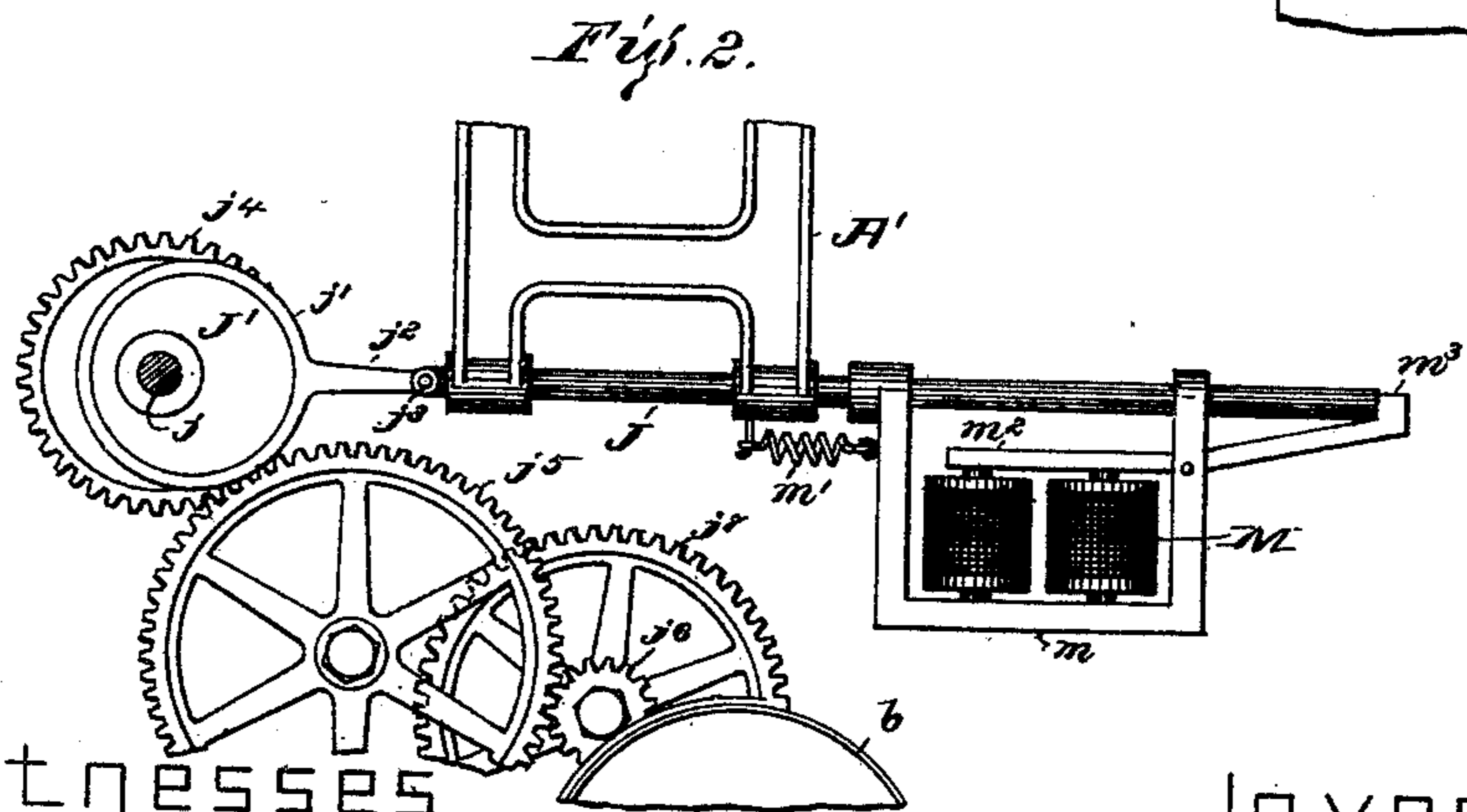
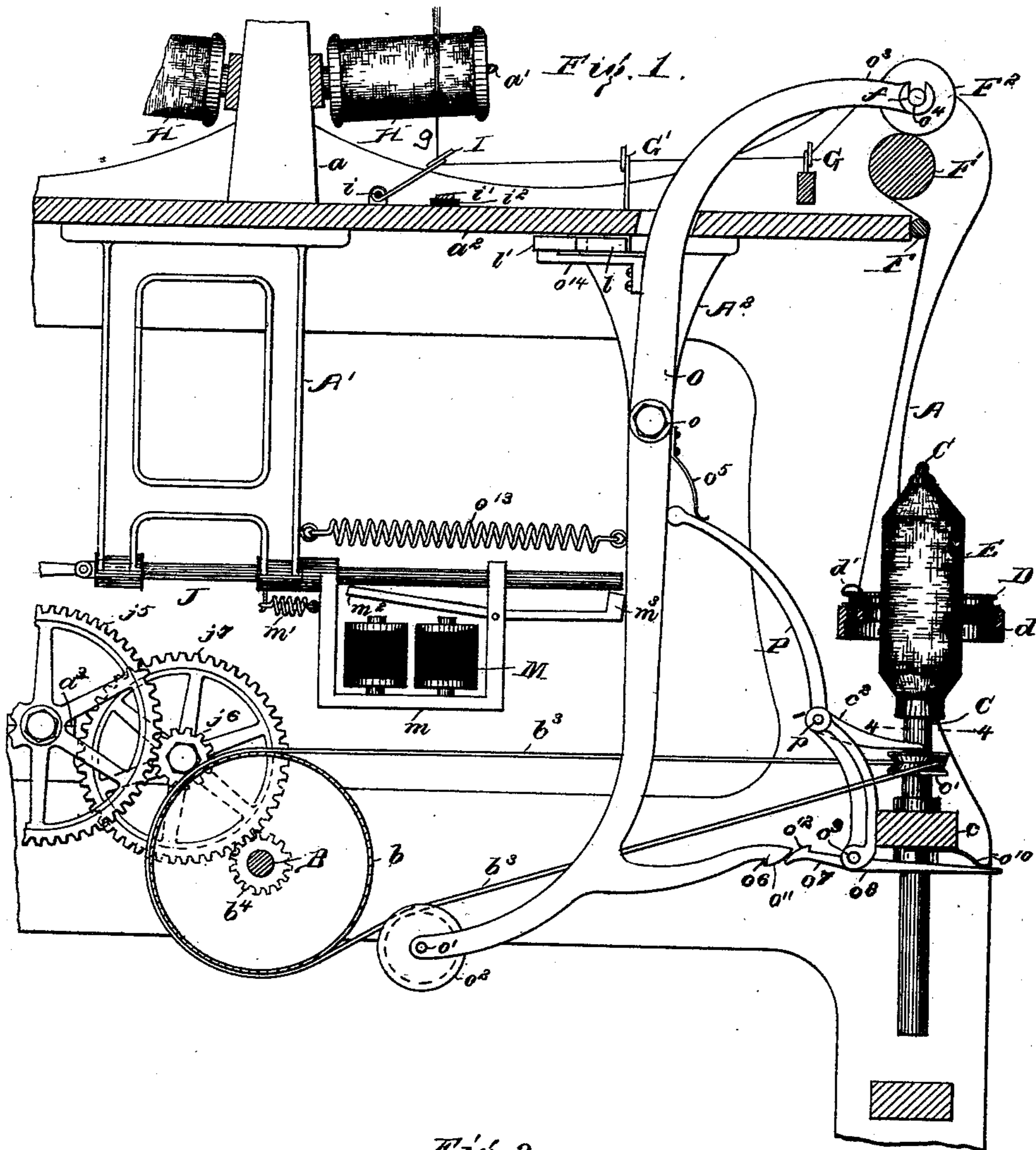


(No Model.)

3 Sheets—Sheet 1.

V. I. CUMNOCK.

ELECTRIC STOP MOTION FOR TWISTING MACHINES, &c.
No. 414,025. Patented Oct. 29, 1889.



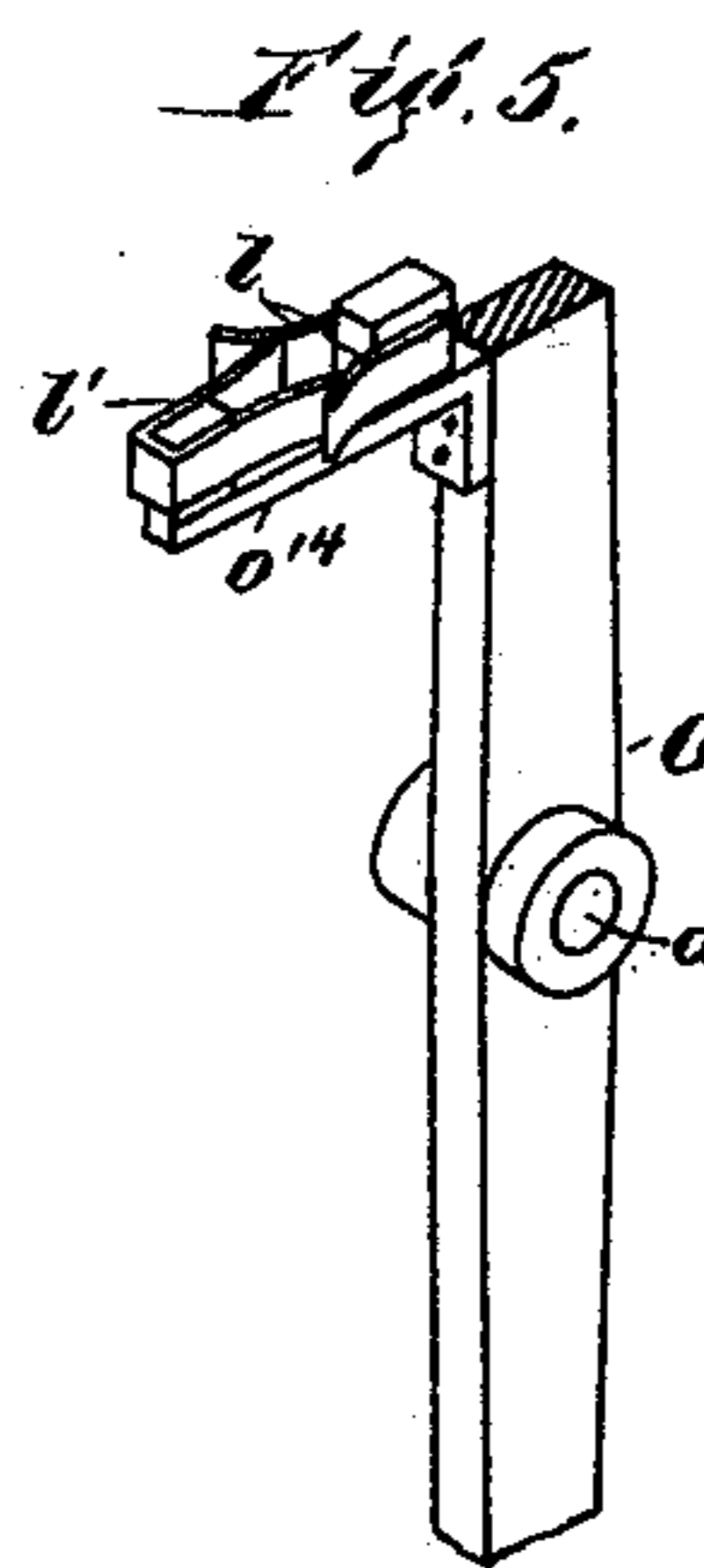
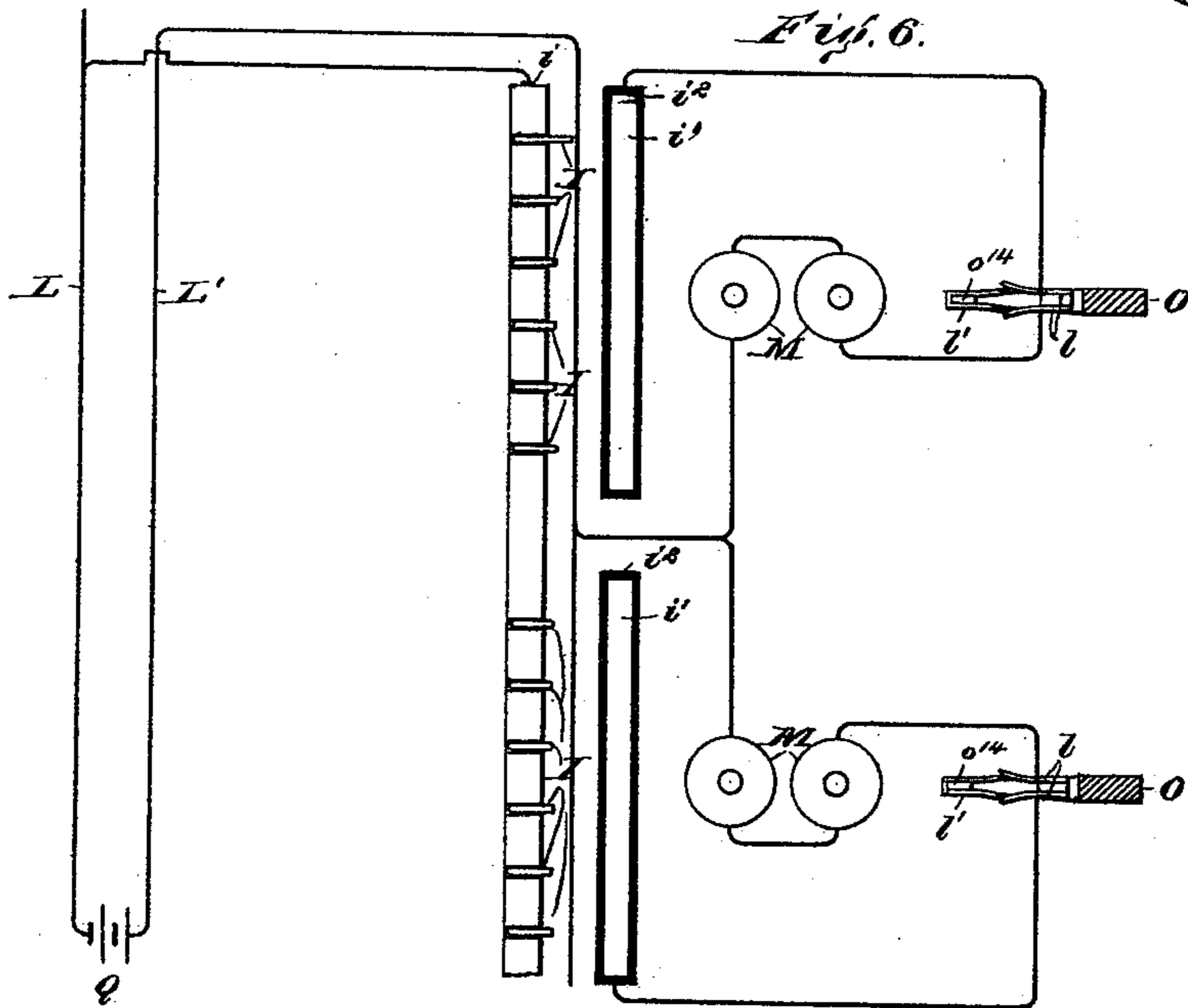
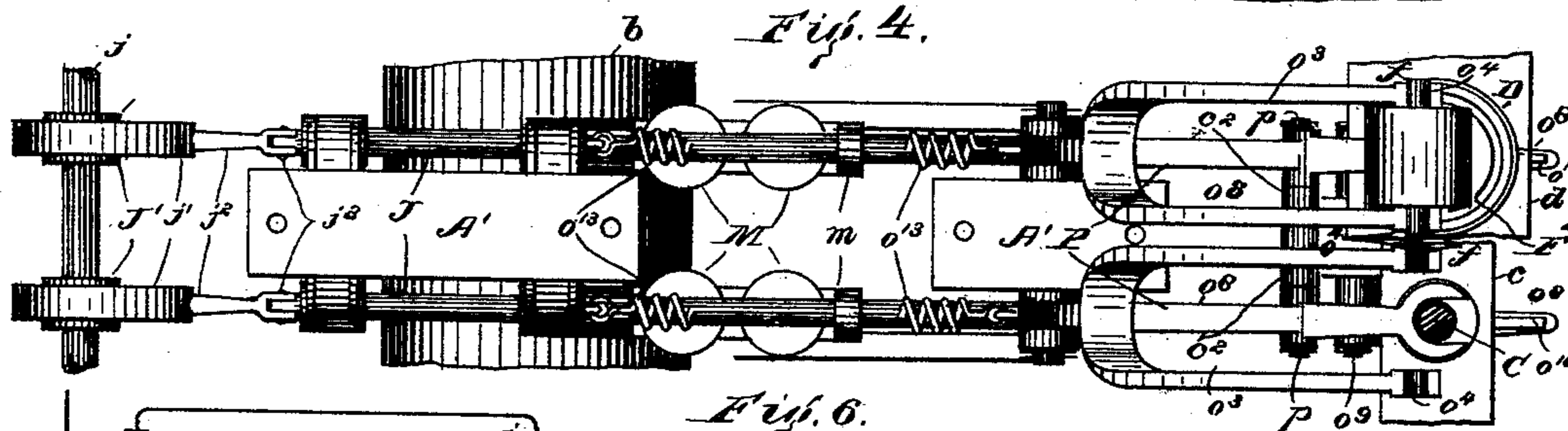
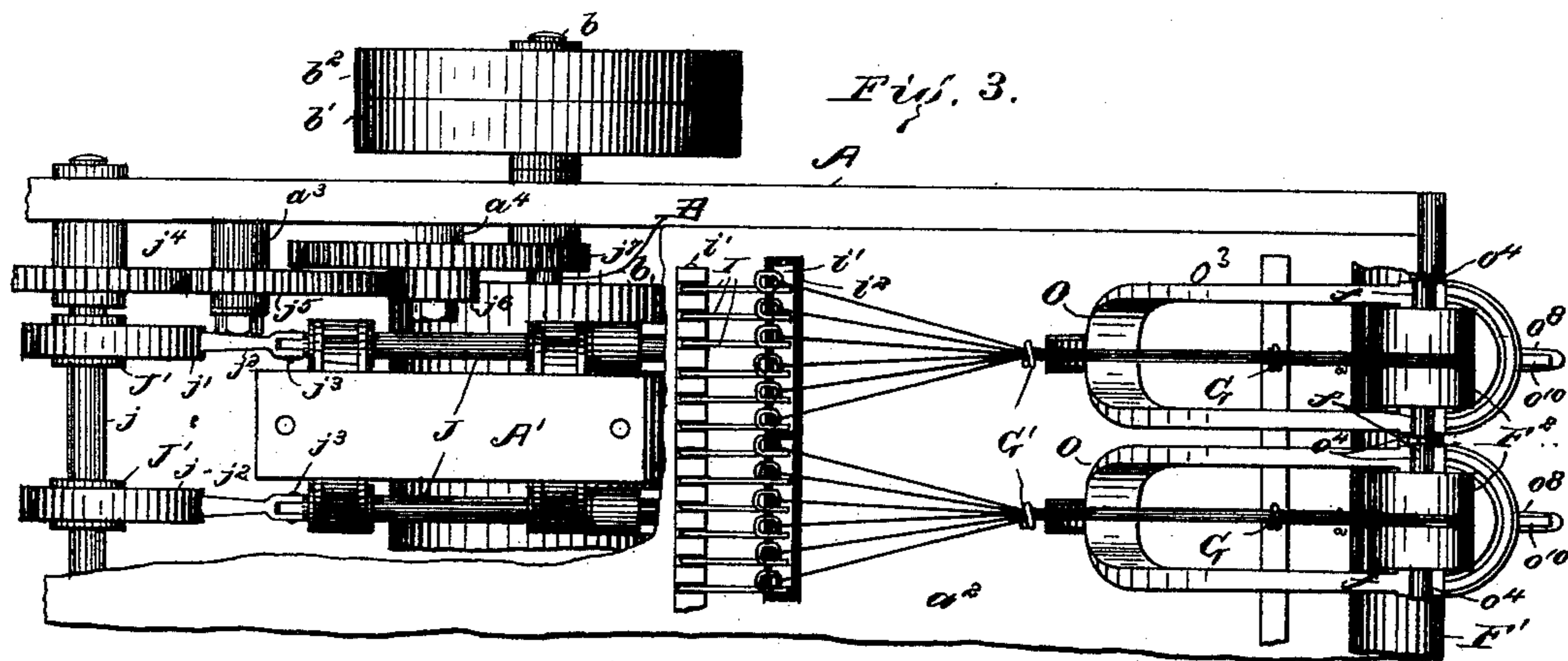
WITNESSES.
Heirkly Hyde.
Myrtie C. Beall.

INVENTOR-
Victor J. Cunwick
By Albert M. Moore,
His Attorney.

3 Sheets—Sheet 2.

ELECTRIC STOP MOTION FOR TWISTING MACHINES, &c.

Patented Oct. 29, 1889.



Witnesses.

Kirkley Hyde.
Myrtic C. Beals

Inventor-

Victor J. Cunnock,
By Albert M. Moore,
His Attorney.

(No Model.)

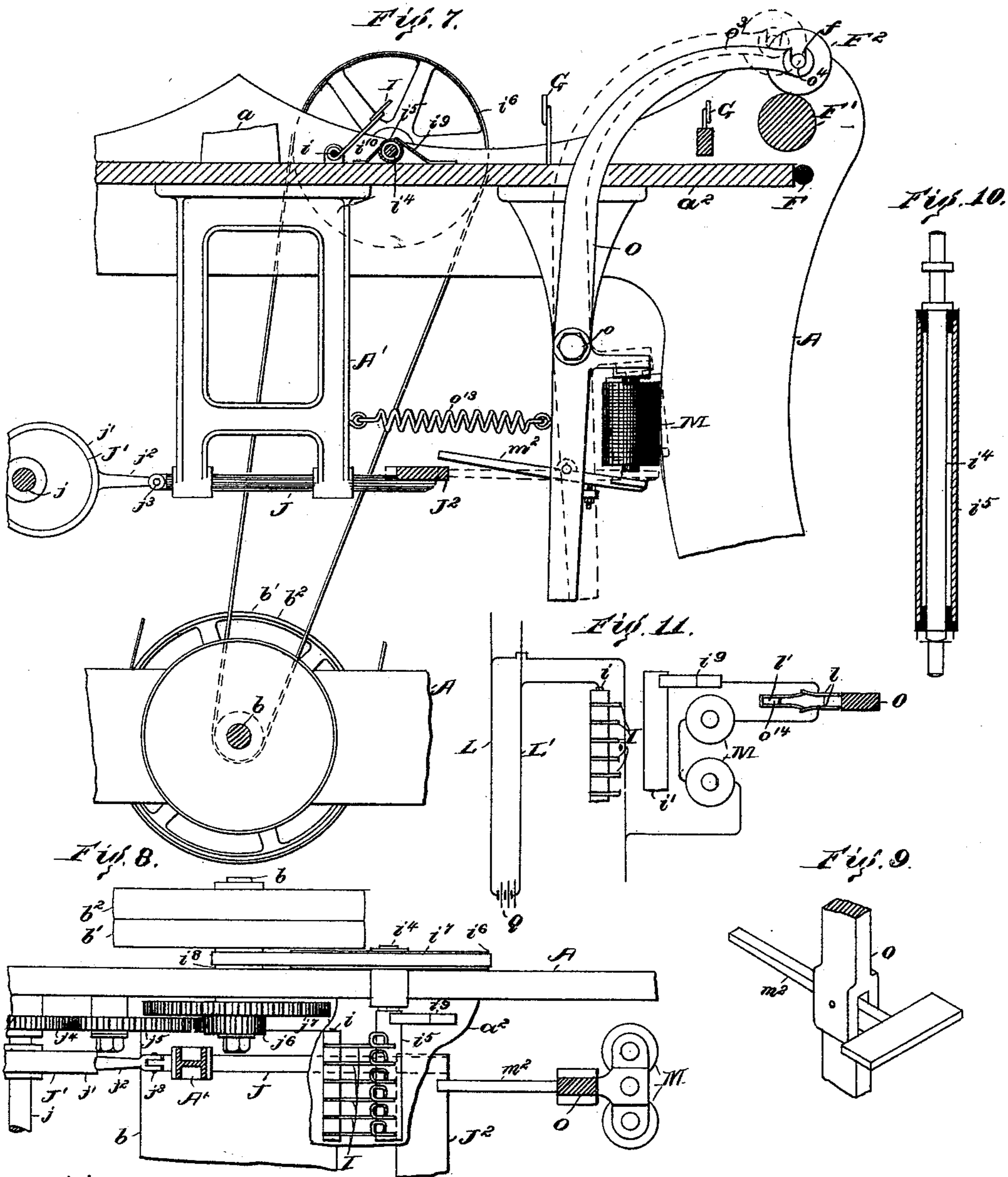
3 Sheets—Sheet 3.

V. I. CUMNOCK.

ELECTRIC STOP MOTION FOR TWISTING MACHINES, &c.

No. 414,025.

Patented Oct. 29, 1889.



Witnesses_

Kirkley Hyde.
Myrtic C. Treals.

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Victor J. Cunneen,
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His Attorney.

UNITED STATES PATENT OFFICE.

VICTOR I. CUMNOCK, OF LOWELL, MASSACHUSETTS.

ELECTRIC STOP-MOTION FOR TWISTING-MACHINES, &c.

SPECIFICATION forming part of Letters Patent No. 414,025, dated October 29, 1889.

Application filed August 14, 1889. Serial No. 320,740. (No model.)

To all whom it may concern:

Be it known that I, VICTOR I. CUMNOCK, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Electric Stop-Motions for Twisting, Winding, and other Machines, of which the following is a specification.

My invention relates to electric stop-motions for winding, twisting, and other machines, meaning to include machines in which each of a number of yarns or threads is individually wound or twisted, or both twisted and wound—as, for example, ring-spinning machines—and also machines in which a plurality of yarns or threads are twisted together and then wound—as, for example, ring-twisting machines—or ring-twisters; and said invention consists in the devices and combinations hereinafter described and claimed, whereby the breakage of any yarn or thread will stop the winding and twisting devices appropriated to that yarn or thread or to the group of yarns or threads to which such broken yarn or thread belongs, without stopping the other parts of the machine.

In the accompanying drawings, on three sheets, Figure 1 is a vertical transverse section of a portion of the frame of a ring-twister, showing some spools, yarns or threads, a drop-wire, yarn-guide, feed-rolls, carrier-roll, spindle-ring, traveler, whirl, band, band-cylinder, and my improvement applied to said twister; Fig. 2, a side elevation of the reciprocating rod, the lower part of the hanger which supports the same, the magnet-carriage, its spring, the magnet and its armature, and a part of the mechanism which causes said rod to reciprocate; Fig. 3, a plan of a part of the top board, the fast pulley, the loose pulley, part of the band-cylinder shaft or main shaft, part of the band-cylinder, the hanger which supports the reciprocating rods, the eccentrics and gears which operate said reciprocating rods, the shaft which supports said eccentrics, drop-wires, a contact-plate, yarns, feed-rolls, two levers supporting top feed-rolls, and a part of the frame of the machine; Fig. 4, a plan of parts below the top board, including two reciprocating rods, their eccentrics and eccentric-rods, two top-

roll-supporting levers, parts of the springs which hold said last-named levers in their normal position, the brake-levers, one of the rings, one of the spindles in horizontal cross-section on the line 4 4 in Fig. 1, one of the whirls, and the catch-levers; Fig. 5, an isometric view of a part of one of the top-roll-carrying levers, its hub, and the switch; Fig. 6, a diagrammatic representation of the battery-connections, switches, electro-magnets, drop-wires, contact-plates, and their insulations, the following-named figures showing modified forms of the invention, Fig. 7 being similar to Fig. 1, except that fewer parts are shown and that a contact-roll is substituted for a contact-plate, showing, also, the means of driving said contact-roll from the band-cylinder shaft and showing the magnet supported upon the top-roll-carrying lever and the armature supported on said lever; Fig. 8, a plan of the parts shown in Fig. 7, omitting the upper part of the top-roll-carrying lever, and showing the gearing which connects the eccentric-shaft and the main shaft; Fig. 9, an isometric view of the armature pivoted to said top-roll-carrying lever, the upper and lower parts of said lever being omitted; Fig. 10, a central horizontal section of the metallic shell of the contact-roll, and of the material which insulates said shell from its shaft; Fig. 11, a diagrammatic representation of the battery, magnet, switch, drop-wires, contact-roll, and brush or wiper which connects said wires with said roll.

In all the figures, the frame A, main shaft B, band-cylinder *b*, fast pulley *b'*, loose pulley *b''*, band *b'''*, spindle C, spindle-rail *c*, whirl *c'*, ring-rail *d*, ring D, ring-traveler *d'*, bobbin E, carrier-roll F, lower feed-roll *F'*, upper feed-roll *F''*, yarn-guide G, condensing-guide *G'*, spool-stand *a*, provided with spindles *a'*, (only a part of which are shown, there being usually three or more ranks of said spindles arranged one above the other,) and spools H, arranged on said spindles *a'*, are all of the usual construction and operation except as hereinafter specified, and are commonly used with other parts, (not here shown,) which regulate the rise and fall of the ring-rail, and therefore the disposition of the yarns or threads upon the bobbin.

The yarns or threads *g* are drawn from the

spools H through the condensing-guide G' and yarn-guide G over the top roll F² and between said top roll and the lower feed-roll F', over the carrier-roll F, and through the traveler to the bobbin, in the usual manner; but the yarn, before entering the condensing-guide G' from the spools, is, in this invention, carried through a drop-wire I, there being as many drop-wires as there are yarns, all of said drop-wires at one side of the machine (it will be understood that the machine is double, as usual, having on each side a row of spindles) turning loosely upon a metallic rod *i*, which runs from end to end of the machine, so that when any yarn breaks its drop-wire, by its own gravity, falls down upon a contact plate or strip of metal *i'*, running the whole length of the row of drop-wires and resting upon a strip *i*² of insulating material. A hanger A' is secured to the frame below the top board *a*², and supports a rod J, capable of sliding endwise transversely of the machine in suitable holes near the lower end of said hanger. The rod J is caused to reciprocate by means of an eccentric J', secured to the eccentric-shaft *j*, said rod J being connected to said eccentric by the eccentric-strap *j'* and eccentric-rod *j*², pivoted at *j*³ to the end of said rod J. The revolution of the eccentric-shaft is caused by a gear *j*⁴ thereon engaging an intermediate gear *j*⁵, supported upon a suitable stand *a*³ on the frame A, said last-named gear engaging a pinion *j*⁶, secured to another intermediate gear *j*⁷ concentric therewith, said last-named pinion and intermediate gear turning upon a stand *a*⁴ on said frame A, and said last-named intermediate gear engaging a pinion *b*⁴, fast on the main shaft B, so that when the machine is in operation the rod J has a constant reciprocating motion in a horizontal plane in the direction of its length. A U-shaped magnet-carriage *m* is supported on said rod J, and is capable of sliding freely thereon, but is ordinarily held at rest by a spiral spring *m'*, which connects said carriage and the hanger A', said rod J sliding freely in said carriage. Upon the carriage *m* is supported the electro-magnet M, its armature *m*² being pivoted on said carriage and being a bent lever, as shown in Figs. 1 and 2, and having at its end farthest from the hanger A' a hook or bent-up portion *m*³, adapted when said armature is attracted by said magnet to be thrown into the path of said reciprocating rod and to be struck by said rod and carried along therewith, with the effect of drawing said magnet-carriage against the tension of said spring *m'* along with said rod.

Upon a suitable hanger A², secured to the frame A below the top board *a*², is pivoted at *o* the lever O, there being as many such levers as there are live-spindles C, the lower end of said lever carrying upon a horizontal stud *o'* an idle-pulley *o*², which, when the machine is in operation, is held up against the band *b*³, connecting the band-cylinder and the

whirl, and tightens said band and keeps the whirl and live-spindle in motion. The upper end of each lever O is forked at *o*³, and is provided with half-journal boxes *o*⁴ to receive the journals *f* of a top roll F², as shown in Figs. 1, 3, and 4. When the machine is running properly, the top roll rests upon the yarns or threads between said top roll and the lower roll F', and causes said yarns or threads to travel with said rolls. When, however, a yarn breaks and causes the electro-magnet to attract its armature, as hereinafter explained, the bent-up end of the armature is forced against said lever below its pivot and causes said lever to turn, simultaneously slackening the band *b*³ by carrying the idle-pulley away from the band and stopping the feeding of the broken yarn, or the yarns of the group containing the broken yarn, by raising the corresponding top roll away from the lower roll.

It is desirable to stop the live-spindle immediately, and therefore upon a bracket *c*², secured to the spindle-rail, is pivoted at *p* a brake-lever P, the lower end of which extends over the whirl *c'* and is normally out of contact therewith, and the upper end of which brake-lever is held in contact with the lever O below the pivot *o* by a spring *o*⁵, secured to said lever O and pressing upon said brake, as shown in Fig. 1. When the lever O is moved, as described, by being struck by the armature, the upper end of the brake-lever is pushed toward its corresponding live-spindle and the lower end of said brake-lever is pressed upon the whirl with sufficient friction to stop said whirl and its spindle immediately. The lever O, when moved to raise the top roll and slack the band, is held from returning to its normal position by a downwardly-extending hook *o*⁶, which projects from the lower arm of said lever O, engaging an upwardly-extending hook *o*⁷ on a catch-lever *o*⁸, pivoted at *o*⁹ on the same bracket *c*² which supports the brake-lever, the outer end of said catch-lever being pressed downward by a spring *o*¹⁰, secured to the spindle-rail, and the ends of the hooks being beveled at *o*¹¹ *o*¹², respectively, to allow said hook *o*⁶ to slip over said hook *o*⁷. The long outer arm of the catch-lever being raised, the hooks *o*⁶ *o*⁷ are disengaged and the lever O is restored to position by the spring *o*¹³, which connects said last-named lever below its pivot and the hanger A' or other stationary part of the frame of the machine.

L L' represent metallic wires running from opposite poles of a battery Q or dynamo-electric machine, one of said wires being connected to the metallic rod *i*, on which the drop-wires I are supported, as above described, and the other of said wires being connected to each electro-magnet and to a contact-plate *i'*, so that when any yarn breaks the drop-wire supported thereby falls upon its contact-plate and closes its circuit through its electro-magnet, causing the armature of said magnet to be attracted and the corresponding

spindle to be stopped and the corresponding top roll to be raised, as above described.

In order that the circuit may not remain closed after the stop-motion has done its work, a switch is interposed between each electro-magnet and the corresponding contact-plate, said switch consisting in effect of two outwardly-diverging leaf-springs l , which form terminals to the sections of the wire L' and are supported on the machine-frame, and consisting, also, of a U-shaped strip of metal l' , secured on a bracket o^{14} , which projects from the lever O in such a manner that when the lever O is in its normal position the strip or plug l' is in contact with both of the leaf-springs, but is drawn out from between them as soon as the lever O is rocked on its fulcrum to raise the top roll, as above described. (See Figs. 1, 5, and 6.)

In Figs. 7 to 9 are represented modifications of the above-described stop-motion. In the modified form of my invention the contact-plate i' is replaced by a contact-roll, the same being a tube of sheet metal surrounding, but insulated from, its axis i^4 , as shown at i^5 in Fig. 10, its shaft turning in suitable journal-boxes supported on the top board of the machine, and having secured to it a fast pulley i^6 , connected by a band i^7 to a small driving-pulley i^8 , secured to the main shaft or band-cylinder shaft, by means of which the contact-roll is given a continuous rotation, and perfect contact between said drop-roll and the drop-wire which falls thereon is secured. The line L' is connected to said contact-roll by a strip of spring metal i^9 or metallic brush, which rests upon the surface of said roll, as shown in Fig. 11.

Another modification consists in supporting the electro-magnet M upon a bracket projecting from the lever O , as shown in Figs. 7 and 8, and in pivoting the armature on said lever O , as shown in said figures and in Fig. 9, in such a position that when said armature is attracted it is moved into the path of the reciprocating rod J , the armature being preferably T-shaped, as shown in Fig. 9.

Instead of employing as many reciprocating rods J as there are levers O , it is only necessary to employ two such reciprocating rods or more, connecting them by a horizontal rod J^2 , which extends the whole length of the machine and strikes any armature which may be attracted by its magnet. A doctor i^{10} may be supported upon the top board and arranged with its edge against the contact-roll to keep the contact-roll clean and insure a more perfect contact of the terminal i^9 . Except in the respects named the stop-motion shown in Figs. 7 to 10 does not differ from that shown in Figs. 1 to 6.

The top rolls may be dispensed with, and the other parts of the stop-motion may be used in connection with the usual parts of the doubling spooler or winder, or any machine by which yarn is transferred from spools to bobbins without twisting.

I claim as my invention—

1. The combination of an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon the failure of the work, a lever, a reciprocating bar or rod, an electro-magnet arranged in said circuit, and its armature arranged, when attracted, to move between said reciprocating rod and lever, and thereby to occasion the movement of said lever, the bottom roll, and the top roll supported upon said lever and adapted by the movement of said lever to be raised out of contact to stop the feed of the work between the rolls, as and for the purpose specified.

2. The combination of a spindle, a brake-lever, an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon a failure of the work, another lever, a reciprocating bar or rod, and an electro-magnet arranged in said circuit, its armature arranged, when attracted, to move between said reciprocating rod and said last-named lever, and thereby to move said lever and to cause said brake-lever to press upon said spindle and stop its rotation, as and for the purpose specified.

3. The combination of a band-cylinder, a spindle, a loose band connecting said cylinder and spindle, a lever and an idle-pulley supported upon said lever and normally pressing against said band, an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon the failure of the work, a reciprocating rod or bar, and an electro-magnet arranged in said circuit, its armature arranged, when attracted, to move between said reciprocating rod and lever, and thereby to move said lever and loosen said band and allow the spindle to stop, as and for the purpose specified.

4. The combination of an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon a failure of the work, a band-cylinder, a spindle provided with a whirl, a loose band or belt connecting said band-cylinder and whirl, a lever, an idle-pulley supported upon said lever and normally pressing against said band to strain the same and to cause said spindle and whirl to be rotated by the rotation of said band-cylinder, a reciprocating bar or rod, and an electro-magnet arranged in said circuit, its armature arranged, when attracted, to move between said reciprocating rod and said lever and to be pushed by said rod against said lever to rock said lever and loosen said band and allow said spindle to stop, as and for the purpose specified.

5. The combination of an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon a failure of the work, a band-cylinder, a spindle provided with a whirl, a loose belt or band connecting said band-cylinder and whirl, a lever, an idle-pulley supported upon said lever and normally pressing against said band to strain

the same and to cause said spindle and whirl to be rotated by the rotation of said band-cylinder, a reciprocating bar or rod, an electro-magnet arranged in said circuit, its armature arranged, when attracted, to move between said reciprocating rod and said lever and to be pushed by said rod against said lever, and thereby to rock said lever and loosen said band, and a brake-lever, one arm of which extends over said whirl, but is normally out of contact therewith, and the other arm of which brake-lever is arranged in contact with said first-named lever, whereby the rocking of said first-named lever will cause said brake-lever to press upon said whirl and to stop the rotation of said whirl and spindle, as and for the purpose specified.

6. The combination of an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon a failure of the work, a band-cylinder, a spindle provided with a whirl, a loose belt or band connecting said band-cylinder and whirl, a lever, an idle-pulley supported upon said lever and normally pressing against said band to strain the same and to cause said spindle and whirl to be rotated by the rotation of said band-cylinder, a reciprocating bar or rod, an electro-magnet arranged in said circuit, its armature arranged, when attracted, to move between said reciprocating rod and said lever and to be pushed by said rod against said lever, and thereby to rock said lever and loosen said band, a brake-lever, one arm of which extends over said whirl, but is normally out of contact therewith, and a spring secured to said first-named lever and holding the other arm of said brake-lever in contact with said first-named lever, whereby the rocking of said first-named lever will cause said brake-lever to press upon said whirl and to stop the rotation of said whirl and spindle, as and for the purpose specified.

7. The combination of an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon a failure of the work, a band-cylinder, a spindle provided with a whirl, a loose belt or band connecting said band-cylinder and whirl, a lever, an idle-pulley supported upon said lever and normally pressing against said band to strain the same and to cause said spindle and whirl to be rotated by the rotation of said band-cylinder, a reciprocating bar or rod, an electro-magnet arranged in said circuit, its armature arranged, when attracted, to be moved between said reciprocating rod and said lever and to be pushed by said rod against said lever to rock the same and loosen said band and allow said spindle to stop, the bottom roll, and the top roll supported upon said lever and turned by frictional contact with said bottom roll or with the work passing between said rolls, and adapted by the rocking of said lever to be moved out of such con-

tact to stop the feed of the work, as and for the purpose specified.

8. The combination of an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon a failure of the work, a band-cylinder, a spindle provided with a whirl, a belt or band connecting said band-cylinder and whirl, a reciprocating rod, a brake-lever, one arm of which extends over said whirl, but is normally out of contact therewith, an electro-magnet arranged in said circuit, its armature arranged to move, when attracted, into the path of said reciprocating rod and to be carried along with said rod and to cause said brake-lever to press upon said whirl and to stop the rotation of said spindle and whirl, and a switch arranged in said circuit and normally closed, but opened upon the rocking of said lever, as and for the purpose specified.

9. The combination of an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon a failure of the work, a band-cylinder, a spindle provided with a whirl, a belt or band connecting said band-cylinder and whirl, a lever, a reciprocating rod, an electro-magnet arranged in said circuit, its armature arranged, when attracted, to move between said reciprocating rod and said lever and to be pushed by said rod against said lever and to rock the same, the bottom roll, the top roll, supported upon said lever and turned by frictional contact with said bottom roll or with the work passing between said rolls, and adapted by the rocking of said lever to be moved out of such contact to stop the feed of the work, and a switch arranged in said circuit and normally closed, but opened by the rocking of said lever, as and for the purpose specified.

10. The combination of an electric circuit containing a circuit-closer normally held open by the work, but automatically closed upon a failure of the work, a band-cylinder, a spindle provided with a whirl, a loose belt or band connecting said band-cylinder and whirl, a lever, an idle-pulley supported upon said lever and normally pressing against said band to strain the same and to cause said spindle and whirl to be rotated by the rotation of said band-cylinder, a reciprocating bar or rod, an electro-magnet arranged in said circuit, its armature arranged, when attracted, to move between said reciprocating rod and said lever and to be pushed by said rod against said lever to rock said lever and loosen said band and allow said spindle to stop, and a switch arranged in said circuit and normally closed, but opened by the rocking of said lever, as and for the purpose specified.

11. The combination of a lever, a bottom roll, a top roll supported upon said lever, said lever being provided with a hook, and the catch-lever adapted to engage said hook and

to hold said top roll out of contact with said bottom roll or out of contact with the work between said top roll and bottom roll, as and for the purpose specified.

- 5 12. The combination of the band-cylinder, the spindle provided with a whirl, a loose belt or band connecting said band-cylinder and said whirl, a lever provided with a hook, an idle-pulley supported upon said lever and
10 normally pressing against said band to strain the same and to cause said spindle to be rotated by the rotation of said band-cylinder, and a catch-lever adapted to engage said hook on said lever to hold said idle-pulley
15 from straining said band, as and for the purpose specified.

13. The combination of the lever provided

with a hook, the brake-lever having one arm in engagement with said first-named lever, a spindle provided with a whirl arranged below 20 the other arm of said brake-lever, and a catch-lever adapted to engage said hook and to hold said last-named arm of said brake-lever in contact with said whirl, and thereby to prevent the rotation of said whirl and spin- 25 dle, as and for the purpose specified.

In witness whereof I have signed this specification, in the presence of two attesting witnesses, this 19th day of July, A. D. 1889.

VICTOR I. CUMNOCK.

Witnesses:

ALBERT M. MOORE,
KIRKLEY HYDE.