

No. 754,290.

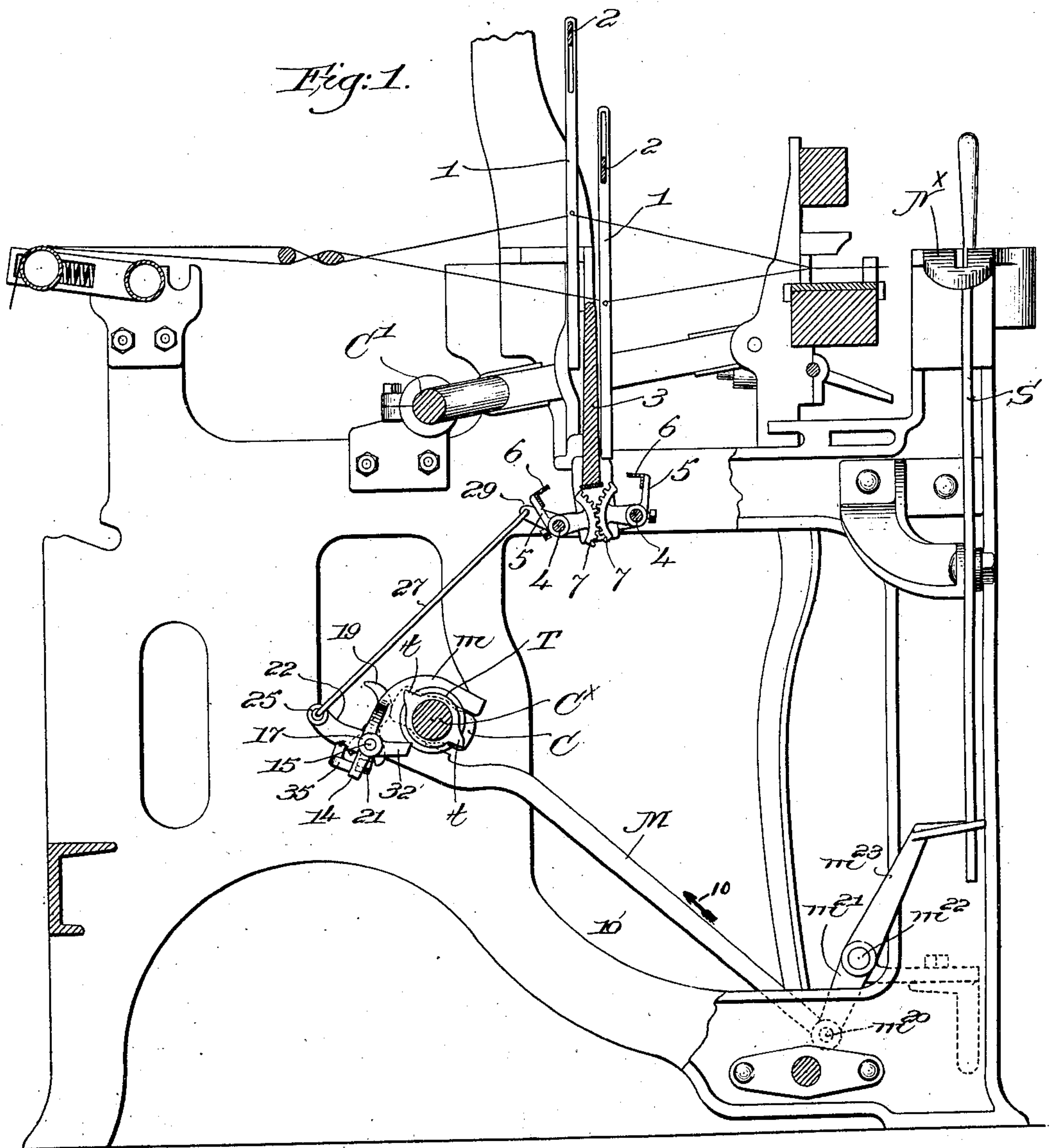
PATENTED MAR. 8, 1904.

C. H. DRAPER.
WARP STOP MOTION FOR LOOMS.

APPLICATION FILED DEC. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses,
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J. Wm. Lutton.

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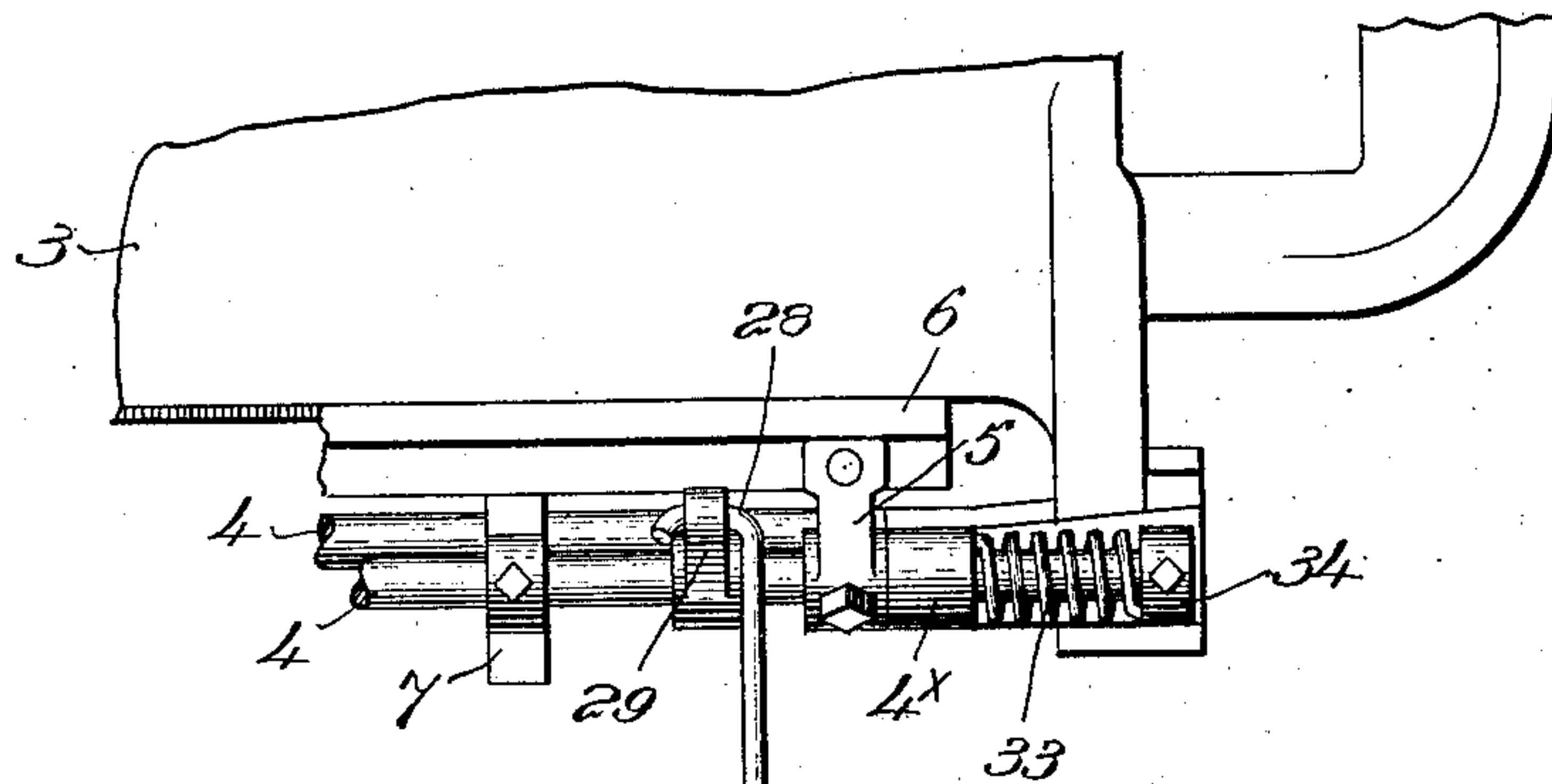


Fig. 2.

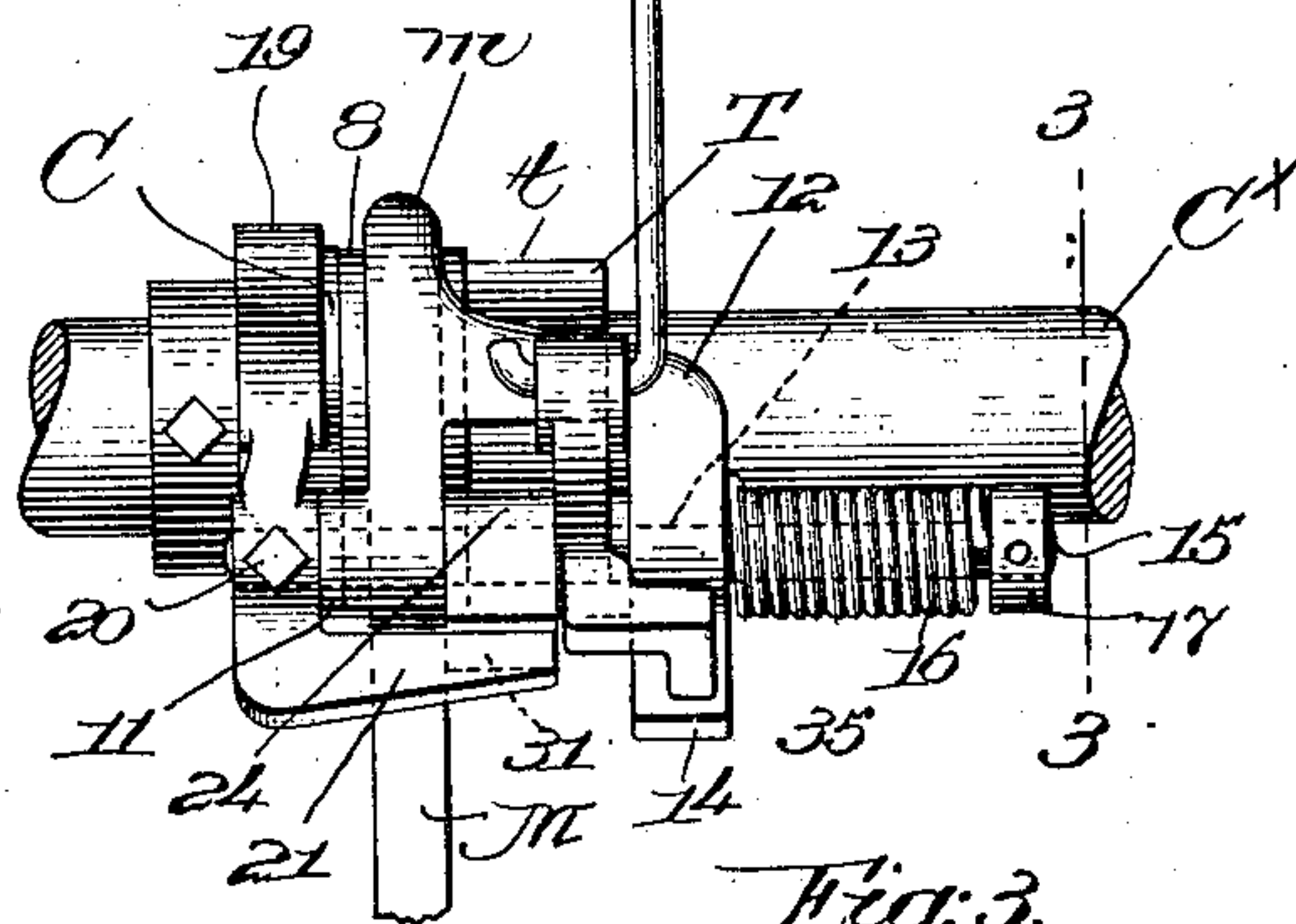


Fig. 3.

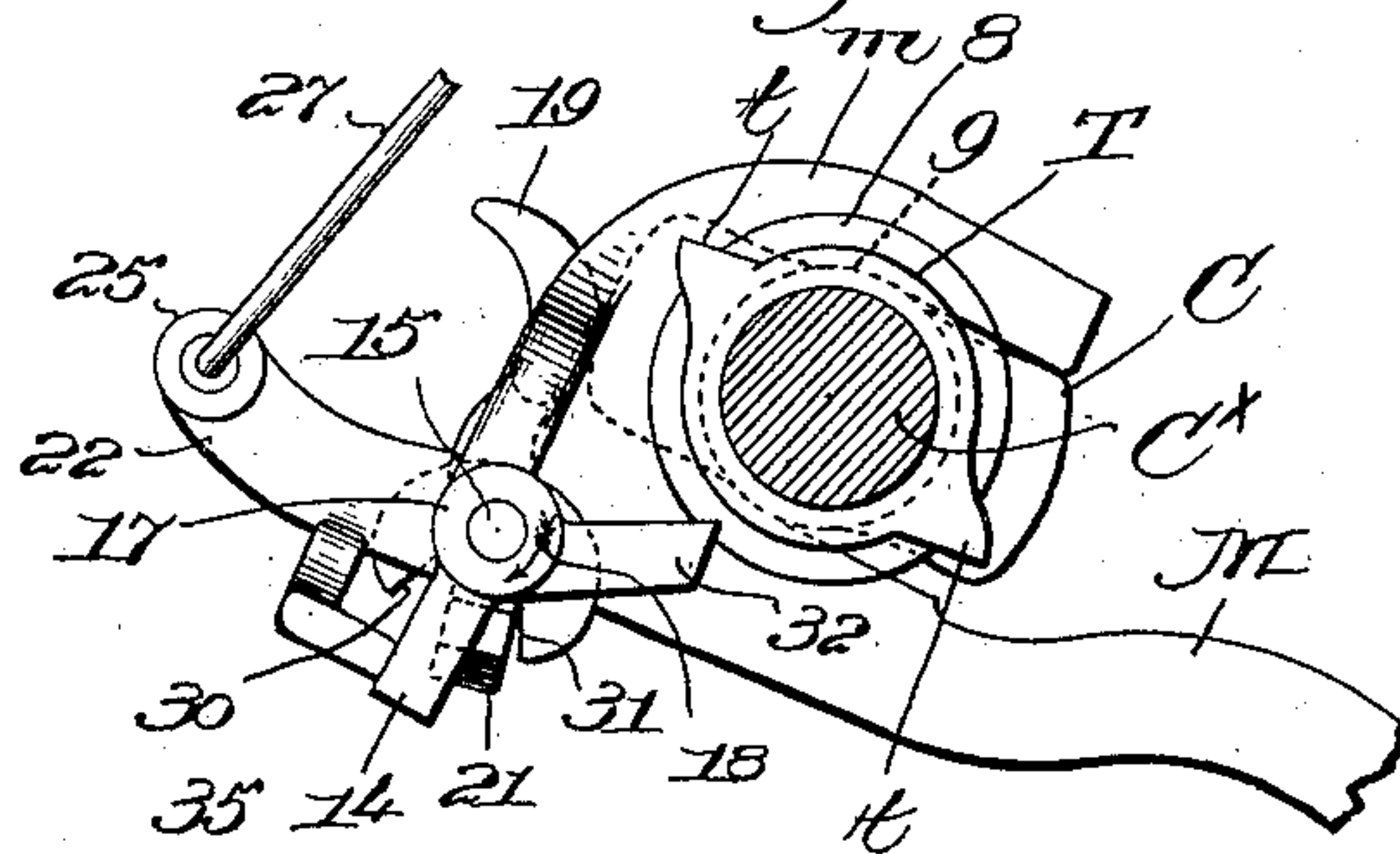


Fig. 4.

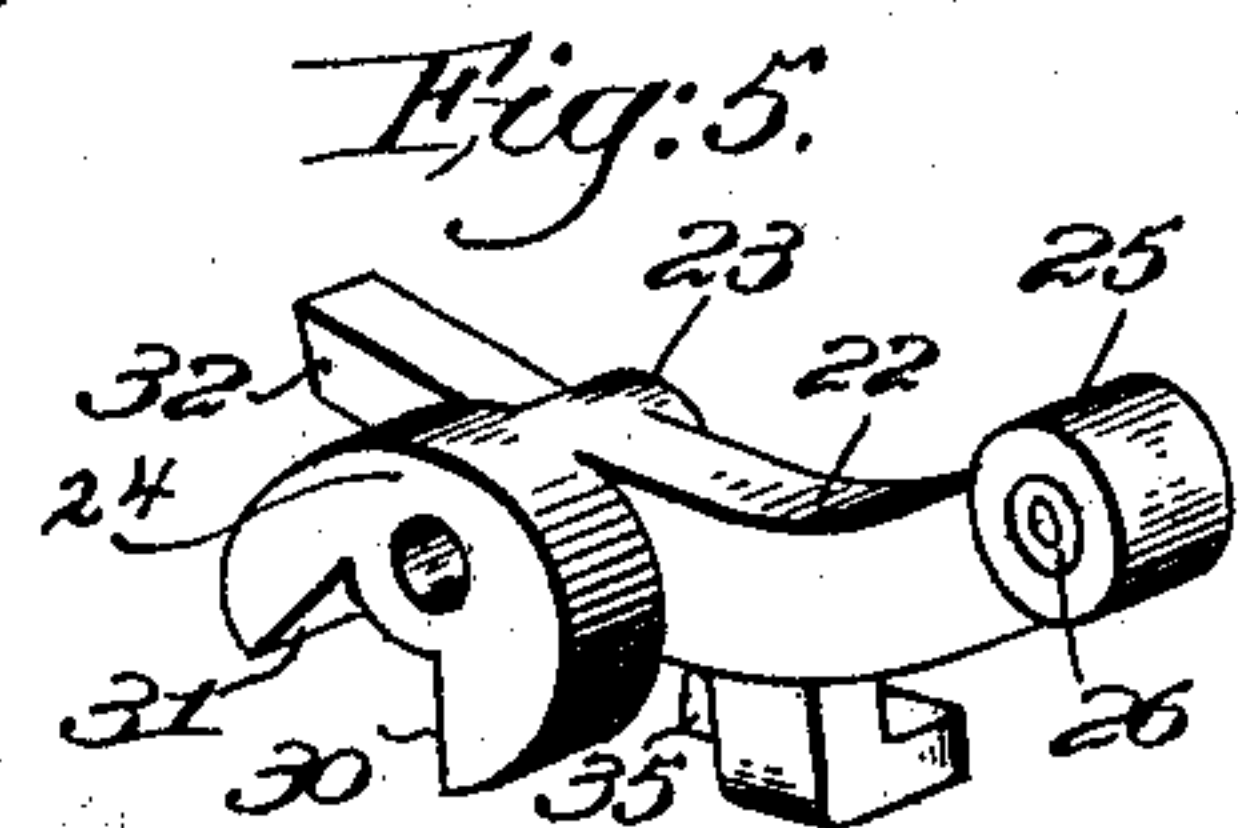


Fig. 5.

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UNITED STATES PATENT OFFICE.

CLARE H. DRAPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO
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WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 754,290, dated March 8, 1904.

Application filed December 24, 1903. Serial No. 186,451. (No model.)

To all whom it may concern:

Be it known that I, CLARE H. DRAPER, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates more particularly to warp-stop-motion mechanism for looms wherein the detectors are normally supported or retained in inoperative position by the warp-threads, failure or undue slackness of a warp-thread releasing its detector and permitting it to move into position to cooperate with a feeler and through suitable means effect the operation of a stopping instrumentality.

In my present invention I have provided novel means for operating the feeler to effect the feeling and non-feeling strokes thereof, and I have also provided means to prevent subjection of a released detector to any material strain when engaged by the feeler.

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 portion of a loom having one embodiment of my invention applied thereto. Fig. 2 is an enlarged view, in rear elevation and looking toward the front of the loom, of the mechanism for effecting the movement of the feeler, together with the devices which serve to actuate a stopping instrumentality upon the arrest of the feeler by a detector released by failure or undue slackness of its warp-thread. Fig. 3 is a sectional detail on the line 3-3, Fig. 2, looking toward the left. Fig. 4 is a side view of the rocker and bunter to be hereinafter referred to, and Fig. 5 is a perspective view of the rocker shown in Fig. 4.

In the present embodiment of my invention I have shown the warp-stop-motion mechanism as belonging to that type wherein the stop-motion-controlling detectors also serve as

heddles, and in Fig. 1 two series or banks of detector-heddles 1 1 are shown slotted at their upper ends to receive transverse supporting-bars 2, which are secured to or form a part of the reciprocating harness-frames in a manner well known to those skilled in the art. The lower ends of the series of detectors are separated by an upright plate 3, extended across the loom, such plate also serving as a back-stop to support the adjacent edge of a released detector.

Two parallel rock-shafts 4 are suitably mounted in bearings below the plate or separator 3, and said rock-shafts are provided with rocker-arms 5, which have attached feelers 6.

The rock-shafts 4 have attached and intermeshing segment-gears 7, whereby rocking motion imparted to one shaft will be imparted simultaneously to the other shaft 4, but in the opposite direction, so that the feelers 6 will be moved toward and from the lower ends of the series of detectors when the loom is running under normal conditions.

By those skilled in the art it will be understood that if a detector when in the lower plane of the shed is released by or through failure or undue slackness of its warp-thread such detector will drop from the position shown in Fig. 1, so that its lower end will be in the path of the cooperating feeler on the feeling stroke, and the engagement of the feeler with the detector will arrest the feeler before it has completed its feeling stroke.

The cam-shaft C^x of the loom has secured to it a feeler-cam C and an adjacent bunter-cam T, shown as a tappet-cam having two tappets t , the feeler-cam being shown as a double cam—that is, the cam is so constructed as to operate twice for each revolution of the cam-shaft, inasmuch as the latter rotates once for every two revolutions of the usual crank-shaft C' . (See Fig. 1.)

Viewing Figs. 2 and 3, a collar 8 is secured to the cam-shaft between the feeler and bunter cams in any suitable manner, and such collar may very conveniently be made an integral part and connecting the two cams, the collar being annularly grooved at 9, (see dotted lines,

Fig. 3,) to be partially embraced by the upper hook-like end m of a movable member or link M , the lower end of the link being pivotally connected at m^{20} (see Fig. 1) to an arm m^{21} , fast on a short shaft m^{22} , supported on the loom-frame, such shaft having a knock-off arm m^{23} rigidly secured to it and in coöperative engagement with the lower end of the shaft S , the arrangement being such that longitudinal movement of the member or link M in the direction of the arrow 10, Fig. 1, will operate to release the shipper from its holding-notch in the usual plate N^x , to thereby automatically stop the loom by any suitable belt-shipping or power-releasing device. (Not herein shown.) The hook m is provided with a bearing-hub 11 (see Fig. 3) on one side, and on the opposite side the hook is extended to form a yoke 12, having a bearing at 13 in alinement with the bearing 11, and below such bearing the yoke is extended to form a stop 14 for a purpose to be described.

A rock-shaft 15 is extended through and supported in the bearings 11 and 13 and is surrounded by a spiral spring 16, one end of which is secured to the yoke, while the other end of the spring is attached to a collar 17, fast on the rock-shaft. The spring is so wound as to normally turn the rock-shaft in the direction of the arrow 18, Fig. 3.

A follower 19 is made fast on the rock-shaft 15, as by a set-screw 20, (see Fig. 2,) adjacent the bearing 11, said follower being held in coöperative relation with the feeler-cam C by the action of the spring 16, whereby rotation of the cam-shaft C^x will rock the shaft 15, such rocker being effected twice for each revolution of the cam-shaft. The follower is extended below the rock-shaft 15 and then turned laterally to form an elongated tail 21, which, as shown in Figs. 2 and 3, is located below the nearer portion of the hooked end or head m of the link. This tail constitutes an impact member which moves with the feeler and which operates to effect the normal feeler movement in a manner to be described.

A rocker 22 (shown separately in Figs. 4 and 5) has hubs 23 24 on its opposite sides to receive and rock loosely on the shaft 15 between the bearing portion 13 of the yoke and the nearer side of the link-head m , the rear end of the rocker being upturned and provided with a boss 25, having a hole 26 through it to receive the lower end of a connecting-rod 27, the upper end of the rod being hooked at 28 to form a pivotal connection with an arm 29, fast on one of the feeler rock-shafts 4. (See Figs. 1 and 2.) The hub 24 of the rocker is cut away for a portion of its periphery to present two opposed shoulders 30 and 31, between which extends the tail 21 of the follower, the distance between the shoulders permitting considerable lost motion between the tail and shoulders, as will be manifest from Fig. 3. The rocker has secured to or formed

integral with it a bunter 32, extended toward the front of the loom and movable into and out of the path of the tappets t by oscillation of the rocker on the shaft 15.

Referring to Fig. 2, a light spring 33 is coiled about one of the feeler rock-shafts 4 and attached at one end to a collar 34, fast on such rock-shaft, the other end of the spring being secured to one of the bearings, as 4^x , for the rock-shaft. The spring is so wound that it tends to throw the feelers outward or away from the detectors and to act as a cushion when the feelers are moved inward on their feeling stroke.

Referring to the drawings, particularly Figs. 1, 2, and 3, wherein the feelers are represented as ready to begin their inward stroke when the rotation of the cam-shaft C^x carries the feeler-cam C forward sufficiently to permit the feeler 19 to rock inward toward the cam-shaft, the tail 21 will be lifted and will hit the shoulder 30 of the rocker with a smart blow, the impact thereof being sufficient to turn the rocker on its fulcrum—viz., the shaft 15—in the direction of arrow 18 and elevate the connecting-rod 27. This moves the feelers inward toward the detectors, the momentum due to the blow being sufficient to overcome the resistance of the spring 33 and complete the feeling stroke under normal conditions. When the continued rotation of the cam-shaft brings the other high portion of the cam C into engagement with the follower, the latter is swung toward the rear of the loom, compressing the spring 16, and then the tail 21 hits the rocker-shoulder 31, and the rocker is returned to the position shown in the drawings, assisted by the action of spring 33 and assuming such position before the impact member or tail 21 reaches its final position, as shown in Fig. 3. Movement of the rocker in the direction just noted—that is, opposite to the arrow 18—is limited by means of a stop 35 on the rocker, which stop brings up against the downward extension 14 of the yoke 12. The timing of the parts is so arranged that normally the turning of the rocker to effect the feeling stroke of the feelers will be in time to depress the bunter 32 before one of the tappets t reaches it, the return movement of the rocker to the position shown in Fig. 3 moving the bunter back again into the path of the tappets as the feelers are swung outward or retracted.

When a detector is released and descends into the path of the feeler on the feeling stroke, it engages and arrests the feeler when thrown inward, as has been described, and such arrest of the feeler prevents the bunter 32 from being moved into inoperative position—that is, out of the path of the advancing tappet t . This nearest tappet will then engage the bunter and move it to the left, viewing Fig. 3, and such movement of the bunter by the tappet-cam is transmitted to the mem-

ber or link M by or through the rock-shaft 15, and the movement of the link in the direction of the arrow 10 is effected to thereby release the shipper. The clearance between the shoulders 30 and 31 is such that after the tail 21 has hit shoulder 30 and caused the rocker to turn the said tail will not reengage the shoulder when the follower 19 drops onto the low part of the feeler-cam C, even should the feeler be arrested by a released detector. Consequently the stress of the follower-spring 16 cannot be transmitted to the released detector, and subjection of the latter to injurious strain is obviated. As a matter of fact, the momentum of the rocker and connected feelers is so nearly counterbalanced by the resistance of the spring that when a released detector is engaged by the feeler it receives a light tap, which neutralizes the effect of the momentum and permits the spring 33 to act. The tendency of this spring is to move the feeler away from the detector and to move the bunter 32 more completely into operative position with relation to the bunter-cam T. It follows that if the released detector should from any cause be lifted above the feeler after engagement therewith the stopping instrumentality will still be operated, inasmuch as such engagement has deadened or neutralized the momentum and permits the spring 33 to act, as has been just described. The spring thus acts as a cushion on the feeling stroke, and such stroke is completed only when no obstacle, as a released detector, is interposed to neutralize the momentum of the moving parts, the cushioning action of the spring reducing the force due to momentum, so that very little pressure is imparted to a detector when engaged by the feeler.

As the operation of the stopping instrumentality is not dependent upon a continued engagement of feeler and detector, as has been shown, the action of the stop-motion is made more sure and exact.

So far as I am aware the operation of the feeler in a warp-stop-motion mechanism by momentum superinduced by a blow upon a rocking part connected with the feeler is broadly new, and my invention accordingly is not restricted to the precise construction and arrangement herein shown and described.

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, a series of detectors, a feeler to cooperate with a detector released by failure of its warp-thread, rotating feeler and bunter cams, a member adapted to be moved to effect the operation of a stopping instrumentality, a rocker mounted on said member and operatively connected with the feeler, a bunter governed by the rocker, a follower fulcrumed on the movable member and cooperating with the feeler-cam, and means acting through the follower to oscillate the rocker by intermittent impact thereon, to thereby move the feeler toward and away from the detectors, arrest of the feeler by a released detector instantly acting through the rocker to cause cooperation of the bunter with the bunter-cam, to move said movable member.

2. In a warp stop-motion for looms, a series of detectors, a feeler to cooperate with a detector released by failure of its warp-thread, rotating feeler and bunter cams, a member adapted to be moved to effect the operation of a stopping instrumentality, a rocker mounted on said member and operatively connected with the feeler, a bunter governed by the rocker, a follower fulcrumed on the movable member and cooperating with the feeler-cam, a cushion-spring to prevent shock on the feeling stroke of the feeler, and means acting through the follower to oscillate the rocker by intermittent impact thereon, to thereby move the feeler toward and away from the detectors, arrest of the feeler by a released detector instantly acting through the rocker to cause cooperation of the bunter with the bunter-cam, to move said movable member.

3. In a warp stop-motion for looms, a series of detectors, a feeler to cooperate with a detector released by failure or undue slackness of its warp-thread, rotating feeler and bunter cams, a link longitudinally movable to effect the operation of a stopping instrumentality, a rocker mounted on said link and operatively connected with the feeler, a bunter governed by the rocker, a follower fulcrumed on the link and cooperating with the feeler-cam, and means acting through the follower to oscillate the rocker by intermittent impact thereon, to thereby move the feeler toward and away from the detectors, arrest of the feeler by a released detector instantly acting through the rocker to cause cooperation of the bunter with the bunter-cam, and move the link longitudinally.

4. In a warp stop-motion for looms, a series of detectors, a feeler to cooperate with a detector released by failure of its warp-thread, rotating feeler and bunter cams, a member adapted to be moved to effect the operation of a stopping instrumentality, a rocker mounted on said member and operatively connected with the feeler, opposed impact-shoulders on the rocker, a bunter governed by the latter, a follower fulcrumed on the movable member and cooperating with the feeler-cam, and a tail movable with the follower and extended between the shoulders on the rocker, to oscillate the latter by intermittent impact on the shoulders and thereby move the feeler toward and from the detectors, arrest of the feeler by a released detector instantly acting through the rocker to cause cooperation of the bunter with the bunter-cam, and move the link longitudinally.

5. In a warp stop-motion for looms, a series of detectors, a feeler to cooperate with a detector released by failure of its warp-thread, rotating feeler and bunter cams, a member adapted to be moved to effect the operation of a stopping instrumentality, a rocker mounted on said member and operatively connected with the feeler, a bunter governed by the latter, a follower fulcrumed on the movable member and cooperating with the feeler-cam, and a tail movable with the follower and extended between the shoulders on the rocker, to oscillate the latter by intermittent impact on the shoulders and thereby move the feeler toward and from the detectors, arrest of the feeler by a released detector instantly acting through the rocker to cause cooperation of the bunter with the bunter-cam, to move said movable member.

6. In a warp stop-motion for looms, a series of detectors, a feeler to cooperate with a detector released by failure of its warp-thread, rotating feeler and bunter cams, a member adapted to be moved to effect the operation of a stopping instrumentality, a rocker mounted on said member and operatively connected with the feeler, a bunter governed by the rocker, a follower fulcrumed on the movable member and cooperating with the feeler-cam, and means acting through the follower to oscillate the rocker by intermittent impact thereon, to thereby move the feeler toward and away from the detectors, arrest of the feeler by a released detector instantly acting through the rocker to cause cooperation of the bunter with the bunter-cam, to move said movable member.

rotating feeler and bunter cams, a link movable longitudinally to effect the operation of a stopping instrumentality, a spring-controlled rock-shaft mounted on the link and having fast upon it a follower to cooperate with the feeler-cam, a rocker loosely mounted on the rock-shaft and provided with a bunter movable into and out of the path of the bunter-cam, means acting through the follower to intermittently engage and oscillate the rocker by impact therewith, and a connection between said rocker and feeler, to operate the feeler by oscillation of the rocker, arrest of the feeler by a released detector instantly causing cooperation of the bunter and bunter-cam, to longitudinally move the link.

6. In a warp stop-motion for looms, a series of detectors movable into operative position when released by failure or undue slackness of their warp-threads, a vibratable feeler to cooperate with a released detector, momentum-operated means to vibrate the feeler and means adapted to cause the operation of a stopping instrumentality by or through engagement of the feeler with a released detector.

7. In a warp stop-motion for looms, a series of detectors movable into operative position when released by failure or undue slackness of their warp-threads, a vibratable feeler to cooperate with a released detector, momentum-operated means to move the feeler on its feeling stroke, a spring to cushion such stroke and thereby reduce the impact of the feeler upon a released detector, and means adapted to cause the operation of a stopping instrumentality upon engagement of the feeler and a detector.

8. In a warp stop-motion for looms, a series of detectors movable into operative position when released by failure or undue slackness of their warp-threads, a vibratable feeler to cooperate with a released detector, a rocker operatively connected with and to vibrate the feeler, means to overcome the inertia of the rocker by intermittent impact therewith, the completion of the stroke being due to its momentum, a member adapted by its movement to effect the operation of a stopping instrumentality, and means to cause movement of said member upon engagement of the feeler with a released detector.

9. In a warp stop-motion for looms, a series of detectors movable into operative position when released by failure or undue slackness of their warp-threads, a vibratable feeler to cooperate with a released detector, means to positively initiate the movement of the feeler toward the detectors, the completion of such movement being due to momentum of the moving parts, and a member adapted to cause the operation of a stopping instrumentality upon such engagement.

10. In a warp stop-motion for looms, a series of detectors, a feeler to cooperate with a detector released by failure of its warp-thread,

rotating feeler and bunter cams, a link movable longitudinally to effect the operation of a stopping instrumentality, a spring-controlled rock-shaft mounted on the link and having fast upon it a follower to cooperate with the feeler-cam, a rocker loosely mounted on the rock-shaft and provided with a bunter movable into and out of the path of the bunter-cam, opposed shoulders on the rocker, a connection between the latter and the feeler, to operate the feeler by oscillation of the rocker, and a tail on the follower extended between the shoulders of the rocker and having a limited movement relative thereto, whereby the rocker is oscillated by impact of said tail upon the rocker-shoulders, arrest of the feeler by a released detector instantly causing cooperation of the bunter and bunter-cam to longitudinally move the link.

11. In a warp stop-motion for looms, a series of detectors, a feeler to cooperate with a detector released by failure of its warp-thread, rotating feeler and bunter cams, a link movable longitudinally to effect the operation of a stopping instrumentality, a spring-controlled follower fulcrumed on the link and cooperating with the feeler-cam, a rocker coaxial with the follower and loosely mounted to rock on the link, said rocker having an attached bunter movable into and out of cooperative relation with the bunter-cam, opposed shoulders on the rocker, a laterally-extended impact member on the follower and extended between the shoulders and having lost motion between them, and a connection between the rocker and the feeler to move the latter toward and from the detectors by oscillation of the rocker, engagement of said impact member with the shoulders effecting such oscillation, arrest of the feeler by a released detector instantly causing cooperation of the bunter and bunter-cam to effect longitudinal movement of the link.

12. In a warp stop-motion for looms, a series of detectors, a feeler to cooperate with a detector released by failure of its warp-thread, rotating feeler and bunter cams, a link movable longitudinally to effect the operation of a stopping instrumentality, a spring-controlled follower fulcrumed on the link and cooperating with the feeler-cam, a rocker coaxial with the follower and loosely mounted to rock on the link, said rocker having an attached bunter movable into and out of cooperative relation with the bunter-cam, opposed shoulders on the rocker, a laterally-extended impact member on the follower and extended between the shoulders and having lost motion between them, a cushion-spring to prevent shock when the feeler engages a released detector, a connection between the rocker and the feeler to move the latter toward and from the detectors by or through the oscillation of the rocker, engagement of the impact member with the rocker-shoulders effecting such oscillation,

and a stop to limit feeler-retracting movement of the rocker, arrest of the feeler by a released detector instantly acting to cause coöperation of the bunter and bunter-cam.

5 13. In a warp stop-motion for looms, a series of detectors movable into operative position when released by failure or undue slackness of their warp-threads, a vibratable feeler to coöperate with a released detector, means to
10 positively initiate the movement of the feeler toward and away from the detectors, the completion of such movement being due to momentum of the moving parts, a spring to

partly neutralize the momentum on the feeling stroke and to retract the feeler when engaged by a released detector, and a member adapted to cause the operation of a stopping instrumentality upon such engagement. 15

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

CLARE H. DRAPER.

Witnesses:

GEORGE OTIS DRAPER,
E. R. MORRISON.