May 17, 1927. 1,628,815

W. H. WAKEFIELD

BALANCED LET-OFF FOR LOOMS

Filed Oct. 17, 1925

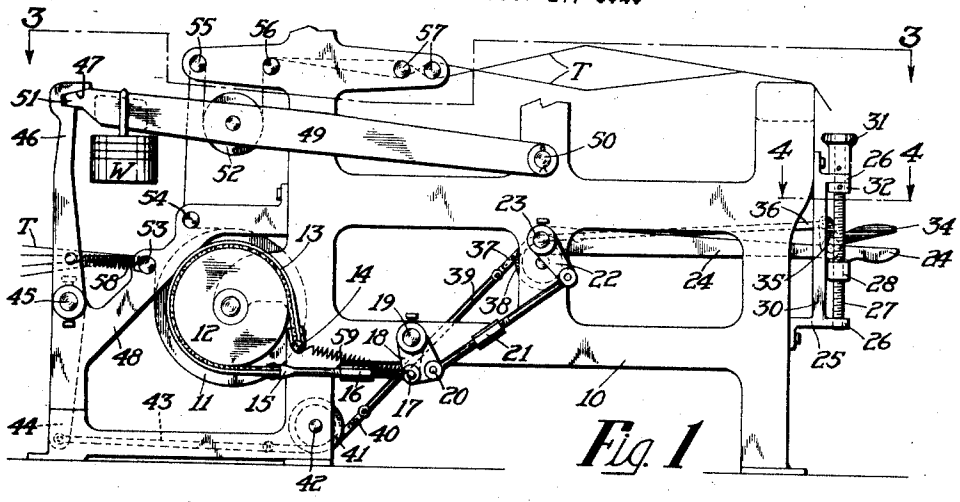


Fig. 1

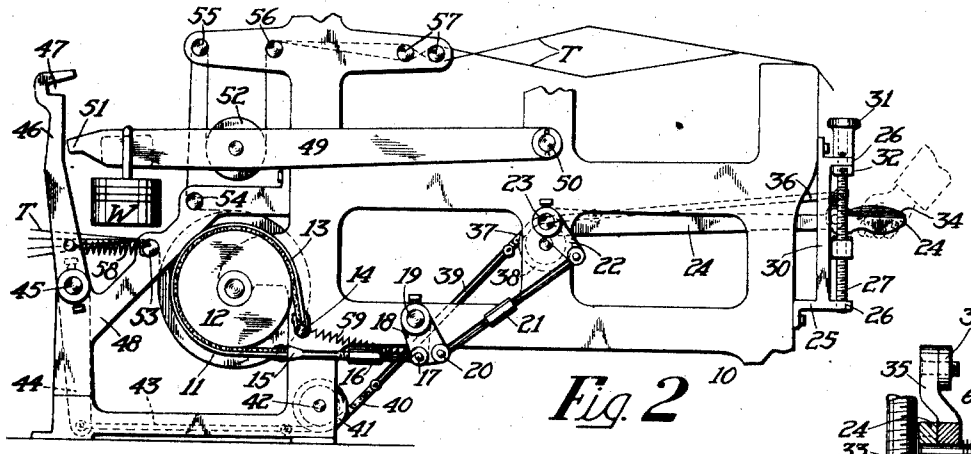


Fig. 2

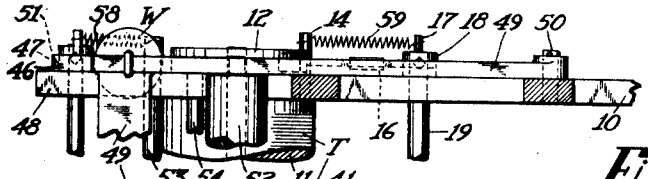
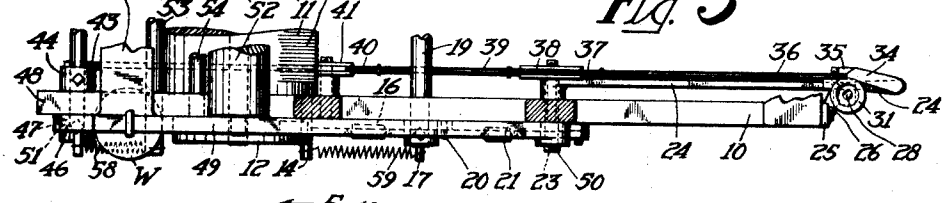


Fig. 3



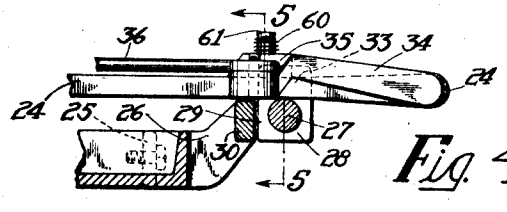


Fig. 4

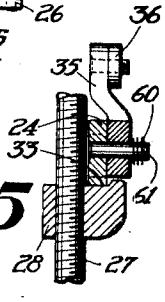


Fig. 5

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Patented May 17, 1927. 1,628,815

UNITED STATES PATENT OFFICE.

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BALANCED LET-OFF FOR LOOMS.

Application filed October 17, 1925. Serial No. 63,175.

This invention relates to let-off mechanism for looms and more particularly to a device which will permit a let-back of the warp for the removal of a mispick in heavy looms for weaving such fabrics as duck.

In the weaving of cloth it not infrequently happens that a short end is left in the shed which must be removed by the weaver. Under such conditions the take-up is reversed to slacken the cloth so that the picks laid after the mispick occurred can be removed. After the pick-out is completed it is necessary to restore the original tension on the warp threads and it is the general object of my invention to provide improved means by which the original tension may be restored to the end that a mark will not be left in the cloth.

It is a more particular object of my invention to provide a pair of balanced devices each capable of exerting the same tension on the warp, one being normally idle and the other normally operative, said other device being acted upon to cause increased tension so that the first device only may operate. A motion of this general character is set forth in co-pending application Serial No. 63,177 filed by George F. Hutchins and in that application there is shown a weighted roll normally held in stationary position and a friction drum, the warp passing around both the drum and the weighted roll. The roll is normally stationary and the forward movement of the warp is resisted by the friction of the drum only. At the time of a pick-out additional friction is placed on the drum so that the same is held stationary and the weighted roll is lowered to take up slack, the subsequent weaving restoring the weighted roll to its normal position. In said application the additional friction is applied by means of auxiliary brake levers controllable by the operator and actuated to operate at the time the weighted roll is released. It is a more particular object of my invention to make use of the usual form of friction and dispense with the auxiliary brake levers employed in said application. The usual form of friction comprises a control lever extending toward the front of the loom and positioned vertically by a screw to vary the tension of the friction band which extends around the friction head of the warp drum. I propose to apply the additional friction which will arrest movement of the drum merely by raising the control lever and holding the same in elevated position, the weighted roll being released by an auxiliary hand lever conveniently located on the control lever and operable to release the weight after the additional tension has been placed on the drum.

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 a portion of a loom having my improvements applied thereto and showing the same in normal running position,

Fig. 2 is a view similar to Fig. 1 but showing the parts moved to permit the taking up of excess warp incident to a pick-out,

Fig. 3 is a horizontal section on line 3—3 of Fig. 1,

Fig. 4 is an enlarged horizontal section on line 4—4 of Fig. 1, and

Fig. 5 is a vertical section on line 5—5 of Fig. 4.

Referring more particularly to the drawings it will be seen that I have provided a loom frame 10 having mounted at the rear end thereof a drum 11 to the ends of which are secured friction heads 12. Each head has partly wrapped therearound a flexible friction band 13 anchored at 14 to a fixed part of the loom and connected as at 15 to an adjustable link 16. Each link 16 is pivotally connected as at 17 to a depending arm 18 secured to a shaft 19 extending across the loom. One of said arms 18 has pivotally connected thereto as at 20 the lower end of an adjustable link 21 the upper end of which is pivotally connected to a lever 22 fastened to a stub shaft 23 suitably journaled in the loom frame. Said stub shaft extends through the frame and has the inner end thereof secured to a control lever 24 which extends to the front of the loom to be accessible.

A stand 25 is bolted to the front of the loom and has spaced arms 26 through which extends a screw 27. A block 28 is threaded on the screw and has the rear portion thereof flattened as at 29 to engage the adacent upright portion 30 of the stand 25. A hand wheel 31 is secured to the screw to afford means for turning the same and collar 32 prevents upward displacement of the screw. The block 28 as shown in Fig. 5 has an offset notch 33 on which the lower edge of the controlier lever 24 normally rests.

Pivotally mounted on controller lever 24 is a hand lever 34 having an upstanding arm 35 to which is pivotally connected a rod 36. A flexible chain section 37 is connected to the rod 36 and extends over a sheave 38 mounted on the frame in such a way that the center of the chain is in alignment with the axis of the stub shaft 23. The flexible section 37 is connected by a second rod 39 to another chain section 40 which extends around a sheave 41 rotatable on a fixed stud 42. The second flexible section or chain 40 is connected by means of a third rod 43 to the lower end of an arm 44 secured to a shaft 45 extending across the rear of the loom. Latch levers 46 are secured to the shaft 45 and each of said latch levers is provided with a notch 47. Bracket 48 is secured to the rear end of the loom and forms a support for cross shaft 47.

A relatively heavy frame 49 is pivoted at the forward end thereof to fixed studs 50 and has the rear end thereof provided with a detent 51 proportioned to enter notches 47 on the latch levers. Variable weights W may be attached to the frame to vary the weight of the same and there is interposed between the opposite sides of said frame a relatively heavy roll 52 pivotally mounted on the frame and free to rotate thereon.

The warp threads T extend from a creel located behind the loom, over guide bar 53, under drum 11 and guide bar 54, over guide rod 55, under roll 52, and over a fourth guide bar 56 to the lease rods 57 and other weaving instrumentalities. A tension spring 58 is interposed between each of the latch levers and the bracket 48 to hold the parts in the position shown in Fig. 1 and each of the arms 18 is normally held rearwardly by a spring 59 which also seats the controller lever 24 in the notch 33. A torsion spring 60 may be interposed between a stud 61 forming the pivot for the hand lever 34 and the controller lever to hold the flexible connections between the locking latch levers and the hand lever taut.

Under normal conditions so long as perfect cloth is being woven the parts will be as shown in Fig. 1 with the frame 49 held locked in raised position by the engagement of detents 51 and notches 47. The roll 52 will be stationary to cause the warp to move therearound against the friction existing between the flexible bands 13 and their associated friction heads which move with the drum 11. The friction exerted against the heads by the bands is varied by the screw 27 to produce a fabric having the same number of picks which would be laid were the drum held stationary and the tension applied to the warp threads by means of the released weighted roll 52. At the time of pick-out the defective picks will be removed, the take-up (not shown) being released to facilitate this operation and causing a resultant slack in the warp. After the faulty picks have been removed the take-up is again tightened and the hand lever 34 depressed to the position shown in Fig. 2 by the operator. The effect of this is to move the latch levers 46 to the position shown in Fig. 2 to release the weighted frame 49. The take-up may then be reversed until the fell of the cloth is in position for the resumption of weaving, after which the loom may be started up and the weaving of cloth continued. This will leave the weighted roll 52 in lowered position and in order that it may be raised to normal position the weaver will elevate controller lever 24 slightly which, through the action of arms 22 and 18, will cause additional friction to be applied to the friction heads through the friction bands 13. This additional friction is sufficient to prevent the rotation of drum 11 and as weaving continues the weighted roll 52 will be raised by the consumption of the excess warp until the same is in normal position, at which time the weaver will lower lever 24 onto the block 28 and release hand lever 34. This will lock the roll 52 in fixed normal position and will relieve the extra tension on the friction heads so that weaving will continue with the warp being drawn from the creel against the friction of the bands on the heads to place the warp under the normal tension which existed before the pick-out.

From the foregoing it will be seen that I have provided a pair of devices each adjustable to the other to be operated one at a time and each capable of exerting the same tension on the warp threads, the normally acting device being of the usual form and subject to a temporary excess tension at the will of the operator to cause functioning of the other or normally idle tension device. It will be seen that the relation of the chain 37 and the axis of the stub shaft 23 is such that adjustments of the controller lever 24 by means of the screw 27 will not disturb the locking of the frame 49.

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 let-off mechanism for looms, two independent tensioning devices each adjustable and each capable of exerting the same tension on the warp threads, one of said devices being normally operative to tension the warp and the other being normally idle, means to adjust the tension of the normally operative device, said means being movable from any adjusted position to increase the tension of the normally operative device when the normally idle device is operative, and manually controlled means mounted on the first named means to render said normally idle device operative.

2. In a let-off for looms, a normally idle device capable of exerting adjusted tension on the warp threads, a normally operative device to tension the threads, means to adjust the tension of the normally operative device to exert the same tension as that which the normally idle device is capable of exerting, said means being movable to increase the tension of the normally operative device, and mechanism controllable from said tensioning means to render the normally idle device operative when the tension of the normally operative device is increased.

3. In a let-off device for looms, a normally idle device to exert an adjusted tension on the warp threads, a lock to hold the same normally idle, a normally operative device to exert tension on the warp threads, means to adjust the tension of the normally operative device so that the latter will exert a tension equal to any adjusted tension which the normally idle device is capable of exerting on the warp, said means being movable to increase the tension of the normally operative device, and mechanism a portion of which is movable with said means to move the lock to unlocking position when the tension of the normally operative device is increased.

In testimony whereof I have hereunto affixed my signature.

WALTER H. WAKEFIELD.