Aug. 10, 1926. 1,595,271

W. M. WATTIE

HARNESS MOTION FOR LOOMS

Filed March 27, 1926 2 Sheets-Sheet 1

Fig. 1.

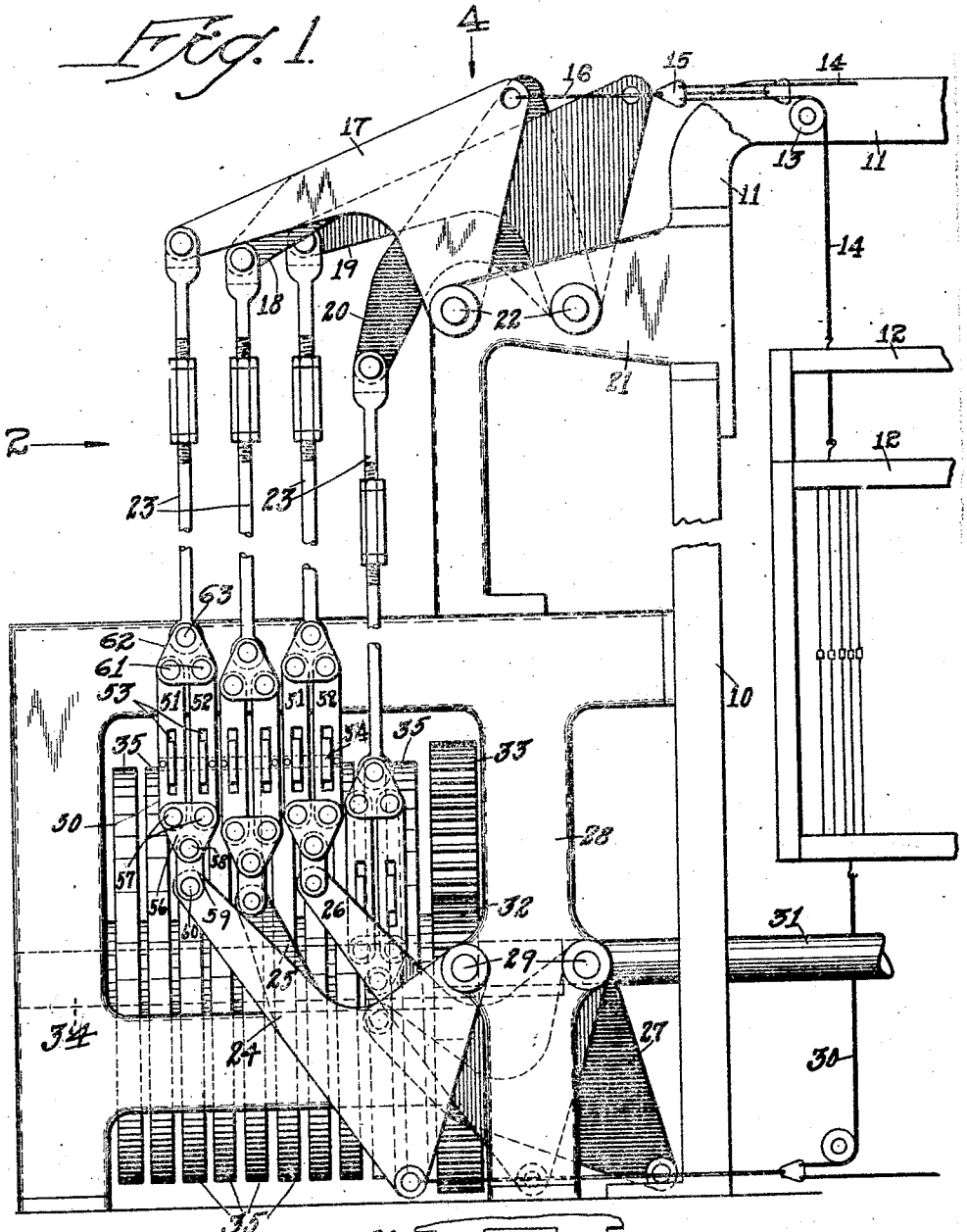
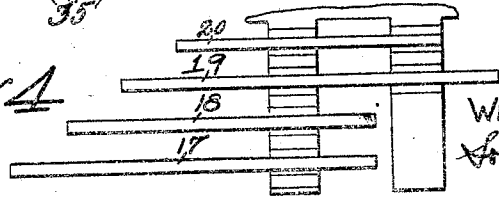


Fig. 4.



INVENTOR
WILLIAM M. WATTIE
Coulter Gale Taylor & Hawley
ATTORNEYS

Aug. 10, 1926. 1,595,271

W. M. WATTIE

HARNESS MOTION FOR LOOMS

Filed March 27, 1926 2 Sheets-Sheet 2

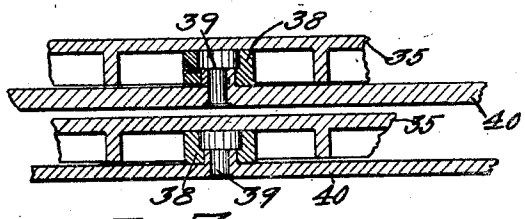


Fig. 3.

Fig. 2.

INVENTOR
WILLIAM M. WATTIE

Routhgate Fay & Hawley
ATTORNEYS

Patented Aug. 10, 1926. 1,595,271

UNITED STATES PATENT OFFICE.

WILLIAM M. WATTIE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

HARNESS MOTION FOR LOOMS.

Application filed March 27, 1926. Serial No. 98,017.

This invention relates to harness mechanism for relatively heavy looms and it is the general object of the invention to provide an improved connection between the harness frames and their actuating cams to the end that if desired cams may be used in pairs to actuate a single harness frame.

In the weaving of certain fabrics, such as heavy felt, the harness frames are subjected to considerable strain in the shedding of the warps, this strain varying with the number of warp threads to be raised by each harness and this in turn is dependent upon the number of harnesses required for the repeat of the pattern. Mills where felt is woven might be equipped with both heavy and light looms and it is desirable that the cams and cam levers which are used on these looms shall be interchangeable but a cam and its corresponding lever which would be proper for a light felt loom would not be heavy enough to lift the harnesses of a heavy felt loom and it is an important object of my invention to use these relatively lighter harness cams in pairs when applied to a heavy loom so that a mill devoted to the weaving of felt or similar fabric can take care of its needs for harness cams and cam levers by keeping on hand spare cams of but one design instead of being required to carry in stock two different designs as would be the case if a single heavy cam were used for the looms weaving the thicker felt.

It is also found that due to the heavy strains incident to lifting a large number of warp threads the harness cams are subject to considerable wear and when the cams are used in pairs a worn cam can be used with a new cam beyond the point where the worn cam could be used if employed alone by reason of the fact that the equalizer which is an important part of my invention averages the throws of the two cams of any one pair.

It is a more particular object of my invention to actuate a single harness frame by a pair of cams and cam levers which are connected to the harness frame through an equalizer the effect of which is to cause each cam and its corresponding lever to lift as much as the other cam and its lever despite any slight irregularities which may be present in the contour of the cams or in the rolls carried by the cam levers which engage the cam surfaces.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings wherein I have shown a convenient embodiment of my invention:—

Fig. 1 is a front elevation of the left hand end of a loom having my improved harness motion applied thereto,

Fig. 2 is an end elevation taken in the direction of arrow 2, Fig. 1,

Fig. 3 is a horizontal fragmentary section on an enlarged scale taken on line 3—3 of Fig. 2 and showing a pair of cams and cam levers, and

Fig. 4 is a top plan view taken in the direction of arrow 4, Fig. 1 showing the harness levers located at the upper part of the loom.

Referring to the drawings it will be seen that I have provided a loom frame 10 having arches 11 and harness frames 12. Rolls, one of which is indicated at 13, are provided on the arches and guide the lifting cords 14 secured to the upper part of the harness frames 12. After being led around rolls 13 the cords 14 are connected by means of a triangular plate 15 to a connector 16 which in turn is attached to one of a series of harness raising levers 17, 18, 19, and 20 pivoted to an extension 21 of the loom frame as at 22. Each of said harness levers has connected to the outer end thereof a depending adjustable link 23 and there will ordinarily be one harness lever for each frame 12.

Other levers 24, 25, 26, and 27, for depressing the harness are pivoted to a cam frame 28 as at 29 and are connected to the bottoms of the harness frames 12 by connectors 30 in a manner similar to the upper connections for said harness frames.

A constantly rotating bottom shaft 31 is provided having a pinion 32 secured thereto and drives a cam actuating gear 33 which is secured to a cam shaft 34. Keyed to said cam shaft is a nest of cams 35, each of said cams being formed substantially as shown in Fig. 2 and having high and low dwells 36 and 37, respectively, which receive a roll

38 pivotally mounted on a stud 39 secured to cam lever 40, as indicated in Fig. 3. Each cam is provided with a corresponding lever 40 and roll 38 and said cams may be keyed to the shaft 34 in either of two positions, certain of the cams being arranged to depress their levers 40 while others are arranged to raise their levers 40. Said levers are pivoted on a pin 41 mounted on the rear side of cam frame 28.

It is to be understood that as the shaft 31 continues to rotate during the normal operation of the loom cam shaft 34 will be rotated and the levers 40 will be raised or lowered to lower and raise their corresponding harness frames. The matter thus far described is of common construction and forms no part of my present invention.

In carrying out my invention I attain the objects heretofore set forth by grouping the cams 35 and levers 40 in pairs to actuate a single harness lever through an equalizer indicated generally at 50. Each equalizer comprises a pair of vertical bars 51 and 52 each slotted as at 53 to receive the forward end of one of the cam levers 40. Each lever 40 is connected to its associated bar by a bearing pin 54 which extends through the corresponding bar and is held thereto by set screws 55. The bottom of each bar lies between a pair of triangular plates 56 and is pivotally connected thereto as at 57, while the lower end of each plate 56 is connected as at 58 to a link 59 connected at the lower end thereof as at 60 to one of the lower harness levers.

The upper end of each of the bars 51 and 52 lies between and is pivotally connected as at 61 to a pair of triangular plates 62 similar to plates 56, while the upper end of each plate 62 is pivotally connected as at 63 to the lower end of one of the links 23. It is to be understood that there is one equalizing unit 50 for each harness frame and its raising and depressing harness levers.

The pivots 57, 58, 61, and 63 permit relative vertical movement of the bars 51 and 52 of each equalizer so that should one lever 40 of a pair be raised in advance of the other member of the pair a corresponding motion of the plates 56 and 62 will result to prevent the lever from operating on the corresponding harness frame until the other lever of the pair is actuated by its cam. In this way slight irregularities in the shape of the cam levers 40 and the contours of the cams 35 are compensated for and each cam of each pair is made to share the load of lifting the corresponding harness frames with the other cam of the pair.

From the foregoing it will be seen that I have provided a very simple equalizer which can be employed to connect a single harness frame with a pair of cams and cam levers in such a way as to require each cam and its lever to assist in the lifting of the corresponding harness frame despite any slight irregularities in the cams or connections therebetween and in the associated harness frame. It will also be noted that this result is accomplished by using the same cams and levers which are used on lighter looms.

Having thus described my invention it will be apparent that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention, and I do not wish to be limited to the details herein disclosed, but what I claim is:—

1. In a harness mechanism for looms, a harness lever, a pair of substantially similar cams, a cam lever for each cam, and an equalizer connecting the harness lever to the cam levers to cause each cam lever to assist the other in moving the harness lever.

2. In a harness motion for looms, a harness lever, a pair of substantially similar cams moving together, a cam lever for each cam, and an equalizer pivotally connected to each of the cam levers and to the harness lever to cause each cam lever to assist the other in actuating the harness lever.

3. In a harness motion for looms, a harness lever, a pair of substantially similar cams rotating together, a separate cam lever for each cam, a bar connected to each cam lever, and an equalizing element connected to the bar and the harness lever to cause each of said cam levers to assist the other in actuating the harness lever.

4. In a harness motion for looms, a harness lever, a pair of substantially similar cams moving together, a cam lever for each cam, a bar connected to each lever, a plate pivotally connected to each bar and having connection with the harness lever, said plate causing each cam lever to assist the other in actuating the harness lever.

5. In a harness motion for looms, a harness lever, a pair of substantially similar cams, a cam lever for each cam, said cam levers receiving substantially similar but slightly different motions from their respective cams, and an equalizer interposed between and operatively connected to the harness lever and each of the cam levers to cause each cam lever to assist the other in actuating the harness lever irrespective of the slight variations in the motion of one cam lever with respect to the motion of the other.

6. In a harness motion for looms, a harness lever, a pair of substantially similar cams moving together, a cam lever for each cam, and an equalizer interposed between the harness lever and the cam lever, each of said cam levers being capable of moving the equalizer independently of the other cam

lever and each assisting the other through the equalizer to actuate the harness lever.

7. In a harness motion for looms, an upper harness lever, a lower harness lever, a pair of substantially similar cams moving together, a cam lever for each cam, a bar for each cam lever, and an equalizing element located between the upper ends of the bars and the upper lever, and another equalizing element located between the lower ends of the bars and the lower harness lever, said equalizers causing each cam lever to assist the other in operating both of said harness levers.

8. In a harness motion for looms, a lifting harness lever, a depressing harness lever, a pair of substantially similar cams moving together, a cam lever for each cam, and an equalizer mechanism operatively connected to and located between the cam levers and the harness levers, said equalizer mechanism causing each cam lever to assist the other in actuating both the lifting and depressing harness levers.

In testimony whereof I have hereunto affixed my signature.

WILLIAM M. WATTIE.