(No Model.) 3 Sheets—Sheet 1.

A. A. MERRITT.

ELECTRIC STOP MOTION FOR KNITTING MACHINES.

No. 515,965. Patented Mar. 6, 1894.

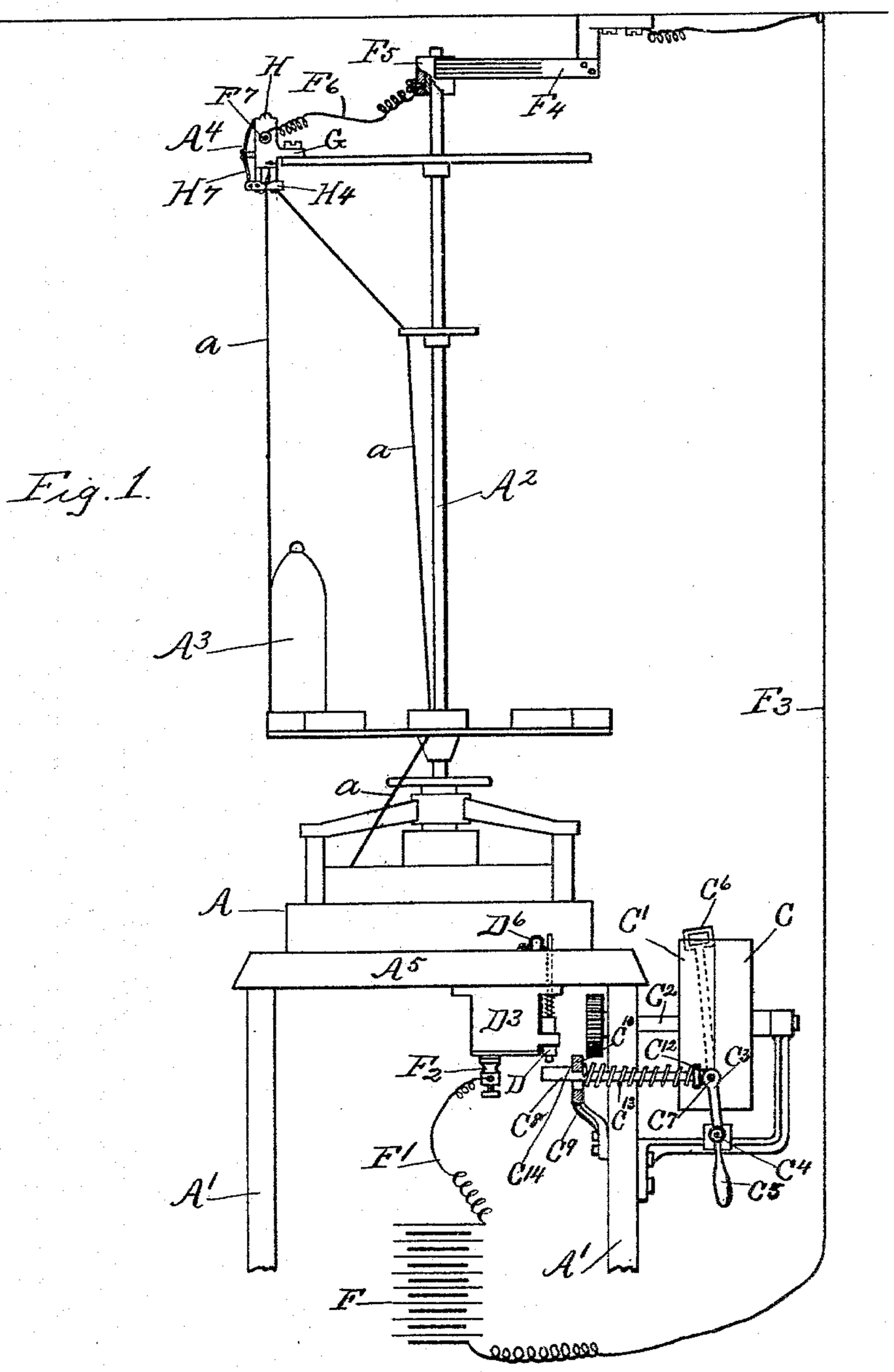

Fig. 1.

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Fig. 3.

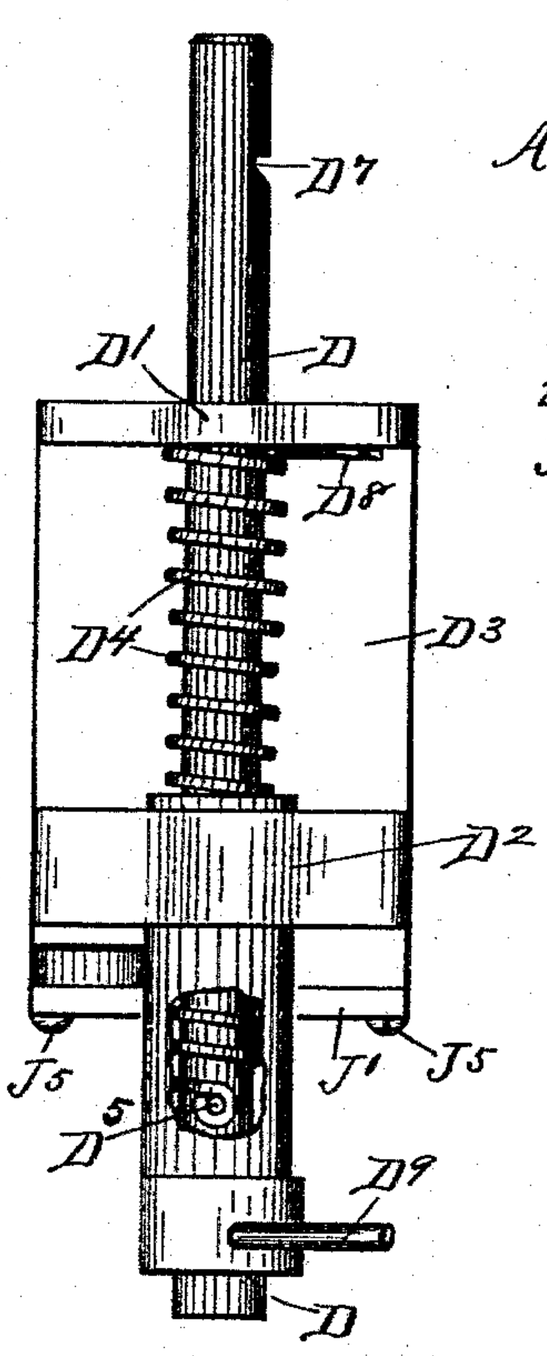

Fig. 2.

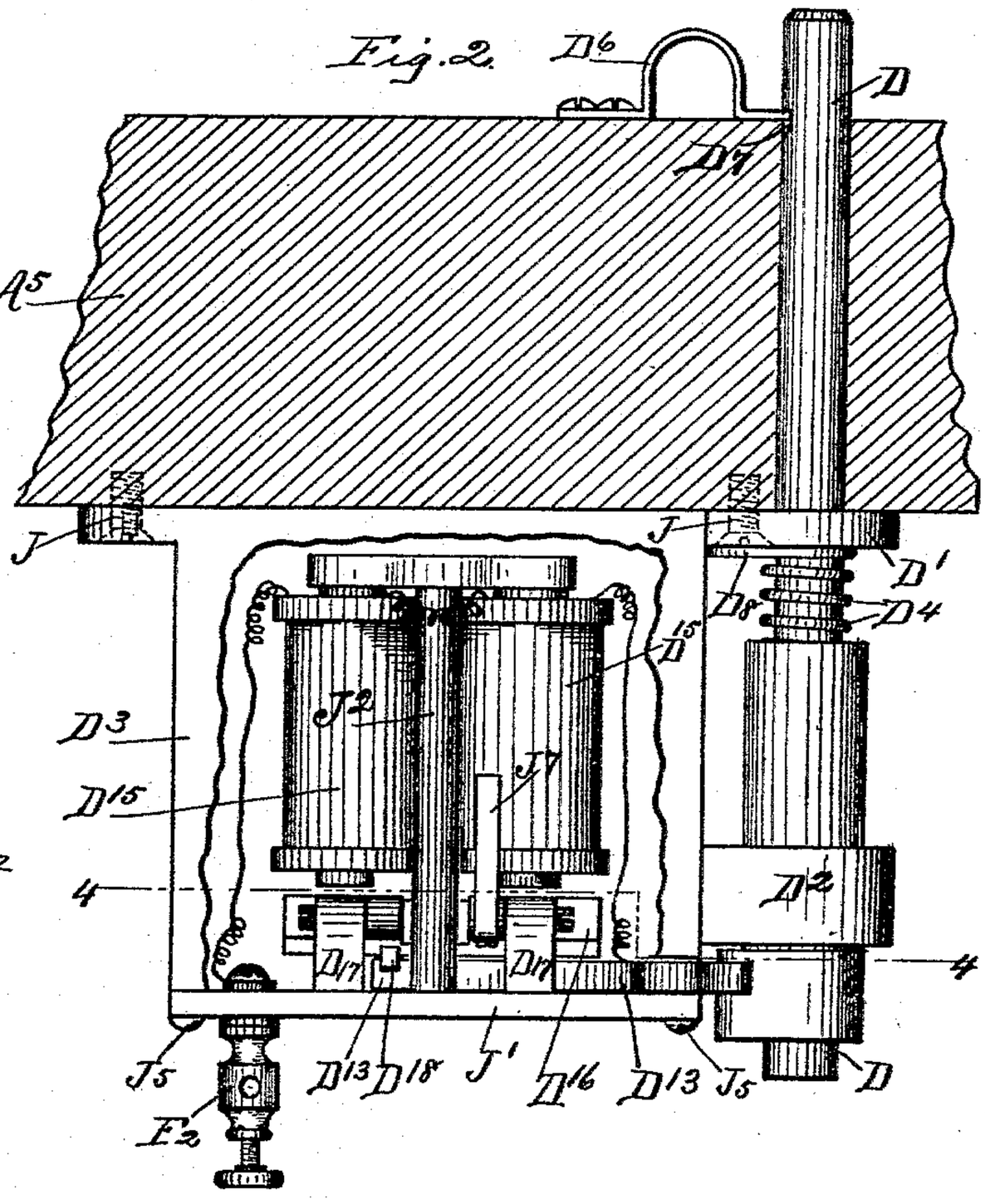

Fig. 4.

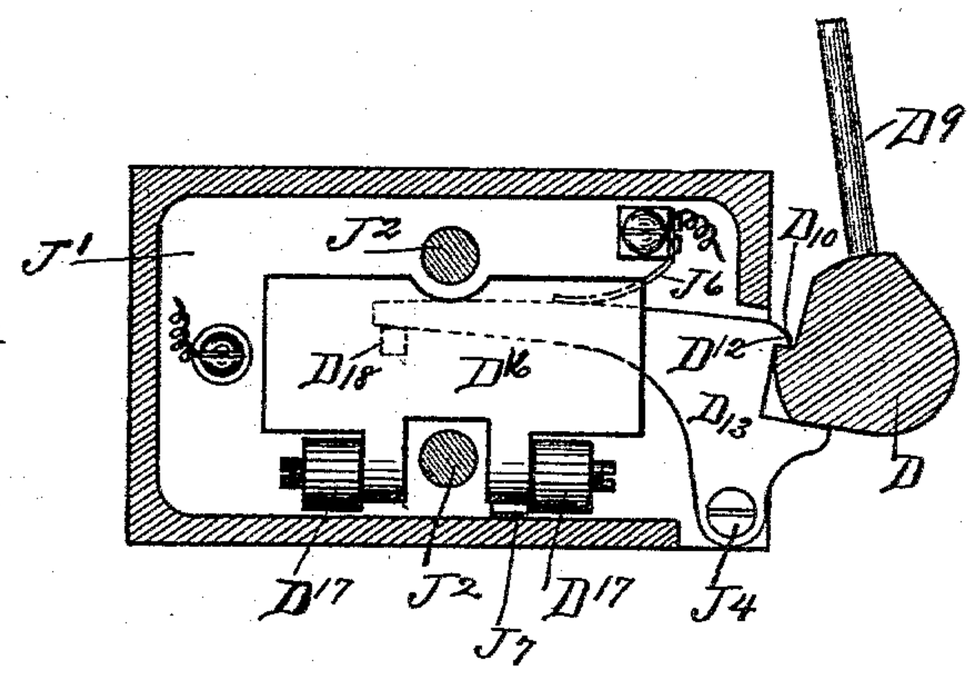

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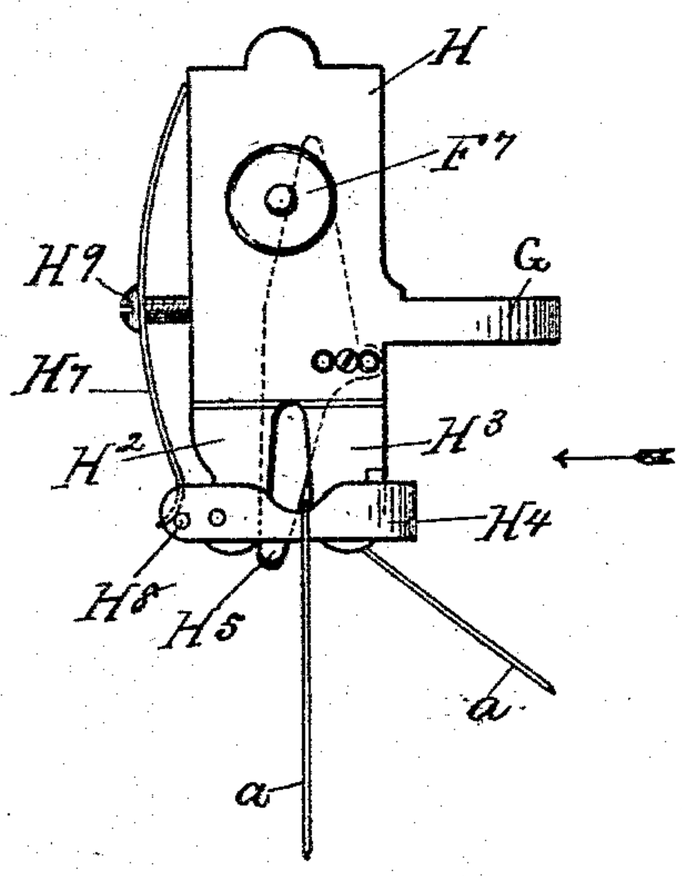
Fig. 5.



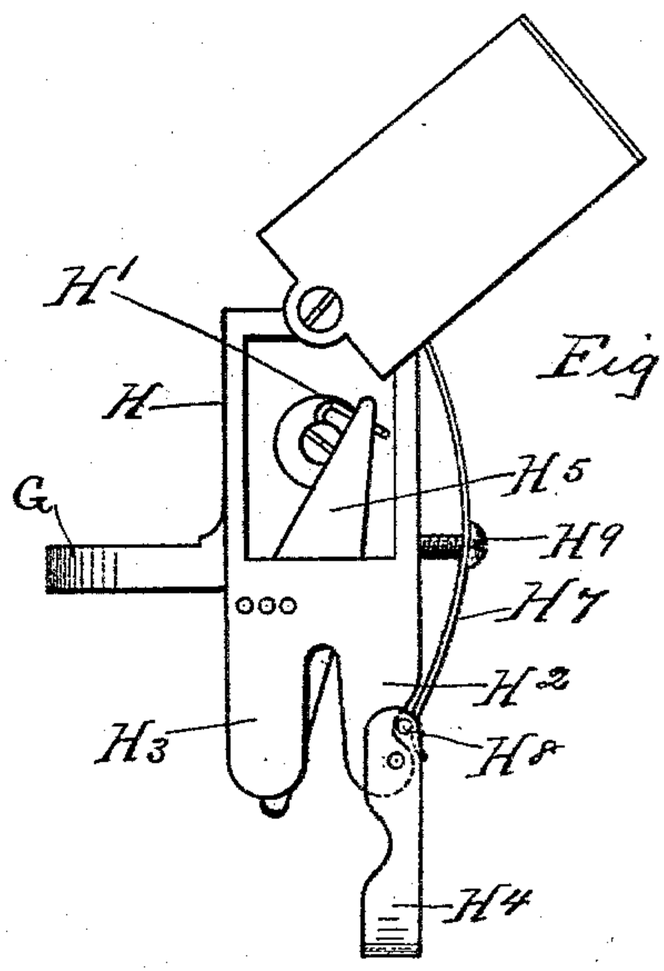


Fig. 6.

Fig. 8.

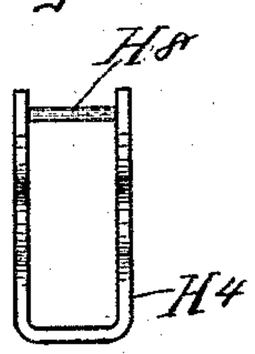


Fig. 7.

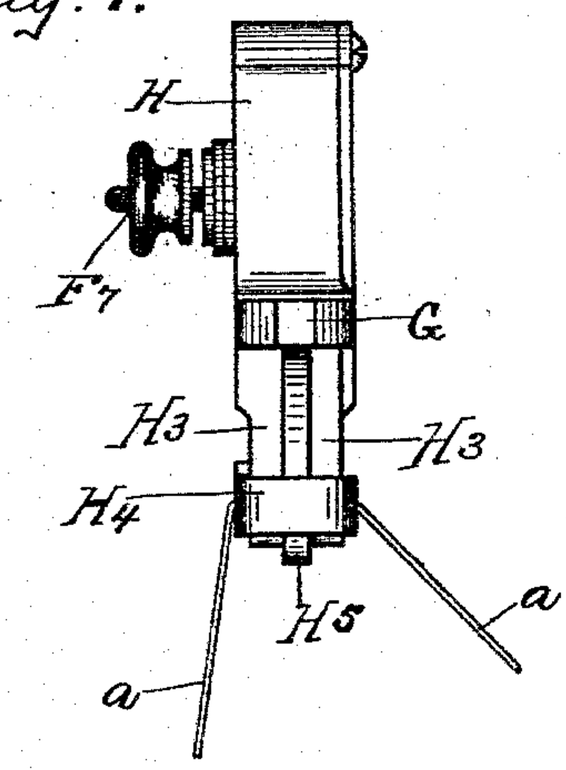
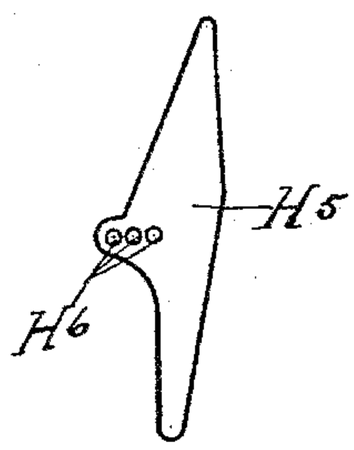


Fig. 9.



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UNITED STATES PATENT OFFICE.

ARTHUR A. MERRITT, OF COHOES, NEW YORK, ASSIGNOR OF ONE-HALF TO LAUGHLIN BROTHERS, OF SAME PLACE.

ELECTRIC STOP-MOTION FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 515,965, dated March 6, 1894.

Application filed May 15, 1893. Serial No. 474,192. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR A. MERRITT, a citizen of the United States, residing at Cohoes, county of Albany, and State of New York, have invented certain new and useful Improvements in Electric Stop-Motions for Knitting-Machines, of which the following is a specification.

My invention relates to such improvements and consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

Figure 1 of the drawings is a view in side elevation of the main parts of a knitting-machine frame, showing my improved electric stop-motion applied thereto. Fig. 2 is a similar view of the electrically-controlled mechanism for releasing the belt-shipper, a portion of the containing case being broken away to show the inclosed mechanism, and the releasing-bar being shown under control of both its keepers. Fig. 3 is an end view of the same with the releasing bar uncontrolled. Fig. 4 is a horizontal section taken on the broken line, 4—4, in Fig. 2. Fig. 5 is a view in side elevation of the thread-guide supporting a thread by which the parts of the guide are held in the position of "open circuit." Fig. 6 is a similar view of the opposite side of the guide, showing the parts in position to release the thread and close the circuit. Fig. 7 is an edge view of the guide in the position shown in Fig. 5, looking in the direction of the arrow. Fig. 8 is a top plan view of the thread-supporting latch detached and seen in the position shown in Fig. 5. Fig. 9 is a view in side elevation of the movable thread-controlled contact, detached. Fig. 1 is drawn upon a smaller scale than the other figures.

The object of my invention is to provide knitting-machines with an electrically-controlled stop-motion which will be operated by the thread to automatically stop the machine without breaking the thread when the tension upon the thread becomes too great, as well as to stop the machine when the thread is accidentally broken.

My invention is applicable to various styles and forms of knitting-machines, and other machines, and only such parts of the knitting mechanism as will facilitate the illustration of my invention are shown.

Referring to the drawings, A— is the frame or body of a knitting machine, and A′— the body-supporting legs with the lower ends broken away. The rotary vertical central shaft A^2— supports near its lower end the bobbins, only one of which, A^3— is shown in the drawings. The thread *a*— passes from the bobbins through guides supported near the upper end of the shaft, only one guide A^4 being shown. The thread passes from the guides down into the machine as shown.

C— is a loose pulley, and C—′ a tight pulley on the drive-shaft C^2—.

The shipping-lever C^3— is fulcrumed at C^4— upon a fixed support, and provided at one end with a handle C^5— and at the other end with an eye C^6—, through which the driving-belt, not shown, passes. Pivoted to the shipping-lever at C^7— is a bar C^8— adapted to slide in the fixed bearings C^9— and C^{10}—, the latter serving as a keeper. The bar is provided with an annular flange C^{12}— which forms a bearing for one end of the coil-spring C^{13}—, the other end of the spring bearing upon the keeper, the resilient force of the spring being sufficient to actuate the shipper lever and slip the driving belt from the fixed to the loose pulley. The slide-bar is provided with a projection or hook C^{14}— which is adapted to engage with the keeper when in the position shown in Fig. 1, and hold the belt upon the fixed pulley.

To release the shipper-bar from its keeper, it is only necessary to force its end in engagement with the keeper downward until the hook is disengaged therefrom. I accomplish such disengagement by means of the releasing bar D—. The releasing-bar, shown on an enlarged scale in Figs. 2, 3 and 4, is capable of an endwise and rotary movement in fixed bearings formed in the lugs D′— and D^2— projecting laterally from the case D^3—, and is actuated by the coil-spring D^4— bearing at one end upon the lug D′— and at the other

end upon the pin, D^5— projecting from the bar. The upper end of the bar passes up through the base-plate A^5— of the machine frame, and is held in a position to compress the spring by the keeper D^6— on the top of the plate which enters the notch D^7— on one side of the bar, as shown in Fig. 2. The coil-spring D^4— is hooked at its lower end around the pin D^5— and projected laterally at its upper end D^8— to engage the vertical wall of the case D^3— whereby the spring exerts a torsional force upon the bar when the latter is rotated in a direction to press the end D^8— of the spring against the case.

D^9— is an operating handle by which the releasing-bar is rotated and moved endwise against the force of the spring.

To cause the notch D^7— to register with the keeper D^6— the bar is not only moved endwise to the position shown in Fig. 2, but is rotated against the torsional force of the spring until the notch D^{10}— in the lower end of the bar is in a position to receive the projection D^{12}— on the lever-keeper D^{13}— fulcrumed upon the case, in which position the bar is firmly held by the two keepers.

The lever-keeper and its controlling mechanism are contained within the case. Such mechanism consists of a pair of electro-magnets D^{15}— and their armature D^{16}— pivoted upon fixed supports, D^{17}—. The lower side of the armature is provided with a downwardly projecting lug, D^{18}— adapted to engage the end of the keeper-lever and hold it in the notch D^{10}— when the armature rests upon the lever. These parts are so arranged that when the magnets are energized by an electric current the armature is drawn upward from the lever until the lever is released from the armature-lug. The lever-keeper is then thrown out of the notch D^{10}— by the torsional force of the coil-spring which rotates the releasing-bar until the notch D^7— is drawn away from its keeper, whereupon the coil-spring imparts to the releasing bar a powerful endwise movement causing its head to strike the shipping-bar and release it from its keeper and thereby ship the belt from the fixed to the loose pulley. It is only necessary therefore to provide some means for closing the electric circuit which energizes the magnets to ship the belt. As such means, I provide a thread-controlled circuit-closing mechanism in each of the thread-guides, and connect up the electro-magnets in the same circuit.

F— represents a battery, one pole being connected by conductor F'— with the binding-post F^2— which is insulated from the case in the usual manner, and connected with one end of the magnet-coils, the other end of the coils being connected with the metallic frame of the machine. The other pole of the battery is connected by the conductor F^3—, brush F^4—, insulated sleeve F^5— and conductor F^6— to a binding-post F^7— inserted in the metallic case H— of the thread-guide and insulated therefrom in any well known manner. The binding-post is provided with an insulated contact H'— on the interior of the case, as shown in Fig. 6. The case is provided with an attaching-lug, G—, by which it is firmly bolted upon the supporting frame which is fixed upon the vertical shaft. The case is also provided with depending guide-fingers H^2— and H^3— between which the thread passes on its way from the bobbin to the machine proper, as shown in Figs. 1 and 5. To one of the fingers is pivoted one end of the open latch H^4—, the other end of the latch being adapted to swing up past the lower end of the other finger to close the thread opening between the fingers and support the thread therein, as seen in Fig. 5. The lever-contact H^5— is pivoted intermediately of its ends to the metallic case so that its upper end is adapted to swing into engagement with the insulated contact H'—, while the lower end swings across the thread-opening. The pivot-holes H^6— in the lever-contact are located at varying distances from the longitudinal axis of the lever-contact and on the same side, so that the gravity force which swings the lever contact into engagement with the insulated contact can be varied as desired by adjusting the position of the pivot from one pivot hole to another. When the knitting-machine is in operation, the lever-contact is swung back to the position shown in Fig. 5, partly by dotted lines, in which position the circuit is open and the lower end of the lever-contact held against gravity to one side of the thread-opening by the thread itself, as shown.

The latch which supports the thread in the opening is held in place by the spring H^7— which forms a yielding keeper. The spring bears upon the pin or cross-bar H^8— and its sustaining power can be varied as desired by means of the adjusting-screw H^9—. Should the tension upon the thread become too great to form good work in the knitting-machine, the latch escapes from its yielding keeper and drops to the position shown in Fig. 6, thereby releasing the lever-contact which swings by gravity into contact with the insulated contact and closes the circuit containing the electro-magnets, the current passing through the metallic frame and operating parts, and the conductors previously pointed out. The magnets immediately act to release the belt-shipper which stops the machine before the slack of the released thread formed between the bobbin and the machine is knitted up, so that the thread is left unbroken and can be easily and quickly readjusted. If, by any possibility, the thread should be broken without releasing the latch, or should run out, the lever-contact would act in the same manner as above explained to close the circuit.

Referring again to the shipper-releasing mechanism, the case D^3— is secured to the lower side of the base-plate as by the countersunk screws shown by dotted lines J— in Fig. 2. The magnets are secured to the case-

cover J'— by the posts J²—, the armature by the fixed supports or bearings D¹⁷— projecting from the cover, and the lever-keeper by the pivot J⁴—.

The cover is secured to the case by the screws J⁵— so as to wholly inclose the parts secured to the cover within the case and protect them from flying lint, dust, &c.

The insulated spring-contact J⁶— connects the magnet-coils with the metallic frame through the lever-keeper when the machine is in operation, but as soon as the lever-keeper is released from the control of the magnet-armature, the contact between the lever and spring is broken, thereby opening the circuit and preventing waste of the battery.

The spring J⁷— fixed upon the armature bears upon the inner wall of the case to overcome any residual magnetism and open the armature when the circuit is opened.

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

1. In an electric stop-motion for knitting-machines, the combination with a spring-actuated belt-shipper, shipper-controlling keeper, and electrically-controlled releasing mechanism for the keeper, substantially as described, of a thread-guide for closing the controlling electric circuit comprising a thread-supporting and releasing latch, a yielding latch-keeper, an open movable thread-controlled contact, and an insulated contact in the path of the movable contact, substantially as described.

2. In an electric stop-motion for knitting-machines, the combination with a spring-actuated belt-shipper, shipper-controlling keeper, and thread-controlled mechanism for closing the electric circuit, substantially as described, of electrically-controlled mechanism for releasing the shipper, comprising a spring-actuated releasing-bar adapted to engage the shipper-mechanism whereby it is released from its keeper, a spring for imparting to the releasing-bar rotary and endwise movements, a keeper engageable with the releasing-bar on one side only which resists endwise movement of the bar, a lever-keeper which resists rotary movement of the bar, an armature-detent which controls the movement of the lever-keeper, and an electro-magnet in the thread-controlled circuit which actuates the armature-detent, substantially as described.

3. In a thread-guide for closing an electric circuit, the combination with a yielding thread-supporting latch, of a movable contact-piece controlled by the latch-supported thread, and an insulated contact located in the path of the movable contact, substantially as described.

4. In a thread-guide for closing an electric circuit, the combination with a yielding thread-supporting latch, of an oscillatory gravity-actuated contact controlled by the latch-supported thread, and an insulated contact located in the path of the oscillatory contact, substantially as described.

5. In a thread-guide for closing an electric circuit, the combination with a yielding thread-supporting latch, of a movable gravity-actuated contact-piece controlled by the latch-supported thread, a fixed support, an adjustable pivotal connection between the fixed support and movable contact-piece, and a fixed contact located in the path of the movable contact-piece, substantially as described.

6. In a thread-guide for closing an electric-circuit, the combination with a thread-supporting latch, and yielding keeper for the latch, of a movable contact controlled by the latch-supported thread, and an insulated contact located in the path of the movable contact, substantially as described.

In testimony whereof I have hereunto set my hand this 8th day of May, 1893.

ARTHUR A. MERRITT.

Witnesses:
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FRANK C. CURTIS.