

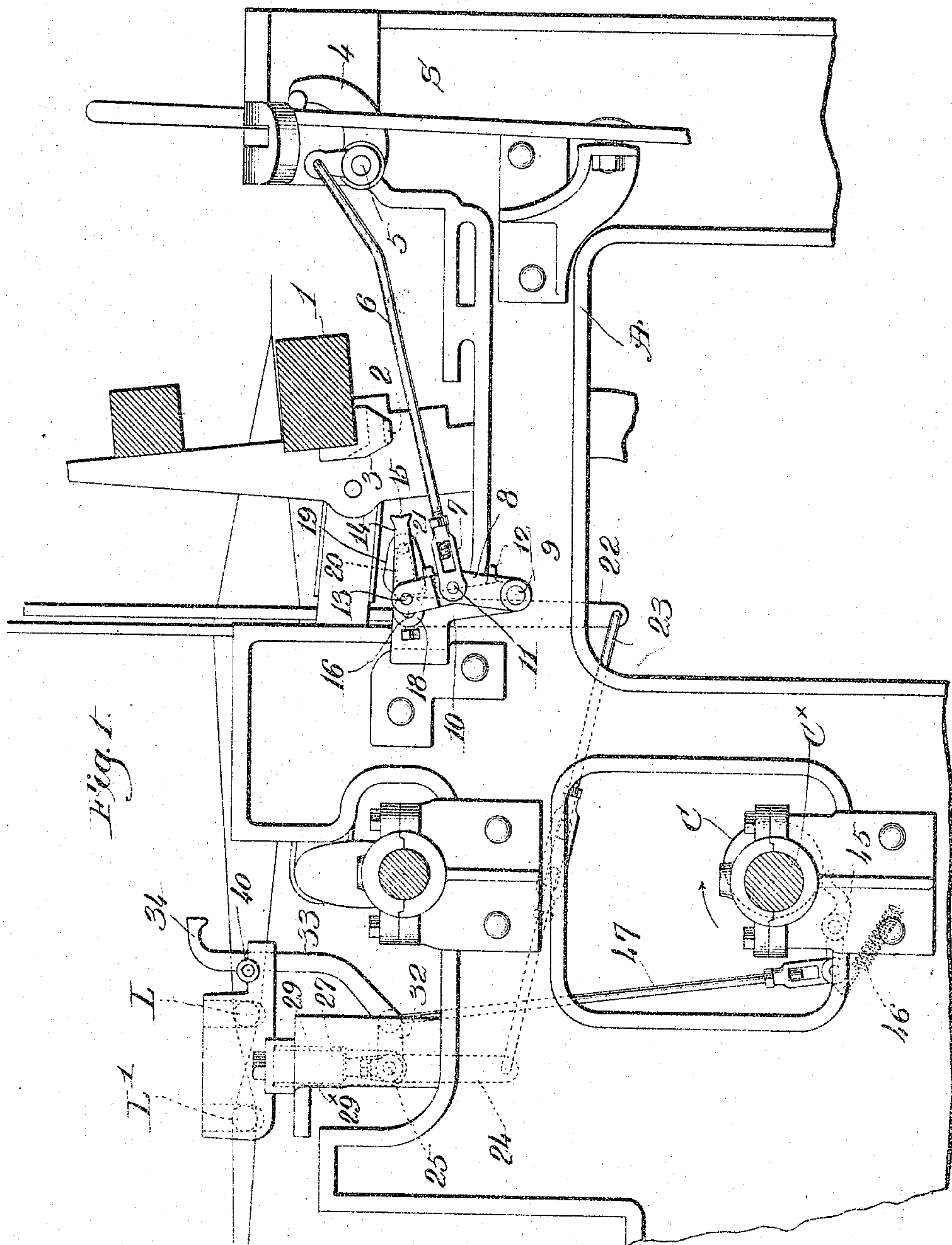
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PATENTED APR. 21, 1908.

G. B. AMBLER.
WARP STOP MOTION FOR LOOMS.

APPLICATION FILED AUG. 13, 1907.

2 SHEETS—SHEET 1.

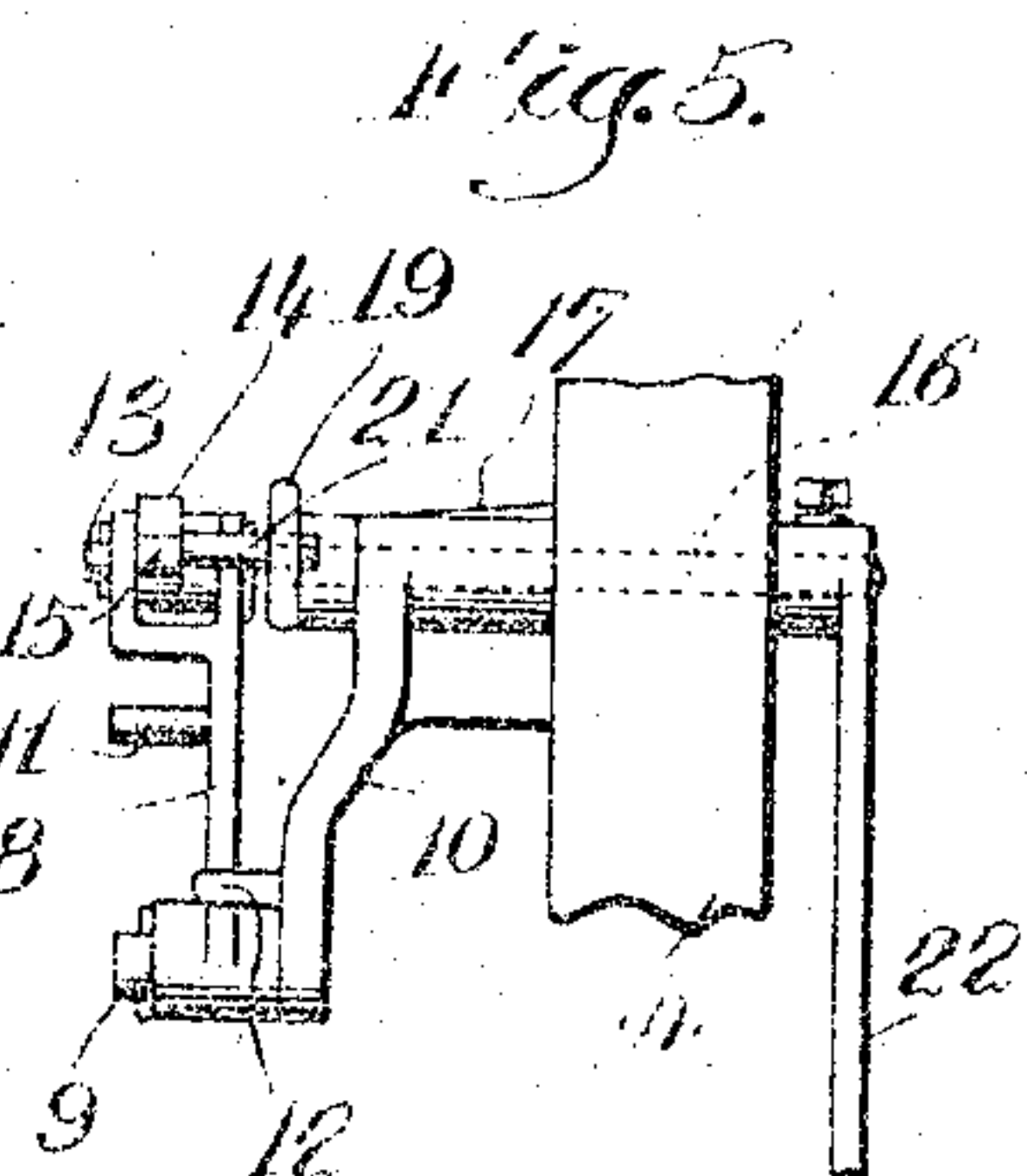
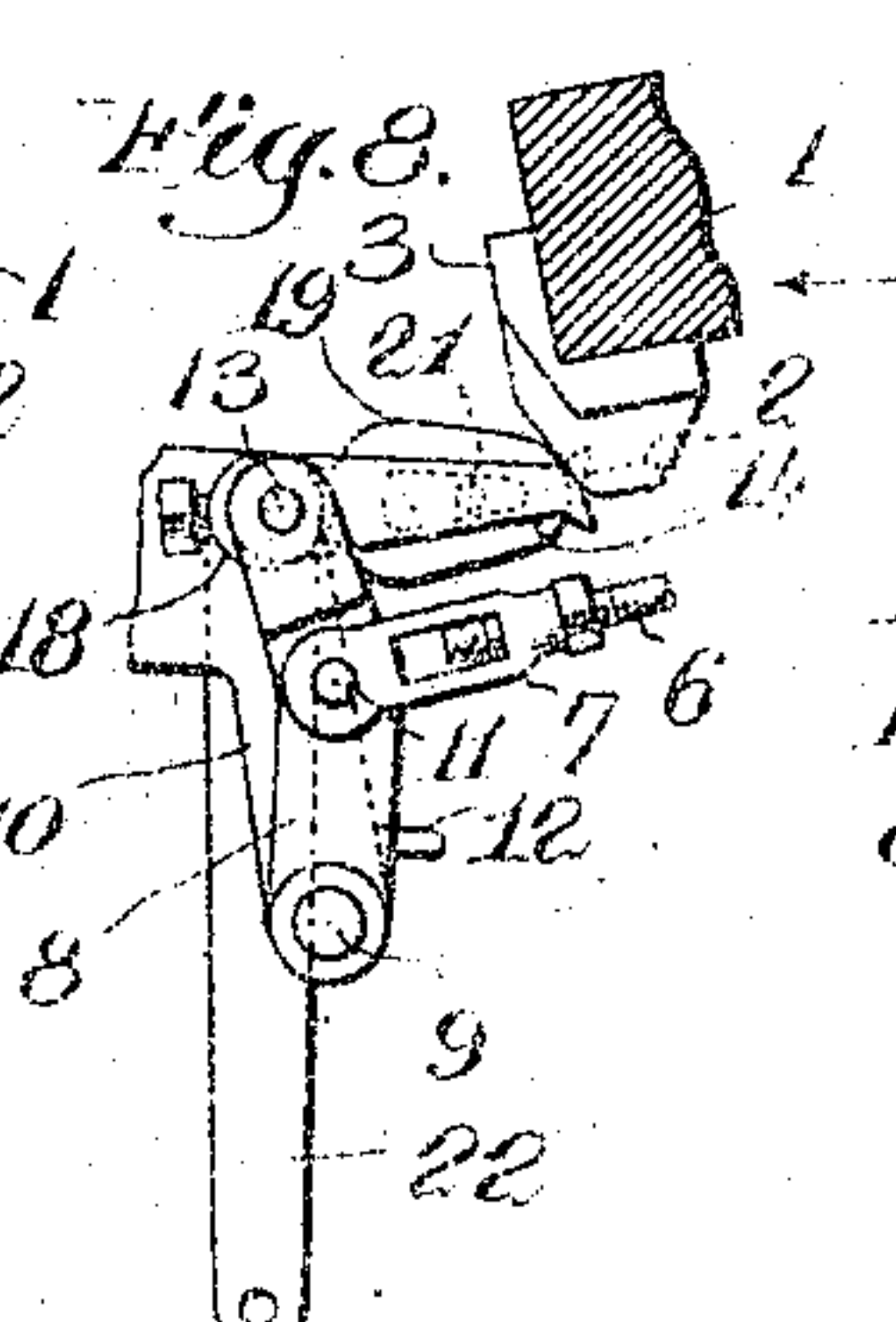
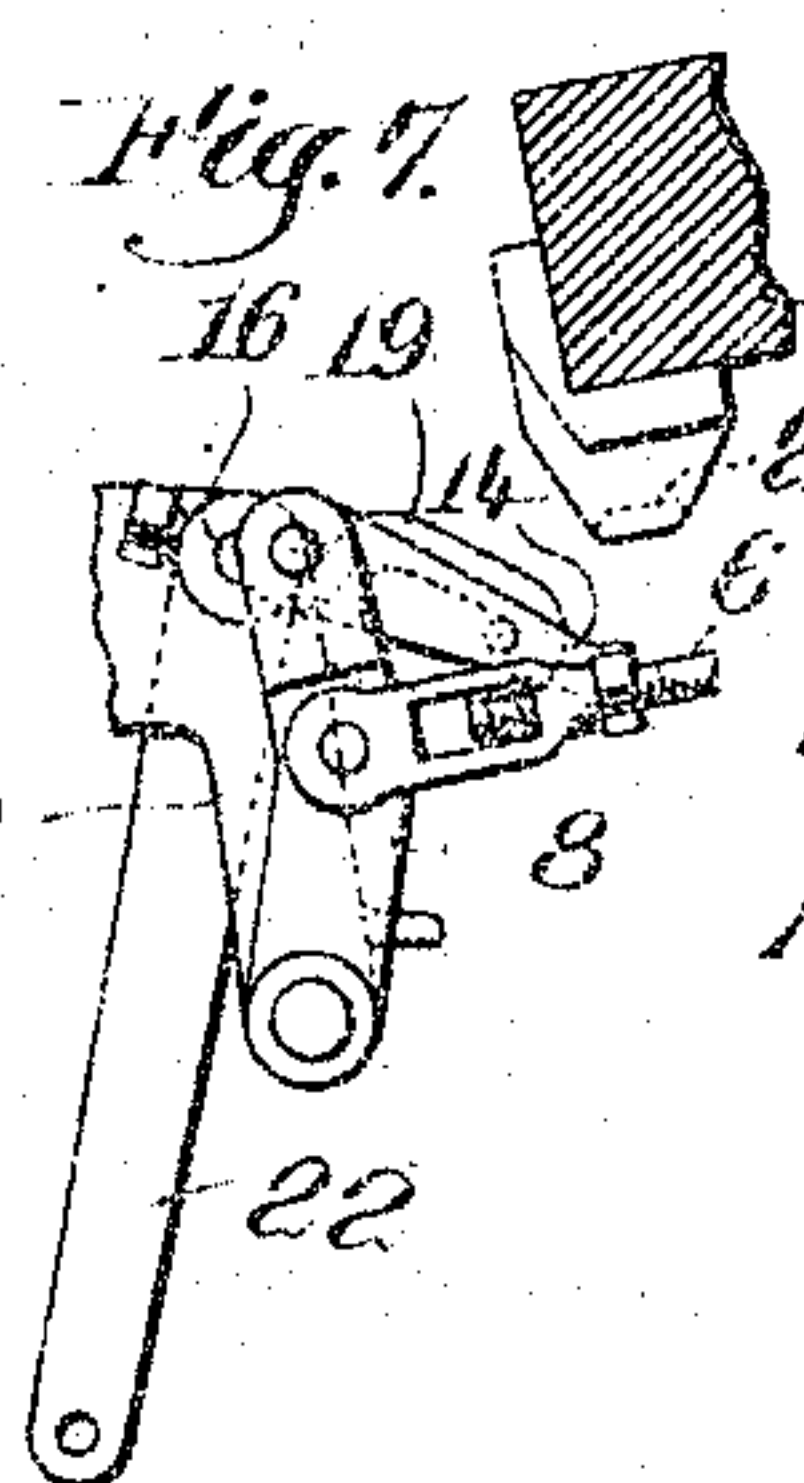
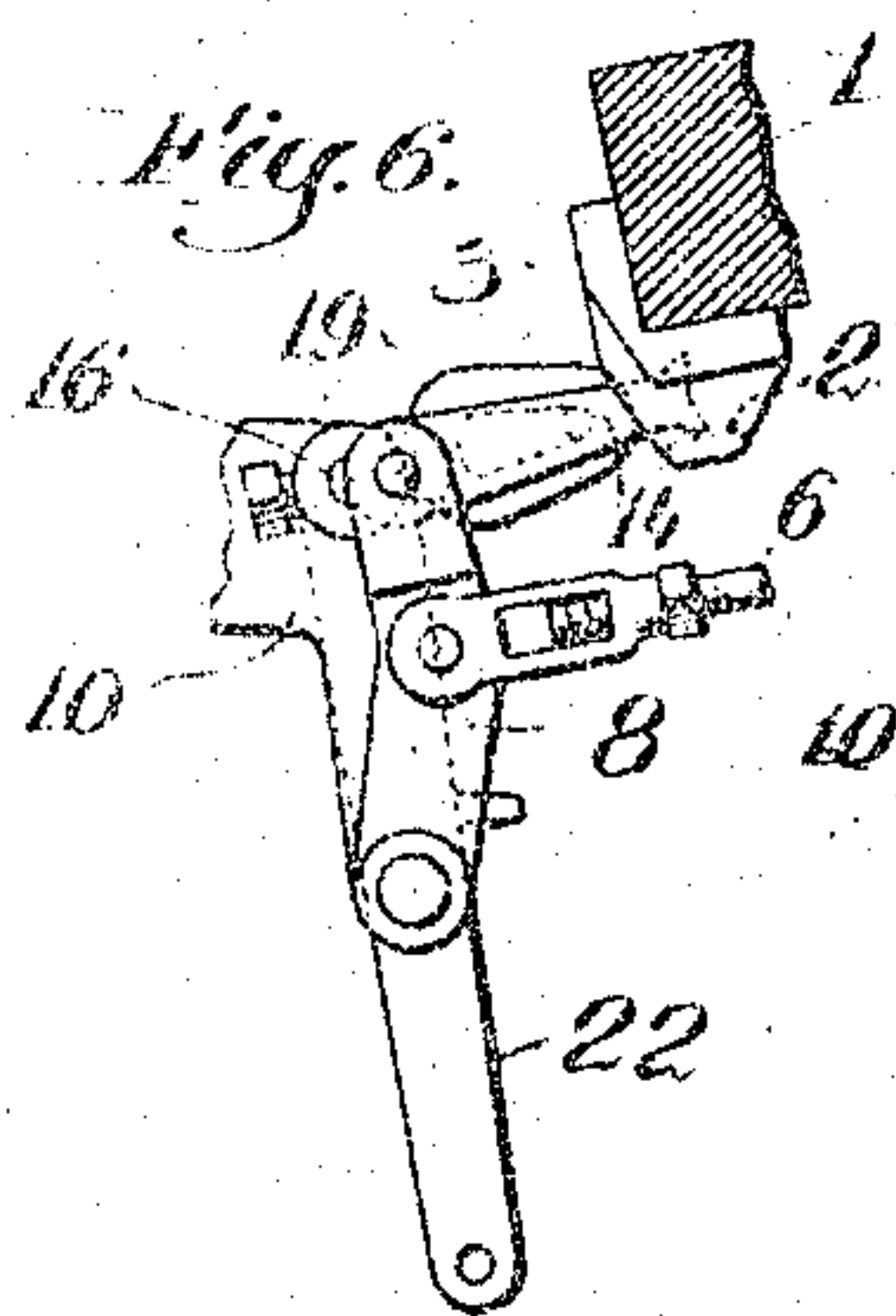
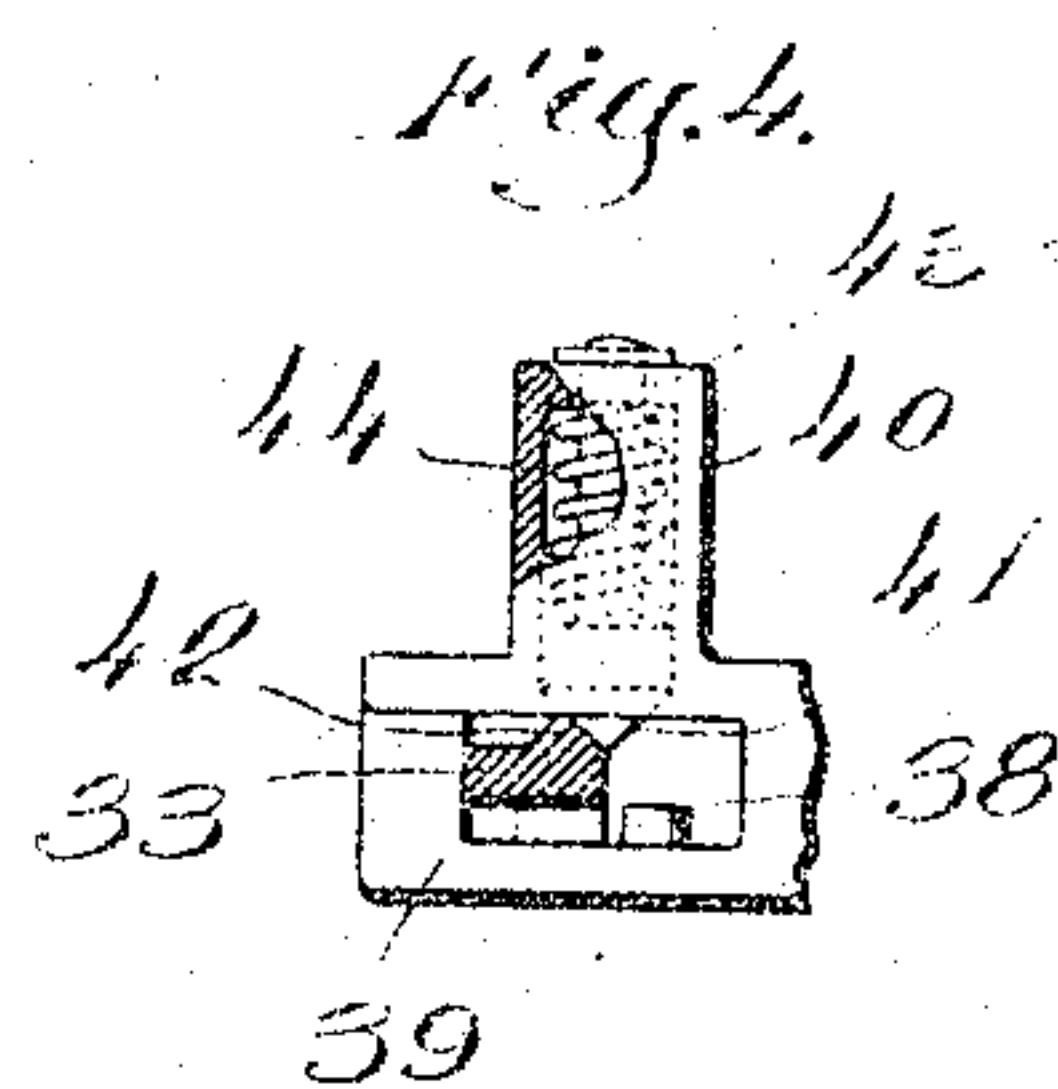
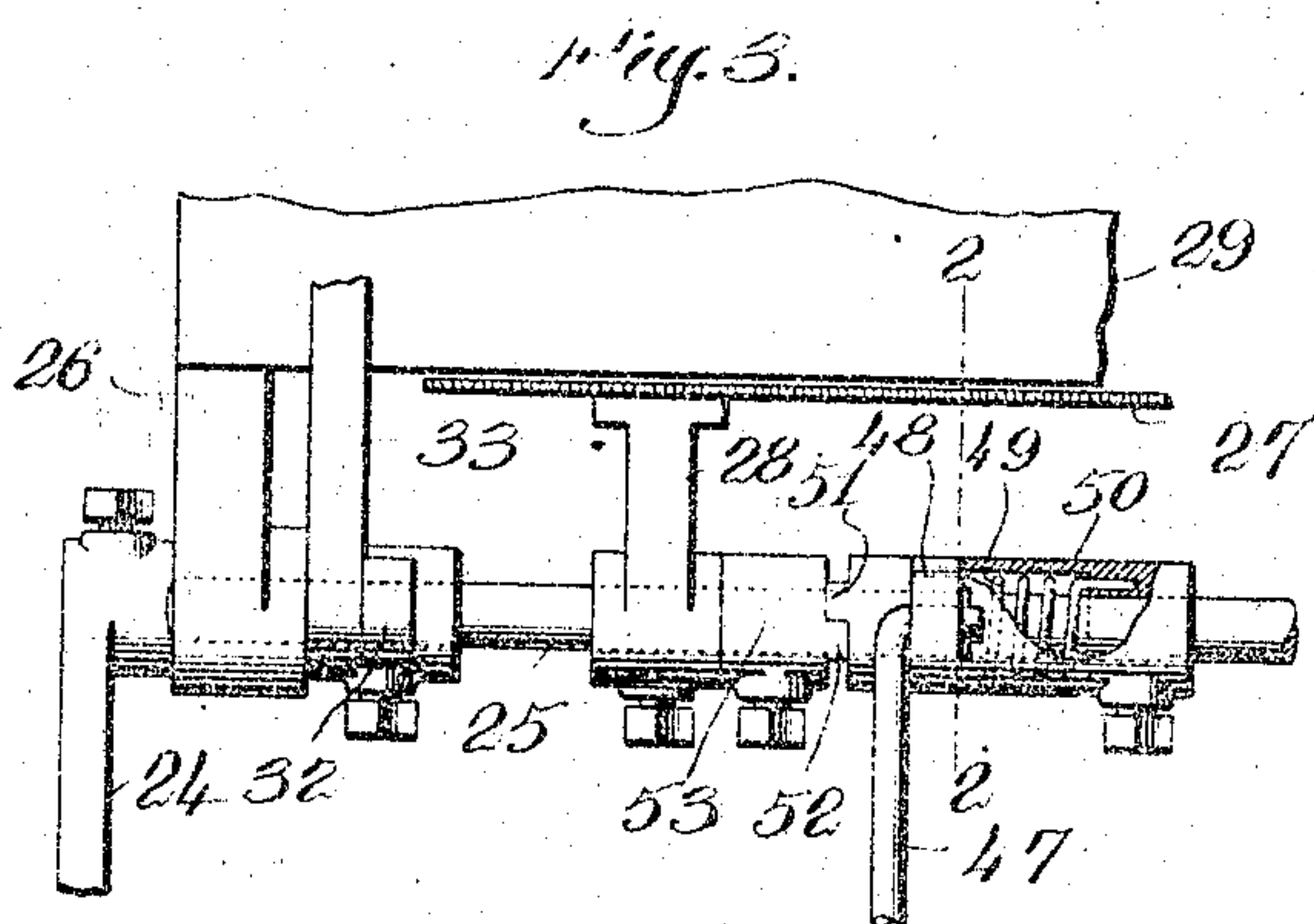
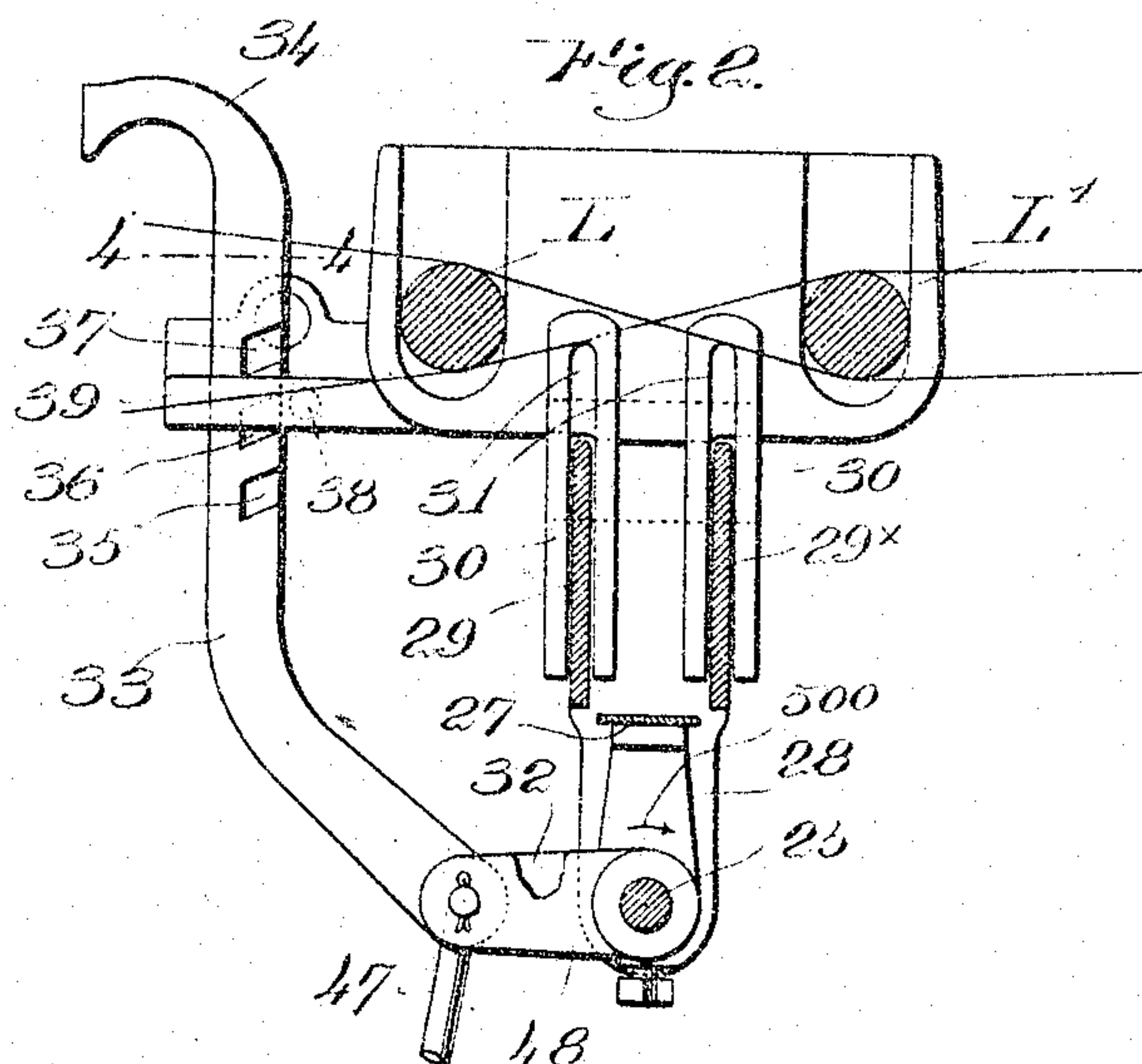


Witnesses.
Thomas Drummond
Joseph M. Ward.

Inventor.
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WARP STOP MOTION FOR LOOMS.
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2 SHEETS--SHEET 2.



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UNITED STATES PATENT OFFICE.

GEORGE B. AMBLER, OF SOUTH FRAMINGHAM, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

WARP STOP-MOTION FOR LOOMS.

No. 885,130.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed August 13, 1907. Serial No. 388,319.

To all whom it may concern:

Be it known that I, GEORGE B. AMBLER, a citizen of the United States, and resident of South Framingham, county of Middlesex, 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 relates to warp-stop-motions for looms wherein controlling detectors are suspended from the warp-threads and normally held thereby out of the path of a vibrating feeler, release of a detector by failure of its warp-thread causing arrest of the feeler and stoppage of the loom.

A very simple and convenient detector is of the so-called "hair-pin" type, shaped substantially like an inverted and elongated U, the detectors being hung upon and suspended from the warp-threads, and such a detector is employed in my present invention, one of the objects of which is the provision of manually controlled means for limiting at times the descent of the detectors so that they cannot drop upon the upper edges of the fixed guide or support upon which they are vertically movable.

Another object of the invention is the provision of means to effect release of the shipper on the backward stroke of the lay, so that the loom will be stopped before beat up takes place.

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 left-hand side elevation of a sufficient portion of a loom, with one embodiment of my invention applied thereto, the crank and cam shafts being shown in section; Fig. 2 is an enlarged detail in section on the line 2—2, Fig. 3, looking toward the left, of the detector supports and the feeler, with the manually controlled means for positioning the feeler; Fig. 3 is a front elevation and partial section of the feeler rock-shaft and connections therewith, Fig. 4 is a horizontal section on the line 4—4, Fig. 2, of the locking device for the feeler-positioning means; Fig. 5 is a front elevation of the dog, its swinging carrier, and adjacent parts, to be described; Fig. 6 a detail in side elevation showing the dog above the path of the bunter

on the lay; Fig. 7 is a similar view, but with the dog below such path; Fig. 8 shows the dog in position and just about to be engaged and moved by the bunter on the backward stroke of the lay.

Referring to Fig. 1 the lay 1 has secured to it at its back and depending therefrom a bunter 2 formed as a lateral lip on a casting 3, and the shipper S is arranged to be released from the holding device by a bell-crank knock-off lever 4 fulcrumed at 5 on the loom side A.

A link 6 is jointed to one arm of the said lever, the other end of the link, outside the loom frame, being connected by an adjustable shackle 7 with an upturned carrier 8, fulcrumed at its lower end on a stud 9 projecting laterally from a bracket 10; see also Fig. 5.

The shackle pivots on a pin 11 extended from the outer side of the carrier, about midway between its ends, and a stop 12 on the bracket limits forward swing of the carrier.

At its upper end the carrier is bifurcated, see Fig. 5, to receive a pin 13 on which is fulcrumed a forwardly extended dog 14 preferably notched at its front end at 15, to at times cooperate with the bunter 2 on the back stroke of the lay.

A transverse rock-shaft 16 extends through a bearing 17 on the bracket 10 and through the loom frame, and on its outer projecting end is secured the hub 18 of a governor 19, shown as a somewhat pear-shaped flattened plate longitudinally slotted at 20 to loosely receive a lug 21 extended horizontally from the dog, the latter and the governor being in parallelism.

The raising or lowering of the governor elevates or depresses the dog correspondingly, above or below the path of the bunter 2, and when the shipper is to be released the governor positions the dog 14 as shown in Fig. 8 in the bunter path, so that as the lay swings back the bunter and dog will be moved rearward together, swinging the carrier 8 on its fulcrum 9. Thereby the link 6 is drawn back and the knock-off lever 4 is turned to release the shipper, and when the dog is moved back the lug or pin 21 slides in the slot 20 of the governor 19, as will be obvious.

The inner end of rock-shaft 16 has secured to it a depending arm 22 connected by a transmitting link 23, Fig. 1, with an arm 24 depending from and secured to the feeler

rock-shaft 25, extended across the loom and mounted in suitable bearings 26, one of which is shown in Fig. 3.

As the rock-shaft 25 is oscillated, as will be described, the connection between it and the governor rock-shaft 16 will oscillate the latter in unison, and the governor will be raised and lowered alternately, so that on one pick the dog 14 will pass over the bunter 2, as in Fig. 6, and on the next pick it will pass under the bunter, Fig. 7, so long as the loom runs and no warp fault occurs.

A plate 27 is connected with the rock-shaft 25 by short arms 28 and constitutes the feeler, as is well known to those skilled in the art, and herein the feeler is vibrated in a path just below the lower edges of two transverse flat bars or detector-supporters 29, 29 arranged in parallelism.

Upon each support is loosely mounted a series of detectors 30, preferably made of thin, flat metal each having a longitudinal slot 31 therein extended upward from its lower end, the detectors being suspended each from a single warp-thread, in well known manner.

The support passes loosely through the slots of the detectors and the latter can move vertically upon the support, the warp-threads passing through the slots between their upper ends and the upper edge of the adjacent support, as clearly shown in Fig. 2. Herein I use two series of detectors and they are hung on the warp-threads between the lease-rods L, L'.

If a detector is released by its warp-thread it will drop and its inner leg will be interposed between the support and the advancing edge of the feeler 27, to arrest the latter and through the mechanism described operatively position the dog 14 in the path of the bunter 2, to release the shipper as the lay is on its back stroke.

When the feeler 27 is moving in one direction it will cooperate with a released detector in one series, and when moving in the opposite direction it will cooperate with a released detector of the other series, in a manner common to double action feelers.

The feeler is of such width that when it is centered, as in Fig. 2, it will project beneath the inner legs of the detectors of both series, and will then serve to limit descent of the detectors.

When the weaver is taking out a pick, technically termed "picking out," the movement imparted to the warp frequently causes the detectors to jump up and down, the warp being slack, and with some warps the consequent hammering or pinching and catching of the threads between the upper ends of the detector-slots 31 and the upper edge of the support 29 will fray or break the threads.

When the feeler is centralized as in Fig. 2

the detectors cannot descend far enough to catch the threads in this manner, and I have provided manually controlled means to so centralize the feeler when the loom is at rest. To this end an arm 32 fast on the feeler rock-shaft 25 has pivotally connected with it a bent, upturned arm 33 hooked at 34 to form a finger-piece, and provided at one edge with three slots 35, 36, 37. Fig. 2, any one of which is adapted to receive a stop pin 38. Said stop pin projects from the inner face of an open guide 39 through which the arm 33 extends, its weight normally holding the arm slidably against the front end of the guide, so that the arm rises and falls as the feeler vibrates.

When the loom is at rest and the weaver wishes to keep the detectors lifted while slackening the warp he lifts the arm 33 and when the notch 36 is opposite the stop pin 38 throws back the arm to cause the pin to enter said notch. This holds the arm in position and centralizes the feeler 27 in the position shown in Fig. 2, so that picking-out or any other manipulation of the warp can be proceeded with and there will be no danger of cutting the threads by the jumping of the detectors on their supports.

If the loom stops by reason of a released detector engaging the feeler the latter can be retracted by means of the arm 33, and held in retracted position. That is, if a detector in the left-hand series, Fig. 2, is caught by the feeler the arm 33 is lifted and the notch 35 brought into engagement with the stop pin 38, whereas if it is a detector in the right-hand series the arm 33 is pushed down to bring the notch 37 into cooperation with the pin. In either case the feeler is held in retracted position as long as desired, and until the arm 33 is positively unlocked.

The back of the guide 39 is upturned and provided with a horizontal tubular bearing 40 for a latch 41, see Fig. 4, having a double beveled end to cooperate with one or the other face of a correspondingly beveled rib or keeper 42 on the side of arm 33, the shank 43 of the latch passing through a hole in the end of the bearing 40 and being surrounded with a spring 44 within said bearing.

When the arm is moved to bring one of its notches into cooperation with the stop pin 38 the latch 41 snaps across the keeper and engages the face thereof at the left, viewing Fig. 4, and said arm is unlocked by moving it back again to the position therein shown.

Vibration of the feeler 27 may be effected in any suitable manner, and herein I show mechanism substantially such as is shown and described in United States Patent No. 784920 granted March 14, 1905 to Chase, the reference characters being changed somewhat.

The cam-shaft C^x, Fig. 1, has a cam C fast thereon cooperating with a pivoted follower

45 held by a spring 46 against the cam and connected by a link 47 to an arm 48, Fig. 3, loosely mounted on the rock-shaft 25. One end of a spring 49 coiled around said shaft, Fig. 3, is fixed to the arm 48 and its other end is secured within a sleeve 50 fast on the shaft, the spring forming a yielding connection between the shaft 25 and the arm 48, as in the Chase patent referred to. A lug 51 on the
 10 said arm coöperates with a lug 52 on the adjacent collar 53 fast on the feeler rock-shaft 25.

When the link 47 is raised the rock-shaft is turned in the direction of arrow 500, Fig. 2, through the spring 49, and if the feeler is arrested by a detector in the rear series, stopping the rock-shaft 25, the spring yields as the arm 48 completes its full movement, the lugs 51, 52 then separating. When the link 47 is moved downward, by the pull of the spring
 20 46, Fig. 1, the lug 51 acts upon lug 52 and turns the feeler rock-shaft opposite to the arrow 500, and if a detector in the front series arrests the feeler on that stroke the follower 45 is held away from the cam C. In either
 25 case the arrest of the feeler stops the oscillation of the rock-shaft 25.

While this particular mechanism for operating the feeler is convenient and simple, my invention is not restricted thereto, as I may
 30 utilize any other suitable mechanism adapted to operate a double-throw feeler.

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

35 1. The combination, in a loom, of two detector-supports arranged in parallelism, a feeler normally vibratable beneath and adjacent the supports, a series of detectors vertically movable on each support, said detectors being longitudinally slotted from
 40 their lower ends, and each suspended from a single warp-thread, manually controlled means to centrally position the feeler below and to limit descent of the detectors, to prevent catching of the warp-threads between
 45 the upper ends of the detector-slots and the upper edges of their supports, and a locking device for said means.

2. The combination, in a loom, of two detector-supports arranged in parallelism, a
 50 feeler normally vibratable beneath and adjacent the supports, a series of detectors vertically movable on each support, said detectors being longitudinally slotted from their
 55 lower ends and each suspended from a single warp-thread, manually controlled means to centrally position the feeler below and to limit descent of the detectors, to prevent catching of the warp-threads between the
 60 upper ends of the detector-slots and the upper edges of their supports, and a spring-controlled latch to lock said means and retain the feeler in central position.

3. The combination, in a loom, of two detector-supports arranged in parallelism, a

feeler normally vibratable beneath and adjacent the supports, a series of detectors vertically movable on each support, and each
 70 suspended from a single warp-thread, each detector having a single slot through which its thread and the support is extended, the feeler engaging the edge of and being arrested
 75 by a released detector, and manually controlled means to centralize the feeler and also to retract it from engagement with a released detector in either series, centraliza-
 80 tion of the feeler causing it to serve as a stop to prevent the descent of the detectors upon the upper edges of their supports.

4. The combination, in a loom, of two detector-supports arranged in parallelism, a
 80 feeler normally vibratable beneath and adjacent the supports, a series of detectors vertically movable on each support, and each suspended from a single warp-thread, each
 85 detector having a single slot through which its thread and the support is extended, the feeler engaging the edge of and being arrested by a released detector, manually controlled
 90 means to centralize the feeler and also to retract it from engagement with a released detector in either series, and a locking device for said means, to maintain the feeler in any
 of the three positions specified.

5. The combination, in a loom, of two detector-supports arranged in parallelism, a
 95 feeler normally vibratable beneath and adjacent the supports, a series of detectors vertically movable on each support, and each suspended from a single warp-thread, each
 100 detector having a single slot through which its thread and the support is extended, the feeler engaging the edge of and being arrested by a released detector, a manually controlled
 105 arm connected with the feeler and having three notches, movement of the arm centralizing the feeler or retracting it from engagement with a released detector of either series,
 110 a stop pin to enter any one of the notches and thereby hold the arm and feeler in a corresponding position, and a spring latch co-operating with the arm to retain it in engagement with the stop pin.

6. In a loom, in combination, a shipper, a knock-off lever therefor, a swinging carrier
 115 and a link connecting it with said lever, a dog pivoted on the carrier, the lay, a bunter thereon to at times coöperate with the dog on the back stroke of the lay and swing the
 120 carrier, to thereby operate the knock-off lever and release the shipper, a series of detectors maintained inoperative by intact warp-threads, a vibrating feeler to engage
 125 and be arrested by a released detector, a rocking governor operatively connected in sliding engagement with the dog, and connections between the feeler and governor to
 130 rock and position the latter according to the position of the feeler, the governor normally moving the dog out of the bunter path and

positioning the dog in said path when the feeler is arrested.

7. In a loom, a lay having a bunter, a shipper, releasing means for the shipper, including a dog to cooperate with the bunter, a rocking governor mounted independently of the dog, a slot and pin connection between the governor and the dog, a series of detectors suspended from the warp-threads, a normally vibrating feeler to engage and be arrested by a released detector, and means intermediate the feeler and governor to normally rock the latter and move the dog out of the bunter path except when the feeler is arrested by engagement with a detector, the connection between the dog and governor permitting relative movement of the dog when engaged by the bunter.

8. In a loom, in combination, a shipper, a knock-off lever therefor, an upright swinging carrier, a fixed fulcrum for its lower end, a dog pivotally mounted on the carrier and having a lateral lug, a link connecting the carrier and knock-off lever, a lay, a bunter thereon operative on the backward stroke, to

at times engage the dog and swing the carrier and thereby actuate the knock-off lever, a rock-shaft having an attached arm and a longitudinally-slotted governor to receive the lug on the dog, a series of detectors each suspended from a warp-thread, a vibrating feeler to engage and be arrested by a released detector, and a transmitting connection between the feeler and the arm to rock the shaft in unison with the vibrations of the feeler, whereby the governor moves the dog into and out of the path of the bunter, arrest of the feeler acting through said governor to position the dog in the path of the bunter, the slot in the governor accommodating the movement of the dog with the swinging carrier when the bunter cooperates with the dog.

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

GEORGE B. AMBLER.

Witnesses:

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FRANK J. DUTCHER.