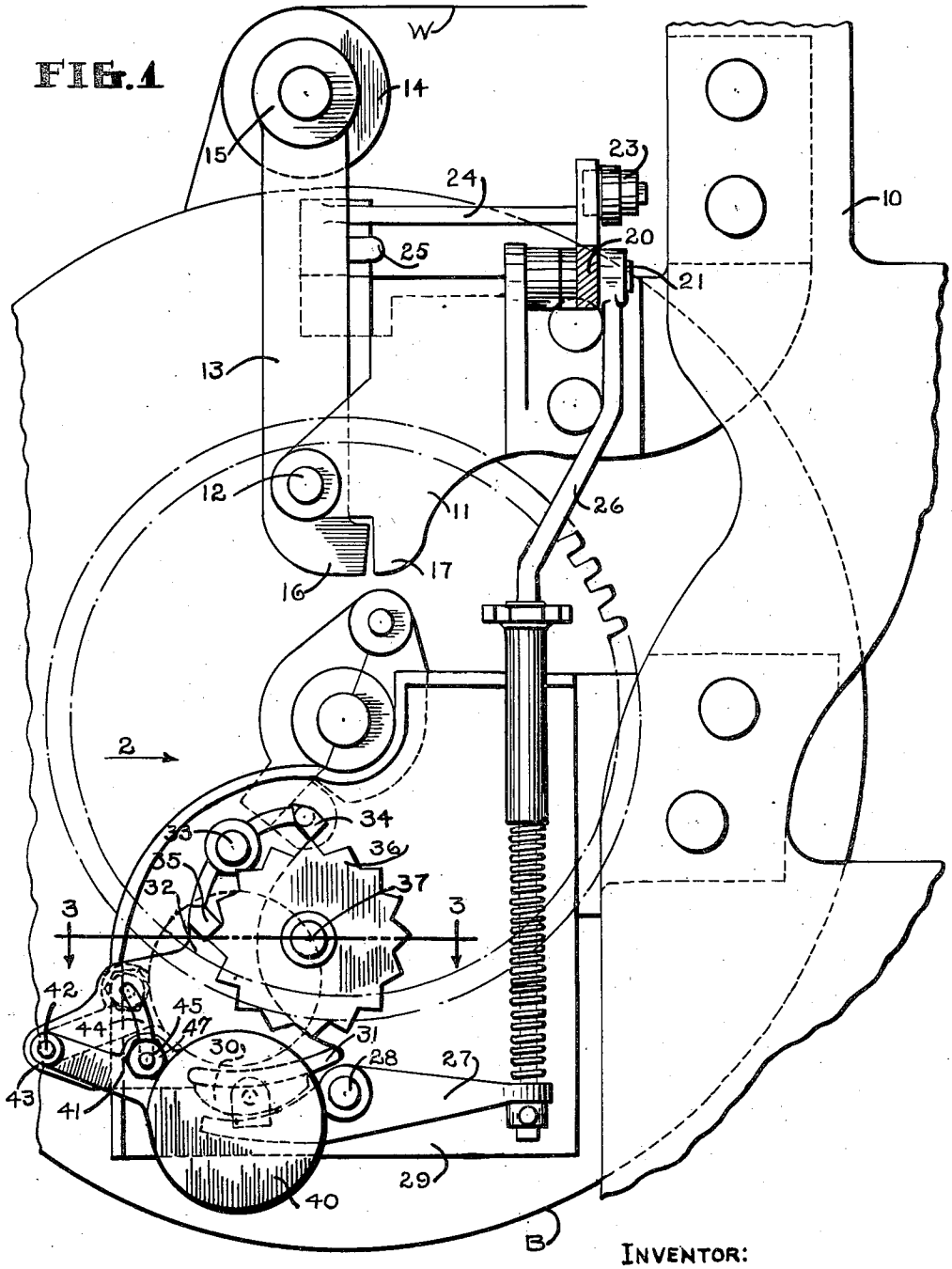
April 23, 1946. C. DARWIN 2,398,925

LET-OFF FOR LOOMS

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FIG. 1



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FIG. 2

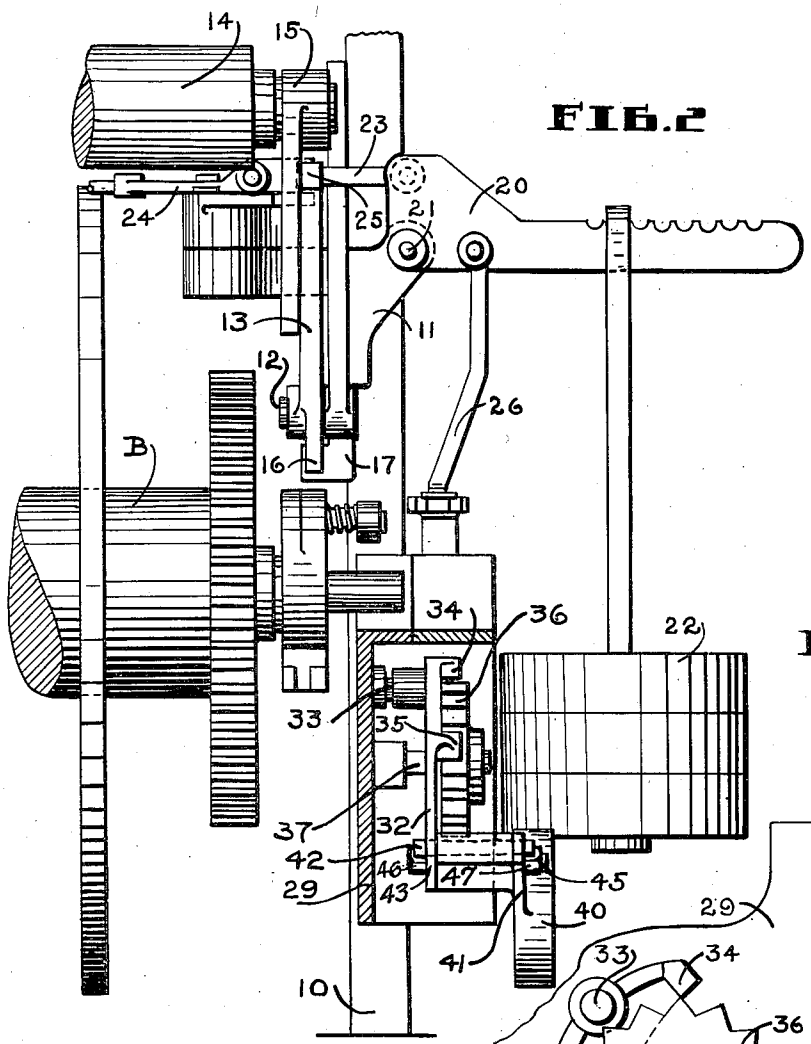


FIG. 4

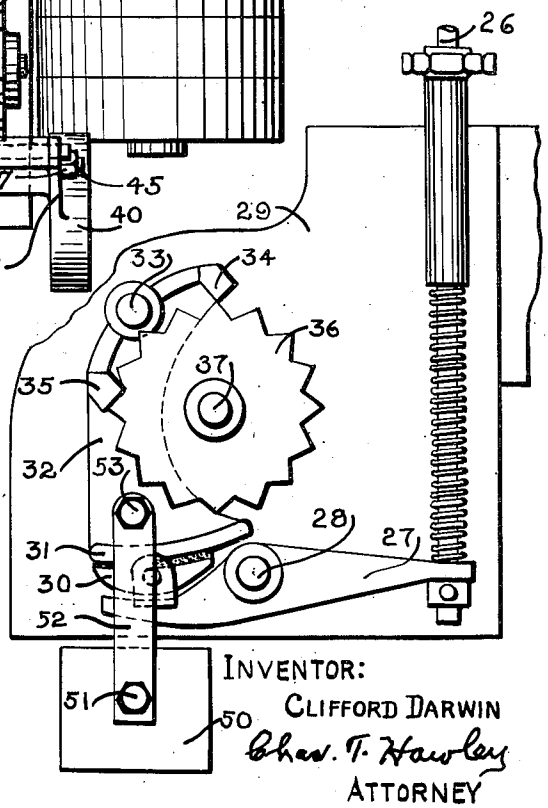
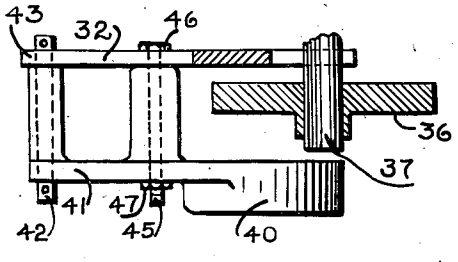


FIG. 5



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UNITED STATES PATENT OFFICE

2,398,925

LETOFF FOR LOOMS

Clifford Darwin, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application April 5, 1945, Serial No. 586,758

3 Claims. (Cl. 139—109)

This invention relates to improvements in letoff mechanisms for looms and it is the general object of the invention to provide a dampener for the escapement mechanism of the letoff.

A type of letoff which has gone into extensive use employs an escapement wheel connected by gearing to the warp beam. The wheel cooperates with an escapement lever controlled by a brake the position of which is determined by mechanism intermediate the whip roll and the brake. Under normal conditions the brake holds the escapement lever against oscillation and therefore prevents turning of the escapement wheel with the result that the warp beam is held against rotation. The warp passes over a whip roll which moves forwardly during the time that the warp beam is locked against rotation, and when the whip roll reaches a given forward position it acts through intermediate mechanism to move the brake to non-braking position, whereupon the escapement lever is free to rock by a force originating in the warp and transmitted through the escapement wheel.

When light-weight goods are being woven a letoff of this type operates satisfactorily, the brake being alternately on and off during loom operation and the escapement wheel turning intermittently and uniformly. When heavy-weight goods are being woven, however, the tension set up in the warp is so high that when the brake is released the escapement wheel has a tendency to spin or rotate at such a fast rate that warp is let off faster than it can be properly tensioned by rearward movement of the whip roll. The purpose of the escapement lever is to prevent too rapid a turning of the escapement wheel, but the lever does not perform this function under all conditions, and the net result of its failure to operate correctly when heavy cloth is being woven is to produce an objectionable slackness in the warp which results in imperfections in the cloth.

It is an important object of my present invention to provide a dampener which will prevent too rapid an oscillation of the escapement lever and thereby reduce the speed at which the escapement wheel turns when it is subjected to considerable rotary force whenever the brake is released during the weaving of heavy fabrics.

The escapement wheel shows a tendency to spin which increases progressively as the weight of goods being woven is increased. Thus, a medium weight goods will cause a small amount of spinning on the part of the escapement wheel, whereas heavier goods will cause a greater amount of spinning. In order to adapt the letoff mechanism to the weaving of a variety of weights of fabric it is another object of my invention to provide means for imposing a variable dampening force on movement of the escapement lever so that the rate at which it can oscillate will be regulated more or less in proportion to the weight of the fabric being woven.

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 accompanying drawings, wherein two forms of the invention are set forth,

Fig. 1 is a side elevation of a loom letoff mechanism having my invention applied thereto,

Fig. 2 is a rear elevation of the mechanism shown looking in the direction of arrow 2, Fig. 1,

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

Fig. 4 is a view similar to a portion of Fig. 1 but showing a modified form of the invention.

Referring particularly to Figs. 1 and 2, I have shown a loom frame 10 to which is secured a rearwardly extending upper support 11 having a pivot 12 around which swings an upright lever 13. A whip roll 14 is journaled as at 15 in the upper end of lever 13 and moves backwardly and forwardly in response to variations in tension existing in the warp W. Stops 16 and 17 on the lever and support, respectively, limit rearward movement of the whip roll.

A weight lever 20 is pivoted as at 21 to the support 11 and has means for supporting a weight 22 at different distances from the pivot 21. A link 23 connects the upper part of weight lever 20 with a whip roll lever 24 pivoted on support 11 and having an arm 25 which bears against the front of upright lever 13. Under normal conditions the weight 22 tends to move link 23 to the right as viewed in Fig. 2 and cause arm 25 to exert a rearward force on the whip roll. As the whip roll moves forwardly lever 13 rocks lever 24 and the latter acts through link 23 to turn lever 20 in a counter-clockwise direction as viewed in Fig. 2 to raise weight 22.

A rod 26 is connected to lever 20 and extends downwardly for connection with a brake lever 27 pivoted as at 28 to a second support 29 extending rearwardly from the loomside. The rear end of lever 27 carries a brake shoe 30 which engages a web 31 on an escapement lever 32 pivoted as at 33 to the lower support 29. Escapement fingers 34 and 35 on lever 32 cooperate with an escapement wheel 36 turning on a stud 37 supported by the part 29. Intermediate connections

not illustrated herein are interposed between the escapement wheel and the warp beam B so that these two parts turn together, the escapement wheel however having a much more rapid angular movement than does the warp beam.

Under normal weaving conditions it may be assumed that weight 22 will be down so that the rear end of lever 27 is up to hold the brake shoe 30 against the web 31 of the escapement lever. Under these conditions the fingers 34 and 35 are held stationary and prevent turning of the escapement wheel. As weaving continues the whip roll advances and in doing so causes lever 20 to rise and effect lowering of the rear end of lever 27 to move the brake shoe away from its web, whereupon the escapement lever is free to rock. The tension of the warp is transmitted from the beam to the escapement wheel and tends to turn the latter so that the warp beam may turn in a clockwise direction as viewed in Fig. 1 to unwind warp. As the warp unwinds weight 22 acts through lever 24 to move the whip roll rearwardly or to the left as viewed in Fig. 1 and eventually the brake shoe will engage the web 31 and arrest further turning of the escapement wheel and beam. This operation goes on during weaving, the escapement wheel being alternately locked and unlocked and when unlocked being responsive to forces derived from the warp tending to turn it. If the warp is heavy and exerts considerable tension the escapement lever as heretofore made will not be able to impose sufficient restraint on the escapement wheel to prevent it from turning very rapidly or spinning on its axis.

The matter thus far described of itself forms no part of my present invention and may be made as set forth in prior patent to Payne 2,184,059 to which reference may be had for parts of the letoff mechanism not specifically described herein, such as the connections between the escapement wheel and warp beam.

In carrying my present invention into effect I provide the escapement lever with a dampener which has the effect of preventing the lever from oscillating too rapidly when the brake shoe is released and the escapement wheel is subject to a strong force tending to turn it. The preferred form of the invention shown in Figs. 1, 2 and 3 comprises a weight 40 having a rearwardly extending arm 41 pivoted as at 42 to a rearward extension 43 of the escapement lever 32. The latter is provided with an arcuate slot 44, see Fig. 1, concentric with the axis 42 and receiving a bolt 45 which passes through the arm 41. This bolt has a head 46 and a nut 47 as shown in Fig. 3 by means of which the weight can be held fixed in angularly adjusted position with respect to the escapement lever 32. Thus, when weight 40 is in its lowest position as shown in full lines in Fig. 1, bolt 45 will be at the bottom of slot 44 and the center of gravity of the lever 32 will be low and at a considerable distance from the stud or axis 33 around which the lever 32 rocks. When the weight 40 is in the high position, shown in dotted lines in Fig. 1, the center of gravity of the escapement lever is relatively high and near the axis 33. When the weight is low its inertia imposes a considerable dampening action on the oscillation of lever 32 which tends to prevent spinning of the escapement wheel. This is the setting which the weight has when the loom is weaving heavy fabric. When the weight is in its high position the moment of inertia of the lever 32 is less and the fingers 34 and 35 exert less restraint on the turning of the escapement wheel. This condition exists when the fabric being woven is of medium grade. This last setting of the weight may also be used when the fabric being woven is light, or the weight may be entirely removed.

In the modified form of the invention shown in Fig. 4 a weight 50 is secured as at 51 to the lower end of a depending link 52 which is secured as at 53 to the escapement lever 32. Weight 50 may be used when a heavy fabric is being woven and removed when a light fabric is being woven.

From the foregoing it will be seen that I have provided dampening means for the escapement mechanism of a letoff mechanism so constructed that the moment of inertia of the escapement lever may be varied depending upon the weight of the fabric being woven in the loom. This variation is attained by changing the position of weight 40 with respect to the axis 33 of the escapement lever. When in different positions due to the adjustment afforded by the slot 44 and bolt 45 the weight can impose varying degrees of inertia on the escapement lever to adapt the let-off to the weaving of a wide range of fabrics. In the modified form of the invention the weight 50 is maintained at a fixed distance from the axis 33 and can be used when heavy fabrics are being woven and removed when light fabrics are being woven.

Having thus described my invention it will be seen 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 letoff for a loom capable of weaving with a variety of warps in which various degrees of warp tension exist, the loom having a warp beam and an escapement wheel turning therewith and having a whip roll movable in response to changes in warp tension and controlling a brake, the escapement wheel tending to turn faster when the warp tension is high than when said tension is low, an escapement lever controlled by the brake and operatively related to the escapement wheel to regulate the rate of turning thereof, a pivot for said lever, a weight for said lever, and means to secure said weight to said lever at different distances from said pivot, whereby the moment of inertia of said lever may be varied.

2. In a letoff for a loom capable of weaving with a variety of warps in which various degrees of warp tension exist, the loom having a warp beam and an escapement wheel turning therewith and having a whip roll movable in response to changes in warp tension and controlling a brake, the escapement wheel tending to turn faster when the warp tension is high than when said tension is low, an escapement lever controlled by the brake and operatively related to the escapement wheel to regulate the rate of turning thereof, a pivot for said lever, a weight pivotally mounted on said lever for movement toward and from the pivot of the lever, and means to hold said weight fixed to said lever at any one of a plurality of distances from the pivot of the lever to vary the moment of inertia of said lever.

3. In a letoff for a loom capable of weaving with a variety of warps in which various degrees of warp tension exist, the loom having a warp beam and an escapement wheel turning therewith and having a whip roll movable in response

to changes in warp tension and controlling a brake, the escapement wheel tending to turn faster when the warp tension is high than when said tension is low, an escapement lever controlled by the brake and operatively related to the escapement wheel to regulate the rate of turning thereof, a pivot for said lever, a weight pivotally mounted on said lever for movement toward and from the pivot of the lever, a slot in said lever concentric with the axis of said weight, and means passing through said slot to hold the weight fixed to the lever in any one of a plurality of distances from the pivot of the lever to vary the moment of inertia of said lever.

CLIFFORD DARWIN.