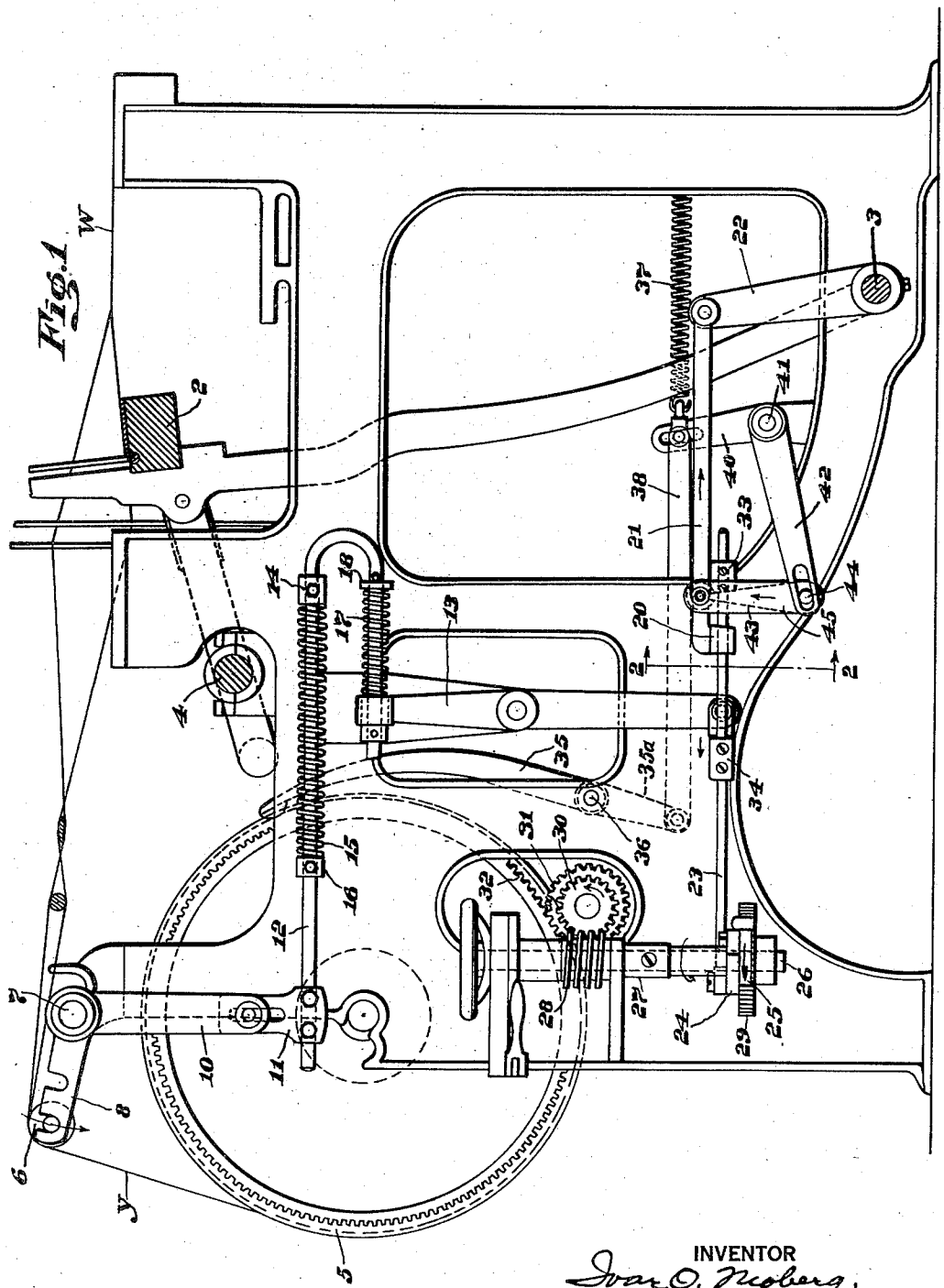
Aug. 22, 1939. I. O. MOBERG 2,170,762

LET-OFF MECHANISM FOR LOOMS

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Fig. 1



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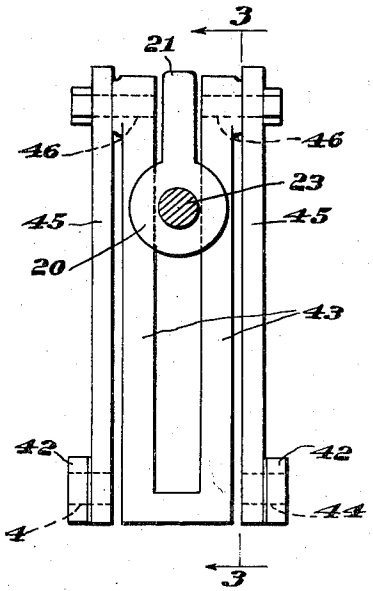


Fig. 2

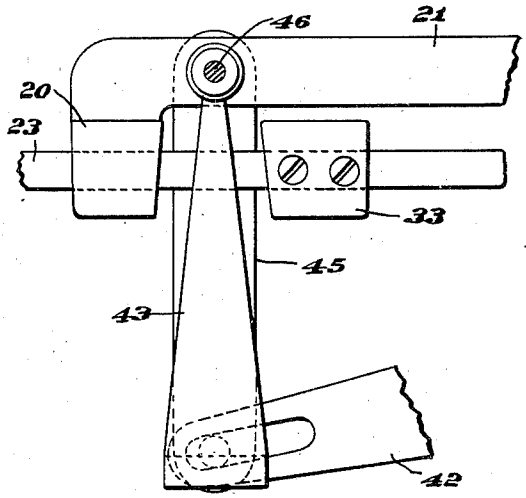


Fig. 3

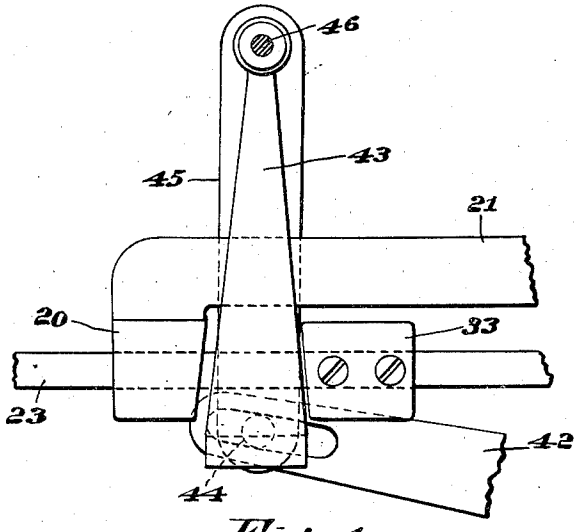


Fig. 4

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LET-OFF MECHANISM FOR LOOMS

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Application July 28, 1938, Serial No. 221,763

6 Claims. (Cl. 139—108)

This invention relates to looms and is more especially concerned with the mechanisms used in connection with weaving from beamed warp to let off the yarn at the rate required for the weaving operations.

It is the chief object of the invention to improve these so-called "let-off mechanisms" with a view to making them more completely automatic in operation, while at the same time providing a simple, reliable and sturdy construction capable of giving long service with a minimum of attention.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a side elevation, somewhat diagrammatic in character, showing those parts of a loom with which the invention is more especially concerned and illustrating a let-off mechanism embodying the invention;

Fig. 2 is a sectional view approximately on the line 2—2, Fig. 1;

Fig. 3 is a sectional view approximately on the line 3—3, Fig. 2; and

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

Referring first to Fig. 1, the loom structure there shown comprises a lay 2 mounted to swing in a rock shaft 3 and driven by the usual pitman or connecting rod from the lay shaft 4. The warp is supported on a beam 5 which is mounted in the usual manner, the warp yarns being led over the whip roll 6 and running thence through the shedding mechanism to the fell of the cloth W being woven. This roll is supported in the usual manner on arms or fingers secured on the whip roll shaft 7, one of these arms or fingers being indicated at 8. In order to apply the desired degree of tension to the roll, another arm 10 extends downwardly from the shaft 7 and is connected by a head 11 to one end of a U-shaped tension link 12, the opposite end of which extends through an eye in the upper end of a let-off lever 13. A bearing 14 fixed on the frame supports the link for sliding movement therethrough and a tensioning spring 15 which encircles the link bears at one end against the bearing and at the opposite end against the collar 16 secured on one leg of said link. A buffer spring 17 is similarly associated with the other leg of the link and is interposed between the eye of the lever 13 and another collar 18 with which the link is equipped.

The let-off mechanism is driven by a slide or driver 20 formed on the free end of a link 21, the opposite end of which is pivoted to an arm 22 secured fast on the rock shaft 3 for the lay. It slides on a rod 23 which is pivoted to a rocker 24 carrying the pawl 25 and mounted to oscillate around the axis of the shaft 26. A sleeve 27 also mounted on the shaft carries a worm 28 meshing with a worm gear 30. On the same shaft with this gear is another gear 31 which drives the beam gear 32.

The construction above described is the well known Bartlett let-off motion. In addition to the parts mentioned, it includes a collar or block 33 adjustably mounted on the pawl operating rod 23 and a second collar or block 34 is similarly secured to said rod and pivoted to the lower end of the left-off lever 13.

When the loom is running the spring 15 operates through the whip roll 6 to maintain a strong tension on the warp threads or yarns *y*, this tension being so balanced against the frictional drag applied to the beam as to hold it approximately in the position shown in Fig. 1. During each beat-up motion of the lay the driver 20 is moved to the right until it strikes the block 33, whereupon it carries the block with it and thus produces an operating movement of the pawl 25, the ratchet wheel 29, and through the reduction gearing between it and the beam 32, moving the beam slightly in a clockwise direction so as to let off a certain amount of warp. The extent of this let-off movement, however, is controlled by the position of the whip roll 6, since this position determines the return or idle movement of the pawl. In other words, the spring 17 operates through the let-off lever 13 to return the rod 23 and consequently the block 33, after each let-off movement, to a position which depends upon the position of the whip roll 6. If the let-off mechanism does not feed yarn at the rate required by the weaving instrumentalities, the whip roll 6 will be depressed, thus operating through its connections with the rod 23 to move this rod toward the left. Consequently, upon the next beat-up of the lay the driver 20 will strike the block 33 at an earlier point in the stroke of the driver than previously and will give the beam an increased let-off movement. Thus the whip roll position governs the relationship between the idle portion of the movement of the driver 20 and the useful fraction of that movement in each beatup of the lay.

It will be evident that as the diameter of the yarn body on the beam 5 is reduced during the

continued operation of the loom, a greater rotative movement must be imparted to it in order to deliver the same length of warp. In the mechanism so far described this demand for an increased rate of warp let-off results in depressing the whip roll further and thereby reducing the lost motion of the pawl driving mechanism so that the pawl will take more teeth on the ratchet wheel at each let-off. However, the constant lowering of the whip roll necessarily compresses the tensioning spring or springs 15 to a greater degree and thereby undesirably increases the tension on the warp. Since this increased tension tends to reduce the width of the goods being woven and to increase the number of picks per inch, it becomes necessary to loosen up the springs 15 from time to time. A further disadvantage of this arrangement is that the slight up and down "easing" movement of the whip roll is increased as the diameter of the warp beam is reduced, and if allowed to continue, becomes excessive I am aware that mechanisms have been designed to deal with these difficulties, but my invention aims to devise a very simple and reliable means for automatically compensating for the change in let-off required by a reduction in diameter of the beam in such a manner as to maintain the position of the whip roll substantially unchanged throughout the weaving operation, holding the warp continuously under practically a constant tension, and maintaining an approximately uniform range of easing movement of the roll.

Referring again to Fig. 1, I have attached a feeler 35 on a shaft 36 where its upper end bears against the body of a yarn on beam 5. On the shaft 36, outside the loom frame, is a finger 35a keyed, or set-screwed, to the shaft and connected to the spring 37 through the link 38. Thus the spring holds the end of the feeler constantly against the peripheral surface of the yarn body. An arm 40 fast on the rock shaft 41 is joined to the link 38 through a stud in a slot in the upper end of the arm. Also secured on the rock shaft 41 is an arm 42, the outer end of which is forked and slotted to straddle a U-shaped wedge or tapered member 43, better shown in Figs. 2, 3 and 4. The arm 42 is not connected directly to the wedge 43, but its two parts are pivoted at 44, respectively, to the lower ends of two upright links 45—45 and the upper end of the wedge is pivoted to them, as shown at 46. It will be clear from an inspection of the drawings that the wedge 43 is suspended from the upper ends of the two links 45—45; that it straddles the pawl operating rod 23; and also that it is interposed between the adjacent ends of the driver 20 and block 33.

When the beam is full, the connections between the feeler 35 and the wedge hold the latter with its relatively thin upper edge between the parts 20 and 23 where it is struck by the driver as the latter moves toward the right, Fig. 1, in producing the pawl actuating movement. As the yarn is unwound from the beam and its diameter consequently is reduced, the wedge 43 is gradually raised. Consequently, it slowly fills more and more of the space between the driver 20 and the block 33 and thus gradually reduces the lost motion fraction of the fixed stroke of the driver 20 and increases its useful fraction. By properly designing this member 43, the rate of increase of the let-off movement of the pawl can be made to bear the correct relationship to the gradual reduction in diameter of the beam so as to increase the rotative movement of the beam by the amount necessary to give the same let-off of warp at each beat-up, notwithstanding such changes in diameter.

The normal control over the idle position of the pawl 25 afforded by the whip roll 6 and its connections with the rod 23 are not disturbed by the new arrangement, but both cooperate in exerting a joint control over the length of stroke imparted to the pawl by the driver at each beat-up. In other words, the length of the stroke of the driver is fixed, but due to its lost motion connection with the pawl the fraction of its movement toward the right, Fig. 1, up to the point at which it strikes the wedge and moves it against the block 33 is idle. The remaining fraction of the right-hand stroke, however, is useful in operating the pawl. This useful fraction therefore varies with the position of the wedge and such position, in turn, is controlled by the feeler bearing on the beam. Jointly with this control is that exerted by the position of the whip roll since, if the roll moves either up or down out of its normal position, it produces a corresponding change in position of the block 33, and thus increases or decreases the length of the stroke imparted to the pawl by the driver.

With this arrangement, therefore, the whip roll remains continuously in substantially the same position except, of course, for its slight easing motion. The latter motion is of a constant amplitude and the tension on the warp is not changed materially by the reduction in the diameter of the beam.

While I have herein shown and described a typical embodiment of my invention, it will be understood that the invention may be embodied in other forms without departing from the spirit or scope thereof.

Having thus described my invention, what I desire to claim as new is:

1. In a loom provided with weaving instrumentalities including a warp beam and a spring tensioned whip roll over which the warp yarns drawn from said beam are guided, the combination of mechanism for operating the beam to let off the warp as the weaving operation progresses, means governed by the position of said roll for controlling the let-off operation, a feeler yieldingly held in contact with the yarn body on said beam, and a tapered member controlled as to position by said feeler and cooperating with said means in controlling said let-off operation.

2. In a loom provided with weaving instrumentalities including a warp beam and a spring tensioned whip roll over which the warp yarns drawn from said beam are guided, the combination of mechanism for operating the beam to let off the warp as the weaving operation progresses; said mechanism including a pawl, a ratchet wheel operated thereby, and a reciprocating driver for said pawl having a lost motion connection therewith; a feeler yieldingly held in contact with the yarn body on the beam, and means operated by said feeler and cooperating with said whip roll to determine the fraction of the stroke of said driver that will be utilized in operating said pawl during successive reciprocations of the driver.

3. In a loom provided with weaving instrumentalities including a warp beam and a spring tensioned whip roll over which the warp yarns drawn from said beam are guided, the combination of mechanism for operating the beam to let off the warp as the weaving operation progresses; said mechanism including a pawl, a ratchet wheel

operated thereby, and a reciprocating driver for said pawl having a lost motion connection therewith; a feeler yieldingly held in contact with the yarn body on the beam, and a tapered member so connected with said feeler that its position is controlled thereby, said member being so associated with said driver as to gradually increase the fraction of the stroke of said driver utilized in operating said let-off mechanism as the diameter of said yarn body is reduced.

4. In a loom provided with weaving instrumentalities including a warp beam and a spring tensioned whip roll over which the warp yarns drawn from said beam are guided, the combination of mechanism for operating the beam to let off the warp as the weaving operation progresses; said mechanism including a pawl, a ratchet wheel operated thereby, and a reciprocating driver for said pawl having an operating stroke of fixed length and a lost motion connection with the pawl; means adjustable relatively to said driver for controlling the degree of its lost motion, a feeler yieldingly held in contact with the yarn body on said beam, and connections between said feeler and said means for adjusting the latter and thereby changing the degree of said lost motion in accordance with changes in the diameter of the yarn body.

5. In a loom provided with weaving instrumentalities including a warp beam and a spring tensioned whip roll over which the warp yarns drawn from said beam are guided, the combination of mechanism for operating the beam to let off the warp as the weaving operation progresses; said mechanism including a pawl, a ratchet wheel operated thereby, a reciprocating driver for said pawl, and a rod connecting said pawl with said driver and having a lost motion relationship to the latter; a wedge straddling said rod and interposed between said driver and a fixed member on it, a feeler yieldingly held in contact with the yarn body on the beam, and connections between said feeler and said wedge for adjusting the latter transversely of the rod and thereby changing the fraction of the stroke of said driver utilized in operating said pawl as said yarn body changes in diameter.

6. In a loom organization according to preceding claim 5, in combination with means connecting said rod with said whip roll and serving to shift the position of the rod axially with reference to both the driver and said wedge in accordance with changes in the position of the whip roll, whereby the let-off action produced by the movement of the driver is controlled jointly by the position of said whip roll and the diameter of said yarn body.

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