

(No Model.)

2 Sheets—Sheet 1.

L. J. KNOWLES, Dec'd.

F. B. KNOWLES & H. A. MARSH, Surviving Executors.

WEFT STOP MOTION FOR LOOMS.

No. 376,774.

Patented Jan. 24, 1888.

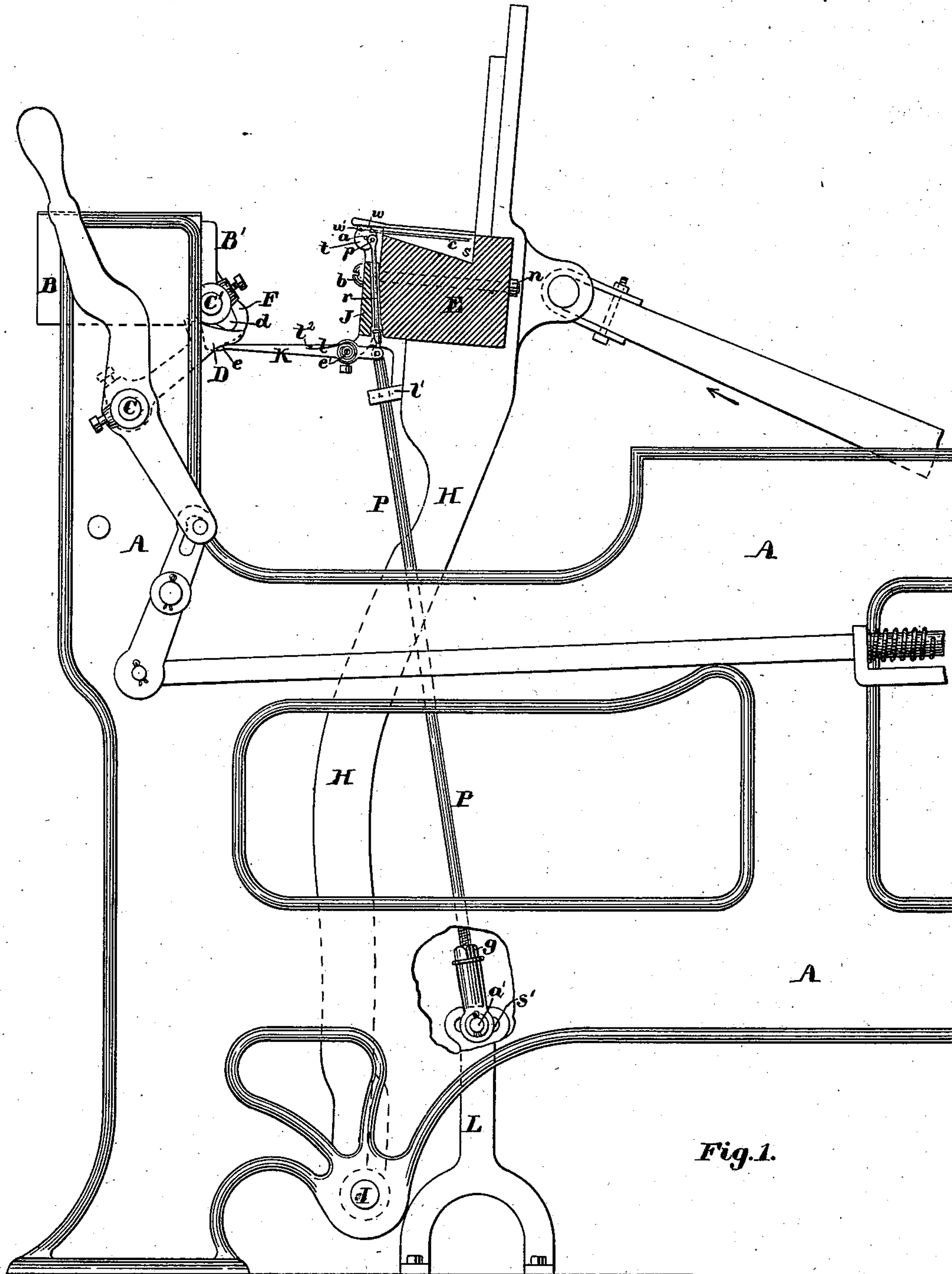


Fig. 1.

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Inventor:

Lucius J. Knowles  
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(No Model.)

2 Sheets—Sheet 2.

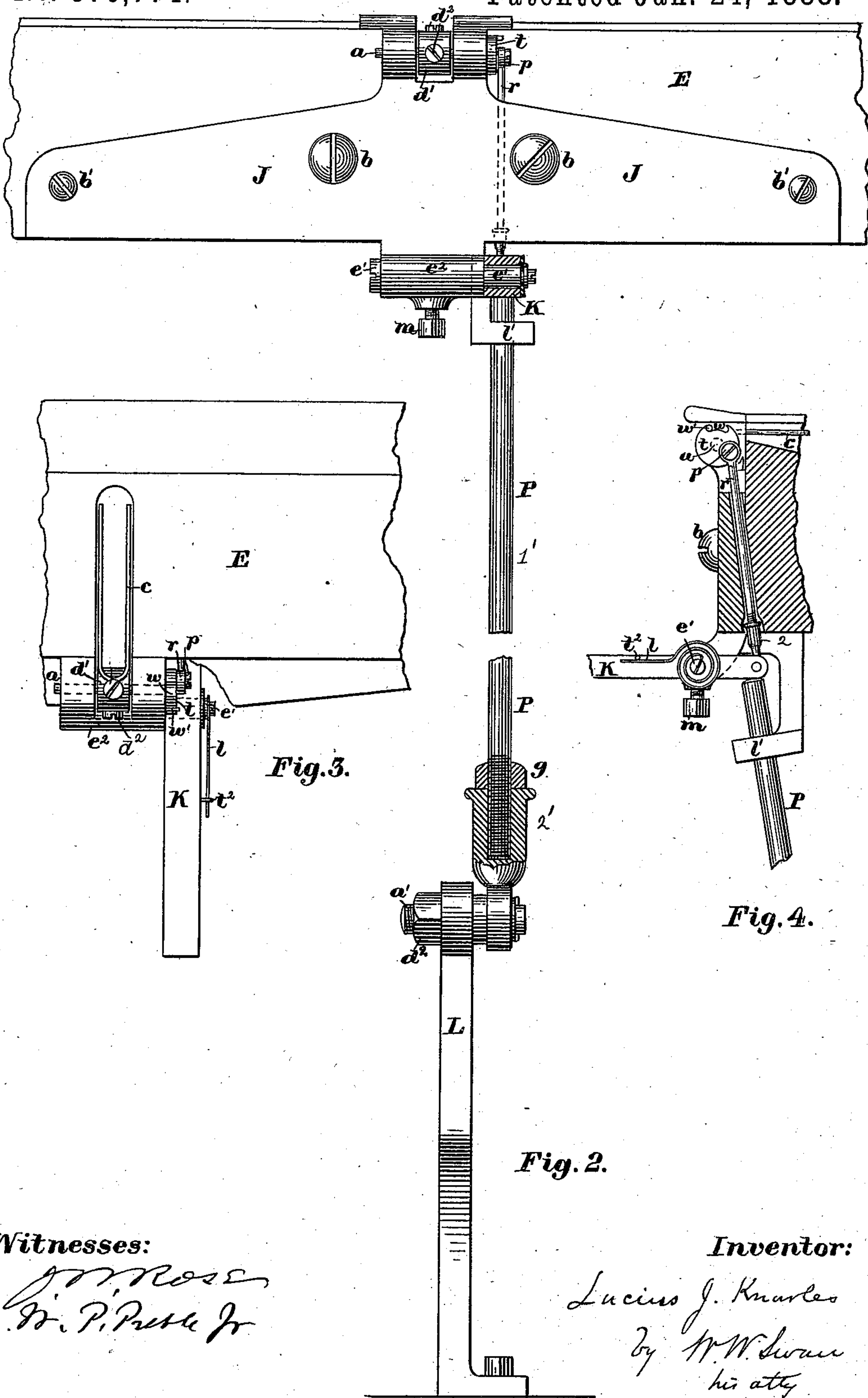
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Witnesses:

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Inventor:

Lucius J. Knowles  
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# UNITED STATES PATENT OFFICE.

LUCIUS J. KNOWLES, OF WORCESTER, MASSACHUSETTS; FRANCIS B. KNOWLES  
AND HENRY A. MARSH SURVIVING EXECUTORS OF SAID LUCIUS J.  
KNOWLES, DECEASED.

## WEFT STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 376,774, dated January 24, 1888.

Application filed April 20, 1882. Renewed June 27, 1885. Serial No. 170,015. (No model.) Patented in England July 31, 1882,  
No. 3,628.

*To all whom it may concern:*

Be it known that I, LUCIUS J. KNOWLES, of Worcester, in the State of Massachusetts, have invented a new and useful Improvement in Weft Stop-Motions, (for which British Letters Patent No. 3,628, of July 31, 1882, have been issued to me,) of which the following is a specification.

This invention, like several others which form the subject-matter of separate applications for patents filed simultaneously herewith, has reference to that class of stop-motions in which weft feeler-wires are pivoted to the front of the lay within the warp, as distinguished from stop-motions employing pivoted weft-feelers which can only be used outside of the warp at the end of the lay; and of this class it has more especial reference to stop-motions in which the lever for operating the feelers, the same rocking upon an independent pivot, is made to serve also as a dagger, and has a crank-connection with the shaft to which the feeler-wires are attached.

It consists in making the connecting-rod between the dagger and the feeler-shaft adjustable in length, and at the same time applying a stop for limiting the movement of the feeler-wires and dagger to the feeler-shaft rather than to the dagger. When this stop is directly applied to the dagger, if the point of the dagger cannot strike the knock-off lever properly it is with difficulty that it can be made to do so except by altering the shape of the dagger, whereas by my contrivance it can be made to do so by merely changing the length of the connecting-rod.

Another part of the present invention, entirely independent of the foregoing, however, relates to the adjustment of a device employed in the stop-motion of the present case, and also in the stop-motions of the applications filed simultaneously herewith for controlling the movements of the feeler-wires. This device, which I term the "governing-rod," consists of a substantially perpendicular rod whose upper and free end passes through a hole in a rigid attachment to the lay, while its lower

end is so pivoted that the rod will vibrate with the lay, but upon a different center. When the lay moves backward, the said governing-rod not only swings back with it, but has at its upper end a longitudinal motion upward through the hole, and in course of its double motion strikes and lifts the feeler-operating lever, which, as usual, is pivoted to the lay, and which in the present stop-motion, as before stated, serves also as the dagger. When the lay moves forward, the upper part of the governing-rod recedes through the hole, and the feeler-operating lever or dagger follows it down either from its own weight or by force of a spring. The feeler-operating lever or dagger is connected by a connecting-rod to a crank-disk on the feeler-shaft. Consequently, when the governing-rod lifts the rear end of the dagger, to which the connecting-rod is attached, it raises the feeler-wires also, and when the dagger follows the receding governing-rod down it pulls down the feeler-wires. It follows that accordingly as the governing-rod is longer or shorter it strikes and leaves the feeler-operating lever or dagger sooner or later during the vibration of the lay, and accordingly as the pivot of the governing-rod is brought horizontally nearer to or carried back from the center upon which the lay vibrates will the arc in which the upper end of the governing-rod travels more or less approximately coincide with the normal arc of vibration of that end of the feeler-operating lever or dagger with which it comes in contact. The feeler-wires, therefore, may thus be made to take a longer or shorter time for raising and falling during the vibration of the lay, and in their own arc of vibration they may be made to travel rapidly when near their horizontal position, and thus in their normal operation be made to fall upon the weft-thread with extreme delicacy. In the operation of this branch of the invention it is immaterial that the feeler-operating lever serves also as a dagger, and it is also immaterial whether the feeler-wires operate a dagger directly or operate a locking mechanism which controls a dagger having a



vertical vibration independent of that of the feeler-wires, as in the more common stop-motions.

The invention consists, further, in details of construction.

In the drawings, Figure 1 is a side elevation, partially in section, of so much of a loom as is necessary to illustrate the construction and mode of operation of mechanism embodying my said invention. Fig. 2 is a partial front elevation of the lay and parts of the stop-motion thereupon with the feeler-operating lever, which serves also as a dagger, shown in section. Fig. 3 is a partial plan; and Fig. 4 is a section of the lay with some of the parts attached thereto upon the scale used in Figs. 2 and 3, which is larger than that used in Fig. 1.

A is the loom-frame.

B is the breast-beam.

C is the shipper-lever shaft, the same being a rock-shaft mounted in suitable bearings beneath the breast-beam. It has connected with it any ordinary belt-shifting mechanism and a lever, by which said mechanism may be operated by hand.

F is the knock-off lever, rigidly secured to a rock-shaft, C', having bearings in a bracket, B', which is bolted to the back of the breast-beam. It has a notch, e, to receive the thrust of the dagger, as hereinafter described. A cam projection, d, is also rigidly secured to the rock-shaft C', and bears upon an arm or lever, D, secured to the shipper-lever shaft C, to rock the said shipper-lever shaft and operate the belt-shifting device when the dagger strikes the said notch e.

E is the lay. H is one of the lay-swords pivoted to a pin, I, at the bottom of the loom-frame, this pin being the center of vibration of the lay and parts attached thereto.

J is the stop-motion frame, secured to the lay by bolts b, nuts n, and screws b' b'. The front plate of this frame is of considerable length, as shown, to strengthen the lay at that portion thereof in which a slot is cut to receive the feeler-wires. The upper part of the stop-motion frame J furnishes bearings for the feeler-shaft a, to which are secured the feeler-wires c, projecting from a sleeve, d', which is adjustably secured upon the feeler shaft by means of a set-screw, d'', as shown.

K is a lever, serving in the mechanism shown both as the feeler-operating lever and a dagger. It vibrates upon a pin, e', projecting from a lug, e'', at the bottom of the frame J, on which pin it is held by a washer and nut, as shown. It is connected with the feeler-shaft, for the purpose of imparting motion thereto, by means of a connecting-rod, r, a wrist-pin, p, and a crank-disk, t. A spring, l, one end of which passes through the pin e', while the other bears against a small pin, t'', in the dagger, tends to throw the point of the dagger up and the rear end down. The pin e' has a screw-head, by means of which it can be turned in a hole in the lug e'', and it can be there held in any required position by a screw, m, thus regu-

lating the tension of the spring l. The connecting-rod r is made in two parts, one (marked 1) screwing into the other, (marked 2,) as shown, in order that the connecting-rod may be made longer or shorter, as required. A slot, w, in the crank-disk t and a pin, w', in the frame J limit the movements of the feeler-wires and also the extreme up-and-down movements of the dagger. Suitable slots are cut in the back of the frame J and in the front of the lay to accommodate the connecting-rod r.

P is the governing-rod. It is pivoted to a stand, L, upon the floor beneath the loom, and has an adjustment forward and back by means of a slot, s', in said stand, pin a', and nut d'', as shown. That it may be adjustable in length, it is made in two parts, one (marked 1') screwing into the other, (marked 2'), as shown, and a nut, g, tightening them in any required position. The upper and free end of the governing-rod passes loosely through a hole in a lug, l', at the lower part of the frame J in the vertical plane of the lever K. The adjustment is such that when the lay reaches a proper place in its backward movement the upper end of the governing-rod strikes the rear end of the lever K, and through the remainder of the backward movement of the lay overcomes the force of the spring l, or the weight of the said lever and raises the feelers. As the lay returns forward, the governing-rod recedes through the hole in the lug l', and the lever K under the force of the spring l, or its own weight, follows down upon the upper end of the governing-rod, and pulls down the feeler-wires until in the ordinary operation of the loom the feeler-wires find the weft-thread, which, if properly thrown for a portion of the remainder of the forward movement of the lay, or until the feeler-wires are drawn off the weft, overcomes the force of the spring l, or the weight of the lever K, and holds up the feeler-wires, and consequently the rear end of the lever. In the mechanism shown the lever K, acting as a dagger as well as a follower of the governing-rod and feeler-operating lever, passes under the knock-off lever F, when the feeler-wires thus find and rest upon the weft-thread, and the loom continues its normal operation; but when the weft-thread has not been well thrown and the feeler-wires fail to find it, they fall immediately into the slot s in the lay-beam and in the mechanism shown, the rear end of the dagger follows the governing-rod still farther down in the receding movement of the latter, and its point strikes the knock-off lever to operate the belt-shifting mechanism.

In the normal operation of the loom after the point of the dagger has passed under the knock-off lever the feeler-wires draw off from the weft-thread and fall into the slot s, that they may not interfere with the beating up of the weft.

It is obvious that so far as concerns that part of the invention relating to the details of construction of the devices for effecting the



raising of the feeler-wires it is immaterial whether the feelers are employed to operate a dagger directly or to operate a locking mechanism which controls a dagger having a vertical vibration independent of that of the feelers.

I claim—

1. The combination of the feeler-shaft, a crank thereon, a vibrating dagger, and a connecting-rod between said crank and dagger with means for adjusting the length of the connecting-rod and mechanism for directly limiting the motion of the feeler shaft, substantially as described.

2. The combination, with the lay and attachments thereto consisting, essentially, of a feeler-shaft and feelers within the web, a feeler-operating lever, and a crank-connection between said feeler-shaft and said feeler-operating lever, of the governing-rod P and bearing-pivot

therefor outside and independent of the lay, whereby said rod is adapted to vibrate with the lay, but upon a different center, substantially as described.

3. The combination, with a lay and feeler-wires pivoted to the front thereof, a feeler-operating lever, and a connection between said lever and said wires, of the vibrating rod P and bearing-pivot therefor outside and independent of the lay, the said pivot being provided with means of adjustment to and from the center of vibration of the lay, and the said vibrating rod being provided with a telescopic adjustment, substantially as described.

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Witnesses:

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