

April 12, 1932.

H. A. LEONARD

1,853,909

WARPING STOP MOTION

Filed Dec. 12, 1930

2 Sheets-Sheet 1

Fig. 2.

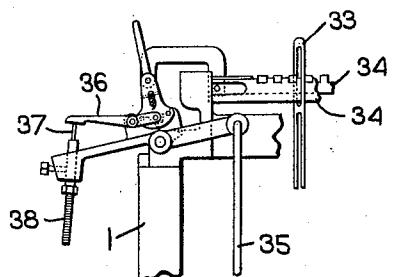
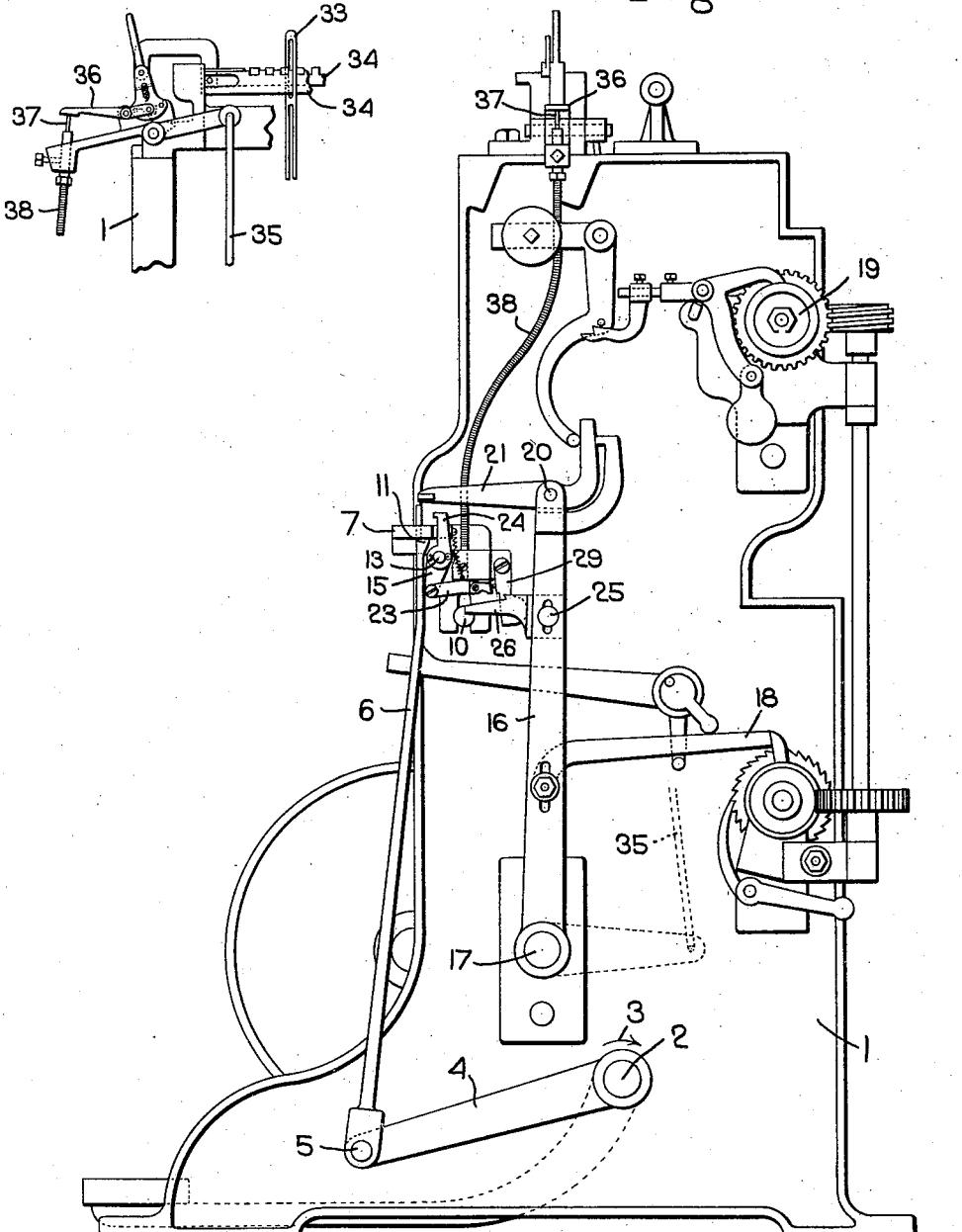


Fig. 1.



Inventor.  
Harry A. Leonard  
by *Heard Smith & Tennant.*  
Atty's.

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Fig. 3.

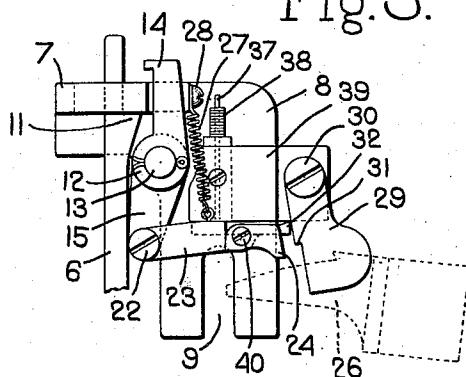


Fig. 4.

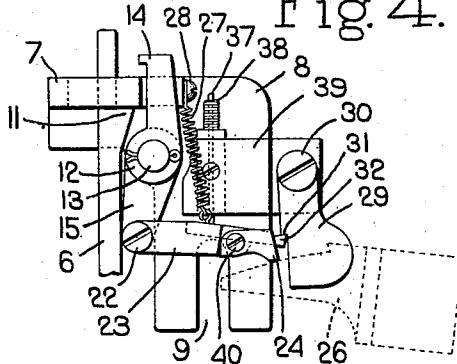
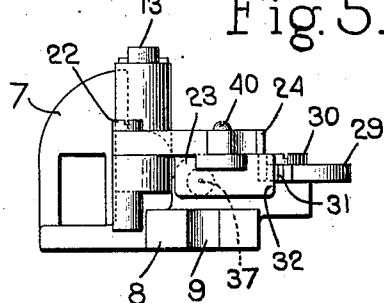


Fig. 5.



Inventor.  
Harry A. Leonard  
by *Howard Smith & Tenant.*  
Atlys.

## UNITED STATES PATENT OFFICE

HARRY A. LEONARD, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER CORPORATION, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE

## WARPING STOP MOTION

Application filed December 12, 1930. Serial No. 501,777.

This invention relates to warping machines and more particularly to the general type of warping machines such as shown in the patents to Rhoades, No. 624,541, May 9, 1899, No. 1,254,936, January 29, 1918, and No. 1,523,361, January 13, 1925. Warping machines are commonly provided with a stop motion mechanism actuated in either of two ways, first, by the completion of the passage 10 through the machine of a predetermined length of warp and, second, upon the absence or failure of any warp end.

The present invention has for its object to provide a simple, efficient, and durable form 15 of mechanism for the latter purpose, that is, for the actuation of the stop motion mechanism to stop the warper upon absence or failure of any warp end.

The nature and objects of the invention 20 will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

As the type of warping machine in which the preferred form of the invention is shown 25 as embodied is fully illustrated and described in the Rhoades patents above referred to and is well known and familiar to those skilled in the art, it will only be necessary here to illustrate and describe in detail those features 30 of the warping machine necessary to a disclosure of a preferred embodiment of the present invention.

In the drawings:

Fig. 1 is an end elevation of a warping machine of usual construction with some of the parts removed.

Fig. 2 is a rear elevation of a portion of a warp stop motion.

Fig. 3 is a detail in end elevation of the knock-off mechanism and associated parts in 40 which the main features of the present invention are preferably embodied.

Fig. 4 is a view similar to Fig. 3 showing the parts in a different position.

Fig. 5 is a bottom plan view of the construction shown in Fig. 3.

The warper is shown as comprising end frames, the right-hand frame 1 being shown. These frames are connected in the usual manner and have mounted therein the various

shafts required. It is assumed, as in the Rhoades patents, that the movement of the shaft 2 starts and stops the warper, a movement of this shaft in the direction of the arrow 3 being utilized to stop the warper and the movement in the opposite direction to start it. The shaft 2 has fast upon it outside the end frame 1 the arm 4 to which is pivotally connected at 5 a shipper rod 6 extending up through an apertured holding plate 7. This plate 7, in the construction illustrated, is a laterally projecting portion of a bracket 8 vertically slotted at 9 and rigidly and adjustably secured to the warper frame by the bolt 10. The shipper rod 6 is provided with a shoulder 11 to engage the underside of the apertured plate 7. When this shoulder is thus in engagement with the apertured plate, the parts are in running position. If, as in the said Rhoades patents, the upper end of the shipper lever be swung or knocked to the left to release the shoulder 11 from the plate 7, the shipper rod rises vertically, the shaft 2 rotates in the direction of the arrow 3, and the warper is stopped.

In order to throw the shipper rod from the running position shown in Fig. 1 to a position to release the shoulder 11 from the plate 7, or toward the left, a knock-off mechanism is provided actuated both from the warper 80 measuring mechanism and from the warp stop motion. In the preferred construction illustrated, this knock-off mechanism comprises a knock-off lever 12 fulcrumed at 13 on the bracket 8 so positioned that if its upper arm 14 be moved to the right or its lower arm 15 moved to the left, it will engage the shipper lever 6 and knock the shoulder 11 from engagement with the plate 7 thus to effect the stopping of the warper.

The warper comprises the usual vibrating arm 16 extending upward from and constantly vibrated by a shaft 17 during the operation of the warper. This vibrating arm carries the pawl 18 for operating the warper clock 95 or warp measuring mechanism shown generally at 19 and it also carries pivoted thereto at its upper end at 20 the L-shaped latch 21. When the warper clock indicates the completion of the winding of a predetermined length 100

of warp, it acts, through the usual type of mechanism, to permit the latch 21 to drop to the left of the arm 14 of the knock-off lever so that on the next vibration of the arm 16 to the right, the knock-off lever will be rocked to knock off the shipper and stop the warper.

The present invention has to do with the operation of the knock-off mechanism when any warp end breaks or fails. For this purpose, in the preferred construction illustrated, there is pivoted to the lower end of the arm 15 of the knock-off lever at 22 a pawl having a body portion 23 and an effective end portion 24, and there is adjustably secured to the vibrating arm 16 by the bolt 25 a lateral projection or striker 26. The pawl 23, 24, constitutes a transmitter for transmitting the movement of the vibrating arm 16 to the knock-off lever. This pawl normally stands out of the path of the striker 26. When the warp stop motion acts, it is moved transversely, or in this case downward, into the path of the striker and then, when the vibrating arm moves to the left, an endwise movement is imparted thereby to the pawl and thereby the knock-off lever is rocked to knock off the shipper and stop the warper.

The pawl is normally held in its inactive position by a light spring 27 connecting the body of the pawl 23 to a screw 28 in the bracket 8. A latch 29 is pivoted at 30 on the bracket 8 and is provided with the latching shoulder 31. Normally the parts stand as shown in Fig. 3 with the extreme end 32 of the body 23 of the pawl holding the latch swung to the right. When the pawl is depressed to bring it into transmitting position, the end 32 passes beneath the shoulder 31 and the latch swings by gravity into latched position shown in Fig. 4.

Since the work of operating the knock-off mechanism is entirely done by the powerful vibrating arm 16 imparting an endwise movement to the pawl, it will be seen that the only work required of the warp stop motion is to give the pawl a movement from its unlatched or non-transmitting position to its latched or transmitting position. The only force required for this purpose is that necessary to overcome the light tension of the small spring 27 or whatever means is employed for holding the pawl in its unlatched position. Consequently there may be employed a warp stop motion of that type which operates a Bowden wire. Such a warp stop motion is shown generally in Fig. 2 and of similar construction and operation to that shown in the patent to Davis, No. 1,538,625, May 19, 1925. This mechanism comprises drop wires such as 33, one for each warp end, and the notched bars 34 given a relative reciprocation by a suitable connection such as 35 from the shaft 17. When a warp end breaks or fails, a drop wire 33 held up thereby falls, locking the notched bars 34 against relative reciprocation, and

thereupon causing the arm 36 to depress the core 37 in the sheath 38 of a Bowden wire. In the construction illustrated, the sheath 38 of the Bowden wire is secured in a lateral projection 39 from the bracket 8 in such position that the core 37 extends through the projection and abuts on top of the pawl body 23. It will thus be seen that when a warp end breaks and the core 37 of the Bowden wire is projected, it will act to swing the pawl from its unlatched position shown in Fig. 3 to its latched or transmitting position shown in Fig. 4.

But the action of the warp stop motion with its consequent movement of the pawl may take place at any time and consequently may take place when the vibrating arm has advanced or moved to the left beyond its pawl-engaging position. To prevent any damage or breakage, the effective end 24 of the pawl is yieldable with respect to the body, for that purpose being pivoted at 40 to the pawl body 23. Consequently if the striker 26 is beneath the portion 24 of the pawl when the stop motion acts, this portion of the pawl will yield, but as the vibrating arm moves to the right, this portion of the pawl 24 will immediately drop into transmitting position so as to be caught by the striker upon the next vibration of the arm 16 to the left.

There is thus presented a very simple and efficient means for stopping the warper upon the absence or breakage of any warp end. This mechanism requires very little force to be exerted by the warp stop motion because the work is all done by the relatively powerful movement of the vibrating arm 16. Furthermore, all the parts are compact and for the most part are readily assembled before attachment to the loom. It will be noted that the plate 7 for holding the notched end of the shipper 6, the knock-off lever 14, 15, the pawl 23, 24, the spring 27, the latch 29, and the projection 39 to which the Bowden wire sheath is secured are all part of or directly connected to the single bracket 8 which is clamped to the warper end frame by the bolt 10. Thus all these parts may be accurately assembled and related to each other while the striker 26 is readily secured to the vibrating arm 16 to cooperate with the parts on the bracket 8. Furthermore, this mechanism does not interfere in any way with the operation of the knock-off mechanism under the control of the warper clock in the usual manner.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A warper comprising stopping mechanism, a knock-off device movable to actuate the stopping mechanism to stop the warper, an arm vibrated by the warper when in operation, a pawl pivoted to the knock-off device, a latch for holding the pawl in the path of the vibrating arm, the said pawl having that

portion engaged by the vibrating arm yieldable to permit the pawl to be moved to latched position when the vibrating arm is advanced beyond its pawl engaging position, 5 means acting to hold the pawl normally in unlatched position, and a warp stop motion including a Bowden wire acting when a warp breaks to project the core and cause the core to move the pawl into latched position.

10 2. A warper comprising the combination of stopping mechanism, a knock-off device movable to actuate the stopping mechanism to stop the warper, an arm vibrated by the 15 warper when in operation, a transmitter normally out of position to transmit movement of the arm to the knock-off device, and means acting upon failure of a warp positively to move the transmitter into transmitting position 20 and thereby to cause the arm to move the knock-off device to actuate the stopping mechanism to stop the warper, in which combination a portion of the transmitter is yieldable to permit the transmitter to be moved 25 to transmitting position when the vibrating arm is advanced beyond its position for moving the transmitter.

30 3. A warper comprising the combination of stopping mechanism, a knock-off device movable to actuate the stopping mechanism to stop the warper, an arm vibrated by the 35 warper when in operation, a pawl pivoted to the knock-off device, a latch for holding the pawl in the path of the vibrating arm, a spring acting to hold the pawl normally in unlatched position and a warp stop motion including a Bowden wire acting when a warp breaks to project the core and cause the core thereby to move the pawl against its 40 spring into latched position, in which combination the pawl comprises a body pivoted to the knock-off device and a vibrating arm engaging portion pivoted to the said body, whereby when the pawl is moved to latched 45 position with the vibrating arm advanced beyond its pawl engaging position the arm engaging portion of the pawl may yield on its pivot.

50 4. In a warper stop motion, a pivoted knock-off device, a pawl body pivoted thereto, a pawl end pivoted to the pawl body, a spring acting to hold the pawl out of operative position, and a latch acting to hold the pawl in operative position when moved 55 thereto.

55 5. In a warper stop motion, the construction defined in claim 4, together with a Bowden wire, the core of which engages the pawl and acts when projected to move the pawl 60 against its spring into operative latched position.

In testimony whereof I have signed my name to this specification.

65 HARRY A. LEONARD.