No. 735,785. PATENTED AUG. 11, 1903.

J. E. LEMYRE.

WARP STOP MOTION FOR LOOMS.

APPLICATION FILED AUG. 18, 1902.

NO MODEL. 6 SHEETS—SHEET 1.

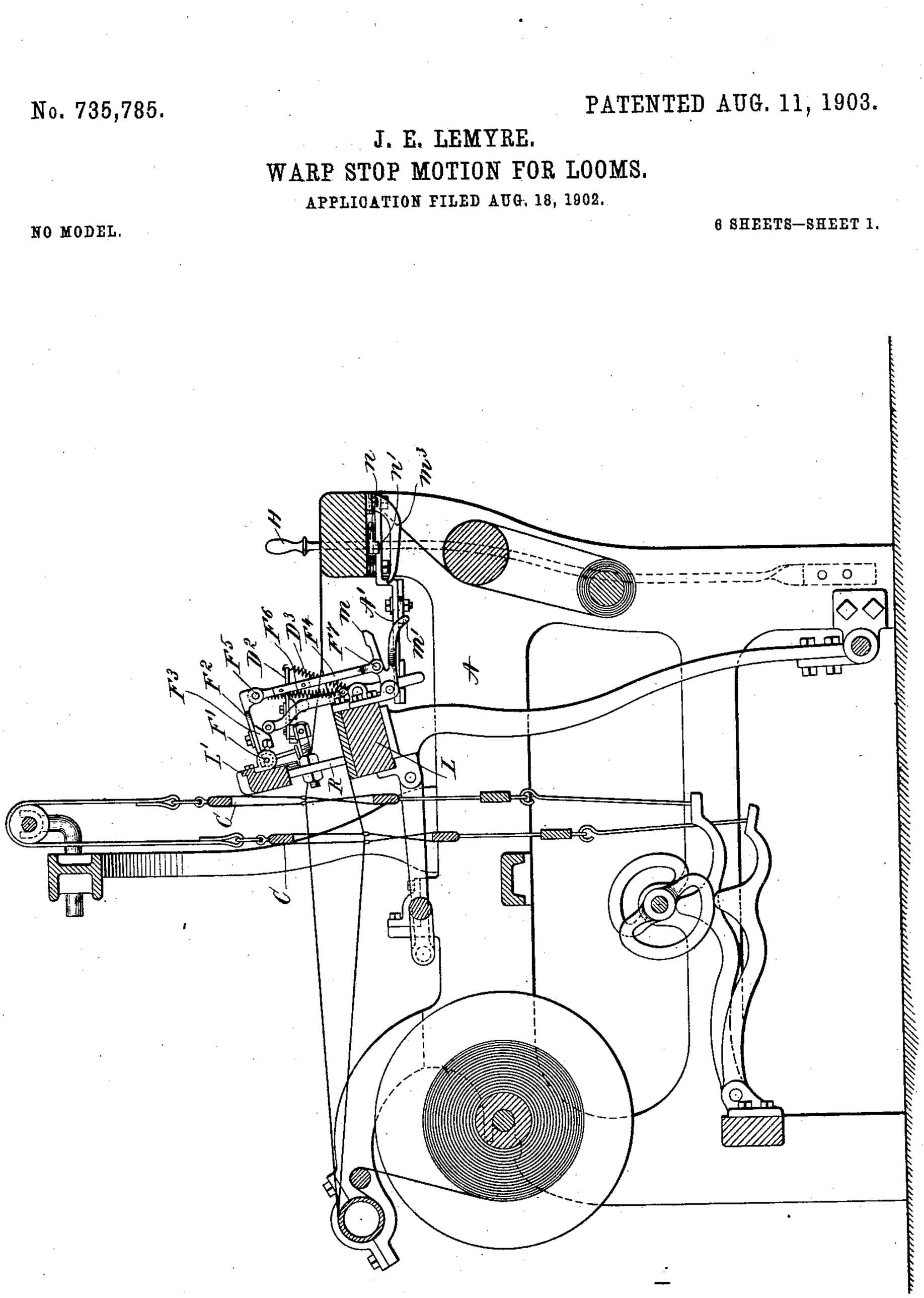

Fig. 1.

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NO MODEL. 6 SHEETS—SHEET 2.

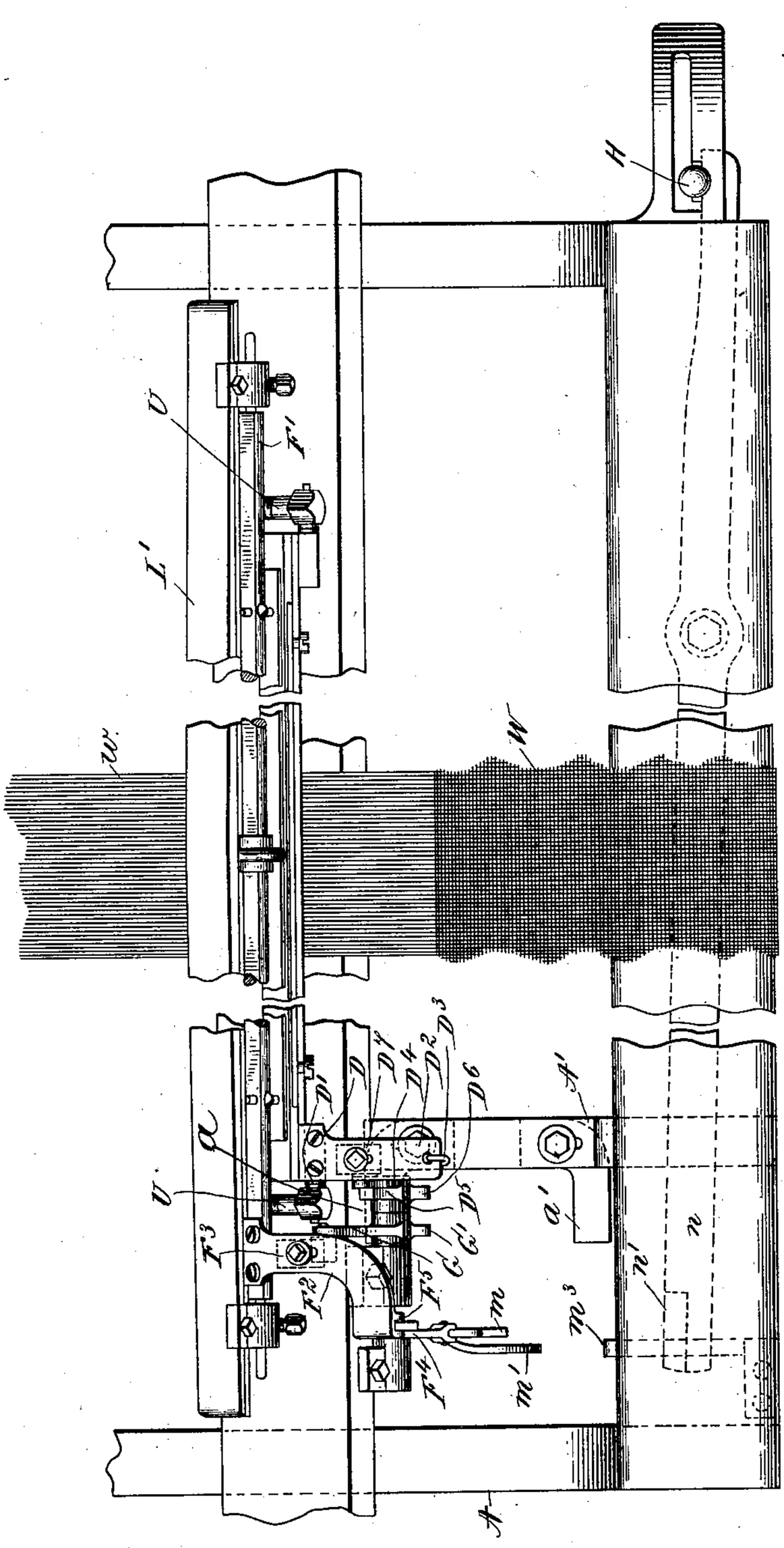

Fig. 1.

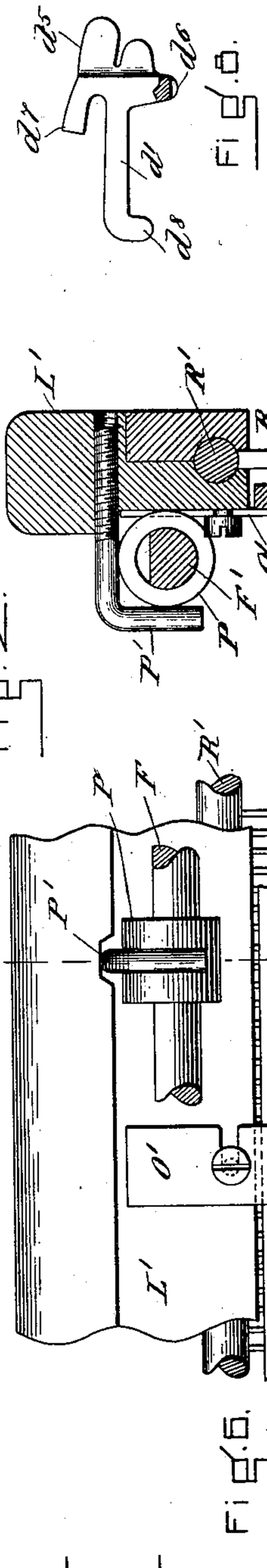

Fig. 5.

Fig. 7.

Fig. 6.

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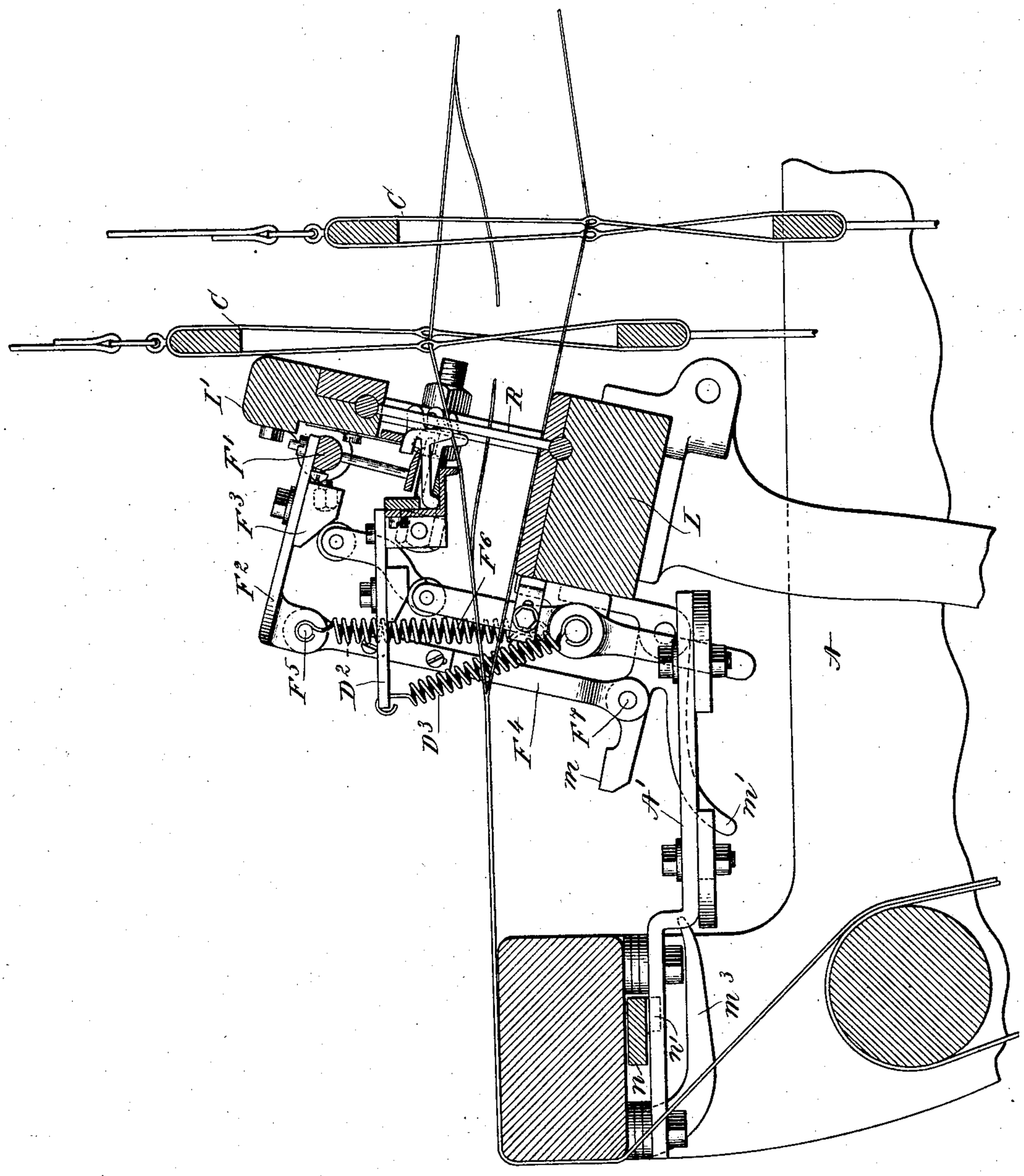
NO MODEL. 6 SHEETS—SHEET 3.



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NO MODEL. 6 SHEETS—SHEET 4.

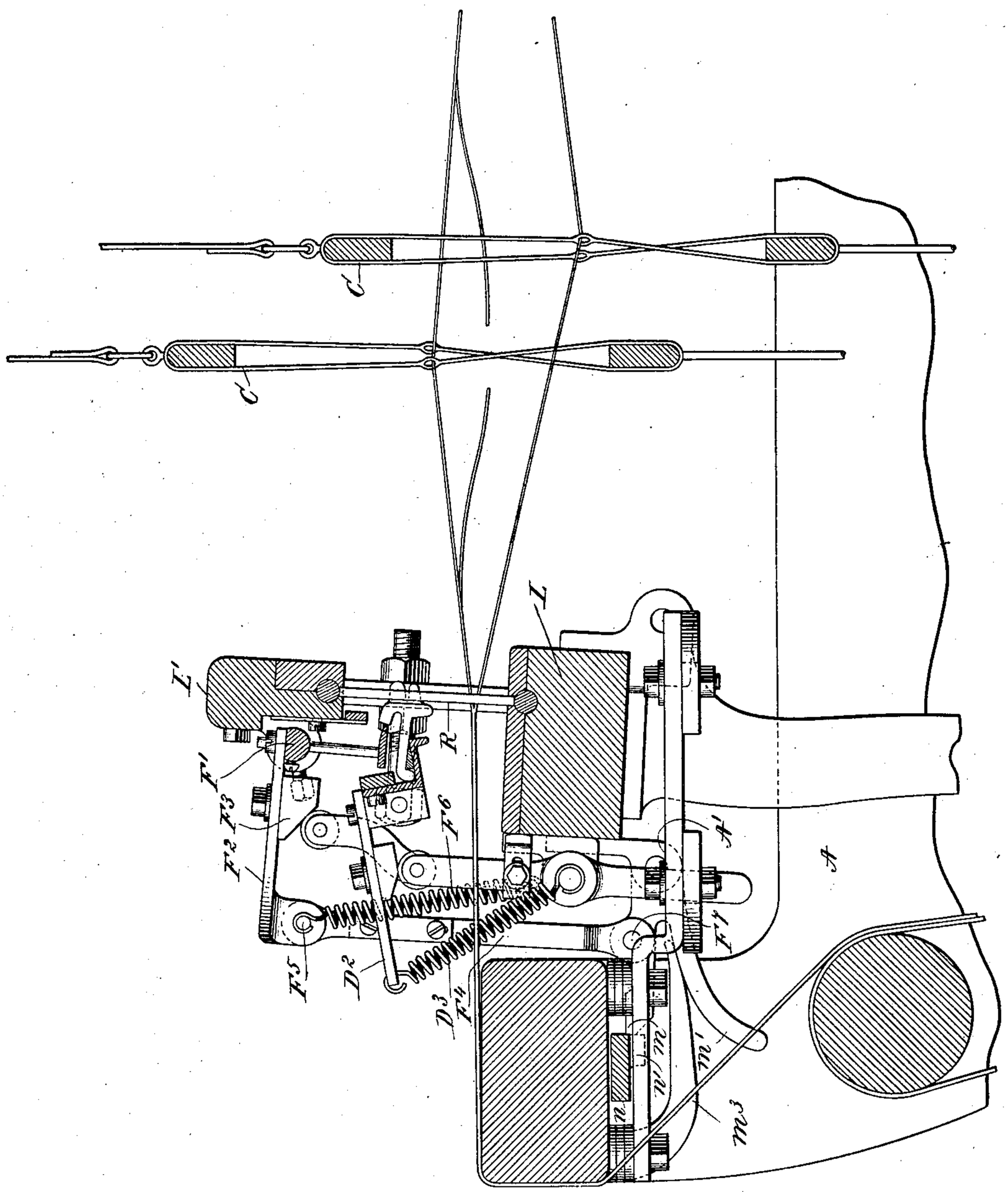

Fig. 4.

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NO MODEL. 6 SHEETS—SHEET 5.

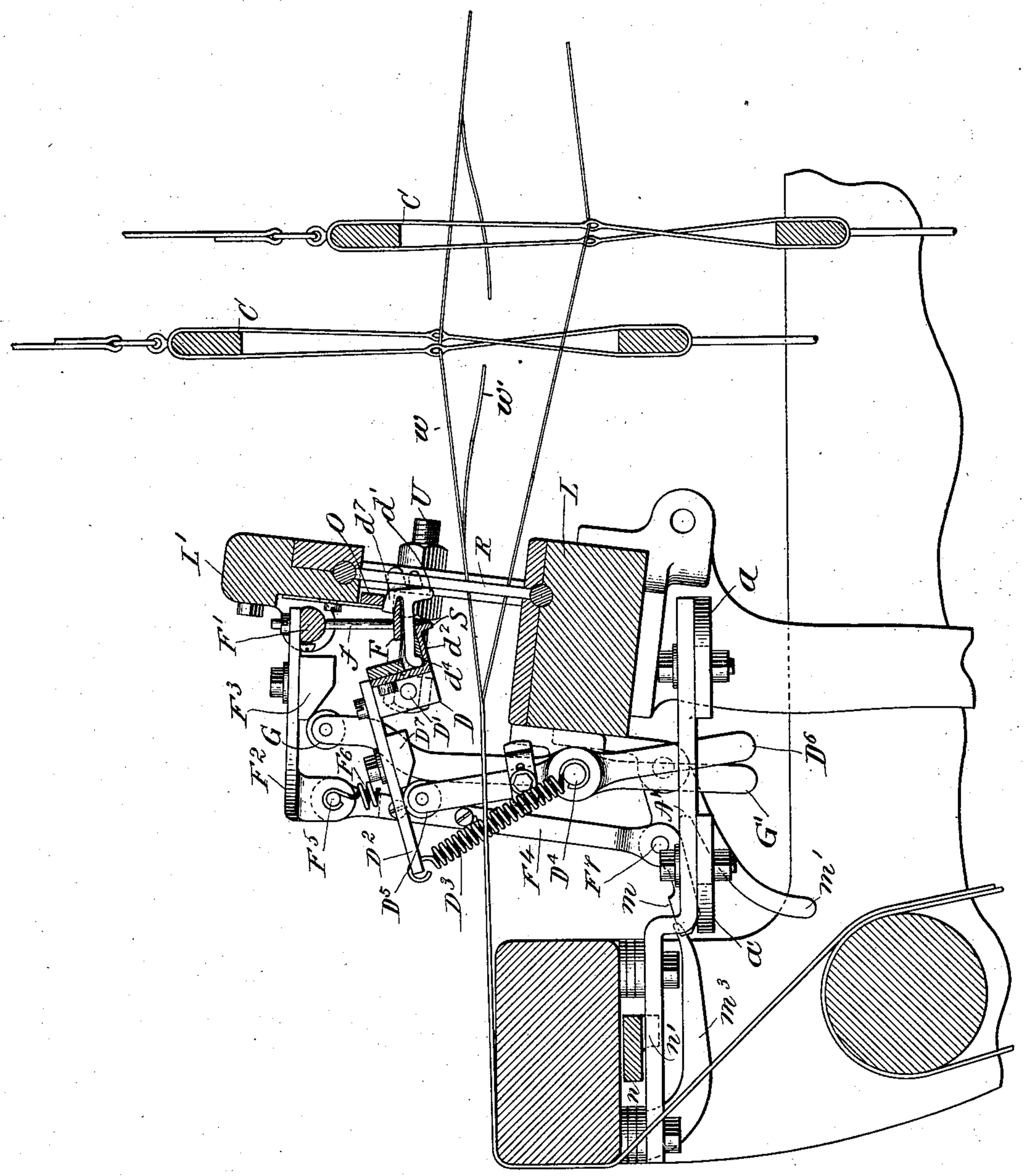

FIG. 5.

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NO MODEL. 6 SHEETS—SHEET 6.

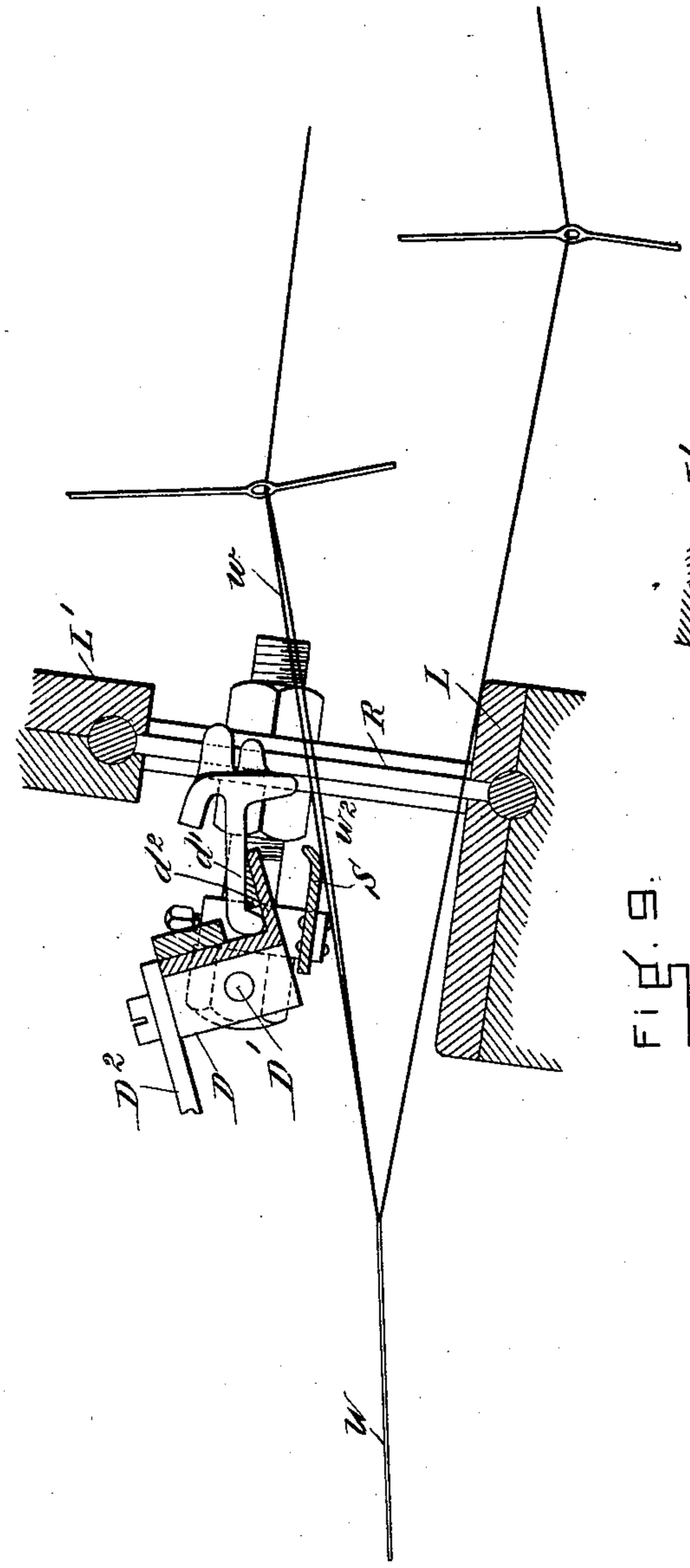

FIG. 9.

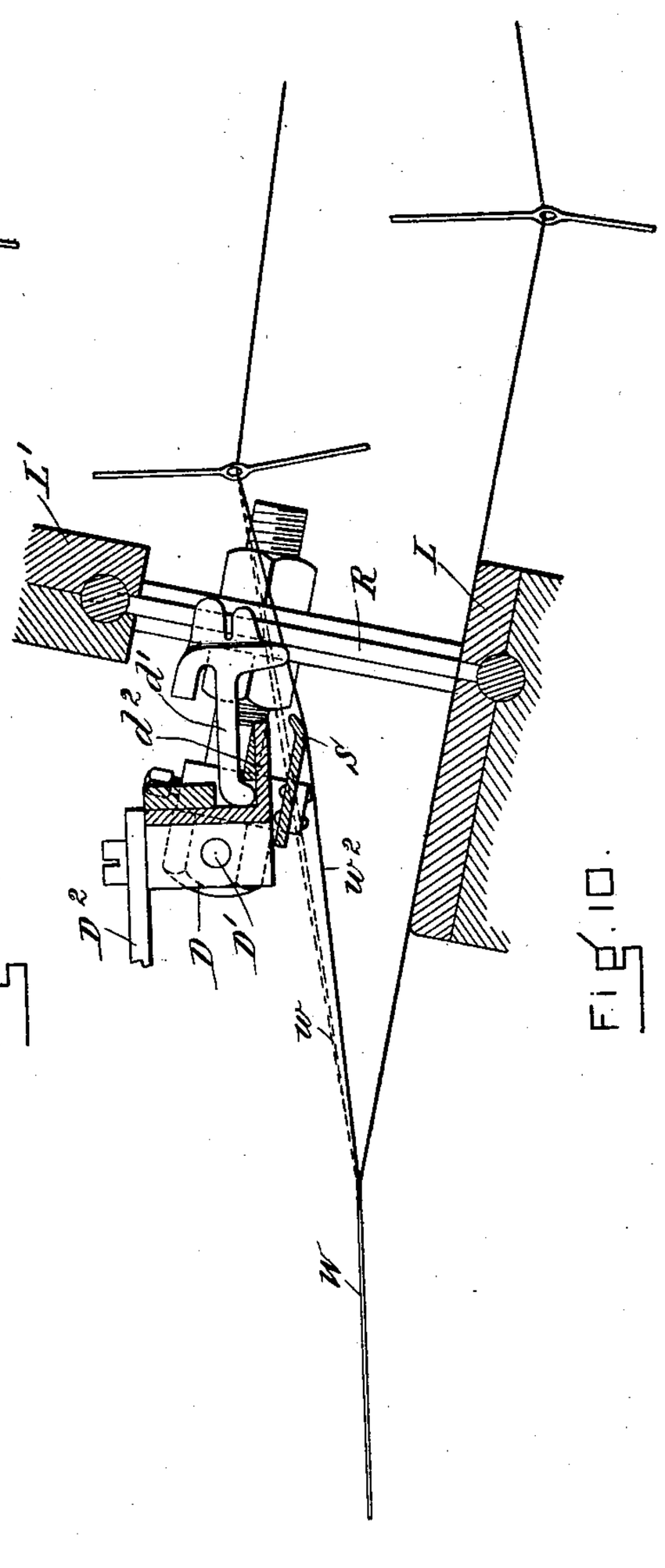

FIG. 10.

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No. 735,785. Patented August 11, 1903.

UNITED STATES PATENT OFFICE.

JOSEPH E. LEMYRE, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNOR TO TEXTILE MACHINERY IMPROVEMENT COMPANY, A CORPORATION OF NEW JERSEY.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 735,785, dated August 11, 1903.

Application filed August 18, 1902. Serial No. 120,013. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. LEMYRE, a citizen of the United States, and a resident of Manchester, in the county of Hillsborough and State of New Hampshire, have invented new and useful Improvements in Warp Stop-Motions for Looms, of which the following is a specification.

My invention relates to warp stop-motions for looms; and it consists of certain novelties and improvements in and upon warp stop-motions of the class characterized by a system of warp-thread detectors, a feeler regularly oscillated with relation to the detectors, and a shipper-actuator controlled by the feeler, all these component parts being so arranged that when the warps are in proper condition to act alike on all the detectors the feeler is unobstructed in its normal movements, but that when a warp is displaced unduly from its proper position it fails to act, as usual, upon the detector appropriate to it, so that the said detector, moving from its usual position in the system, obstructs the normal movement of the feeler, which then by means of suitable connections controls the shipper-actuator to stop the loom. In stop-motions of this character the feeler may operate on the shipper-actuator through electrical or mechanical intervening devices. A stop-motion of the character above generally described is shown in United States Letters Patent No. 692,316, granted to me February 4, 1902, and I here illustrate my present invention as applied to a warp stop-motion such as shown in the said patent.

In the drawings hereto annexed, which show an embodiment of my invention and improvements, Figure 1 is a general view, in vertical cross-section, of a loom having my improved warp stop-motion attached. Fig. 2 is a top plan view of the front part of the loom shown in Fig. 1, on a larger scale. Fig. 3 is a vertical cross-section, on a still larger scale, showing the position of the parts of the stop-motion when a warp-thread is broken or displaced and the lay is at its rearward position. Fig. 4 is a similar vertical cross-section showing the action of the stop-motion on the shipper as the lay beats forward. Fig. 5 is a similar vertical cross-section showing the parts as they stand while the lay is moving rearward or as they stand after the stop-motion has operated to stop the loom. Figs. 6 and 7 are views in elevation and cross-section, respectively, of a detail of construction. Fig. 8 is a detail showing one of the detectors, and Figs. 9 and 10 are details showing a modification of one of the elements of my invention.

The loom-frame A, lay-beam L, lay-cap L′, reed R, detectors *d′*, and feeler F are all substantially as shown and described in my patent above referred to and differ therefrom only in such respects as will be hereinafter specifically described. The functional relations of the detectors *d′*, feeler F, and the shipper stop mechanism are also substantially the same as described in my said patent.

I have found that in some situations the stop-motion described in my said patent is not perfectly adapted to meet the requirements of the manufacturer, for the reason that the stop-motion is under such conditions liable to stop the loom oftener than is actually necessary. For instance, in weaving the finer grades of goods, such as cotton-print cloth, the tension of the warp is often very moderate and some of the warp-threads are almost certain to become slack as compared with the general body of the warp and yet be not so slack as to create any substantial defect in the goods. Under these conditions a detector such as described in my said patent will fall far enough below its usual position as to stop the loom, even when no warp-thread is broken or has become so slack as to require attention, and thus the loom may be stopped very much oftener than is necessary, entailing loss of time in searching for a defect which does not exist and decreasing the productive efficiency of the loom by reason of such delay.

The improvements herein described constitute a stop-motion which while in every respect as sensitive to defects of the warp as the stop-motion of my said patent is nevertheless insensitive to variations in the warp which do not constitute defects.

Referring to Fig. 3 of the drawings, the detectors *d′* are seen in the position when they are supported by the warp-threads on the for-

mation of the shed by the heddles C. These detectors d' are pivoted at d^4 upon a shelf d^2, the said shelf being secured at its ends to the blocks D. The blocks D are pivoted at D′ to the vertically-adjustable studs U, which are clamped at the end of the reed, and an arm D^2 is secured to one of the blocks D, extends forwardly therefrom, and is provided on its lower side with a cam-block D^7. The spring D^3, secured at the outer end of the bar D^2 and also to the pivot-bearing D^4, tends constantly to depress the arm D^2, and consequently to elevate the shelf d^2, which carries the supports or detectors d'.

The feeler F is suspended by short rods f from the rocking shaft F′, which rocks on bearings secured to the lay-cap L′. The top of the rocking shaft F′ is planed off or flattened and the arm F^2 is secured by screws or otherwise to the flattened surface of the rocking shaft F′. Upon the lower side of the arm F^2 there is secured the cam-block F^3. Pivoted at the outer end of the arm F^2 at F^5 is the connecting-link F^4, which is pivoted also at F^7 to the finger m, which constitutes the connection between the feeler F and the shipper-actuating devices which form part of the stop-motion.

Pivoted on the bearing D^4 are two lever-bars D^5 and G, Figs. 2 and 3. The lower ends D^6 and G′ of these lever-bars play between the abutment pieces a a', which are adjustably secured to the stationary plate A′, fast to the under side of the breast-beams of the loom, so that as the lay swings back the bars D^5 and G strike their lower ends D^6 and G′ against the abutment a and as the lay swings forward strike against the abutment a'. The upper ends of these bars coöperate with the cam-blocks D^7 and F^3, respectively, and when the lay swings back the lower ends of the bars, as aforesaid, strike the abutment a and raise the arms D^2 and F^2, respectively, against the pull of the springs D^3 and F^6. The result of this movement is the simultaneous lowering of the detector-shelf d^2 and the withdrawal of the feeler F from beneath the hooks d^7 of the detectors d'. This movement of the shelf d^2 and the feeler F takes place as the lay reaches its extreme backward position, and thus at a time when the warps are raised to form the shed. If the warps w are all intact and at proper tension, the detectors find their support upon the warps by resting the warp-notches d^6 upon the warp-threads, and the hooks d^7 are thus retained in a position of sufficient elevation to permit the feeler F to return without obstruction under the hooks d^7 when the lay begins its forward movement and by moving the end G′ of the bar G from the abutment a permits the spring F^6 to act upon the bar F^2. If, however, a warp-thread is broken or unduly slack, the detector, which extends immediately from it, drops down, turning in the bearing d^4 upon its rounded end d^8, Fig. 8, and falls to such a position that the feeler F is prevented from returning to its normal place under the hooks d^7. Thus the bar F^2, link F^4, and finger m are retained in an elevated position, and as the lay swings forward the finger m strikes the lug n' upon the shipper-bar n, which knocks the shipper-handle H out of its notch and stops the loom in the usual manner. In order that a harmlessly-slack warp-thread will not cause the stop-motion to operate, I provide a warp-leveler S, which in the specific form of mechanism shown in Figs. 1 to 5, inclusive, constitutes a lip or flange projecting downward from the detector-shelf d^2 to such an extent that when, as above described, the said shelf swings downward to lower the detectors into operative position it presses upon the warp-threads and levels the tighter warps into even position with the slacker warps, and thus insures an equal support for all the detectors, provided a warp is not broken, as at w', Fig. 3, or is not so slack as to constitute a defect.

In order that the detectors may be depressed into warp contact position only at the critical moment when the lay reaches the backward limit of its swing and so that the warps may not be subjected to any rubbing of the detectors themselves, I provide an abutment a', which arrests the lower end D^6 of the bar D^5 at the forward swing of the lay and moves the upper end of the said bar out from under the cam-block D^7 and permits the bar D^2 to move downward under the influence of the spring D^3. This movement raises the shelf d^2 and detectors d', restoring them to their normal position and permitting the feeler F to resume its place under the hooks d^7.

In order to guard against the finger m striking too high at the forward swing of the lay, I provide the steering-arm m' and the guide m^3, the latter being secured to the front beam of the loom. These two parts are so proportioned that the steering-arm m' is depressed just enough to steer the finger m straight against the lug n' of the shipper-arm n. The operation of this stop-motion is indicated by the successive Figs. 3 to 5, inclusive. In Fig. 3 the lay is shown at its extreme backward movement when the broken warp w' has permitted one of the detectors to fall below the others to a position where it arrests the feeler F. Fig. 4 shows the lay at its forward swing just as the finger m reaches the lug n' and the instant before the last forward movement of the lay causes the lower end D^6 of the bar D^5 to strike the abutment a', so as to permit the bar D^2 to fall and the shelf d^2 to rise, and Fig. 5 shows the stop-motion at the instant when the lay has swung partially back (the loom having stopped) and the detector-shelf d^2 has lifted all the detectors into contact with the stop-plate O, so that the feeler F slips into its normal position. This is also the position of the parts when the lay is swung forward and the warps are all in good condition, the finger m being so far depressed as not to affect the shipper-lever n.

In Figs. 9 and 10 I have shown a modifica-

tion of my invention wherein the warp-leveler S is illustrated as a fixed bar extending across the front of the reed R below the detector-shelf d^2. In Fig. 9 a slightly-slack warp w^2 is shown, and in Fig. 10 the warp w^2 is shown as depressed along with all the tight warps, so that the entire shed is evenly leveled to receive the detector. However, the particular form in which the means for leveling the warps is embodied is wholly immaterial, the only physical requisite being that said means shall act to level both the tight and loose warps as the detectors and warps come into operative relation.

Figs. 6 and 7 show the guard-bar O and its fastening-clips O′, whereby it is secured to the lay-cap L′, and also show the mode I have adopted for steadying the rocker-bar F′, which, especially in very wide looms, is liable to spring if unsupported. Collars P are shrunk or wedged upon the bar F′ at intervals along its length, and hooks P′ are screwed into the lay-cap L′ until they just bear against the collars P.

What I claim, and desire to secure by Letters Patent, is—

1. In a warp stop-motion for looms of the character described, the combination of a system of warp-detectors, a movable support therefor normally holding the detectors out of warp contact position, and means for vibrating the detector-support and detectors to and from the warp at regular intervals.

2. In a warp stop-motion for looms of the character described, the combination of a system of warp-detectors, and means for leveling the warps as the detectors and warps come into operative relation.

3. In a warp stop-motion for looms of the character described, the combination of a system of warp-detectors, a movable support therefor normally holding the detectors out of warp contact position, means for vibrating the detector-support and detectors to and from the warp at regular intervals, a warp-leveler, and means for pressing the leveler upon the warps as the detector-support moves the detectors to warp contact position.

4. In a warp stop-motion for looms of the character described, the combination of a system of warp-detectors, a movable support therefor normally holding the detectors out of warp contact position, an abutment, and means, operated by the abutment, to move the detector-support and detectors into warp contact position as the shed is raised.

5. In a warp stop-motion of the character described, the combination of a system of warp-detectors, a movable support therefor, normally holding the detectors out of warp contact position, a rear abutment and a forward abutment, and means, operated by the rear and forward abutments, to lower and raise, respectively, the detector-support, as the lay swings to rear and front, respectively.

6. In a warp stop-motion of the character described, the combination of warp-detectors, a shelf therefor, pivoted upon the lay, an arm secured to the pivoted shelf, a cam, a lever-bar, and operating abutment therefor, substantially as described.

7. In a warp stop-motion of the character described, the combination of detectors, a feeler, a shipper-actuating finger, and a guide for positively steering the shipper-finger.

8. The combination in a warp stop-motion of the character described, of detectors, a feeler, a detector-shelf, pivoted on the lay, an arm therefor, a controlling-spring, a cam, and lever-bar; an arm secured to the feeler, a controlling-spring therefor, cam, and lever-bar, abutments on the loom, coöperating with the said lever-bars, and shipper-actuating devices controlled by the feeler-bar, substantially as described.

Signed by me, at Manchester, aforesaid, this 29th day of July, 1902.

JOSEPH E. LEMYRE.

Witnesses:
FRANK C. TWOMBLY,
FRANK S. HARTNETT.