No. 824,335. PATENTED JUNE 26, 1906.

J. W. BRIDGE.

STOP MECHANISM FOR LOOMS.

APPLICATION FILED MAY 13, 1905.

4 SHEETS—SHEET 1.

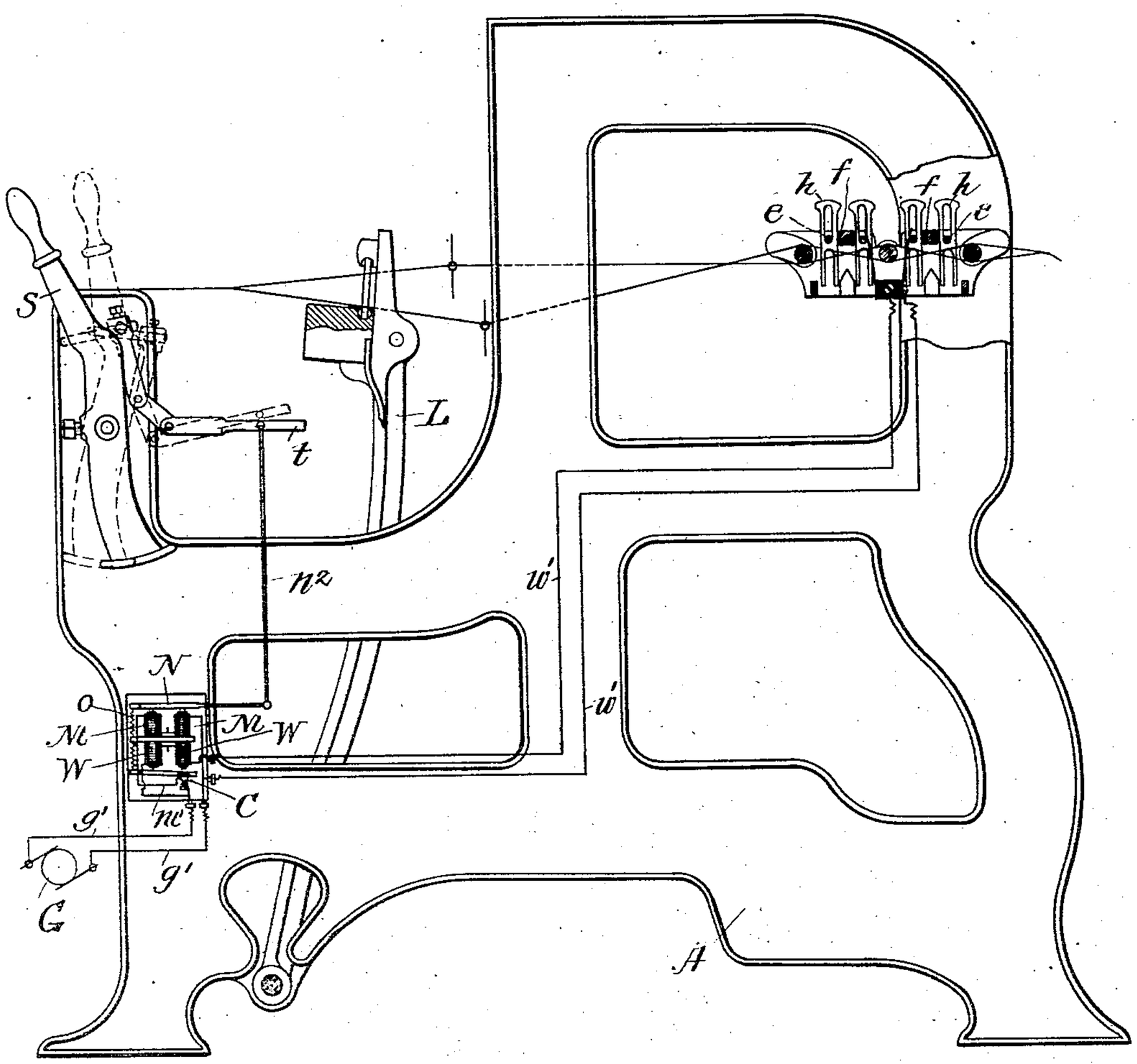


Fig. 1.

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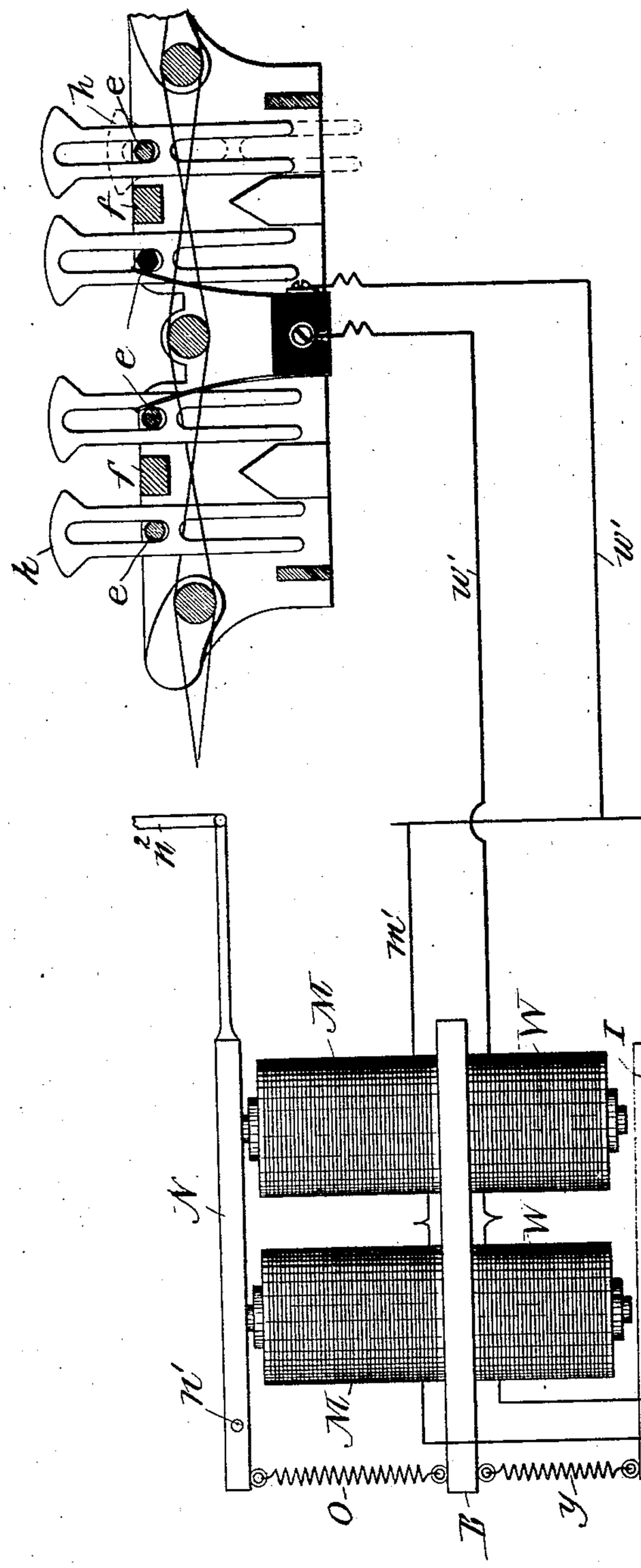


Fig. 2.

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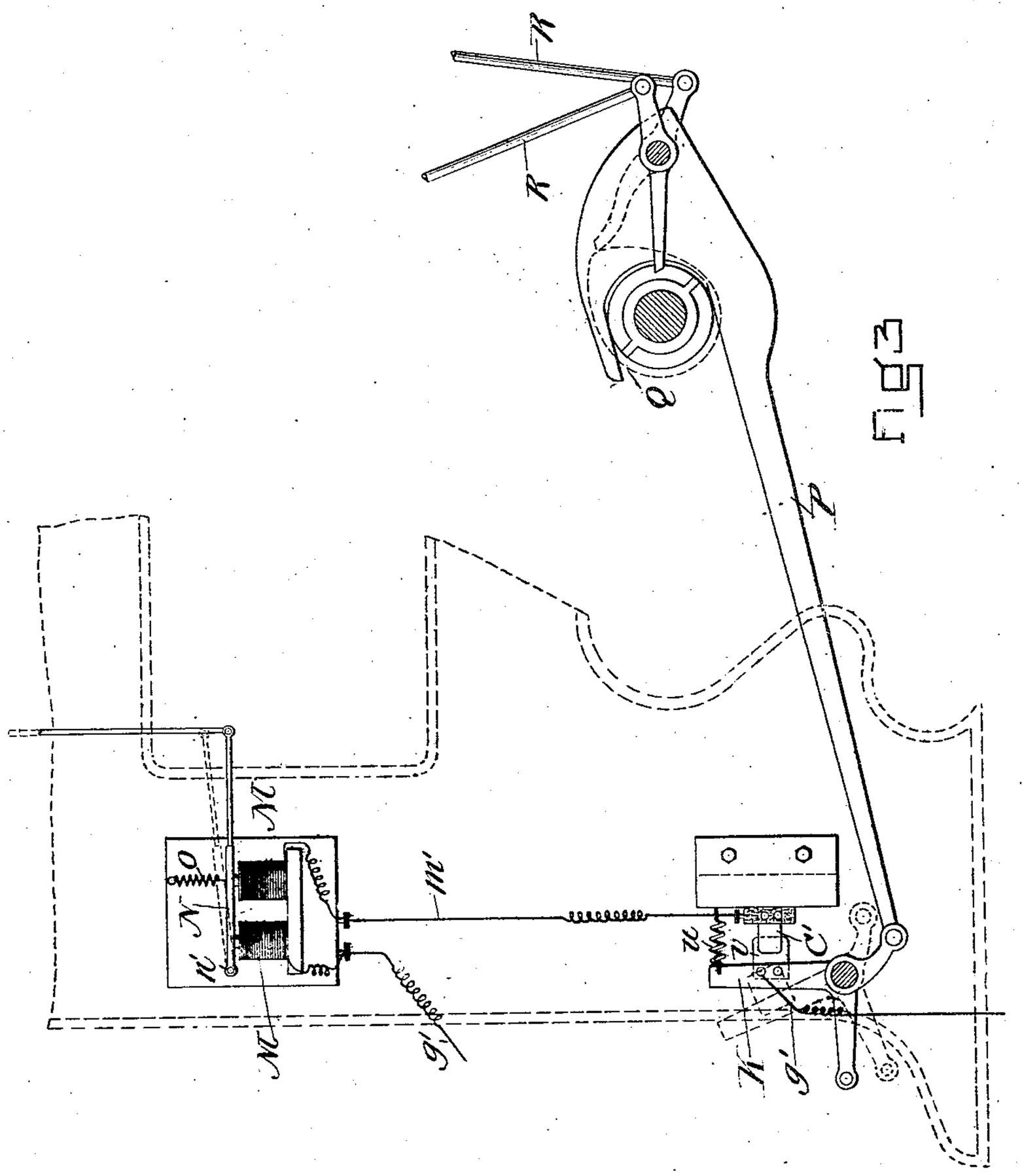


FIG 3

WITNESSES

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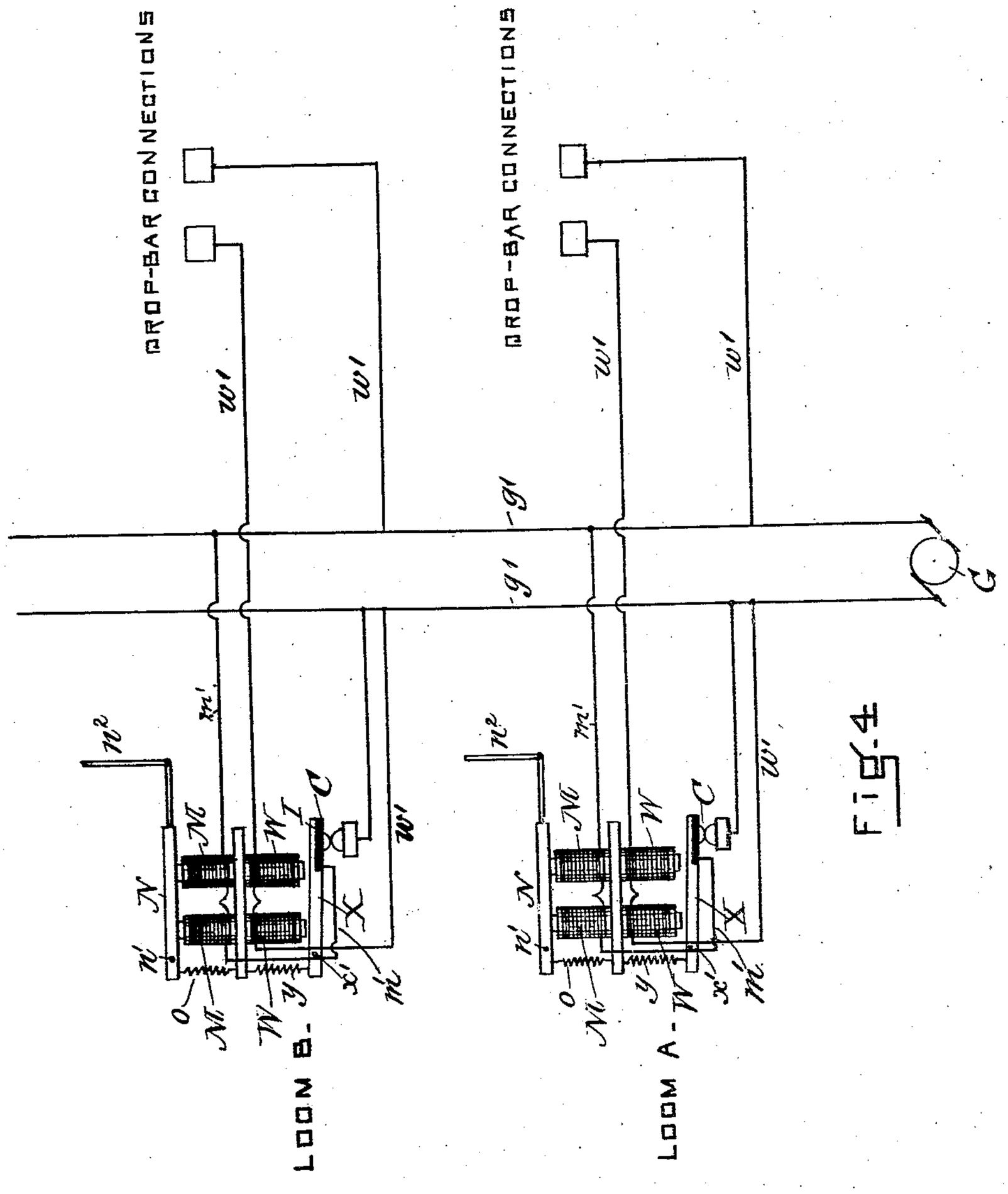


Fig. 4

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# UNITED STATES PATENT OFFICE.

JOHN WESLEY BRIDGE, OF METHUEN, MASSACHUSETTS, ASSIGNOR TO ARLINGTON MILLS, OF LAWRENCE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## STOP MECHANISM FOR LOOMS.

No. 824,335. Specification of Letters Patent. Patented June 26, 1906.

Application filed May 13, 1905. Serial No. 260,284.

*To all whom it may concern:*

Be it known that I, JOHN WESLEY BRIDGE, a citizen of the United States of America, residing at Methuen, in the county of Essex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Stop Mechanism for Looms, of which the following is a specification.

The invention relates particularly to stop mechanism for looms which is automatically electrically controlled by an electromagnet for each loom in the system, each of which magnets is in a normally closed shunt-circuit from the main conductors, and collectively they are in multiple circuit therewith.

Where automatically-operated stop mechanism is employed in looms, the operatives soon rely upon such automatic mechanism and give little attention to defects in the weaving which are not thus indicated. Heretofore where such stop mechanism has been electrically controlled the circuits employed have been open circuits, which were closed by the fall of a metallic drop-bar when a warp-thread which supported it was broken. In this open-circuit arrangement there were no means for determining when the main line was broken or the electric current otherwise interrupted, except in some instances where a sound or light signal was employed, but this was ineffective by reason of the inattention of the operative. When weaving expensive fabrics, it is very essential not only that means be provided for automatically determining when a warp-thread breaks, but also when the main current is interrupted from any cause, for if the electric current is interrupted the stop mechanism intended to be put in action by the breaking of a warp-thread will not operate when a drop-bar falls, and in such case many yards of imperfect fabric might be woven before it is discovered by the loom tender, and as a consequence so much expensive material would practically go to waste. This invention will obviate such a contingency; and it consists in an electromagnet for each loom to be controlled, these magnets being in normally closed loops or multiple circuit with the main electric conductors, and their respective armatures connected with and adapted to control the operative relation of the parts of the stop mechanism in the loom. These magnets may be termed "retaining-magnets," for the reason that normally they retain the parts of the stop mechanism out of operative relation, while if from any cause the main current is broken or interrupted all of the armatures will be released and all of the looms connected with the system will be stopped. Then if the cause of the interruption cannot be readily found and removed each loom can be disconnected from the automatic control devices and the loom tenders made to rely upon their own attention until repairs to the main electric line can be made. The short time during which all the looms may be stopped in this arrangement involves much less loss than the production of a number of yards of defective fabric.

This automatic control for loom-stop mechanism may be employed with the usual warp-stop motion employed in looms, either those electrically operated or those mechanically operated; and a further portion of this invention consists in combining the well-known automatic warp-stop mechanism of each loom with a cut-out in the shunt-circuit of the retaining-magnet connected with that loom in such manner that when a warp breaks and a drop-bar falls it will operate the cut-out of the shunt-circuit, open that circuit, and cause the stop mechanism to stop the loom, and this will be done without affecting the shunt-circuit of any other loom connected with the system. As an electric circuit will be required for the operation of the retaining-magnets, it will be found advantageous to employ the electric current for operating the warp-stop mechanism, and such construction will be chiefly shown and described herein.

In the drawings, Figure 1 is an end elevation of a loom-frame, partially broken away, showing one end of the bracket which supports the lease-rods, drop-bar contact-rods, a series of drop-bars hung on warp-threads, the lathe, shipper-lever and its connection with the armature of the controlling-magnets, and diagrammatically the electric circuits. Fig. 2 is an enlarged detail showing the stop mechanism control or retaining magnets, the warp-stop-motion magnets, which operate the cut-out to break the retaining-magnet circuit, and the electrical connections in the system. Fig. 3 is a detail showing the con-

struction by which the cut-out for the retaining-magnet may be operated by mechanical warp-stop mechanism. Fig. 4 is a diagrammatic view showing the electrical connections of two loom-magnets with the main circuit.

Referring to the drawings, A is the loom-frame; L, the lathe; S, the shipper-lever; and *t*, an arm by which the shipper-lever is released or knocked out of its retaining-slot by the movement of the lathe when the arm *t* is in the position shown in dotted lines, Fig. 1.

M is a pair of electromagnets secured upon the insulating-bracket B. The armature N of the magnets M is fulcrumed at *n'*, and to the short end of this armature-lever N one end of a spring O is secured and the other end to the bracket B, the tension of the spring being made sufficient to raise the long end of the armature, the rod $n^2$, and the arm *t*, to which it is attached, when the magnetic force of the magnets M ceases to act. Exciting-current is supplied to the magnets M from the generator G through the main circuit-conductors *g' g'* and shunt-circuit *m' m'*. These shunt-circuits are each provided with a cut-out C, Figs. 1 and 2, or C', Fig. 3, which cut-out is operated by the warp-stop mechanism in the loom. As illustrated in Figs. 1 and 2, electrically-controlled warp-stop mechanism of the usual construction is employed, consisting of magnets W, which for convenience are supported by the insulating-bracket B. The armature *x* of the magnets W has its fulcrum at *x'* and is controlled by a spring *y*. The long end of the armature W carries one part of the cut-out C, consisting of a metallic contact piece or button *d*, secured thereto with an interposed insulating-block I. The other part *d'* of the cut-out is secured to a stationary block. These two contact-pieces of the cut-out are in the shunt-circuit *m'*, while the magnets W are in another circuit *w'*, connected with the main conductors, which also includes the drop-bar guide-rods *e* and contact-bars *f*, and when a drop-bar *h* falls the circuit *w'* is closed by the contact of the drop with a rod *e* and bar *f*, the magnets W are thereby energized, the armature *x* is drawn upward, the parts *d d'* of the cut-out C are separated, the circuit *m'* is opened, which releases the armature N, and by the operation of the spring O the long arm of the armature, with the rod $n^2$, are raised, and with them the arm *t*, to which the rod is connected. This places the arm *t* in position to be struck by the lathe L at its next forward movement, by which the shipper-lever S will be operated in the usual way and the loom stopped.

The cut-out for the circuit of the magnets M may be operated by mechanical warp-stop mechanism by connecting the operating-lever of any of the usual mechanical forms—for instance, as illustrated in Fig. 3. There the cut-out C' is of the knife-blade type, the blade *v* of which is secured upon one arm of a crank-lever K. The other arm of the lever K is pivoted to a rod P, which is operated in the usual manner of mechanical constructions by a cam Q. The action of the cam upon the rod P is controlled in the usual way by the position of the drop-bars or other detectors, which when down intercept fingers or feelers connected with rods R and cause the cam to pull the rod P back, tilt the lever K to the dotted-line position, and separate the parts of the cut-out C', which opens the circuit *m'* and causes the stop mechanism to operate through the release of the armature N of the magnets M the same as when the cut-out is operated by the magnets W. When the drop-bar has been restored to its normal position by mending the warp-thread, the crank-lever K is returned to its normal position by a spring *u*, and the circuit *m'* is again closed by the contact of the coacting parts of the cut-out C'.

Any of the usual forms of drop-bars or detectors may be employed, the form illustrated being only one of many. Magnets for one loom only are shown; but it will be understood that magnets and connections of similar construction are to be applied to each loom which it is desired to control.

I claim—

1. In electrically-controlled stop mechanism for looms, a shunt-circuit from the electrical source, for each loom to be controlled, a magnet in each shunt-circuit, and an armature for each magnet, which is connected with and controls the operative relation of the parts of the stop mechanism of its loom.

2. In electrically-controlled stop mechanism for looms, a series of magnets connected in multiple with the electrical source, one magnet of the series for each loom to be controlled, and an armature for each magnet connected with and adapted to control the operative relation of one part of the stop mechanism to the other, in that loom.

3. In electrically-controlled stop mechanism for looms, a shunt-circuit from the electrical source, for each loom, a magnet in each shunt-circuit, an armature for each magnet which retains the parts of the stop mechanism out of operative relation, while its circuit is closed, and a cut-out in each shunt-circuit which is controlled by warp-stop mechanism in the loom.

4. In electrically-controlled stop mechanism for looms, a shunt-circuit from the electrical source, for each loom, a magnet in each shunt-circuit, an armature for each magnet which is connected with and controls an operative part of the stop mechanism, a cut-out in each of said shunt-circuits, a series of warp-supported drop-bars, a second magnet for each loom in a normally open circuit, which is closed by the fall of a drop-bar, and

an armature for the second magnet which operates the cut-out in the shunt-circuit of the stop mechanism control-magnet of the loom.

5. In electrically-controlled stop mechanism for looms, provided with warp-supported drop-bars and main circuit-conductors, an electromagnet and armature therefor the respective poles of which magnet are connected with a contact-rod of the warp-supported drop-bars, one directly and the other through a main electric conductor, another magnet in circuit with the main conductors, one pole connected directly with one conductor and the other pole with the other conductor through a contact carried by the armature of the magnet in the drop-bar circuit.

6. In electrically-controlled stop mechanism for looms, provided with main current-conductors and warp-supported drop-bars, a magnet normally in circuit with the main current-conductors, an armature for the magnet which retains the parts of the stop mechanism out of operative relation, while the circuit is closed, a second magnet in shunt-circuit connected directly with one contact-rod of the warp-supported drop-bars and indirectly through a main conductor with another contact-rod, and an armature for the second magnet which carries a cut-out for the circuit of the first magnet.

7. In a stop mechanism for looms provided with main current-conductors and warp-controlled detectors, a magnet normally in closed circuit with main current-conductors, an armature for the magnet which controls the operative relation of the parts of the stop mechanism of the loom, a second magnet one pole of which is in circuit with one contact-rod of the warp-controlled detectors, and the other pole with another contact-rod through a main conductor, a cut-out for the circuit of the first magnet, and an armature for the second magnet which carries and operates the cut-out.

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Witnesses:
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JOHN J. SWEENEY.