

UNITED STATES PATENT OFFICE.

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BEATING-UP MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 754,192, dated March 8, 1904.

Application filed June 4, 1902. Serial No. 110,235. (No model.)

To all whom it may concern:

Be it known that I, HIRAM A. BOND, a citizen of the United States of America, and a resident of West Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Beating-Up Motions for Looms, of which the following is a full, clear, and exact description.

This invention particularly relates to improvements in looms for the weaving of wire-cloth, such as used in paper-machines and for other purposes having the general characteristics and manner of operation described and explained in Letters Patent of the United States, issued to me October 15, 1901, No. 684,536; and the present improvements particularly pertain to improvements in the means for acquiring the peculiar beating-up movement of the lay—that is to say, the improved means for insuring that the lay in its beating-up movements will be swung through the operation of positive mechanical driving connections forwardly toward the battening-line, whereupon the positive impelling means will become non-effective on the lay, the latter being permitted to have and having its final movement to the battening-line with more or less momentum as required or desired for obtaining a lay beat or stroke of similar character and for similar effect to that imparted to the lays of wire-weaving looms which are hand-operated.

In practice in the carrying out of this invention by the utilization of the present improvements the best results are acquired by the provision of the means for having the lay move to the battening-point with a momentum blow on the weft, for having the lay slightly recede and again quickly move to the battening-point for striking a supplemental, "natural," or momentum blow a second time against the weft-wire.

A further object of the invention is to combine with the swinging lay, which has the means for imparting the final portion of its beating-up movement or movements with the

natural or momentum stroke, adjustable momentum-regulating devices whereby the degree of the momentum may be increased or lessened to insure the most satisfactory action of the lay.

To these ends the invention consists in the combination and arrangement of parts and the construction of certain of the parts, all substantially as hereinafter fully described in connection with the accompanying drawings and set forth in the claims.

In the drawings, Figure 1 is a side elevation of so much of a loom as is required to illustrate the present improvements. Fig. 2 is a view of the cam as seen at the inner side, which is the opposite side from that shown in Fig. 1, and showing the arrangement relatively thereto of the parts which constitute the engagement between the groove of the cam and the lay-moving connections. Fig. 3 is a perspective representation of the cam-groove-engaging device.

Similar characters of reference indicate corresponding parts in all of the views.

The lay M in the form of a rectangular frame is pivoted at the upper part thereof at *a* to have a forwardly and backwardly swinging movement, such lay being by duplicated connecting-bars *b*, which have connection therewith at *d* and at *d'* with another frame or part comprising duplicated levers M.

f indicates the reed of the lay, and C and D indicate the harness-frames.

F represents the driving-shaft of the loom, having pulley G thereon and having the duplicated cam-grooved disks J, the cam-groove *g* in each receiving therein the stud *h* and the circular stud-block *i*, engaged thereabout, and the external roller *j*, which are equipments at the lower end of each of the duplicated lever members N.

The circular block or disk *i* has a horizontally-elongated rectangular slot or aperture *m* therein, within which fits the rectangular portion of the stud *h*, and the screw *n*, having the comparatively large head *n'* by its shank-screw engages into the threaded axial endwise-open-

ing hole h^2 in the stud h , insuring that the circular block and the encircling roller j will be restrained against displacement from their proper engagements at the lower ends of the lever members N.

The cam-groove g is of a heart shape approximately—that is, it has the portion concentric with its center of rotation for insuring a dwell of the lay in its retreated position, the cam-groove extensions 12 12, the walls of which are operative to forwardly drive the lay and thereafter to cause it to retreat to the position at which it dwells, and the extremities of the groove projecting are joined and continued by the groove portion 13, having the “dip” or convexity toward the center of rotation. Thus the lay has given to it at every rotation of the cam its forward throw as corresponds to the extremes of the cam-groove g plus the additional beating-up movement which will be acquired by the momentum developed in the forwardly-moving lay and as permitted by the lost-motion connection between the lever and lever-stud h and the roller-surrounded member i , which engages in the cam-groove, and with reference to Fig. 2, which shows the reverse side of the grooved cam-disk from that shown in Fig. 1, it is understood that just previous to the time when the member i has been crowded to the position at which it is here seen the stud or rectangular projection h has its position relatively leftward from the position in which is it shown by the full lines and with its left-hand side contacted against by the corresponding boundary of the elongated aperture m , it being further understood that so soon as the cam-groove wall has acted to positively forwardly force said member i to its forward limit the stud h , lever member N, and lay, because of the developed momentum in such parts, move forwardly slightly farther relatively to the cam-groove engagement member i and its surrounding friction-roll for the natural blow of and for the lay, and of course where the cam is graded with the dip 13, as shown, the main lay beating-up stroke having the free moving finishing portion thereof will be quickly followed or supplemented after the lay has slightly retreated by a second beating-up stroke, the latter portion of which also moves with the free lost motion or natural characteristic, relieving the weft-wire, which is laid in by the shuttle mechanism of the loom in the ordinary manner, from becoming hardened or rendered harsh or refractory, as would be the case if the lay were driven to the limits of its beating-up strokes with the positive mechanical force, as it would be in the absence of the lost-motion provisions in the connections between the lay and its actuating-cam or duplicated cams.

In order to regulate and adjust the momentum of the lay M, I provide arms s and t , ex-

tended, respectively, forwardly and rearwardly from the lay, together with weights s^2 and t^2 , which by the set-screws s^3 and t^3 are confined in their adjustments farther or nearer from the lay by adjusting one of the weights outward and the other inward, or vice versa, the degree of momentum of the lay may be increased or diminished, as may be desired, for the most satisfactory beating-up results.

The member i , apertured as described and receiving the lost-motion engagement therein of a stud which is to all intents and purposes as a fixture of the lay, being connected thereto and movable therewith, has, as shown, for purposes of the avoidance of friction in the cam-groove the annular roller or encircling sleeve j to constitute the outer bearing-surface of the said member; but of course the sleeve-roller might be dispensed with and the member i made solid and of somewhat larger diameter to fit in the cam-groove for the requirement of reasonably satisfactory operation.

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

1. In an actuating mechanism for the lay of a loom, in combination, a cam, a member engaged and reciprocated by the cam having an elongated aperture therein, and a part connected to, and movable with, the lay engaging in the aperture of said cam-reciprocated member, and capable of being moved bodily therewith and thereby, and having a movement independently of the movement of said member.

2. In an actuating mechanism for the lay of a loom, in combination, a rotary disk having a cam-groove therein, a member engaged in said groove for a reciprocatory movement having an elongated aperture therein, and a part connected to, and movable with, the lay engaging in the aperture of said cam-reciprocated member, for the purpose set forth.

3. In an actuating mechanism for the lay of a loom, in combination, a rotary disk having a cam, the groove g therein comprising the portions 12 12 and the uniting dip or groove portion 13, a member engaged in said groove having an elongated aperture therein, and a part connected to, and movable with, the lay engaging in the aperture of said member substantially as and for the purposes set forth.

4. In a loom, the combination with a driving-shaft, the lay, and a lay-connecting part provided with a stud secured thereto and having an extension therefrom, of a disk driven by the shaft and having a cam-groove therein, a circular member having an elongated aperture, an end wall of which engages said stud extension, and a sleeve rotatably mounted on said circular member and arranged to engage the walls of the said cam-groove in the disk.

5. In a loom the combination with the lay,

of a cam, a member engaged and reciprocated
by the cam having an elongated aperture there-
in, a part, connected to and movably with the
lay, engaging in the aperture of said cam-re-
5 ciprocal member and capable of being
moved bodily therewith and independently of
said member, and means carried by the lay for
regulating the momentum thereof emanating

from the movements of the cam-reciprocated
member.

Signed by me at Springfield, Massachusetts,
in the presence of two subscribing witnesses.

HIRAM A. BOND.

Witnesses:

WM. S. BELLOWS,

M. A. CAMPBELL.