

(No Model)

C. F. ROPER.
WARP STOP MOTION FOR LOOMS.

No. 583,419.

Patented May 25, 1897.

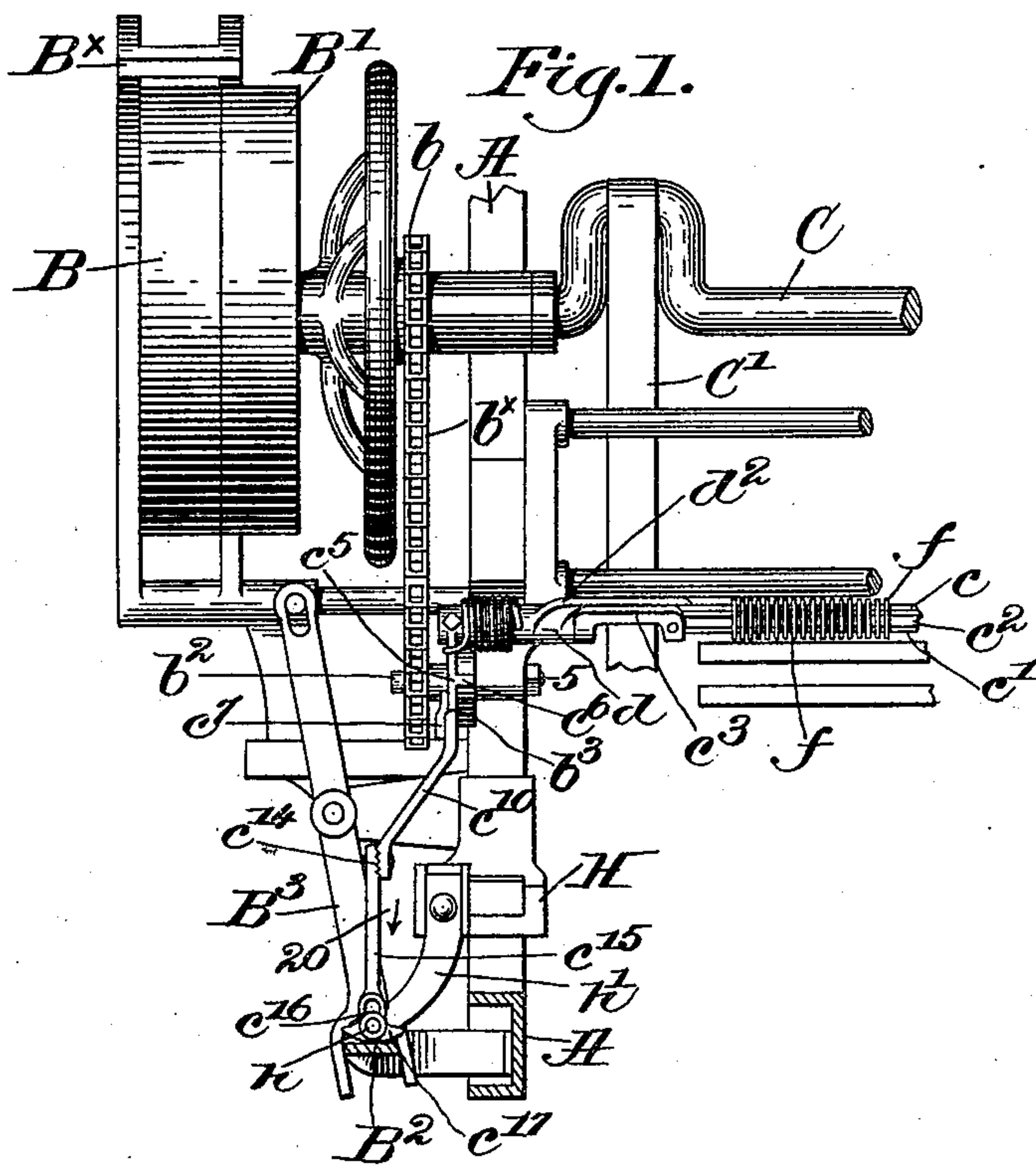


Fig. 2.

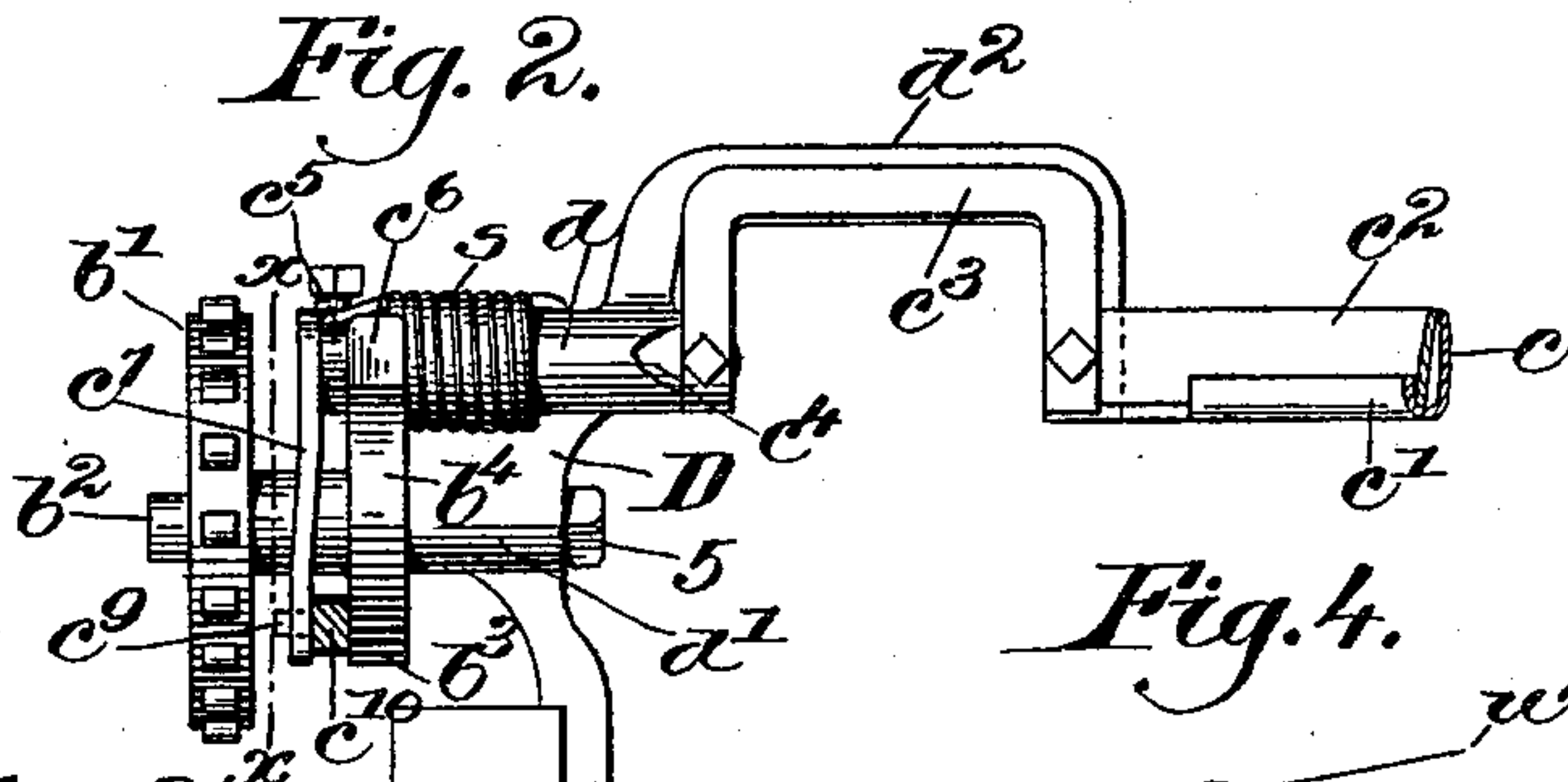


Fig. 3.

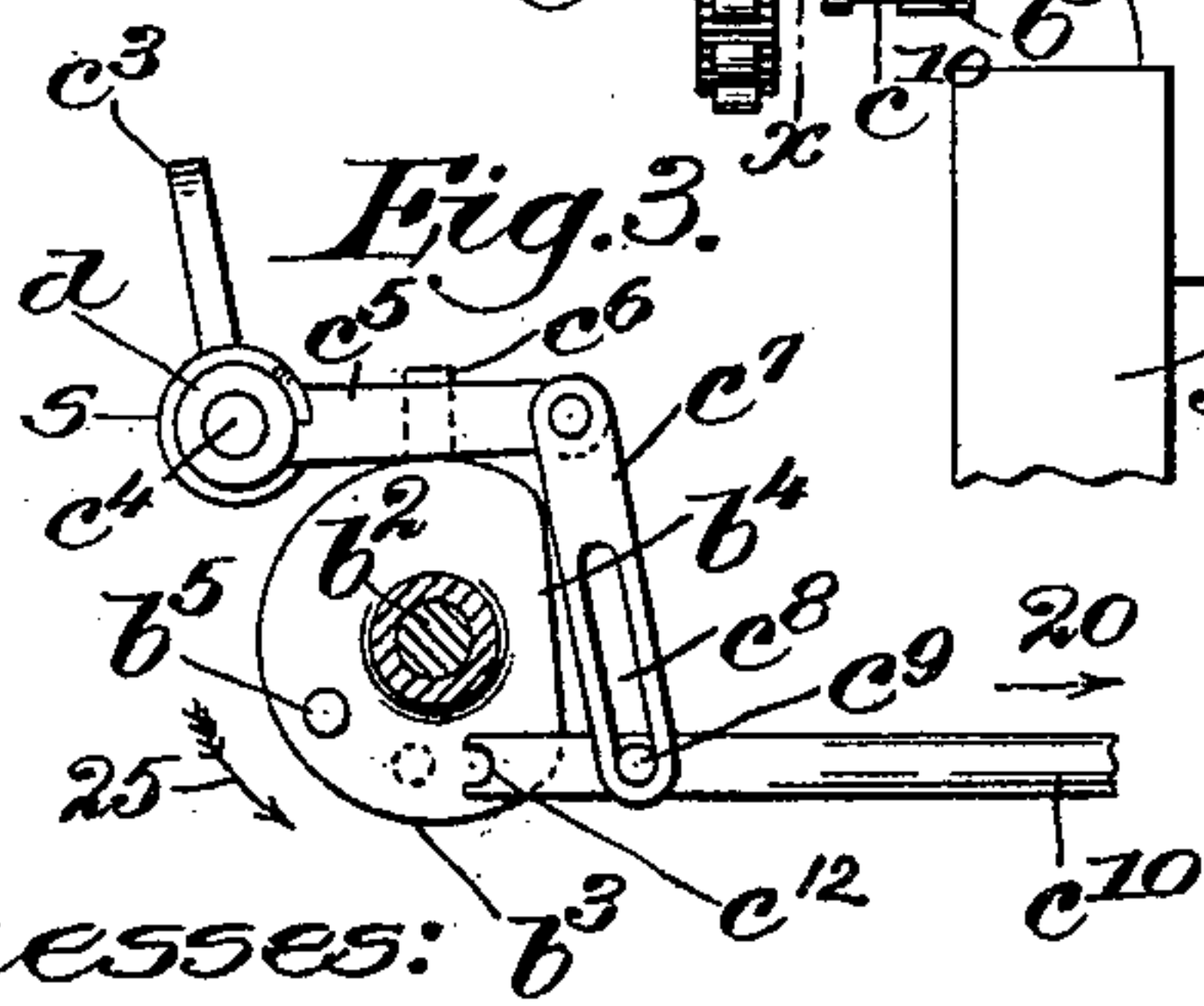
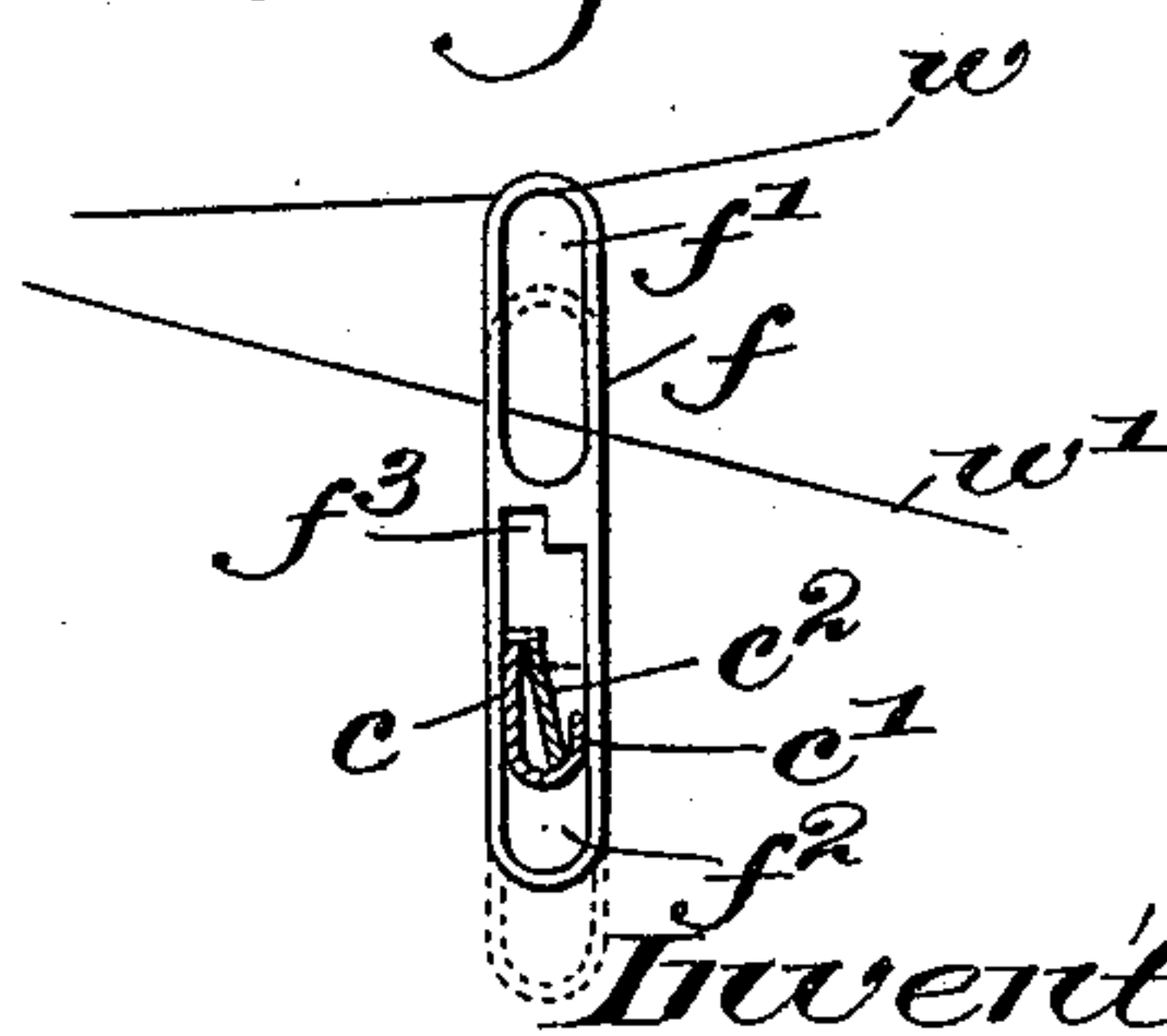


Fig. 4.



Witnesses: *b^3* *c^12* *c^10*
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UNITED STATES PATENT OFFICE.

CHARLES F. ROPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE
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WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 583,419, dated May 25, 1897.

Application filed December 7, 1896. Serial No. 614,733. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. ROPER, 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 letters and figures on the drawings representing like parts.

This invention relates to warp stop-motions for looms for weaving, wherein a series of detectors are under the control of the warp-threads and maintained inoperative while the loom is running properly, said detectors moving into abnormal operative position upon breakage or undue slackening of the warp to thereby cooperate with and effect the operation of suitable stopping mechanism for the loom. In some well-known warp stop-motion devices the detectors are arranged to drop upon failure of the warp between two serrated bars, one of which has a vibratory movement relatively to the other, the two bars acting on the opposite longitudinal edges of the dropped detector. Unless the two bars act upon the detector at exactly opposite points in the same vertical plane they tend to twist the detector. In my present invention I obviate this tendency to bend or twist the detector and have so located the vibrating member relatively to the fixed member and the detector that any tendency of the vibrator to move acts to maintain the detector in a perpendicular position without any twisting effect whatever. The construction whereby I attain this result is simple and effective and quickly responsive to abnormal position of a detector.

Figure 1 is a top or plan view of a sufficient part of a loom to be understood, with one embodiment of my invention applied thereto. Fig. 2 is an enlarged detail view, in front elevation, of a portion of the mechanism shown in Fig. 1. Fig. 3 is a view taken on the line $x x$, Fig. 2, looking to the right of the controlling means for the stopping mechanism of the loom; and Fig. 4 is a side elevation of one of the detectors with the vibrator and fixed cooperating member in section.

The loom-frame A, the crank-shaft C, provided with connecting-rods C', connected with

the lay, (not shown,) the fast and loose pulleys B B' on said shaft, the belt-fork B^x, the shipper-lever B², Fig. 1, and the lever B³, connecting the shipper-lever with the belt-fork, are and may be of usual or well-known construction.

Brackets D are secured to the loom sides, each having a bearing d , Figs. 1 and 2, and an upwardly-bent overhanging arm d^2 , to which arms are rigidly secured the ends of a transverse bar c , located at the rear of the lay and shown best in Figs 2 and 4 as bent outward and up to form a curved foot c' .

The overhanging arms d^2 accommodate the play of the lay connecting-rods C'.

A vibrator or feeler, shown as a straight flat bar c^2 , is rigidly secured at one end to a yoke c^3 at one side of the loom, the yoke accommodating one of the connecting-rods C', the outer end of the yoke having a journal c^4 in the central line of the vibrator, entering the bearing d of bracket D, and it is normally rocked therein, the other end of the vibrator having a suitable journal to enter a bearing on the transverse bar c , it being unnecessary to extend the vibrator beyond the connecting-rod at the other side of the loom, so that a second yoke is unnecessary.

The vibrator c^2 is located immediately in front of the guide member c , and it is normally rocked or vibrated relatively thereto, as will be described, the curved foot c' of the guide receiving the lower edge of the vibrator and permitting the rocking movement thereof.

The warp-detectors f , one of which is shown in side elevation in Fig. 4, are preferably made of light stiff sheet metal, having longitudinal slots or openings f' and f^2 in their upper and lower ends, respectively, the said detectors being arranged in a parallel series in front of or behind the heddles, as may be most convenient, the guide member c and the vibrator c^2 extending through the lower slots or openings f^2 .

As is best shown in Fig. 4, the main vertical portion of the member c acts upon the rear sides, while the upturned foot c' acts upon the front sides of the slots f^2 of the detectors, serving to guide the detectors in their vertical movement. Each slot f^2 is notched

at its upper end back of the center line of the detector, as at f^3 , Fig. 4, to embrace the upper edges of the guide and vibrator when the detector is in abnormal position (shown in dotted lines, Fig. 4) and thereby prevent the normal vibratory movement of the vibrator or feeler c^2 , which movement acts to tip the upper edge of the vibrator away from the guide. I have herein shown two warp-threads w and w' as passed through the upper slot f' of the detector, thus reducing the number of detectors to half the number of warp-threads, though obviously, if desired, only one detector may be used for each warp-thread, the detector being maintained in raised normal position so long as the thread in the upper plane of the shed is intact or under proper tension. Upon failure or undue slackening of the thread in the upper plane of the shed, however, the detector will descend to abnormal inoperative position. (Shown in dotted lines, Fig. 4.)

A sprocket or other suitable wheel b , fast on the crank-shaft C beyond the loom side, is connected by a sprocket-chain b^x with a second sprocket b' , rotatable on a stud b^2 , secured in a boss or hub d' of the bracket, as herein shown, by a nut 5, whereby the sprocket b' will be rotated continuously while the loom is running. The sprocket b' has suitably secured thereto a cam-disk b^3 , having a flattened portion b^4 (see Fig. 3) and a lug or projection b^5 on its outer face, as herein shown. The adjacent vibrator-journal c^4 has fast thereon a rocker-arm c^5 , provided with a lug c^6 to rest upon the periphery of the cam b^3 , said rocker-arm c^5 having pivoted thereto a depending link c^7 , slotted longitudinally at c^8 , (see Fig. 3,) to be entered by a stud-pin c^9 on a controlling-lever c^{10} , the rear end of which is notched at c^{12} to be at times engaged by the lug b^5 on the cam b^3 . In order to always insure the engagement of the lug c^6 with the cam periphery, I prefer to secure one end of a spring s to the rocker-arm c^5 , the other end being secured to a fixed part of the loom, the spring acting to normally depress the rocker-arm.

The controller-rod c^{10} is shown in Fig. 1 as made in two parts adjustably connected at c^{14} , the outer portion c^{15} being longitudinally slotted at c^{16} to embrace a stud h on an arm h' of the usual slide H, which is operated in usual manner by a dagger (not shown) if the shuttle fails to enter the shuttle-box.

The enlarged outer end c^{17} of the part c^{15} of the controller-rod bears against the shipper-lever B^2 , which is held inoperative by the usual notched plate, (not shown,) so that movement of the controller-rod in the direction of the arrow 20, Figs. 1 and 3, will release the shipper-lever to stop the loom.

Referring now to Fig. 3, it will be seen that when the cam b^3 rotates in the direction of arrow 25 the flattened portion b^4 of its periphery will permit the rocker-arm c^5 to descend, moving the inner end of the controller-rod c^{10}

out of the path of the lug b^5 , the vibrator c^2 at the same time being rocked on its journals, and when the part b^4 of the cam passes beyond the lug c^6 of the rocker-arm c^5 the latter will be raised, rocking the vibrator in the opposite direction into position shown in Fig. 4, such movements being continued while the loom is running properly. Should a warp-thread break, however, or become unduly slack, its detector will move into abnormal position, (shown in dotted lines, Fig. 4,) the notch f^3 engaging and preventing the forward rocking movement of the vibrator c^2 and descent of the rocker-arm c^5 , and consequently the notched end c^{12} of the controller-rod c^{10} will remain in the path of and to be struck by the lug b^5 as the cam rotates, said lug moving the controller longitudinally to release the shipper-lever and stop the loom.

The lug b^5 moves in a circular path, and when in engagement with the controller-rod c^{10} will move the latter longitudinally, continued movement of the lug tending to lift the notched end of said rod. This lifting movement of the rod is permitted by the slot c^8 in the link c^7 , the stud-pin c^9 on the rod traveling up in the slot until the cam-lug c^5 passes out of engagement with the notch c^{12} . It will be seen that the detector is held by the guide c acting on the rear edge of the detector-slot f^2 and the vibrator acting on the front edge of the notch f^3 , which is in about the central line of the detector, so that any tendency of the vibrator to move forward, due to the spring s or the weight of the parts connected with the rocker-arm, merely aids in maintaining the detector straight and in perpendicular position without twisting, so that no external detector-guides are necessary and the serrating of the guide is obviated.

The guide c acts as a support for a dropped detector, holding it in convenient position for the attendant to lift it and piece the broken warp.

I have provided a slot-and-pin connection between the controller-rod and the slide-block arm h' in order that the slide-block may be operated to release the shipper-lever without disarranging the warp stop mechanism, while the adjustable connection of the two-part controller-rod makes adjustment or regulation thereof easily accomplished.

My invention is not restricted to the precise construction and arrangement herein shown, for the same may be modified or rearranged in various particulars without departing from the spirit and scope of my invention.

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

1. In a loom, a series of vertically-movable slotted warp-stop-motion detectors maintained in inoperative position by the warp-threads when intact, a rocking vibrator extended through the slots of the detectors, to be engaged and held from movement by a detector in abnormal position, and stopping

mechanism for the loom, operative upon stoppage of the vibrator, substantially as described.

2. In a loom, a series of vertically-movable warp-stop-motion detectors each having an opening therein notched in the central line of the detector, a rocking vibrator extended through the openings in the detectors and adapted to enter the notch of and be held from movement by a detector in abnormal position due to breakage or undue slackening of its warp-thread, and stopping mechanism for the loom operative upon stoppage of the vibrator, substantially as described.

3. In a loom, a series of vertically-movable warp-stop-motion detectors having each a holding-notch, open at its lower end, a rocking vibrator located below said notches in the detectors and adapted to enter the open end of the notch of and be held from movement by a detector in abnormal position due to a broken or unduly slack warp-thread, and stopping mechanism for the loom operative upon stoppage of the vibrator, substantially as described.

4. In a loom, a series of vertically-movable warp-stop-motion detectors having each an opening therein decreased in width at its upper end, a fixed guide and an adjacent vibrator extended through the openings in the detectors, the upper edges of said members being adapted to enter the narrowed end of the opening of a detector in abnormal position due to breakage or undue slackening of a warp-thread, to thereby hold the vibrator from movement, and stopping mechanism for the loom operative upon stoppage of the vibrator, substantially as described.

5. In a loom, a series of vertically-movable warp-stop-motion detectors having each a notch one side of which is in the central line of the detector, a fixed upright guide and a rocking vibrator located below the notches in the detectors, the vibrator engaging and being held from movement by the side of the notch at the center of the detector when the latter is in abnormal position due to breakage or undue slackness of a warp-thread, the guide and vibrator acting upon the detector at such time to maintain it perpendicular and without twisting, and stopping mechanism for the loom operative upon detention of the vibrator, substantially as described.

6. In a loom, a series of vertically-movable warp-stop-motion detectors each having a holding-notch, open at its lower end, a rocking vibrator located below the notches in the detectors and adapted to enter the open end of the notch of and be held from movement by a detector in abnormal position, and means to normally rock the vibrator, combined with

a shipper-lever, a controlling device therefor, and means operative upon stoppage of the vibrator to actuate said controlling device, substantially as described.

7. In a loom, a series of vertically-movable, longitudinally-slotted warp-stop-motion detectors having holding-notches, a fixed guide to prevent edgewise movement of the detectors, a rocking vibrator extended through the slots of the detectors and adapted to enter the notch of and be held from movement by a detector in abnormal position, and means to normally rock said vibrator, combined with a shipper-lever, and controlling means therefor, operative upon stoppage of the vibrator to release the shipper-lever, substantially as described.

8. In a loom, a series of vertically-movable, longitudinally-slotted warp-stop-motion detectors having holding-notches, a fixed guide having an upturned foot, extended through the slots of and to guide the detectors, a rocking vibrator adjacent the guide and above its foot, said guide entering the notch of and being held from movement by a detector in abnormal position, the guide acting oppositely upon the detector, and means to normally rock, the vibrator, combined with a shipper-lever, controlling devices therefor, and an actuator for said devices, operative upon stoppage of the vibrator, substantially as described.

9. In a loom, a series of warp-stop-motion detectors, having each a slot therein, a rocking vibrator adapted to engage a detector near its central longitudinal line and to be held from movement, when the detector is in abnormal position, stopping mechanism for the loom, and controlling devices therefor operative upon stoppage of the vibrator, substantially as described.

10. A warp-stop-motion detector for looms, composed of sheet metal, having a warp-receiving opening and a longitudinal slot notched at its upper end, the inner side of the notch being in the central line of the detector, substantially as described.

11. A warp-stop-motion detector for looms, having elongated slots therein, the upper end of the lower slot being reduced in width and having its inner edge in the central line of the detector, substantially as and for the purpose described.

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

CHARLES F. ROPER.

Witnesses:

GEO. OTIS DRAPER,
H. S. MANLEY.