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1,647,729

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WEFT DETECTING MECHANISM FOR DROP BOX LOOMS

Filed April 9, 1926

2 Sheets-Sheet 1

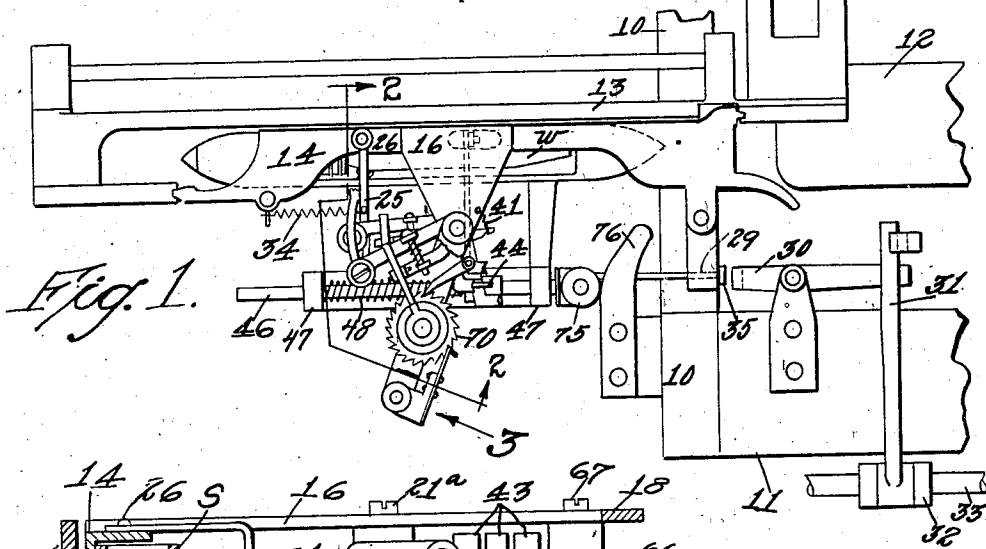


Fig. 1.

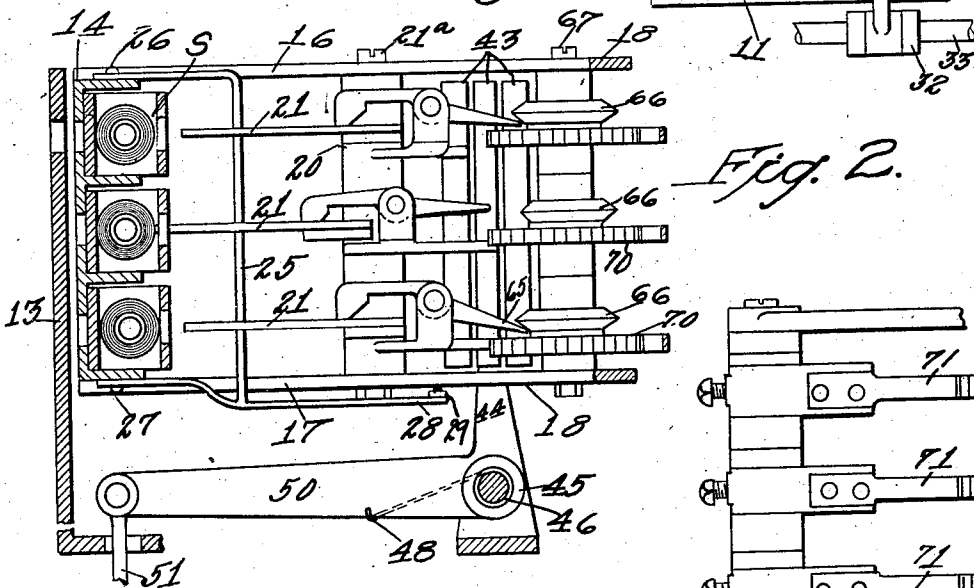


Fig. 2.

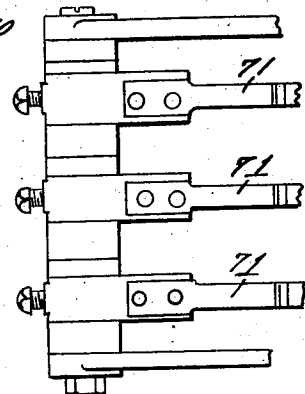
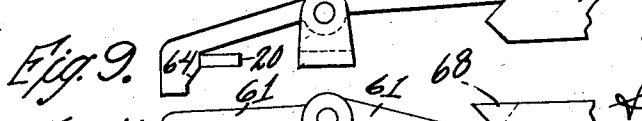
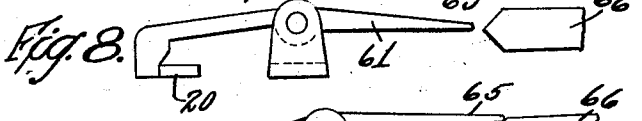
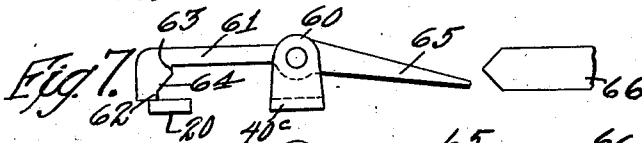


Fig. 3.



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WEFT DETECTING MECHANISM FOR DROP BOX LOOMS

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2 Sheets-Sheet 2

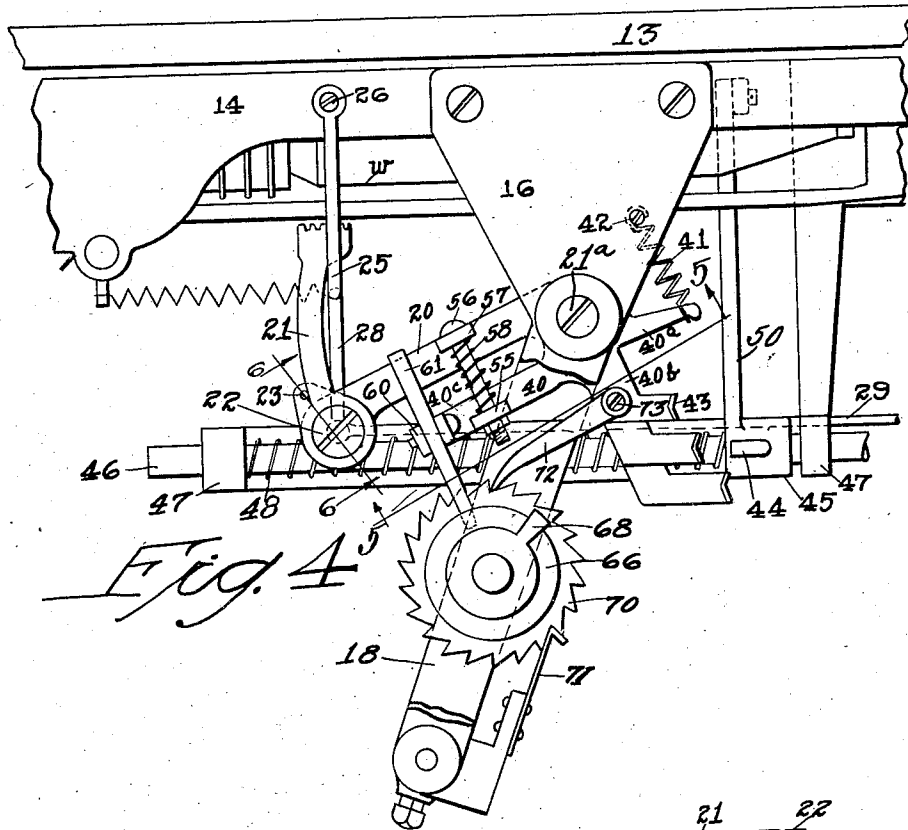


Fig. 4

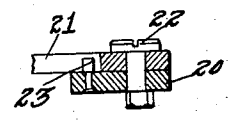


Fig. 6

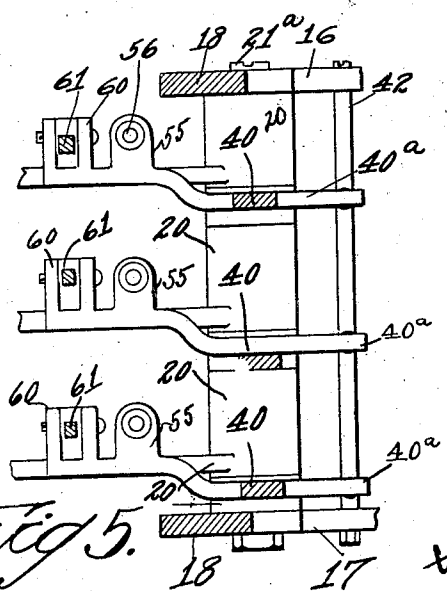


Fig. 5

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UNITED STATES PATENT OFFICE.

ALBERT A. GORDON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

WEFT-DETECTING MECHANISM FOR DROP-BOX LOOMS.

Application filed April 9, 1926. Serial No. 100,979.

This invention relates to weft detecting mechanism for a drop box loom of the general type in which a separate detecting member is provided for each drop box at the detecting end of the loom.

More specifically, my invention relates to devices or attachments by which each separate detecting member may be held inoperative for a pre-determined number of flights of its particular shuttle.

One particular object of my invention is to provide means for moving each detecting member to a position spaced from the weft on the active weft carrier while said member is held inoperative, so that no contact between the detecting member and the weft will occur.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings in which

Fig. 1 is a plan view of portions of a loom to which my improved detecting mechanism is applied;

Fig. 2 is a sectional end elevation of the detecting mechanism, taken along the line 2—2 in Fig. 1;

Fig. 3 is a partial side view of a detecting mechanism, looking in the direction of the arrow 3 in Fig. 1;

Fig. 4 is an enlarged plan view of the detecting mechanism;

Figs. 5 and 6 are detail sectional elevations, taken along the lines 5—5 and 6—6 in Fig. 4; and

Figs. 7, 8, 9, and 10 are diagrammatic views, illustrating the operation of my invention.

Referring to the drawings, I have shown a portion of a loom side 10, a breast beam 11, and a lay 12 having a lay end 13 in which drop boxes 14 are mounted for vertical movement. The mechanism for shifting the drop boxes may be of any usual commercial type and is not shown in the drawings, as it forms no part of my present invention.

A plate or bracket 16 (Fig. 4) is secured to the top of the drop box frame 14 and a similar plate or bracket 17 (Fig. 2) is secured to the bottom of the frame 14. These brackets form a support for the detecting mechanism and each bracket is provided

with a forwardly extended arm 18 on which the numbering wheels are mounted.

A plurality of detector supporting levers 20 are pivoted on a stud 21^a on the brackets 16 and 17, and are mounted for free swinging movement. A detecting member 21 is pivoted at 22 (Figs. 4 and 6) to the outer or swinging end of each detecting arm or lever 20 and a stop pin 23 limits outward swinging movement of each detecting arm.

The members 21 are positioned adjacent the side of a contact member or frame 25, (Fig. 2) pivoted at 26 and 27 to the top and bottom of the drop box frame 14. The upright portion of the frame 25 is thus positioned for engagement by any one of the detecting members 21. At its lower end, the frame 25 is provided with an outwardly projecting arm 28 (Fig. 4) to which is pivoted an indicating rod 29.

When one of the detecting members 21 engages a substantially exhausted weft carrier, said engaging member will slide axially on the weft carrier toward the point or tip thereof, and in so doing will engage the frame 25 and move the indicating rod 29 to the right to a position where it will engage a lever 30 (Fig. 1) as the lay and detecting mechanism moves forward.

The swinging movement of the lever 30 causes a member 31 to be raised into the path of a cam-actuated operating member, (not shown), but which, upon engagement of the member 31, forces the same forward across the top of the breast beam 11.

At its front end, the member 31 is pivoted to an arm 32 mounted on a rock shaft 33, pivoted in bearings at the lower front edge of the breast beam and connected to indicate weft exhaustion to the weft replenishing mechanism at the opposite end of the loom.

A spring 34 is provided to retain the indicating rod 29 normally in inoperative position and a stop collar 35 limits the movement of the indicator rod to the left in Fig. 1.

For a more complete description of the connections between the indicator rod 29 and the weft replenishing mechanism, reference is made to my prior application, Serial No. 83,859, in which this mechanism is fully described.

A series of three-armed levers 40 are mounted on the pivot stud 21^a of the de-

tector supporting levers 20, one lever 40
 being provided for each lever 20. One arm
 40^a of each lever is connected by a spring
 41 to a fixed tie-rod 42 and acts to yield-
 5 ingly hold the lever 40 in the position shown
 in Fig. 4. A second arm 40^b of each lever
 40 is provided with a vertically elongated
 contact plate 43 for engagement by a con-
 tact arm or member 44, extending upwardly
 10 from a hub 45, fixed to a rod 46 supported
 in bearings 47 in fixed relation to the lay
 end 13. A spring 48 normally moves the
 hub 45 and contact member 44 to the right,
 as indicated in Fig. 4, but permits yielding
 15 operative sliding movement of the rod to
 the left.

The hub 45 is also provided with an arm
 50 (Fig. 2) extending rearwardly therefrom
 and connected by a link 51 to a pattern con-
 20 trolled mechanism by means of which the
 contact member 44 will be at all times posi-
 tioned opposite the contact plate 43 of the
 particular lever 40 which is associated with
 the shuttle about to become active. For a
 25 full disclosure and description of the pattern
 controlled connections for the link 51, refer-
 ence is again made to my prior application,
 Serial No. 83,859.

The right hand end of the spring 48 (Fig.
 30 2) is engaged beneath the arm 50 and acts
 to yieldingly swing the contact member 44
 toward the front of the loom, movement in
 the opposite direction being effected under
 the control of the pattern mechanism.

35 The third arm 40^c of each of the three-
 armed levers 40 is provided with a lug or
 projection 55 (Fig. 4), through which a bolt
 56 is loosely slidable. The bolt 56 also ex-
 tends through a similar lug 57 on the as-
 40 sociated detecting lever 20 and a spring 58
 is interposed between the lugs 55 and 57.
 The spring thus holds each lever 40 and its
 associated lever 20 in yieldingly spaced rela-
 tion, the exact amount of separation being
 45 determined by the bolt 56.

Each arm 40^c of each lever 40 is also pro-
 vided with an upward projection 60 in which
 is pivoted a locking lever or latch 61. The
 shape of these locking levers is clearly shown
 50 in Fig. 10, each lever 61 being provided with
 locking shoulders 62 and 63 and with an in-
 terposed cam surface 64. The other end of
 each locking lever is formed as a tapered
 point 65, positioned for engagement by a
 55 rotatable control member 66.

One of these control members is provided
 for each of the locking levers 61 and all of
 the control members are loosely pivoted upon
 a stud 67, secured in the arms 18 of the
 60 brackets 16 and 17. Each control member
 66 is made in the form of a double cone, hav-
 ing a double conical surface which is inter-
 rupted at one point on one face, as indi-
 cated at 68 in Fig. 4.

65 A ratchet wheel 70 is secured to each con-

trol member 66 and is rotatable therewith.
 A spring locking pawl 71 for each ratchet
 wheel 70 holds the wheel yieldingly from
 rotation and a separate feed pawl 72 pivoted
 at 73 on the arm 40^b of the associated lever
 40 acts to advance each ratchet wheel one
 70 space for each actuation of its lever 40.

Having described the details of construc-
 tion of my improved detecting mechanism,
 the operation thereof is as follows:

75 The contact arm or member 44 is intermit-
 tently shifted by the connections from the
 pattern mechanism to successive position op-
 posite the contact plate 43 belonging to the
 detecting mechanism for the shuttle about
 80 to become active or about to be thrown across
 the lay. The contact member remains in this
 position opposite one plate 43 as long as
 that particular shuttle is active.

As the lay moves forward, a roll 75 (Fig.
 85 1) on the end of the sliding rod 46 engages
 a cam plate 76 fixed to the loom frame 10
 and is forced to the left (Figs. 1 and 4), giv-
 ing the contact member 44 an operative
 movement by which the selected arm 40 is
 90 moved angularly in a clockwise direction, at
 the same time advancing the associated de-
 tecting member 21 through the slot in the
 shuttle, to engage the weft carrier W in the
 selected shuttle, and to indicate the supply
 95 of weft thereon. If the supply of weft is
 sufficient, the detecting member 21 will be
 held from sliding movement along the weft
 carrier and the frame 25 and indicator rod 29
 100 will not be shifted to indicate weft replenish-
 ment.

When the member 21 engages a well filled
 weft carrier W, further swinging movement
 of the lever 20 is thereby prevented, while
 the lever 40 continues to move clockwise,
 105 thus compressing the spring 58 and allowing
 the locking lever or latch 61 to drop over
 the lever 20 to the position shown in Fig.
 8, with the lever held behind the shoulder 62.

As the levers 40 and 20 return to their
 110 normal outward position, the end 65 of the
 locking lever 61 engages the upper side of
 the associated double cone control member
 66 and is forced thereby to the position
 shown in Fig. 9. By this movement, the
 115 lever 20 is further withdrawn by the cam
 face 64 and is finally positioned behind the
 shoulder 63, in which position the detecting
 member 21 is so far withdrawn that it does
 not engage the weft on the weft carrier W,
 120 even when swung rearward to detecting posi-
 tion.

The contact member 44 continues to swing
 the detector rearward at every alternate beat
 of the lay so long as that particular shut-
 125 tle remains in operation and on each such
 rearward motion the pawl 72 advances the
 ratchet wheel 70 one space. When the
 ratchet wheel has been rotated for almost a
 complete revolution, the offset or raised por-
 130

tion 68 of the control member is positioned for engagement by the point 65 of the latch 61 upon its next return movement from detecting position, and on such return movement the latch is shifted to the position indicated in Fig. 10, releasing the lever 20 so that the detecting member 21 will engage the weft on the weft carrier W on its next detecting movement.

If a sufficient supply of weft is found, the lever 20 will be again latched in the position shown in Fig. 8, and will be thereafter moved to the position shown in Fig. 9 for another revolution of the ratchet wheel 70 and its control member 66. If the shuttles are shifted before the rotation of the ratchet wheel and control member are completed, the holding pawl 71 retains the parts in the position then occupied until the return of that particular shuttle to running position when the count is continued.

Each separate weft detecting member is thus withdrawn from operative position after a single engagement by a well-filled weft carrier, and is retained in inoperative position until a full revolution of its ratchet wheel and control member. Each detector is thus retained inoperative for a predetermined number of flights of its shuttle, regardless of the changes of the shuttle boxes and regardless of the movements of the other shuttles in the loom.

When, however, the weft in any one of the shuttles is so far reduced in diameter that the corresponding lever 20 is not forced forward by detecting engagement therewith far enough for engagement with the shoulder 62, as indicated in Fig. 8, the locking device for that particular lever 20 will thereafter remain inoperative and the detecting member will detect every time that shuttle returns to the detector side of the loom until the partly exhausted weft carrier therein has become substantially exhausted, whereupon weft replenishment will be indicated by the indicating rod 29.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed otherwise than as set forth in the claims, but what I claim is:—

1. In a drop box loom having a lay and a plurality of shifting shuttle boxes at the detecting end thereof, a separate weft detecting member permanently associated with each of said shuttle boxes, means effective to selectively actuate the detecting member for the shuttle about to be picked from the detecting end of the lay, a separate disabling device for each detecting member, and separate counting means for each disabling device, each counting means being advanced only while the associated shuttle is active.

2. In a drop box loom having a lay and a

plurality of shifting shuttle boxes at the detecting end thereof, a separate weft detecting member permanently associated with each of said shuttle boxes, means effective to selectively actuate the detecting member for the shuttle about to be picked from the detecting end of the lay, a separate disabling device for each detecting member, and separate counting means for each disabling device, each counting means being advanced only while the shuttle is active and being held in the position to which it has been advanced so long as its shuttle is inactive.

3. In a drop box loom having a lay and a plurality of shifting shuttle boxes at the detecting end thereof, a separate weft detecting member permanently associated with each of said shuttle boxes, means effective to selectively actuate the detecting member for the shuttle about to be picked from the detecting end of the lay, means to advance each detecting member toward its shuttle at every alternate flight thereof, and means to prevent contact of each detecting member with the weft in its shuttle for predetermined periods of active operation of said shuttle.

4. In a drop box loom having a lay and a plurality of shifting shuttle boxes at the detecting end thereof, a separate weft detecting member permanently associated with each of said shuttle boxes, means effective to selectively actuate the detecting member for the shuttle about to be picked from the detecting end of the lay, means to advance each detecting member toward its shuttle at every alternate flight thereof, means to hold said detecting member slightly withdrawn from weft detecting position, means to withdraw said member further from said weft detecting position, and means to release said detecting member after a predetermined number of flights of the indicated shuttle.

5. In a drop box loom having a lay and a plurality of shifting shuttle boxes at the detecting end thereof, a separate weft-detecting member permanently associated with each of said shuttle boxes, means effective to selectively actuate the detecting member for the shuttle about to be picked from the detecting end of the lay, means to advance each detecting member toward its shuttle at every alternate flight thereof, and means to withdraw said detecting member from detecting position when thus advanced, said means being inoperative when the weft in the indicated shuttle is reduced below a predetermined diameter.

6. In a drop box loom having a lay and a plurality of shifting shuttle boxes at the detecting end thereof, a separate weft-detecting member permanently associated with each of said shuttle boxes, means effective to selectively actuate the detecting member

- for the shuttle about to be picked from the detecting end of the lay, means to advance each detecting member toward its shuttle at every alternate flight thereof, means to withdraw said detecting member from weft-engaging position even when thus advanced, and means to release said detecting member after a predetermined number of flights of the indicated shuttle.
7. The combination in a drop box loom as set forth in claim 6, in which said withdrawing means includes a double conical engaging member having an outwardly projected release portion at one point in its periphery.
8. The combination in a drop box loom as set forth in claim 6, in which said withdrawing means includes a latch having two shoulders and an intervening cam portion, and means to move said latch to operative and inoperative position.
9. The combination in a drop box loom as set forth in claim 6, in which said withdrawing means includes a latch having two shoulders and intervening cam portion, and includes a rotatable member effective in certain angular positions to move said latch to operative position and in another position to release said latch.
10. The combination in a drop box loom as set forth in claim 6, in which said withdrawing means includes a latch having two shoulders and intervening cam portion, and includes a rotatable member effective in certain angular positions to move said latch to operative position, and in another position to release said latch, and includes counting means effective to give said rotatable member an intermittent motion during active operation of the associated shuttle.
11. In a drop box loom having a lay and a plurality of shifting shuttle boxes at the detecting end thereof, a separate weft detecting member permanently associated with each of said shuttle boxes, separate connecting devices selectively actuated to give a detecting movement to the detecting member for the shuttle about to be picked from the detecting end of the lay, and means effective to hold each detecting member inoperative after a detecting movement until its particular connecting device has been ineffectively operated a predetermined number of times.
12. In a drop box loom having a lay and a plurality of shifting shuttle boxes at the detecting end thereof, a separate weft detecting member permanently associated with each of said shuttle boxes, separate connecting devices selectively actuated to give a detecting movement to the detecting member for the shuttle about to be picked from the detecting end of the lay, and a separate disabling device effective to hold each detecting member inoperative after a detecting movement until its particular detecting device has been ineffectively operated a predetermined number of times, each disabling device operating entirely independently of the other disabling devices.
- In testimony whereof I have hereunto affixed my signature.

ALBERT A. GORDON.