles to the axis of rotation of the cams.

Referring now to Fig. 1, the free or pointed end of the weft-inserting needle is shown as passed through a guide t , mounted upon a part of the guide or rail B^3 . The opening in this guide t , through which the needle B^5 works, must necessarily be such as to admit passage therethrough of the full cross-section of the needle; but it will be noticed that just back of the point of the needle a portion of the body of the latter is removed, as at t^x , to clear the usual shuttle at the opposite side of the loom, and if there was nothing to prevent, the needle, when in its position shown in Fig. 1, during the operation of the loom might vibrate vertically within the hole in the guide t , inasmuch as its cross-section does not in such position completely fill the hole or opening in the said guide. To obviate this liability I have enlarged the guide-opening to a size sufficient to admit the presser t' , shown as a lever pivoted at t^2 , and acted upon by a spring t^3 , which presses the acting end of the said lever against the under side of the needle and keeps the latter, whatever its cross-sectional area at the point acted upon by the lever, always pressed up against the top of the opening in the guide t —that is, against the guiding-

surface, in contact with which the top of the needle moves. Thus, in the position Fig. 1, the lever-presser t' holds the needle firmly against the top guiding-surface, and as the needle moves forward or to the left in laying the weft-thread the presser-lever yields and moves downwardly before and to permit the increase or full cross-section of the needle to pass through the guide, yet holding the needle always against the top guiding-surface. By this arrangement an accurate entrance of the needle between the warps is insured, for whatever play or looseness there may be between the needle and its guide the former is always pressed against the top guiding-surface, which when properly adjusted renders it impossible for the needle to enter in any but the correct line, this presser further acting to prevent undue vibration of the needle at any time during its movement.

This invention is not limited to the particular construction herein shown and described, for it is evident the same may be varied without departing from the spirit and scope of the invention.

We claim—

1. A weft-inserting mechanism for looms, containing the following instrumentalities, viz:—a weft lever, two relatively adjustable cams continuously controlling and co-operating to vibrate said lever, and means to operate said cams, substantially as described.
2. A weft-inserting mechanism for looms, containing the following instrumentalities, viz:—a pivoted weft lever, two actuating cams therefor, two arms continuously acted upon by the respective cams and to independently move said weft lever in opposite directions, substantially as described.
3. A weft-inserting mechanism for looms, containing the following instrumentalities, viz:—an actuating shaft; two actuating cams thereupon; a weft-lever and its pivotal shaft; actuating arms co-operating with said cams to positively rock said pivotal shaft, a spring to draw said arms toward their respective cams, and a stop to limit such spring-actuated movement, substantially as described.
4. A weft-inserting mechanism for looms, containing the following instrumentalities, viz:—an actuating shaft; two actuating cams thereupon; roller carriers co-operating with and moved by said cams; a weft-lever, its pivot shaft and rocking arms therefor, actuated by said roller carriers, to vibrate said weft-lever, substantially as described.
5. A weft-inserting mechanism for looms, containing the following instrumentalities, viz:—an actuating shaft; two actuating cams thereupon; roller carriers co-operating with and moved by said cams; a weft-lever; its pivot shaft and rocking arms therefor, universal connections between said roller carriers and rocking arms, whereby the latter are rocked by the former, substantially as described.
6. The actuating shaft; the actuating cams

thereupon; the roller carriers, and their rollers in contact respectively with said cams; the weft-lever; its pivot shaft; a rocker arm fast thereon and co-operating with one of said roller carriers; a second rocker arm loose on said shaft and co-operating with the other of said roller carriers; and a spring connecting said rocker arms, substantially as described.

7. In a weft-inserting mechanism for looms, the combination with a weft-needle, and means to actuate the same, of a guide for the said needle; and a presser acting to press the said needle normally toward one guiding face of the said guide, substantially as described.

8. In a weft-inserting mechanism for looms, the combination with a weft-needle having a

portion removed near its pointed end, and means to reciprocate the said needle, of a guide for the pointed end of the said needle, and a yielding presser acting at the cut away side of the needle to press the latter normally toward the guiding face at the opposite side of said needle, 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,
JOHN B. SYME.