

No. 665,713.

Patented Jan. 8, 1901.

H. WYMAN.

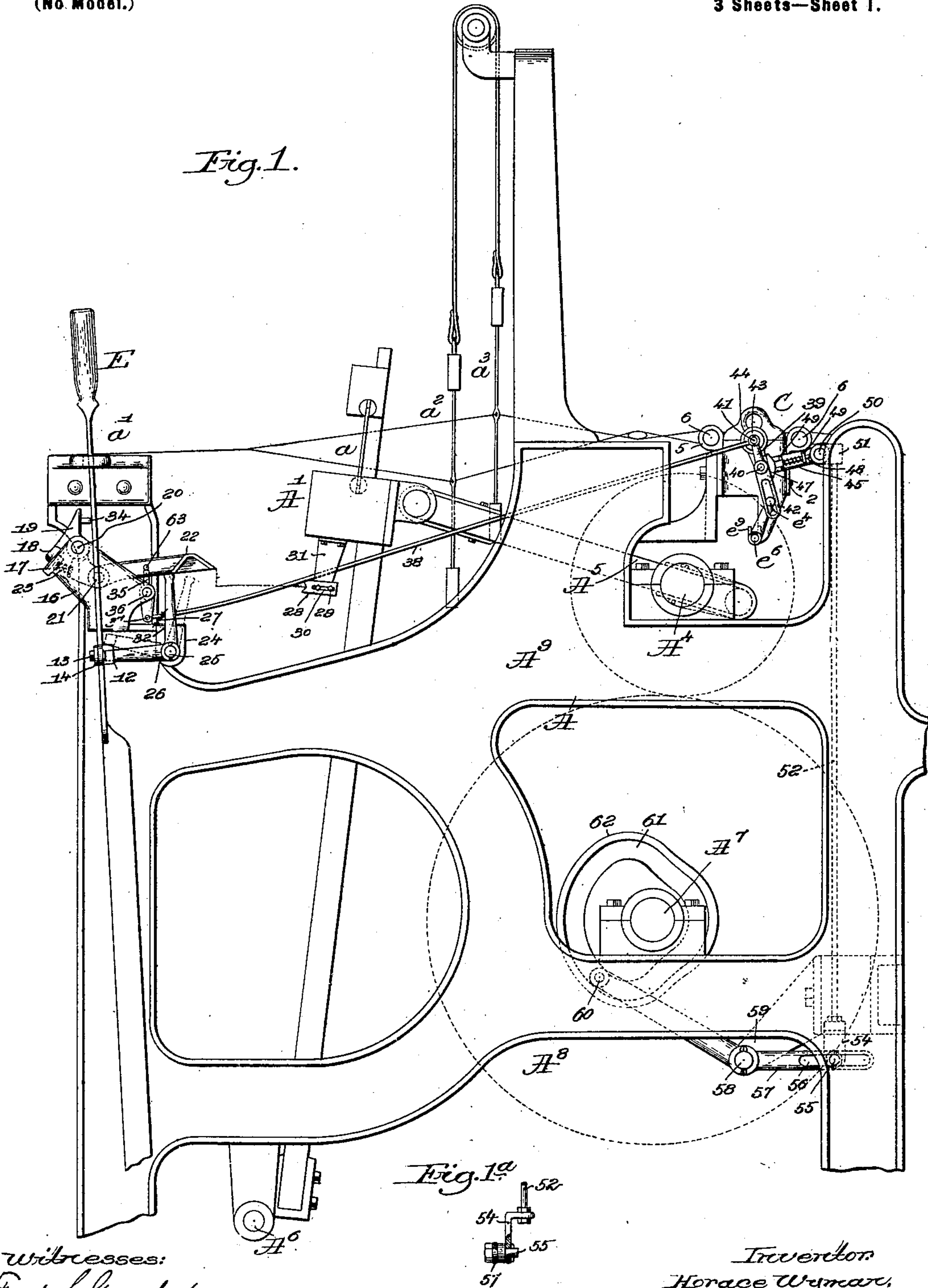
WARP STOP MECHANISM FOR LOOMS.

(Application filed Mar. 24, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



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Inventor  
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by Leroy S. Gregory  
att'y.

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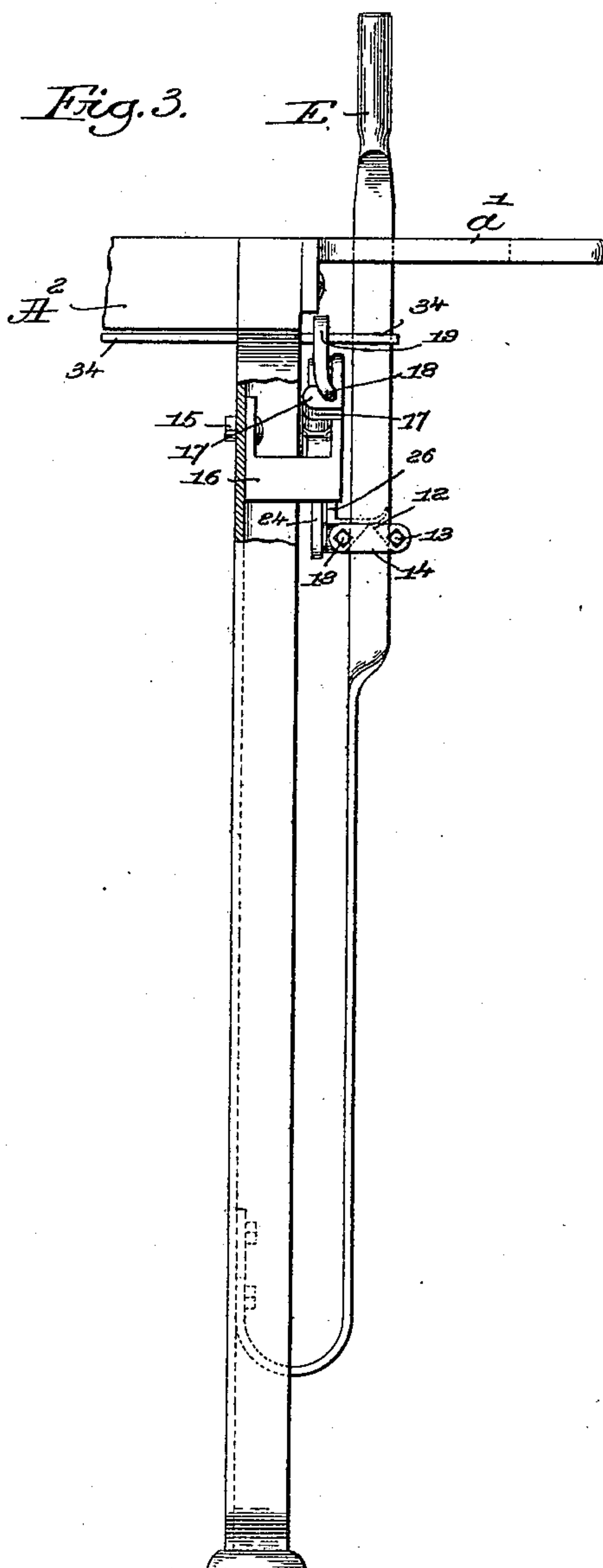
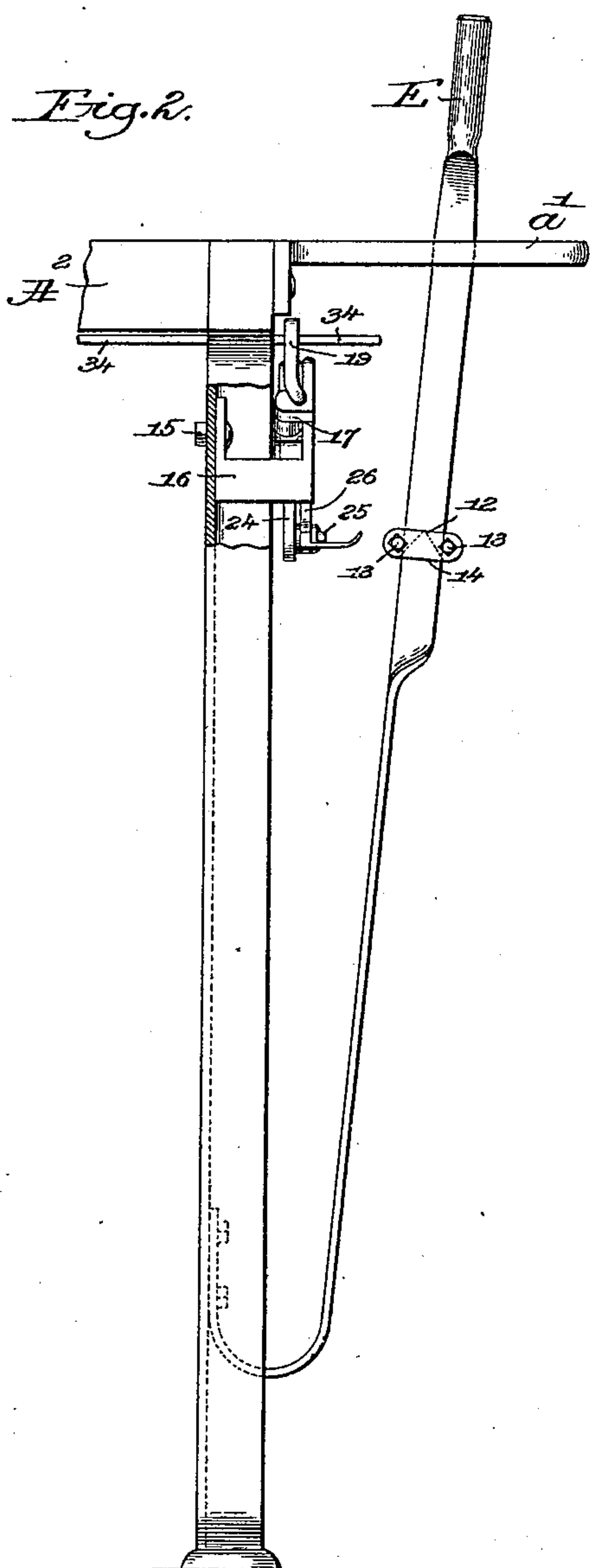
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## WARP STOP MECHANISM FOR LOOMS.

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**3 Sheets—Sheet 2.**



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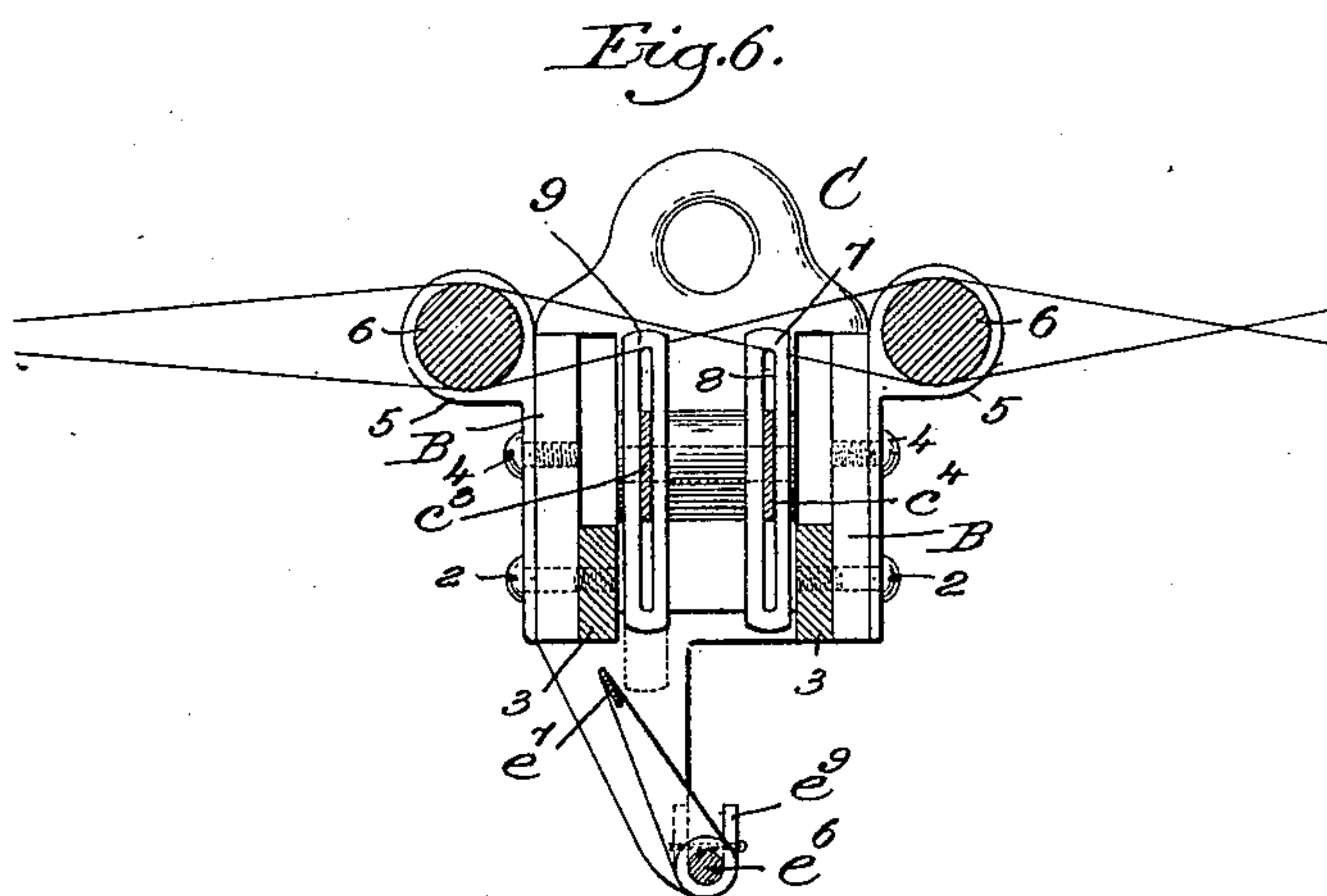
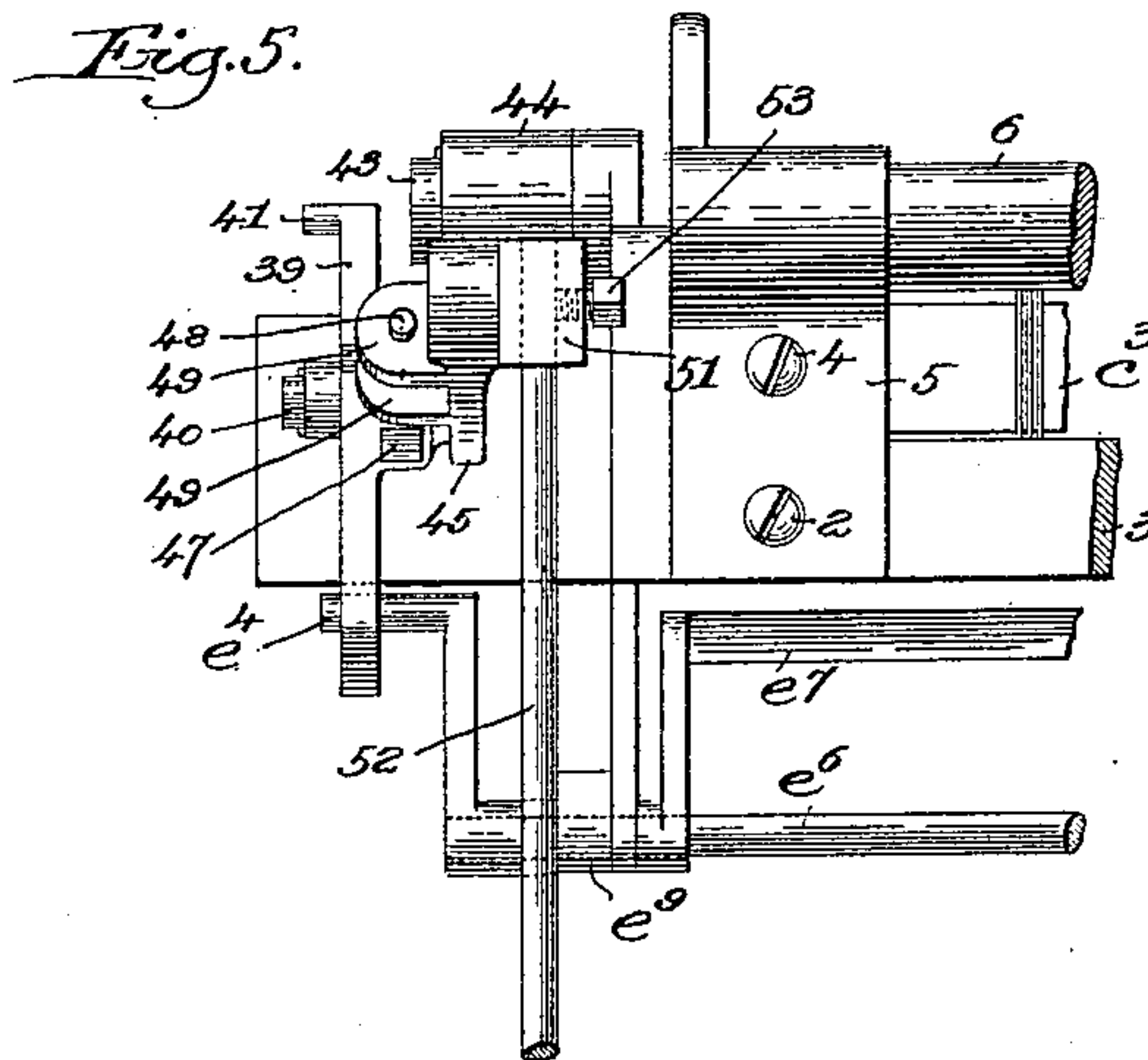
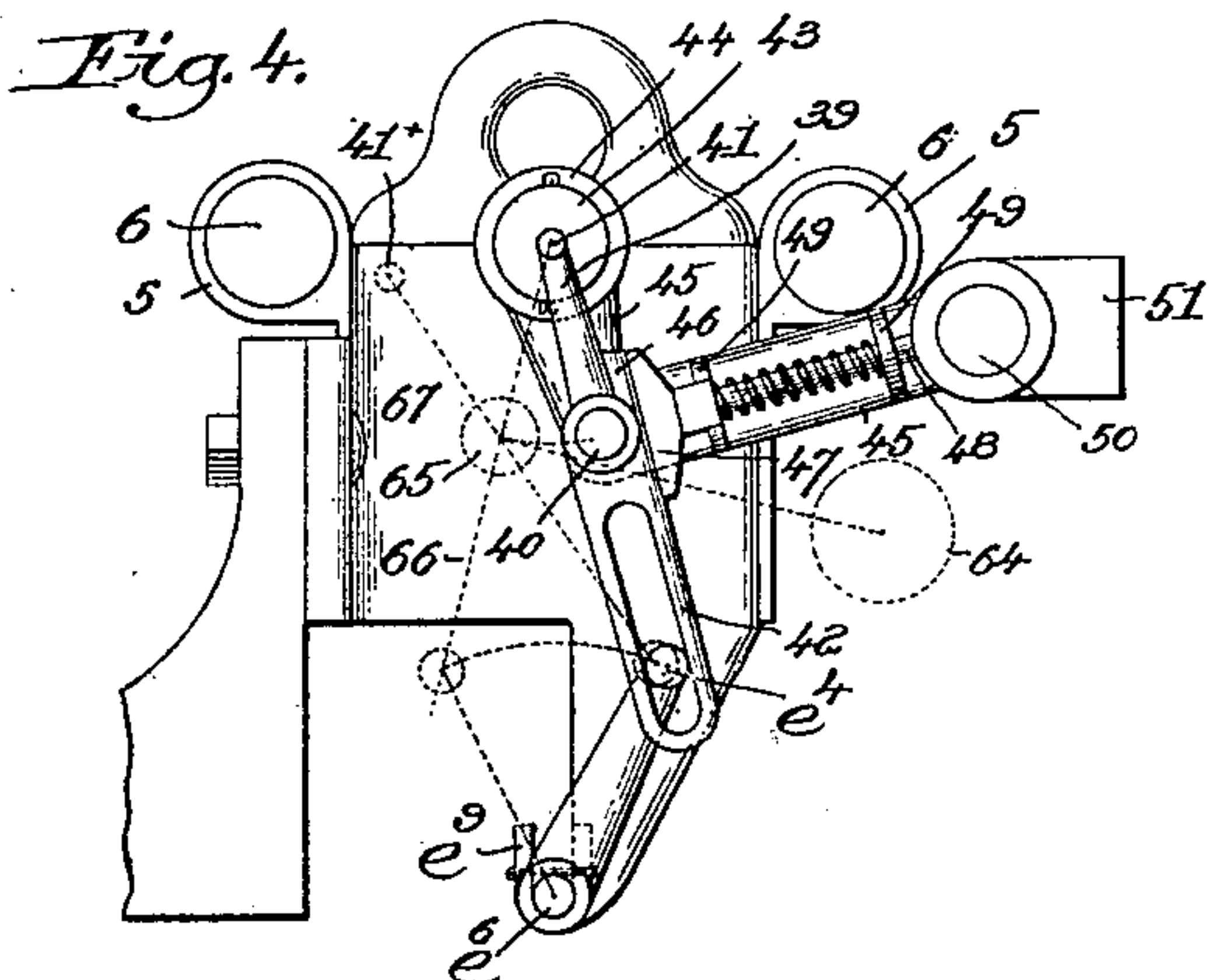
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WARP STOP MECHANISM FOR LOOMS.

(Application filed Mar. 24, 1900.)

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3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

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CROMPTON & KNOWLES LOOM WORKS, OF SAME PLACE.

## WARP STOP MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 665,713, dated January 8, 1901.

Application filed March 24, 1900. Serial No. 9,989. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE WYMAN, of Worcester, county of Worcester, State of Massachusetts, have invented an Improvement in Warp Stop Mechanism 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 has for its object to improve and simplify the construction of warp stop mechanism used in looms to instantly stop the loom whenever the warp breaks or becomes too slack.

The invention herein to be described and claimed is intended as an improvement on the class of warp stop mechanism illustrated in United States Patent No. 631,243, dated August 15, 1899.

One feature of this present invention includes in a loom a dagger, a bunter to meet and actuate the dagger, a shipper-handle, and a dagger-lifter, it acting normally when the shipper-handle is in its inoperative position to lift the dagger into its inoperative position, so that a dagger support or retainer may come under and retain said dagger in its inoperative position. When the shipper-handle is in its operative position, the dagger-lifter is put into its inoperative position, leaving the dagger sustained by the dagger-support. When the loom is running regularly and the dagger-lifter referred to occupies its inoperative position, the dagger is sustained by a support under the control of the warp stop mechanism; but on the breakage or failure of the warp said support is moved, enabling the dagger to immediately drop into its operative position to be struck by the bunter and stop the loom. As the shipper-handle is moved to effect the stopping of the loom it retires from contact with the dagger-lifter, letting it come into its operative position to immediately lift the dagger into its inoperative position, so that it cannot be struck twice in succession and so that the dagger-support may come into operative position to sustain the dagger when the shipper-handle is put into its operative position.

Another feature of the invention resides in the novel drop devices and their coacting

means whereby they are held on their respective warp-threads in a manner to avoid liability of contact thereof with warp-threads other than the particular warp-thread on which the said drop devices are suspended.

Referring to the drawings representing this present invention in one of the best forms now known, Figure 1 represents a right-hand side elevation of a sufficient portion of a loom to enable the invention to be understood. Fig. 1<sup>a</sup> is a detail showing the adjustable stud 55 for uniting the rod 52 with the slotted end of the lever 57, the adjustment of said stud in the slot 56 enabling the throw of the actuator to be varied according to the work to be done. Fig. 2 shows the shipper-handle in its inoperative position. Fig. 3 shows the shipper-handle in its operative position. Fig. 4 is an enlarged detail showing the means for operating the feeler. Fig. 5 is an enlarged detail taken from the rear side of the loom; Fig. 6, a cross-section taken through the guide-bars and the feeler and showing the drop devices in their normal positions suspended by warp-threads.

In the drawings the loom-frame A, the lay A', carrying the usual reed *a*, the lay being pivoted at A<sup>6</sup>, the crank-shaft A<sup>4</sup>, having usual cranks receiving lay-actuating connecting-rods A<sup>5</sup>, suitably connected with the lay, the cam-shaft A<sup>7</sup>, driven from the gear A<sup>9</sup> on the crank-shaft engaging a gear A<sup>8</sup> on the cam-shaft, said gears being represented only by circles, the shipper-handle E, working in a slot of the extension *a'*, notched at one side and connected with the loom-frame at one end of the usual breast-beam A<sup>2</sup>, the shed-forming devices *a*<sup>2</sup> and *a*<sup>3</sup>, receiving the warps, the removable end piece C, having suitable guide-bars *c*<sup>3</sup> and *c*<sup>4</sup>, said end pieces and their connected guide-bars being supported in a suitable casting, as B, extended across the loom-frame, the rock-shaft *e*<sup>6</sup>, sustained in suitable bearings *e*<sup>9</sup>, there being one such bearing near each side of the loom, said rock-shaft carrying a vibrator *e*<sup>7</sup> and having connected to one end thereof outside one of said bearings a projection *e*<sup>4</sup>, are and may be substantially as represented in said patent. Herein the casting B is sustained by screws 2, inserted in cross-bars 3, said screws and



other screws 4 being also extended through bearings 5, sustaining each a proper lease-rod 6, said rods also sustaining the warps between the points where the drop devices 7 are suspended therefrom. These drop devices are composed of thin metal of substantially uniform thickness throughout their length, each drop device being slotted for nearly its entire length, as at 8, to embrace a guide-bar, as  $c^3$  or  $c^4$ , each drop device receiving, as herein represented, in its slot a warp-thread, the unslotted extremities 9 of the drop devices being shortened in length to avoid contact with adjacent warp-threads, said drop devices being interchangeable end for end to thereby more readily select the drop devices when being placed upon the guide-bars. With drop devices of this kind, their upper ends being below the planes of the next adjacent warp-threads, all liability of contact or interference of the upper end of a drop device with an adjacent warp-thread is avoided.

The shipper-handle E in the present illustration of this invention has clamped upon its inner side a lug 12, represented by dotted lines in Figs. 2 and 3 and full lines in Fig. 1, the lug being carried by a piece of metal having ears provided with holes to receive bolts 13, extended through a clip 14, bearing against the front side of the shipper-handle.

The side frame of the loom has applied to it by a screw 15 (see Figs. 2 and 3) a stand 16, having an ear 17, against which normally rests a toe 18 of a dagger-carrier 19, mounted to turn about a pivot or stud 20 in said stand, the lower end of said carrier having jointed to it at 21 (see dotted lines, Fig. 1) a dagger 22, a spring 23, interposed between the lower end of said carrier and the under side of the ear 17, acting normally to maintain the pivot 21 in the position represented in Fig. 1 of the drawings. The loom side has also connected with it, as herein represented, a stand 24, having a projection 25, which constitutes the fulcrum for a dagger-lifter 26, having cooperating with it a spring 27, which acts normally to put the upper end of the lifter in its operative position, as represented by full lines in Fig. 1, with relation to and so as to maintain the dagger 22 out of the range of movement of the bunter 28, represented as adjustably connected by bolts 29 in a slot 30, with a depending leg 31 attached to the under side of the lay, the said spring 27 acting to keep the support in contact with a stop 32 to lift the dagger, so that a dagger-support 35 may operate to sustain the dagger.

Whenever the shipper-handle stands in its inoperative position, Fig. 2, the spring 27 puts the lifter 26 in its operative position and maintains the dagger in its inoperative position, permitting the dagger-support 35 to come under the projection 63, as represented in full lines, Fig. 1; but whenever the shipper-handle is in its operative position (see Fig. 3) the lug 12, acting against the rear end of the lifter 26, turns it into its inoperative position, so

that thereafter while the shipper-handle occupies its operative position the dagger may be sustained by the dagger-support 35, the latter being moved to let the dagger fall into a position to be met by the bunter only after a warp breaks or becomes too slack. The dagger having been permitted to drop, as will be hereinafter described, by the breakage of the warp or too great slackness therein is struck by the bunter, which turns the lever 19 in the direction of the arrow near it in Fig. 1, causing it to meet and actuate a stop-lever 34, pivoted at the under side of the breast-beam, (said lever being commonly actuated to unlock the shipper-handle whenever a shuttle fails to be properly boxed to unlock the shipper-handle,) moving said lever and releasing the shipper-handle that it may spring into its inoperative position, Fig. 2, the lug 12 retiring from contact with the main dagger-lifter 26, letting it be moved by the spring 27 from its inoperative into its operative position, such movement of the dagger-lifter causing it to act instantly upon the dagger and put it into its inoperative position, (see Fig. 1,) so that the said dagger cannot be struck a second time by the bunter, the lifter putting the dagger into position to enable the dagger-support to come into working position, the movement of said shipper-lever by the hand of the operator putting the lifter again into its inoperative position and permitting the dagger to be sustained wholly by the dagger-support.

In order that the dagger during weaving may be controlled wholly by the warp when the shipper-handle is in its operative position and the loom is running, the dagger-lifter 26 then being in its inoperative position, there has been provided the second dagger-support 35, it being represented as a lever having its fulcrum at 36, the lower end of the lever 37 having jointed to it a suitable rod or connection 38, in turn suitably attached at its rear end with the upper end of an initiatory device 39, the initiatory device in this present instance of this invention being pivoted upon a stud 40 and having at its upper end a stud 41, which enters a hole in the connection 38, the lower end of the initiatory device having a slot 42, which is entered by the projection  $e^4$ , connected with the rock-shaft  $e^6$ , carrying the feeler  $e^7$ . The stud 41 is located centrally with relation to a stud or support 43, upon which is mounted the hub 44 of an actuator 45, represented as an elbow-lever, the said actuator having extended from it the stud 40, supporting the initiatory device. The initiatory device has at one side of it a surface or flat-faced projection 46, against which acts a positioning device 47, having, as represented, a straight face and carried by a slide-rod 48, movable in suitable ears 49, extended from one side of the actuator 45. The outer end of the actuator has a suitable hole in which is forced a stud 50, said stud receiving upon its inner end loosely a block 51, said block



having a suitable opening to receive the upper end of a rod 52, connected by a screw 53 with said head.

The lower end of the rod 52 is represented as provided with a suitable plate 54, represented by full lines, Fig. 1<sup>a</sup>, and dotted lines, Fig. 1, having a suitable pin or projection 55, which enters a slot 56 in one end of a lever 57, pivoted upon a stud 58, extended from a stand 59, connected with the loom-frame, the inner end of said lever having a roller or other stud 60, which enters a cam-groove 61 in a cam 62, suitably secured upon the cam-shaft A<sup>7</sup>, said cam moving the lever 57 in one direction at one pick and in the opposite direction at the next pick, so that the feeler so operated in one direction of its movement for one pick may coöperate with a drop device of one of the two series if in an abnormal position and in the other direction of its movement with a drop device of the other series if in an abnormal position.

So long as the drop devices occupy their normal positions the feeler moves to and fro under them, and notwithstanding the actuator is moved the rod 38 does not move and the support 35 remains in its operative position, the upper end of said support resting against the stud or projection 63, carried by the dagger 22.

It will be understood that notwithstanding the actuator is moved constantly the projection 41 of the initiatory device, owing to its location in line with the center of motion of the actuator, does not move, and consequently so long as the drop devices remain in their normal position, the support 35 remains in its operative position.

Viewing Fig. 4, the dotted circle 64 represents the other extreme of the movement of the rear end of the actuator 45, and the dotted circle 65 represents the other extreme position of the stud 40 constituting the fulcrum for the initiatory device, and the dotted line 66 shows the said initiatory device in the position it will occupy when the stud 40 is in the position 65, and it will be noticed that the projection 41 stands in both these positions in exactly the same position, so that the rod 38 is not moved. When, however, a drop device descends into its abnormal position, as represented by dotted lines in Fig. 6, it is met by the feeler and the further movement of the feeler is restrained, and thereafter in the movement of the actuator 45 the initiatory device by reason of its slotted end in engagement with the projection  $e^4$  is turned about the stud 40, causing said initiatory device when said stud comes into the position indicated by the dotted circle 65 to occupy a position in the dotted line 67, putting the projection 41 in the position represented by 41<sup>x</sup>, such movement of the projection moving the bar 38 in the direction of its length and turning the support 35, putting it into its operative position, letting the dagger 22 immediately drop, so that as the lay comes forward the bunter

may meet the dagger and effect the stopping of the loom.

If a drop device should drop when the feeler occupied its extreme position next the rear side of the loom and the feeler was arrested in its forward movement by contact with such a drop device, then the movement of the rod 38 by the initiatory device would be in a direction directly opposite that in which it is moved when the feeler strikes a drop device as the feeler is moving toward the rear end of the loom; but in either direction of the movement of the rod 38 it will tip or turn the support 35 to instantly release the dagger.

Viewing Fig. 6, it will be seen that the warp-supports 6 are of such diameter and are located at such distance apart that the warps spread by them and carried from one support to the other are so separated as to permit the upper ends of the drop devices to occupy each a position below the run of the warp not extended through its slot 8, such construction obviating the friction of a drop device hung on one warp against an adjacent warp extended through a drop device of the parallel series.

The upper ends of the drop devices do not project upwardly and show above the warp passing from one to the other support 6.

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

1. In a loom, a dagger, a bunter to meet and actuate the dagger, a shipper-lever, and a dagger-lifter occupying its normal position to put the dagger in its inoperative position when the shipper-handle is in its inoperative position.

2. In a loom, a dagger, a dagger-lifter normally operative to put the dagger in its inoperative position, and a shipper-handle which when in its operative position puts the dagger-lifter in its inoperative position.

3. In a loom, a bunter, a dagger, a dagger-lifter normally operative to put the dagger in its inoperative position, and a shipper-handle which when in its operative position puts the dagger-lifter in its inoperative position, and a dagger-support movable by a failure of the warp to let the dagger come into its operative position to meet and be moved by the bunter to release the shipper-handle.

4. A lay, a bunter, a dagger, a series of drop devices maintained normally in their inoperative position by the warp-threads, a vibrator adapted to be arrested by a drop device, a support for said dagger, connections between said vibrator and said support to move the latter on the arrest of a drop device in its abnormal position, to permit the dagger to come into its operative position and stop the loom.

5. In a loom, a shipper-handle, a dagger-lifter, and a lug carried by the shipper-handle to move the dagger-lifter in one direction.

6. In a loom, a shipper-handle, a dagger, a lifter for said dagger controlled by the shipper-handle, drop devices, and a dagger-sup-



port under the control of drop devices, said support being moved whenever a drop device comes into its abnormal position.

7. In a warp stop-motion for looms, a plurality of guide-bars, means to sustain the warps above said guide-bars, a series of metallic drop devices of uniform thickness throughout and slotted nearly throughout their entire length to embrace the guide-bars, each drop device receiving a warp-thread, the unslotted extremities of the drop devices being shortened in length to avoid contact with adjacent warp-threads, said drop devices being interchangeable end for end to thereby more readily select the drops when being placed upon the guide-bars.

8. In a loom, a shipper, a dagger, a series of drop devices, and intermediate devices occupying normally their inoperative positions and maintaining the dagger in its inoperative position when the warp-threads are unbroken, said intermediate devices being actuated to put the dagger in its operative position on the breakage of a warp-thread, and means actuated by the shipper when released to stop the loom to put said dagger automatically in its inoperative position.

9. In a loom, a shipper, a dagger, a dagger-support to keep said dagger in its inoperative position, a series of drop devices, devices intermediate said drop devices and dagger-support to place said dagger in its operative position when actuated by the breaking of a warp-thread, and means to restore said dagger into its inoperative position preparatory to the return of said dagger-support into its operative position.

10. In a loom, a bunter, a shipper, a dagger, a dagger-support to hold said dagger in its inoperative position, drop devices, means under the control of said drop devices to move said dagger-support and permit the dagger to come into its operative position to be struck

by said bunter and effect the release of the shipper to stop the loom when a warp breaks, means to lift or return said dagger into its inoperative position after the dagger has been struck by the bunter to enable the dagger-support to again operate to sustain the dagger in its inoperative position, said shipper when returned into its operative position putting the dagger-lifter into its inoperative position leaving the dagger sustained only by the dagger-support.

11. In a warp stop-motion for looms, two supports for the warp-thread acting as lease-rods, one half of the warp passing above one of the rods and under the other rod, and the other half of the warp passing on the opposite sides of the rods, forming a lease in the warp, combined with two series of drop devices interchangeable end for end, supported upon the warp-thread of the two lower planes of the lease and guide bars to sustain said drop devices when in an abnormal position by the breaking of a warp-thread.

12. In a warp stop-motion for looms, a plurality of guide-bars, means to sustain the warps above said bars, a series of slotted drop devices sustained on said warps and embracing the guide-bars, the length of the drop devices extended beyond their slots embracing the guide-bars being substantially equal that said drop devices may be interchangeable end for end, and a feeler to contact with the lower end of said drop devices, either end being uppermost when a drop device occupies its abnormal or lowered position.

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

HORACE WYMAN.

Witnesses:

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SAMUEL B. SCHOFIELD.