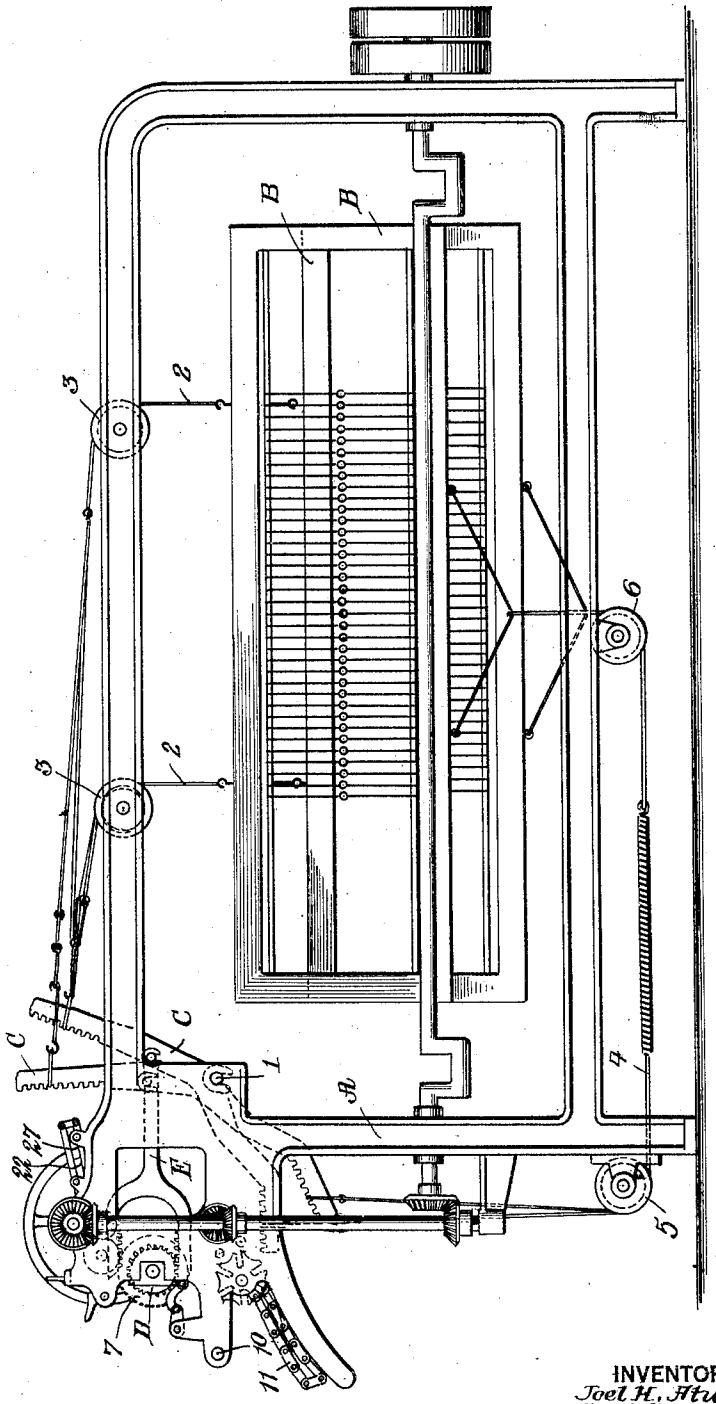
Sept. 20, 1932. J. H. ATWOOD ET AL 1,877,759

HEAD MOTION FOR LOOMS

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Fig. 1.



WITNESSES

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Fig. 2.

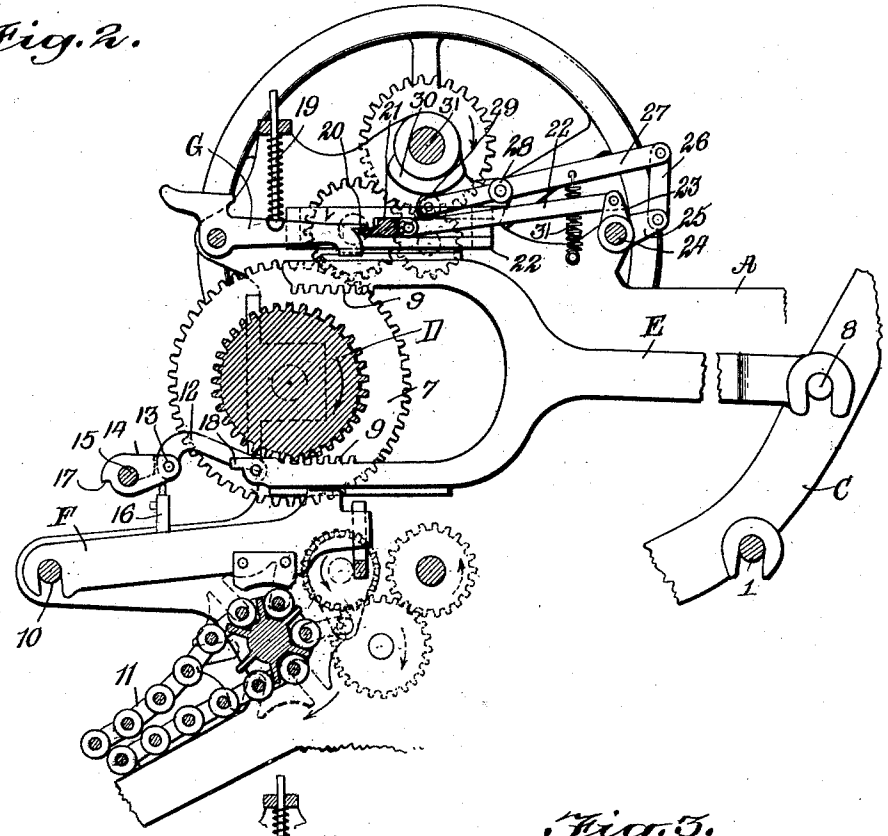
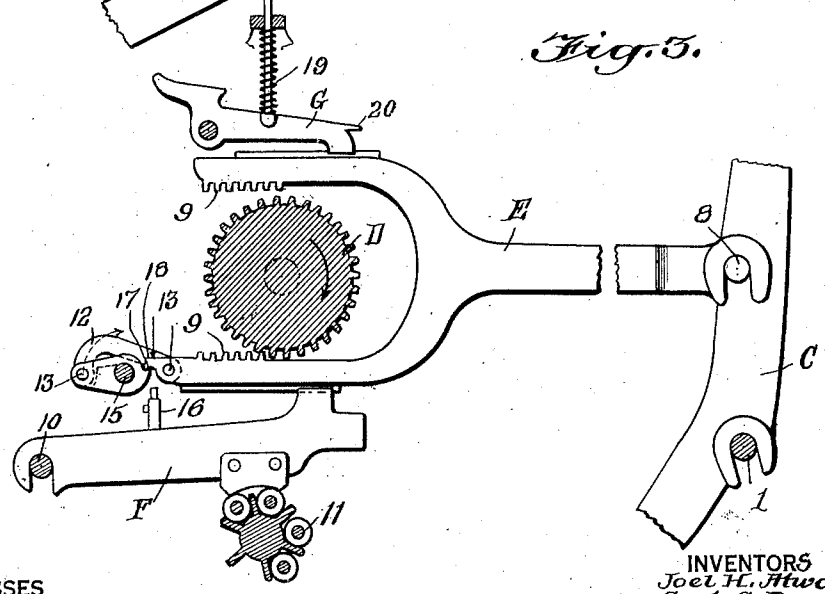


Fig. 5.



WITNESSES

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Fig. 4.

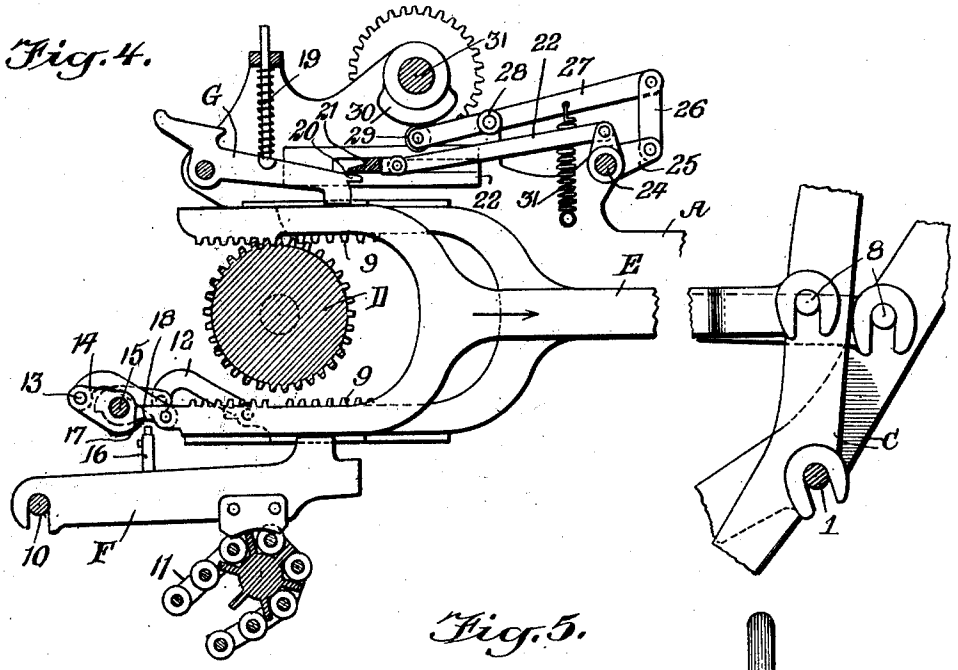
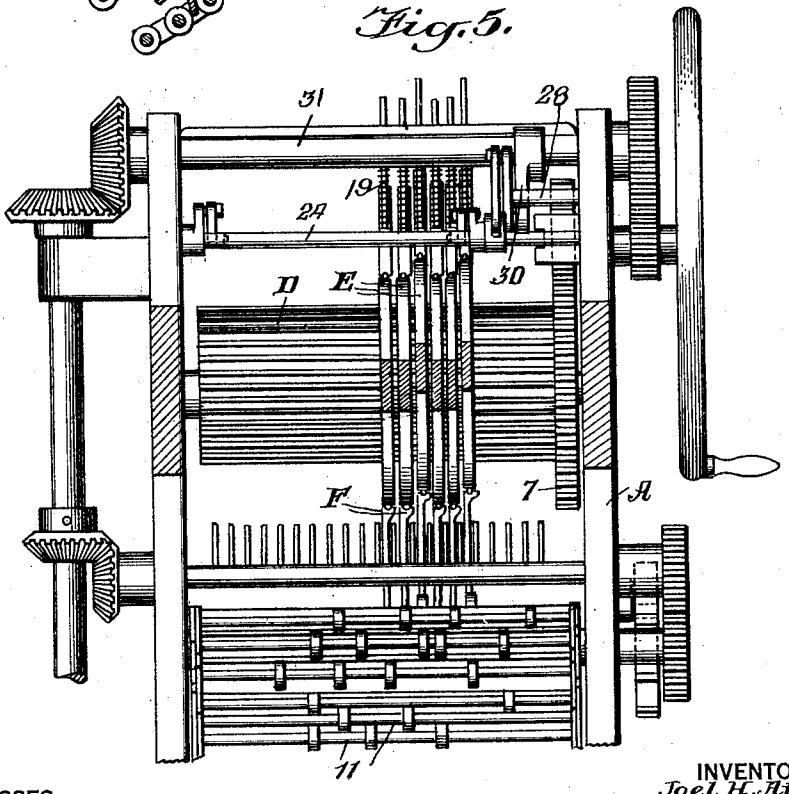


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE

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HEAD MOTION FOR LOOMS

Application filed February 8, 1929. Serial No. 338,544.

This invention relates to head motions for looms, an object of the invention being to provide a single toothed cylinder for positively moving the harnesses both in their up and down movements and positively locking the harnesses in these positions for the desired length of time.

Our invention has many advantages over head motions such as heretofore employed, some of which may be enumerated as follows:

We eliminate the necessity for a vibrator gear, vibrator lever and vibrator connector, such as commonly employed.

We employ a single direct cylinder connector which reduces and practically eliminates the extensive maintenance costs now existent on many types of harness motion.

The direct cylinder connector design makes it possible to run the head motion twice as fast as other motions due to the fact that the number of operating parts is greatly reduced.

With our improved mechanism there is no snap or vibration on the warp threads.

The speed of the cylinder is timed one revolution to four revolutions of the crank shaft.

With these and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts, which will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings—

Figure 1 is a view in elevation showing a loom frame with harnesses therein controlled by our improved mechanism;

Figure 2 is an enlarged sectional view illustrating the cylinder and its co-operating parts;

Figure 3 is a view similar to Figure 2 with parts removed showing another position of the mechanism;

Figure 4 is a view similar to Figure 2 with parts eliminated showing another position of the parts;

Figure 5 is a sectional plan view of the mechanism shown in Figures 2, 3 and 4.

A represents the loom frame and B the harnesses. C represents the harness jacks fulcrumed between their ends on a rod 1. The upper ends of the jacks C are operatively connected to the upper portions of the harnesses B through the medium of flexible connecting devices 2 passed over idle pulleys 3 on the frame A, and the lower ends of the harness jacks are operatively connected to the lower portions of the harnesses through the medium of flexible connecting devices 4 passed over idle pulleys 5 and 6 mounted on the frame A.

Our invention has to do with the means for controlling the pivotal movement of the jacks to positively lift and lower the harnesses, and for this purpose we employ a single cylinder having an annular series of teeth thereon and constituting an elongated gear.

Motion is transmitted to the cylinder D through the medium of a gear wheel 7 secured to one end thereof and operated by any desired power transmitting mechanism. This cylinder D controls the longitudinal movement of a series of connectors E. These connectors E are pivotally connected to the upper portions of the harness jacks C, as indicated at 8, and at their other ends are forked or bifurcated, each furcation having a rack 9 thereon.

The upper furcation of the connector E has its rack 9 on its lower face, and the lower furcation of the connector E has its rack 9 on its upper face, and these racks are spaced apart a distance greater than the diameter of the cylinder D so that only one rack may be in engagement with the cylinder at the same time.

Below each connector E is a lifter F pivotally supported at one end on a rod 10, and these lifters are moved vertically by a pattern chain 11. Each connector E at the end of its lower furcation is pivotally connected by a curved link 12, and each curved link 12 is connected by a pivot pin 13 with a link 14 having turning motion on a rod 15 intermediate the ends of the link 14. This arrangement of links 12 and 14 with their pivots constitute a lock to hold the harnesses in their elevated or lowered positions for a desired length of time.

Each lifter F has a cushioned finger 16

thereon to engage one end of the link 14 to lift the pivot pin 13ª above the plane of the other pivots of the links to break the lock and allow the connector to move longitudinally.

The link 14 at its free end has a shoulder 17 adapted to engage under a tongue 18 on the connector E so as to limit the pivotal movement of the link in one direction. The operation of this locking mechanism will be more fully hereinafter pointed out.

Above the series of connectors E pivoted tension levers G are located and have springs 19 exerting pressure thereon to force the levers G downwardly against the connectors E when permitted.

The levers G have fingers 20 at one end under which a sliding block 21 mounted in a guide 22 is adapted to move to hold the levers elevated. This block 21 extends entirely across the machine, operating all of the levers G at one time. This sliding block 21 is operated by a link 22ª connected to a crank arm 23 on a shaft 24. A second crank arm 25 on the shaft 24 is connected by a link 26 to a lever 27 pivotally supported between its ends, as shown at 28, and carrying a roller 29 at one end held in engagement with a cam 30 on a cam shaft 31 which is turned continuously and in synchronism with the movement of cylinder D through mechanical means. A spring 31ª connects the lever 27 with the loom frame A so as to hold the roller 29 in the path of the cam 30.

It is of course to be understood that all of the moving parts of the mechanism are properly timed and controlled through the medium of the pattern chain 11 and with this understanding the operation is as follows:

The cylinder D always turns in one direction, as indicated by the arrows of the drawings. Figure 2 illustrates the initial lifting movement of the harness. It will be noted that in this figure of the drawings the pattern chain 11 and the finger 16 thereon have moved the pivots 13ª, 13 of the links 12 and 14 to a point above the horizontal plane of the other pivots of these links so that the lock is broken and the connector E is free to move to the left of Figure 2. Furthermore, the lifter F has moved the connector E upwardly so that the lower rack 9 is engaged by the teeth of the cylinder. As the cylinder revolves in the direction of the arrow it will move the connector E to the left and cause the jack C to swing on its pivot 1, and as this motion continues the harness B will be moved upwardly. As the connector E reaches the extreme of its movement in this direction the links 12 and 14 will swing on their pivots to the position shown in Figure 3, bringing the several pivots of said links into substantial alinement and forming a positive lock to prevent movement longitudinally of the connector E in either direction. The harness is thus maintained in elevated position as long as desired.

When the pattern chain 11 permits and the power mechanism has been operated to move the cam 30 to a position to release the block 21 from the tension lever G, the spring 19 of this tension lever will force the lever downwardly, pressing the connector E downwardly and bringing the upper rack 9 into mesh with the teeth of the cylinder D. As the connector is forced downwardly, the finger 16 on the selector F engages the link 12 and moves the same to a position to move the pivots of the locking mechanism out of alinement to allow the connector E to again move. The rotation of the cylinder D will then cause the connector E to move to the right of Figure 2, swinging the jack C in a direction to positively draw the harness B downwardly, and as the harness reaches its downward position the locking mechanism pressing the links 12 and 14 will move to the position shown in Figure 4 with the pivots in such alignment as to hold the parts against movement. When the connector E is again lifted the tension levers G will be elevated and the block 21 moved to a position to hold them elevated, as indicated in Figure 2, so that there will be no downward pressure on the connectors E.

It will thus be noted that in our improved mechanism a single cylinder turning always in the same direction imparts positive movement to the harnesses of the loom to move them in both directions, and locking means is provided for holding them for a predetermined length of time in either position.

Various changes and alterations might be made in the general form of the parts described without departing from our invention and hence we do not limit ourselves to the precise details set forth but consider ourselves at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

We claim:

1. A head motion for looms including bifurcated connectors having racks on both their furcations, a single toothed cylinder, selector mechanism for moving the connectors to position either of the racks in mesh with the cylinder, a stationary rod, a pair of links pivotally connected, one of said links pivotally connected to the connector and the other to the rod, the pivotal connection between the links movable out of alinement with the other pivots of the links to lock the connectors in both of their extreme positions, and means for moving the pivotal connection of the links to permit the movement of the connector.

2. A head motion for looms, including connectors operatively connected to the harness of the loom, a single toothed cylinder for

moving the connectors in both directions, racks on the upper and lower portions of the connectors, a pattern chain for elevating the connectors to cause the lower racks to engage the cylinder, spring-pressed levers exerting pressure on the connectors to force the upper racks of the connectors into mesh with the cylinder, and a cam operated holding device for engaging the levers to hold them elevated when the lower rack is in engagement with the cylinder.

3. In a head motion for looms having a revoluble gear, and a harness jack-connector having a rack engageable with the gear to move the connector in one direction; locking means joined with the connector depending on the complete movement of the connector in said one direction for the assumption of the locking position.

4. In a head motion for looms having a gear and a harness jack-connector having a rack engageable with the gear to move the connector in one direction; articulated locking means including pivoted members joined with the connector, and means to act on the connector to disengage the rack from the gear at the end of its movement and swing said members into a position of registration of the pivots to lock the connector in the shifted position.

5. In a head motion for looms having a harness jack-connector with racks in confronting positions, a gear revoluble between the racks, and means to shift the connector in one direction thus to engage one of the racks with the gear for a forward motion of the connector; locking means joined with the connector dependent on the movement of the connector to the limit in said direction to assume the locking position, and means to shift the connector in the opposite direction to engage the other rack with the gear and thereby break the lock preparatory to the return movement of the connector.

6. In a head motion for looms having a harness jack-connector capable of end movement and having a rack, and a continuously revoluble gear respecting which the rack is initially spaced; a rod, and a pair of links pivoted to each other, one being pivoted to the rack the other turnably mounted on the rod assuming a position of alinement of the rod and pivots in the initial position of the rack to lock the connector against said end movement.

7. In a head motion for looms having a harness jack-connector capable of end movement and having a rack, and a continuously revoluble gear respecting which the rack is initially spaced; a rod, a pair of links pivoted to each other, one being pivoted to the rack the other turnably mounted on the rod assuming a position of alinement of the rod and pivots in the initial position of the rack to lock the connector against said end movement, means for moving the rack from said initial position into engagement with the gear, and means for simultaneously kicking the pivot of the links out of alinement.

8. In a head motion for looms, a harness jack-connector having a rack, a tongue on the rack, a rod, a link turnable on the rod and having a shoulder, means joining said turnable link with the rack, and a revoluble gear with which the rack is engageable to move the connector in one direction thereby turning said link until the shoulder and tongue engage.

9. In a head motion for looms, a revoluble gear, a harness jack-connector having a rack, a spring-pressed lever to continuously exercise pressure on the connector to engage the rack with the gear, and a rectilinearly movable lock to alternately engage the lever on opposite sides.

10. In a head motion for looms, a revoluble gear, a harness jack-connector having a rack engageable and disengageable with the gear, a spring-pressed lever exercising pressure on the connector to cause said engagement of the rack and yield to the disengagement of the rack, thus assuming either of two positions in respect to the gear, and a reciprocable lock to hold the lever in its respective positions.

11. In a head motion for looms, a revoluble gear, a harness jack-connector having a rack engageable and disengageable with the gear, a spring-pressed lever continuously bearing on part of the connector, causing said engagement and yielding to the subsequent disengagement of the rack thereby shifting between two positions, a finger on the lever, and a lock reciprocable in respect to the lever thus alternately engaging opposite sides of the finger to temporarily hold the lever in its shifted positions.

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