

E. H. FORD.
 WARP STOP MOTION FOR LOOMS.
 APPLICATION FILED MAY 9, 1908.

907,982.

Patented Dec. 29, 1908.

Fig. 1.

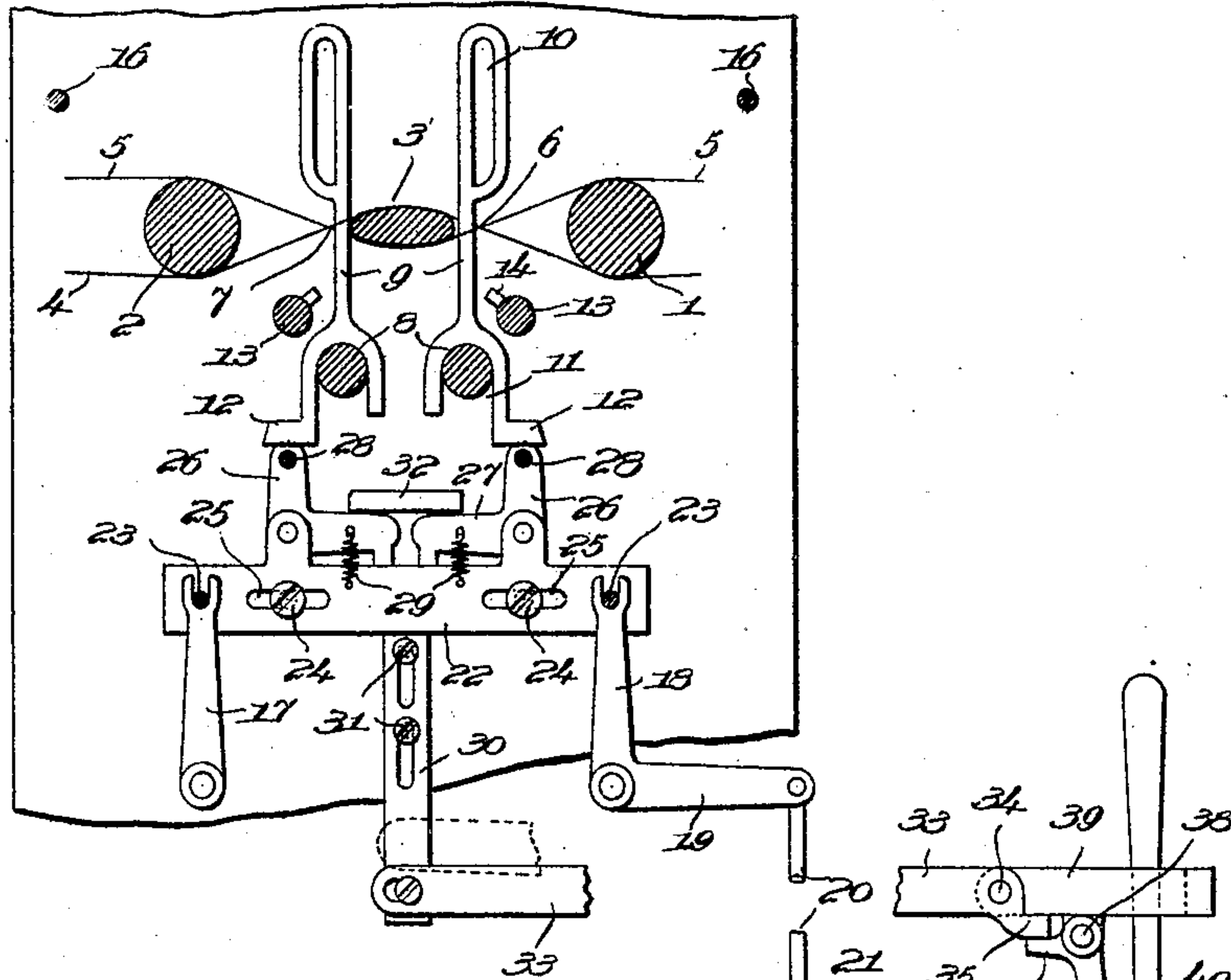


Fig. 2.

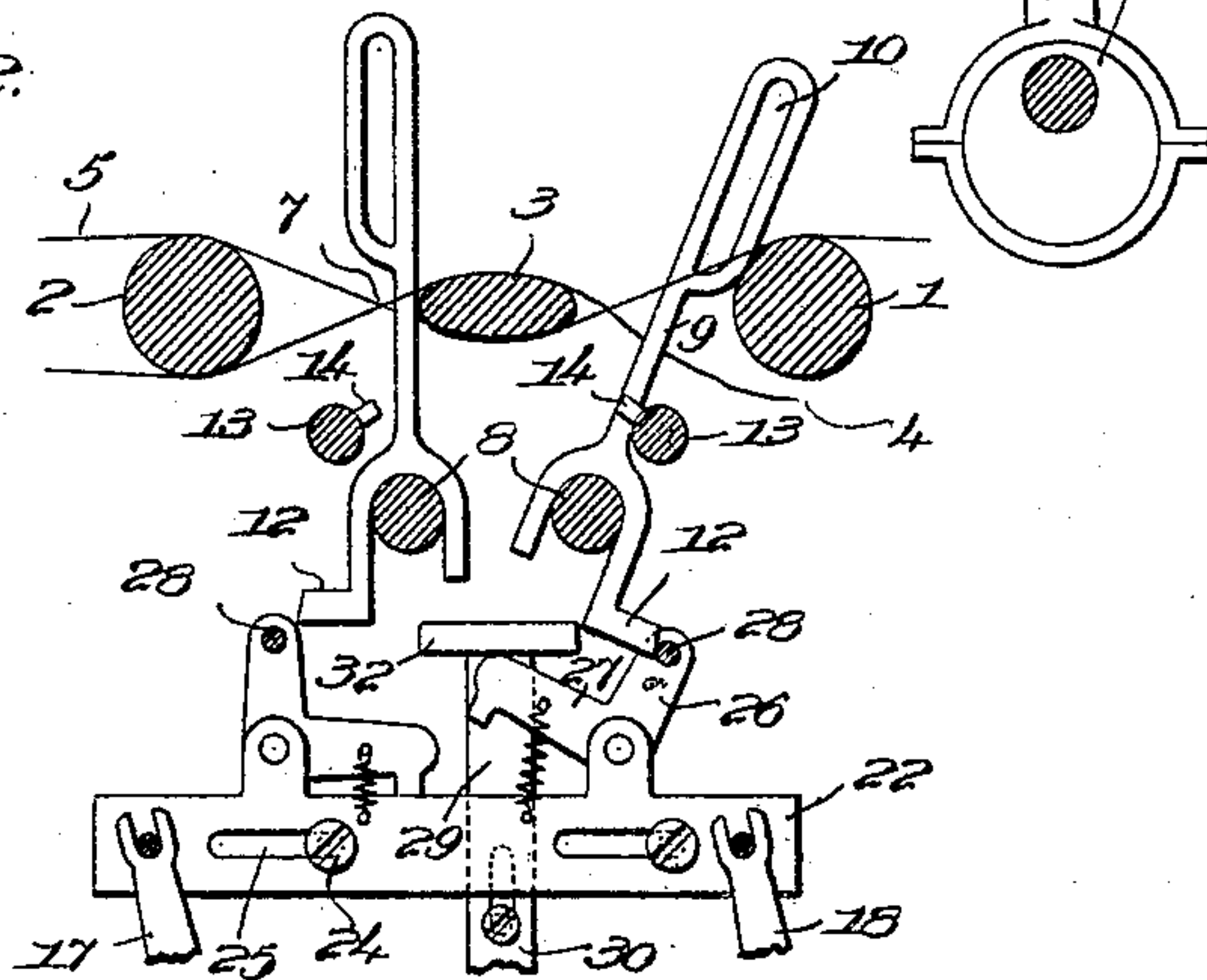
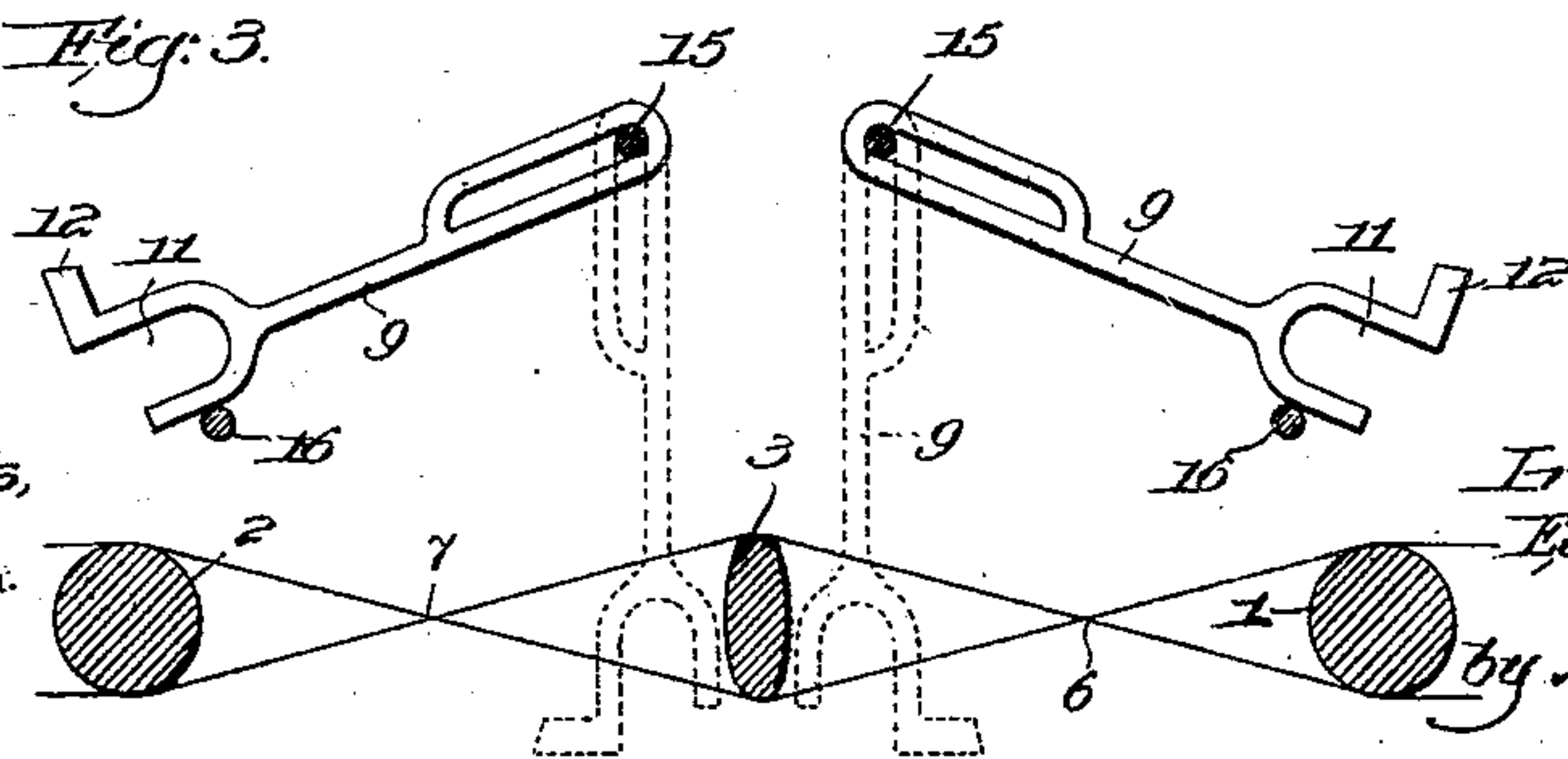


Fig. 3.



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UNITED STATES PATENT OFFICE.

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WARP STOP-MOTION FOR LOOMS.

No. 907,982.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed May 9, 1908. Serial No. 431,904.

To all whom it may concern:

Be it known that I, EDWIN H. FORD, a citizen of the United States, and resident of New Bedford, county of Bristol, State of Massachusetts, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention has for its object the production of a novel warp stop-motion particularly adapted for use in looms, of such construction and arrangement that the number of controlling detectors is materially reduced for a given number of ends, the detectors being so supported that the greater portion of the weight thereof is taken off the warp.

In accordance with my invention each detector coöperates with two warp-threads at their crossing point between leasing members, so that upon failure of either or both threads of a pair the detector moves into abnormal position and through suitable intermediate mechanism brings about stoppage of the looms.

The detectors are so constructed that they can be readily applied to or removed from the support on which they are angularly movable, and I have also provided means whereby the setting of the detectors is effected easily and quickly.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a transverse sectional view of a warp stop-motion embodying one form of my present invention, two series of detectors being shown in normal position; Fig. 2 is a similar view but showing a detector as moved into abnormal position, to illustrate the effect of such movement upon other portions of the mechanism; Fig. 3 is a view showing the mode of setting the detectors.

In the present embodiment of my invention I employ front and back lease rods 1, 2, which may be cylindrical in cross-section, and a central lease-rod 3 preferably elliptical in cross-section and under normal circumstances with its longer transverse axis lying in the direction of warp travel. The warp is divided as shown, one section 4

passing over the rod 3 and under rods 1 and 2, while the other section 5 passes under rod 3 and over the rods 1 and 2, the crossing points being indicated at 6 and 7. Below the lease-rods, and substantially underneath the crossing points 6 and 7 I mount two like and fixed detector supports 8, extended from one to the other side of the loom and cylindrical in cross-section, these supports vertically sustaining the detectors of the two series and also forming fulcrum upon which they can rock, and as will appear later the detectors are readily applied to or removed from said supports.

The detectors are preferably made of thin sheet-metal each comprising an elongated narrow body 9 enlarged to form a widened offset head longitudinally slotted at 10, the lower end of the body being bifurcated or forked, as at 11, to easily embrace a support 8, that one of the legs at the same side of the body as the offset head being elongated and having an outturned foot 12.

When the detectors are in normal position, Fig. 1, the narrow bodies thereof extend upward between the lease-rod 3 and the adjacent crossing-point of the warps, the slotted head and the foot 12 being turned toward one of the outer lease-rods, so that the preponderance of weight causes a detector to swing toward such outer lease-rod, upon its support 8 as a fulcrum, if either or both of its crossed warp-threads fails. Inasmuch as the weight of the detector is in the main sustained by the support 8 there is no objection to the use of the stop-motion with the lightest or finest yarns, as will be obvious.

Outside of each series of detectors I suitably support a transverse rod 13 having comb-like teeth 14 turned toward the detectors, as shown in Figs. 1 and 2, a released detector swinging over into the position shown at the right hand, Fig. 2, into abnormal position, its body entering between two of the comb-teeth 14, preventing any twisting of the detector.

Before describing the mechanism whereby an abnormally positioned detector effects the operation of the loom-stopping instrumentality I will explain the manner of setting the detectors. A removable rod 15 is inserted in the slots 10 of the detector heads of a series, as in Fig. 1, the rods being temporarily sustained in any suitable manner at the

loom-sides, and the bifurcated ends 11 rest on temporary supports 16, the detectors being set after the warp is tied in the loom. The center lease-rod 3 is turned halfway round, Fig. 3, and the rods 1 and 2 are moved a considerable distance apart, enough to bring the crossing points 6 and 7 far enough from the center lease-rod 3 to permit freedom in setting the detectors. The number of detectors in each series is one quarter the whole number of warp-threads, and each detector is grasped by its head and drawn upward clear of the temporary support 16 and into upright position, and then dropped between the lease-rod 3 and one of the crossing points, the lower end of the detector passing between the pair of threads which cross, as shown in dotted lines Fig. 3.

The detectors are set in alternation from the back and front series, until all are in dotted line position, Fig. 3, after which, by grasping the rods 15 the two series are placed on the permanent supports 8, the rods 15 are withdrawn, and the toothed bars or rods 13 are positioned as shown in Fig. 1, so that when the lease-rods are restored to the position shown in Fig. 1 the stop motion is ready for use. At the inner face of each loom side I mount upturned rocker-arms 17, 18, the latter having a lateral extension 19 connected by a link 20 with an eccentric cam 21, Fig. 1, on the cam-shaft of the loom, the cam serving to swing the arm 18 back and forth.

A bar 22 is pivotally connected with the slotted upper ends of the rocker-arms by rods 23 which extend across the loom and are fixedly secured at the opposite side to a bar like the bar 22, so that the two bars will be reciprocated in unison, said connected bars constituting a feeler-carrier located below the lower ends of the detectors. I prefer to guide the bars by means of headed studs 24 extended through longitudinal slots 25 in the bars and fixed in the loom sides or adjacent parts. Each bar has pivotally mounted upon it two bell-cranks 26, 27 the upturned arms 26 of opposite bell-cranks being connected by a transverse rod 28 constituting a feeler for one of the series of detectors, the bell-cranks being normally held stationary relative to the bars 22 by means of light springs 29 attached to the arms 27 and to the bar. Normally the feelers 28 reciprocate just below the feet 12 of the detectors, the feelers having no movement relative to the bar 22 of the feeler-carrier on which they are mounted, but if a warp-thread fails its detector is released and swings into the position shown at the right, Fig. 2. Thereby its foot 12 is moved into the path of its feeler 28 and on the stroke of the carrier to the left, viewing Fig. 2, the feeler is arrested and the bell-cranks to which it is connected are rocked on their fulcras, lifting the inturned arms 27, as shown.

At one side of the loom a link 30 is mounted to slide vertically on studs 31, Fig. 1, said link having an elongated head 32 which at all times overhangs the arms 27 of the adjacent pair of bell-cranks, the lower end of the link being pivotally connected with an arm 33. When the movement of a feeler 28 in unison with the feeler-carrier is arrested by a released detector the elevation of the arm 27 of the rocked bell-crank which is under the head 32 will act upon said head to lift the link 30, as in Fig. 2, and the arm 33 will be moved to dotted line position Fig. 1. Such movement is made operative to effect the release of the shipper, it being understood that for the series of detectors nearest the lease-rod 1 the feeling stroke of the feeler-carrier is to the left, Fig. 1, while for the other series of detectors the feeling stroke is toward the right, each stroke of the feeler-carrier thus being a feeling stroke for one series of the detectors.

Various devices may be utilized to effect release of the shipper by the described movement of the arm, and in Fig. 1 I have shown one arrangement which may be used. The arm 33 is pivoted at 34 on the breast-beam and has a finger 35 extended above the short arm 36 of a knock-off lever 37 fulcrumed at 38 on the notched holding-plate 39 for the shipper 40. When the rear end of arm 33 is raised as has been described the finger 35 is depressed and acts upon the short arm 36 of the knock-off lever 37, moving the latter sufficiently to push the shipper out of its holding notch. As the preponderance of weight of a detector is at one side of its longitudinal axis the detector when released falls in that direction and away from the center lease-rod 3, a released detector showing clearly as it is then well out of alinement with the normally positioned detectors of the series.

Various changes in details of construction and arrangement may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a warp stop-motion for looms, leasing members to separate the warp into divisions, a series of angularly movable detectors normally maintained inoperative by engagement with pairs of warp-threads at their crossing between the leasing members, each detector having its lower end bifurcated, a fixed support loosely embraced by the bifurcated ends of said detectors, the latter being mainly sustained by said support and pivotally movable thereon into abnormal position when released by failure of a warp-thread, the bifurcated ends of the detectors permitting their instant removal from or application to the support, and means

adapted to effect loom stoppage by or through abnormal positioning of a released detector.

2. In a warp stop-motion for looms, leasing 5 members to separate the warp into divisions, a series of angularly movable detectors bifurcated at their lower ends and normally maintained in substantially upright position by engagement with pairs of warp- 10 threads at their crossing between the leasing members, a fixed support upon which the bifurcated lower ends of the detectors are pivotally and removably mounted, each detector having a lateral foot adjacent its 15 bifurcation, a reciprocating feeler-carrier, a feeler movable with and also relatively to the carrier and adapted to be engaged by the foot of a released detector and moved relatively to the carrier, and means to effect the 20 operation of a stopping instrumentality when the feeler is moved relatively to the feeler-carrier.

3. In a warp stop-motion for looms, front and back lease-rods and a center lease- 25 rod, dividing the warp into sheets with crossing points front and back of the center lease-rod, a series of detectors interposed between said lease-rod and each set of crossing points, each detector being held 30 in inoperative position by the crossing of two warp threads, means independent of the lease-rods to detachably and pivotally support the major portion of the weight of the detectors, and means to effect the opera- 35 tion of a loom-stopping instrumentality by coöperation with a detector released by failure of either or both of its controlling warp-threads.

4. In a warp stop-motion for looms, 40 front and back lease-rods and a center lease-rod, dividing the warp into sheets with crossing points front and back of the center lease-rod, a series of detectors interposed between said lease-rod and each set of 45 crossing points, each detector being held in inoperative position by the crossing of two warp-threads, transverse supports upon which the lower ends of the detectors are pivotally and detachably mounted, a 50 toothed bar to engage and prevent twisting of a released detector, a feeler for each series of detectors, normally reciprocated below them, a released detector engaging and effecting a change in the movement of its 55 feeler, and means to effect loom stoppage by or through such change in the movement of the feeler.

5. In a warp stop-motion for looms, front and back lease-rods and a center-lease- 60 rod, dividing the warp into sheets with crossing points front and back of the center lease-rod, a series of detectors interposed

between said lease-rod and each set of crossing points, each detector being held in inoperative position by the crossing of two 65 warp-threads, each detector having a longitudinally slotted head adapted to receive temporarily a sustaining rod when the detectors are set, transverse temporary sup- 70 ports for the lower ends of the detectors at such time, a permanent support upon which the lower ends of the detectors of a series are pivotally and detachably mounted when in set position, and means to effect loom stoppage by engagement with a released de- 75 tector.

6. In a warp stop-motion for looms, two series of detectors each held in inoperative position by engagement with the cross- 80 ing point of a pair of warp-threads, leasing members to divide the warp into two sheets with two sets of crossing points, a feeler-carrier reciprocated below the lower ends of the detectors, supports upon which the de- 85 tectors are pivotally mounted at their lower ends, two feelers mounted to swing on the feeler-carrier and normally moving in unison therewith, a released detector engaging a feeler and rocking it relatively to the car- 90 rier, a link abnormally positioned by rocking movement of a feeler, and means to effect loom stoppage by such abnormal positioning of the link.

7. A stop-motion detector having an elongated body and a bifurcated lower end, 95 and a feeler engaging foot on its lower end extended from one side of the bifurcation at right angles to the body.

8. A stop-motion detector having an elongated body provided with a longitudi- 100 nally slotted head at its upper end and having its lower end bifurcated, and a feeler-engaging foot on the bifurcated end.

9. A stop-motion detector having an elongated body, provided with a longitudi- 105 nally slotted head at its upper end and having its lower end bifurcated, and a feeler-engaging foot on the bifurcated end, the head and said foot being located at one side of the longitudinal axis of the detector. 110

10. A flat, sheet-metal stop-motion de- 115 tector having an elongated body provided with a longitudinally slotted head and bifurcated at its lower end to loosely embrace a fixed support, and a foot extended laterally from one side of said lower end adjacent the bifurcation thereof.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

EDWIN H. FORD.

Witnesses:

GEO. H. POTTER,
THOMAS THOMPSON.