G. L. REED.

HAND LOOM.

APPLICATION FILED JAN. 3, 1910.

1,004,079. **Patented Sept. 26, 1911.**

2 SHEETS—SHEET 1.

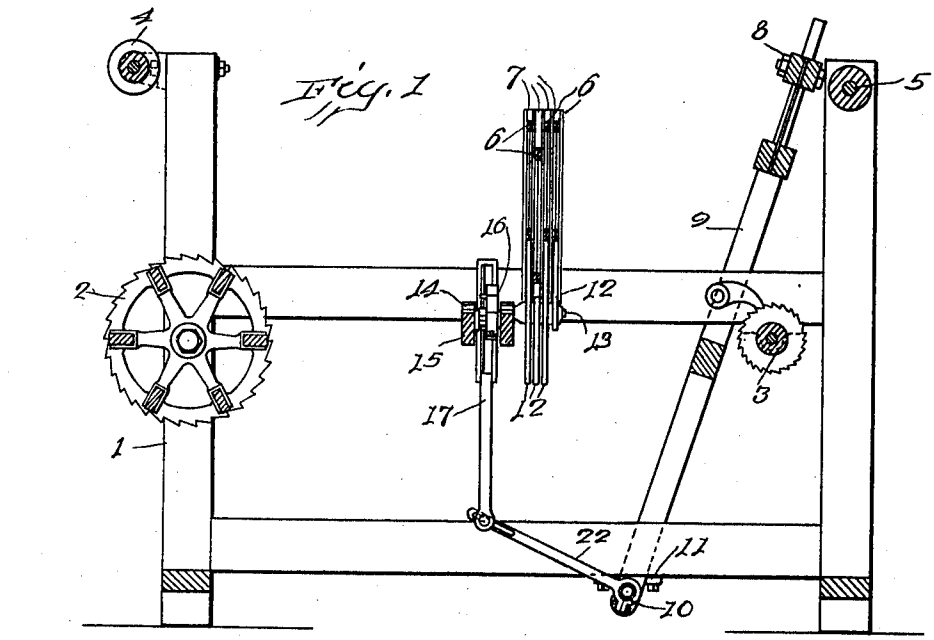

Fig. 1

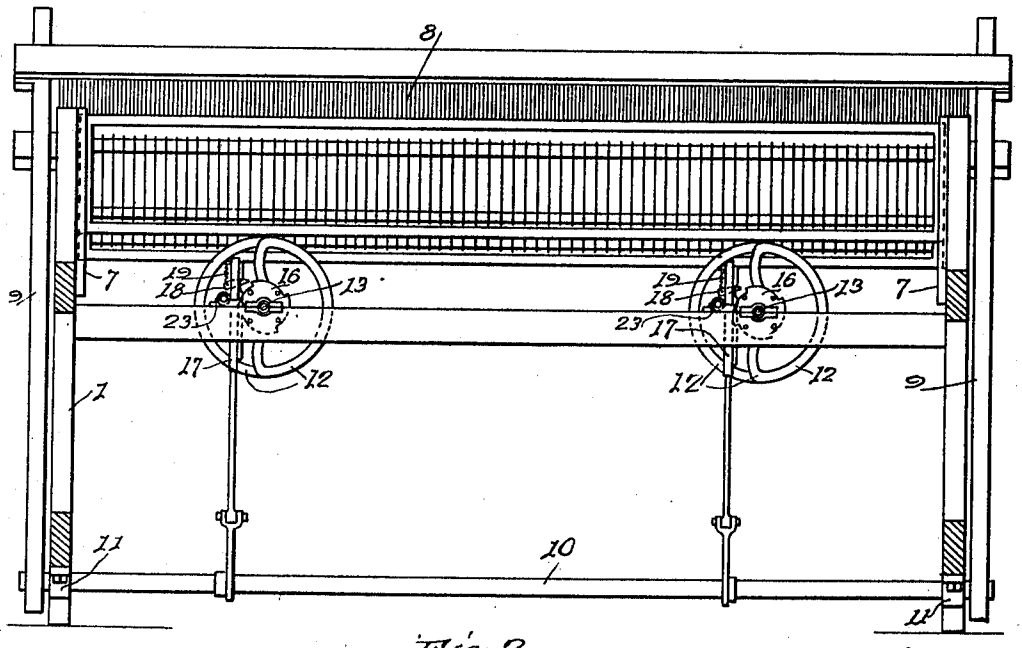

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

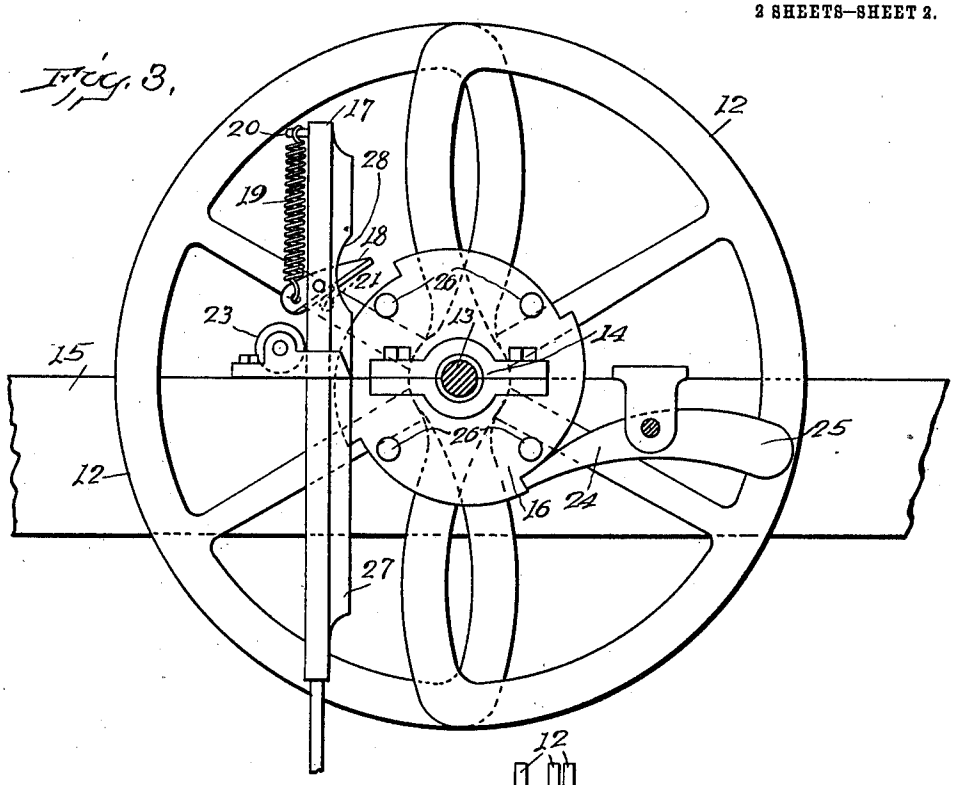
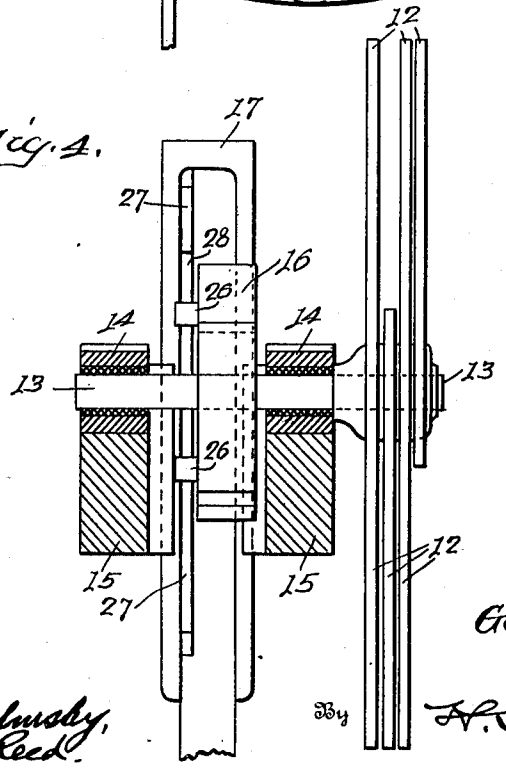


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE L. REED, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE REED MANUFACTURING COMPANY, OF SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

HAND-LOOM.

1,004,079. Specification of Letters Patent. **Patented Sept. 26, 1911.**

Application filed January 3, 1910. Serial No. 536,033.

To all whom it may concern:

Be it known that I, GEORGE L. REED, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Hand-Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to hand looms, and more particularly to what are known as harness changers for such looms.

The invention is designed especially for use in connection with four harness looms, that is, looms employing four heddle frames, but it is capable of use with looms employing a greater or lesser number of heddle frames.

The object of the invention is to provide positively actuated means for shifting the positions of the heddle frames relatively one to the other each time the lathe makes a complete movement.

To this end it is a further object of the invention to provide cams adapted to engage the respective heddle frames and be moved in unison to shift said frames, movement being imparted to the cams by the movement of the lathe.

A further object of the invention is to provide such a device which will be simple in its construction and positive in its operation and which will not be liable to become disarranged or to be broken.

In the accompanying drawings, Figure 1 is a longitudinal, sectional view of a loom embodying my invention; Fig. 2 is an end elevation of such a loom; Fig. 3 is a side elevation of the cams and their pawl and ratchet actuating mechanism; and Fig. 4 is an end elevation of the same.

In these drawings I have illustrated one embodiment of my invention and have shown the same as embodied in a loom, the main features of which are of ordinary construction. This loom comprises a main frame 1 provided along the opposite ends thereof with rollers 2 and 3 for the warp and the woven material, respectively, and also having the usual guide rollers 4 and 5 arranged along the opposite sides of the frame. The heddle frames 6, here shown as four in number, are arranged longitudinally of the frame at a point between the guide rollers 4 and 5 and are preferably loosely mounted in vertically arranged guideways 7, which guideways are supported at the opposite ends of the main frame. The usual reed 8 is carried by a lathe or frame comprising side members 9 rigidly secured at their lower ends upon a shaft 10 extending longitudinally of the main frame and rotatably mounted in bearings 11 carried by the transverse members at the opposite ends of that frame. The shaft 10 is so arranged as to allow the lathe a free oscillating movement between the heddle frames and the guide roller 5.

Suitable means are provided for adjusting each of the heddle frames 6 relatively to the other heddle frames and this adjusting means is so connected to the lathe that, for each complete oscillation of the lathe, the relative positions of the heddle frames will be changed. This adjusting means preferably consists of a series of cam plates 12 arranged immediately beneath and in operative relation to the respective heddle frames 6. The cams 12 are preferably mounted on a shaft 13 extending transversely to the heddle frames and journaled in bearings 14 carried by members 15 extending transversely of the main frame and constituting a supporting frame for the shifting or adjusting mechanism. The two members 15 of this supporting frame are spaced some distance apart and the actuating mechanism for the shaft 13 and the cams 12 is preferably located between the two members. In the present instance I have shown this actuating mechanism as comprising a ratchet 16 rigidly secured to the shaft and provided with four teeth, it being desirable, in the present form of the device, to rotate the shaft through a quarter of a revolution at each operation of the lathe. Slidably mounted between the members 15 at one edge of the ratchet 16 is a vertically reciprocating bar 17 carrying a pawl 18 adapted to engage the teeth of the ratchet 16. As here shown, this reciprocating bar 17 is substantially U-shaped and the pawl 18 is pivotally mounted between the two arms of the same. The pawl 18 is pivotally mounted on the reciprocating bar 17 at a point between its ends and that end opposite the end which engages the teeth of the ratchet is secured to one end of a spring 19, the opposite end of which is secured to a projection 20 carried by the bar 17 at a point above the

ratchet, thus tending to hold the pawl 18 in engagement with the ratchet. A stop 21 carried by the bar 17 serves to limit the downward movement of the nose of the pawl 18 and maintain the same at all times in a position to engage the teeth of the ratchet. The bar 17 extends downwardly to a point a considerable distance below the supporting frame and is pivotally connected to a rock arm 22, which arm is rigidly secured to the shaft 10 carrying the frame 9 of the lathe.

The connection between the rock arm 22 and the vertically reciprocating bar 17 is a loose one and permits the end of the bar 22 to move through the arc of a circle without affecting the vertical position of the bar 17. A guide roller 23 mounted on the members 15 in the rear of the bar 17 tends to hold the same normally in its operative relation to the ratchet 16. A pawl 24 arranged on the side of the ratchet 16 opposite the bar 17 engages the teeth of the ratchet and prevents the reverse movement thereof while the bar 17 and pawl 18 are out of engagement with the ratchet. The pawl 24 is preferably weighted, as shown at 25, to maintain the same normally in engagement with the teeth of the ratchet. Suitable means are also provided to prevent the overthrow of the ratchet, and, consequently, of the cams 12. For this purpose a series of laterally projecting pins 26 are arranged on one side of the ratchet 16 and in such positions as to engage a flange 27 extending from one side of the reciprocating bar 17. This flange preferably extends beyond the edge of the ratchet and the relation of the pins 26 to the flange 27 is such that the pin will engage the flange after the ratchet has completed a quarter of a revolution and will form a positive stop to prevent the overthrow of the ratchet. The flange 27 is cut away at a point adjacent to the pawl 18 to form a recess 28 which permits the passage of the pin when the pawl 18 is in engagement with the tooth adjacent to the pin. It will be noted that the flange 27 extends above the pawl 18 and is maintained in the path of the adjacent pin 26 while the pawl is in a position below the ratchet. In this manner sufficient loose movement is allowed between the parts to permit them to assume their proper positions, but this movement is not sufficient to materially affect the positions of the cams, and the ratchet is, in effect, locked against forward movement at all times except when the pawl 18 is in operative relation thereto, and is locked against rearward movement at all times by the pawl 24.

The operation of the device will be readily understood from the foregoing description and it will be apparent that at each complete oscillation of the frame comprising the lathe the ratchet 16 and the shaft 13 carrying the cams 12 will be moved through a quarter of a revolution and the heddle frames shifted relatively one to the other, the amount and character of the changes in the position of the heddle frames depending upon the shape of the cams 12 and their arrangement on the shaft 13, both the shape and arrangement of the cams being capable of wide variation. Further, it will be apparent that the operation of the shifting mechanism is positive and that the cams are locked against movement except when the pawl is moved into operative relation therewith; and that the pawl is so supported that it cannot resume an operative position relatively to the teeth of the ratchet. Further, it will be apparent that the lathe and the reed may be moved through a considerable portion of their movement without moving the pawl into such a position as to permit it to engage the next tooth of the ratchet. Consequently, the reed may be operated to beat the woven material without affecting the position of the heddle frames.

I wish it to be understood that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a loom, the combination, with a main frame, a plurality of heddle frames movably supported thereon, and a lathe frame pivotally mounted on said main frame, of a shaft, a plurality of cams mounted on said shaft and arranged to engage the respective heddle frames, a ratchet secured to said shaft and having its teeth equal in number to said cams, a vertically movable member arranged near said ratchet, a pawl carried by said vertically movable member and adapted to engage the teeth of said ratchet, means for operatively connecting said movable member to said lathe frame, means to check the movement of said ratchet with the tooth next to be engaged near the lower limit of movement of said pawl, whereby said pawl will not engage said ratchet until the lathe frame has substantially completed its forward movement, and means to prevent the overthrow of said cams.

2. In a loom, the combination, with a main frame, a plurality of heddle frames movably supported thereon, and a lathe frame pivotally mounted on said main frame, of a shaft, a plurality of cams mounted on said shaft and arranged to engage the respective heddle frames, a ratchet secured to said shaft, a vertically reciprocating bar, a pawl carried by said bar and adapted to engage the teeth of said ratchet,

a forwardly extending part carried by said reciprocating bar, a stop carried by said ratchet and adapted to engage said forwardly extending part, and means for operatively connecting said reciprocating bar to the pivoted lathe frame.

3. In a loom, the combination, with a main frame, a plurality of heddle frames movably mounted thereon, and a lathe frame pivotally mounted on said main frame, of a shaft, a plurality of cams mounted on said shaft and arranged to engage the respective heddle frames, a ratchet secured to said shaft, a vertically reciprocating member, a pawl pivotally mounted on said vertically reciprocating member, a spring for moving said pawl about its pivotal center, a stop for limiting the movement of said pawl under the tension of said spring, and means for operatively connecting said vertically reciprocating member to said pivoted lathe frame.

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

GEORGE L. REED.

Witnesses:
HUGH HAGAN,
EDWARD L. REED.