

(No Model.)

V. S. CLUTE.  
ELECTRICALLY CONTROLLED STOP MOTION FOR KNITTING MACHINES.  
No. 481,726.

Patented Aug. 30, 1892.

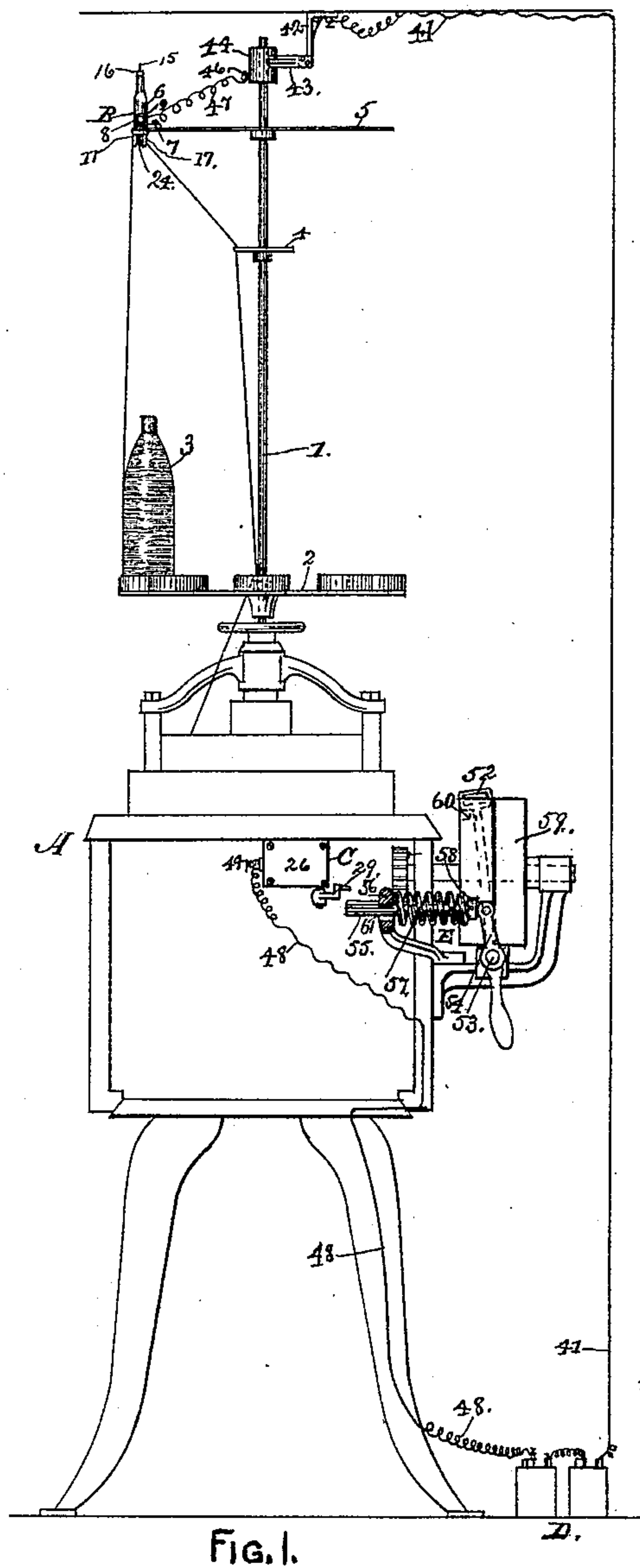


FIG. 1.

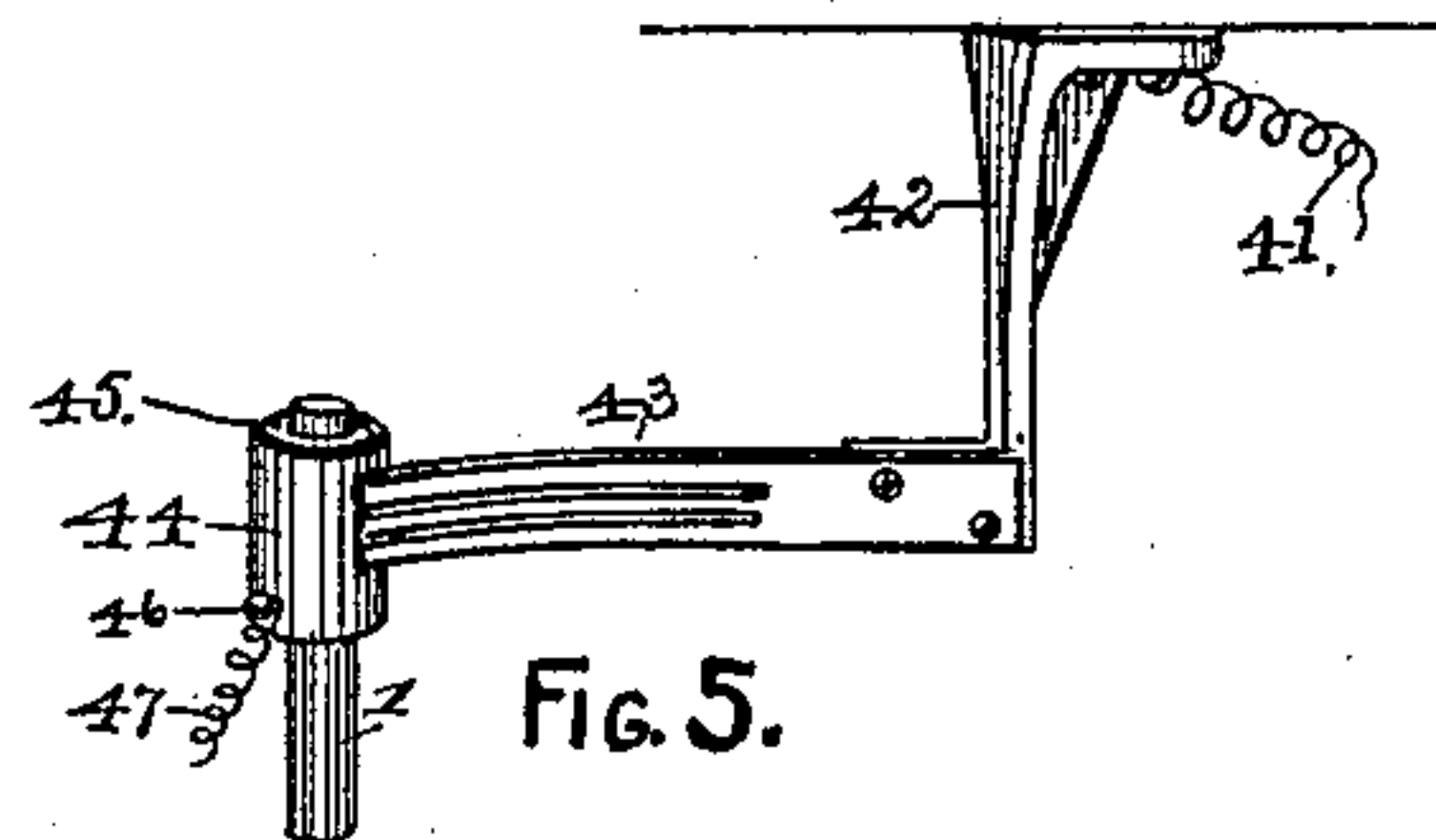


FIG. 5.

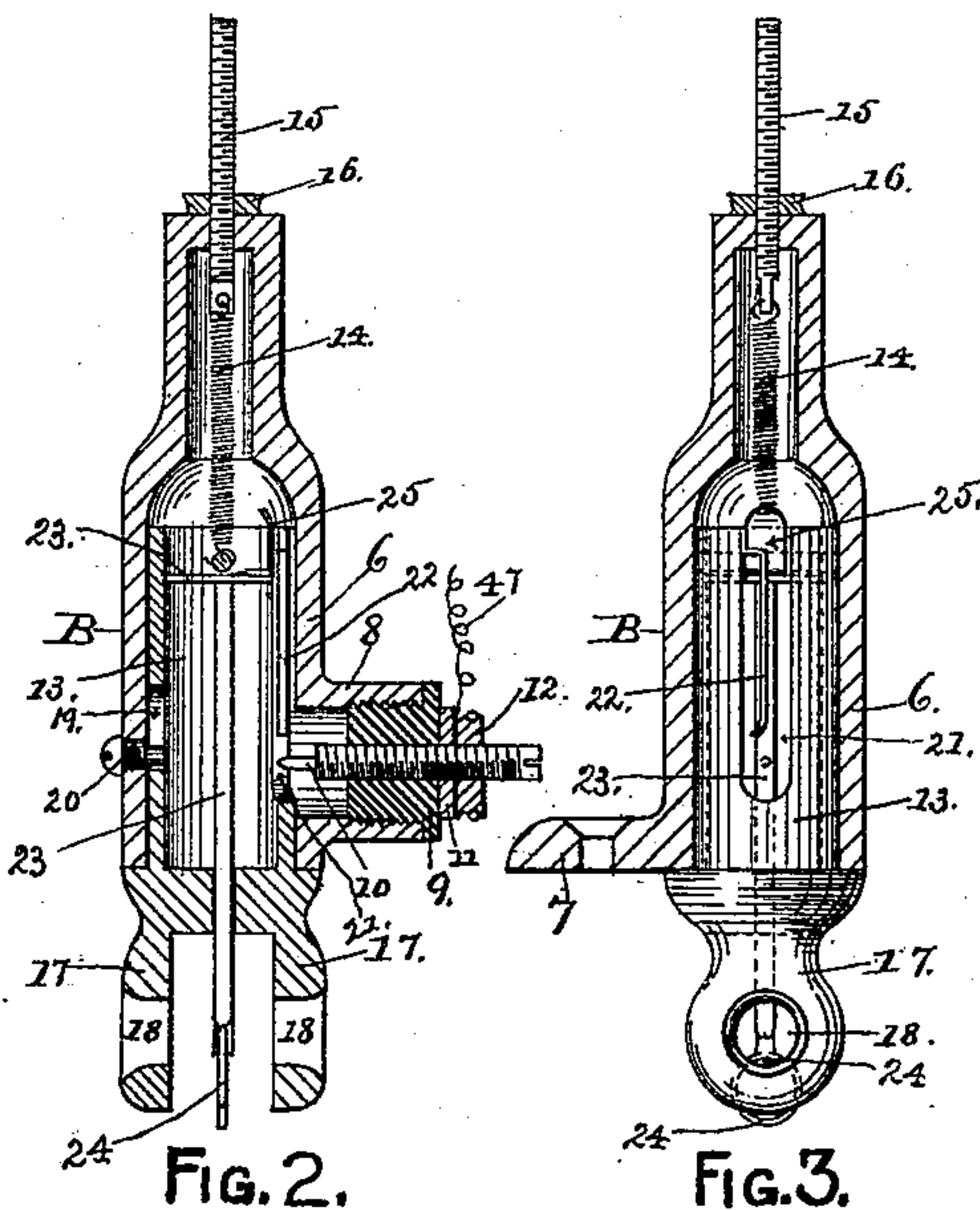


FIG. 2.

FIG. 3.

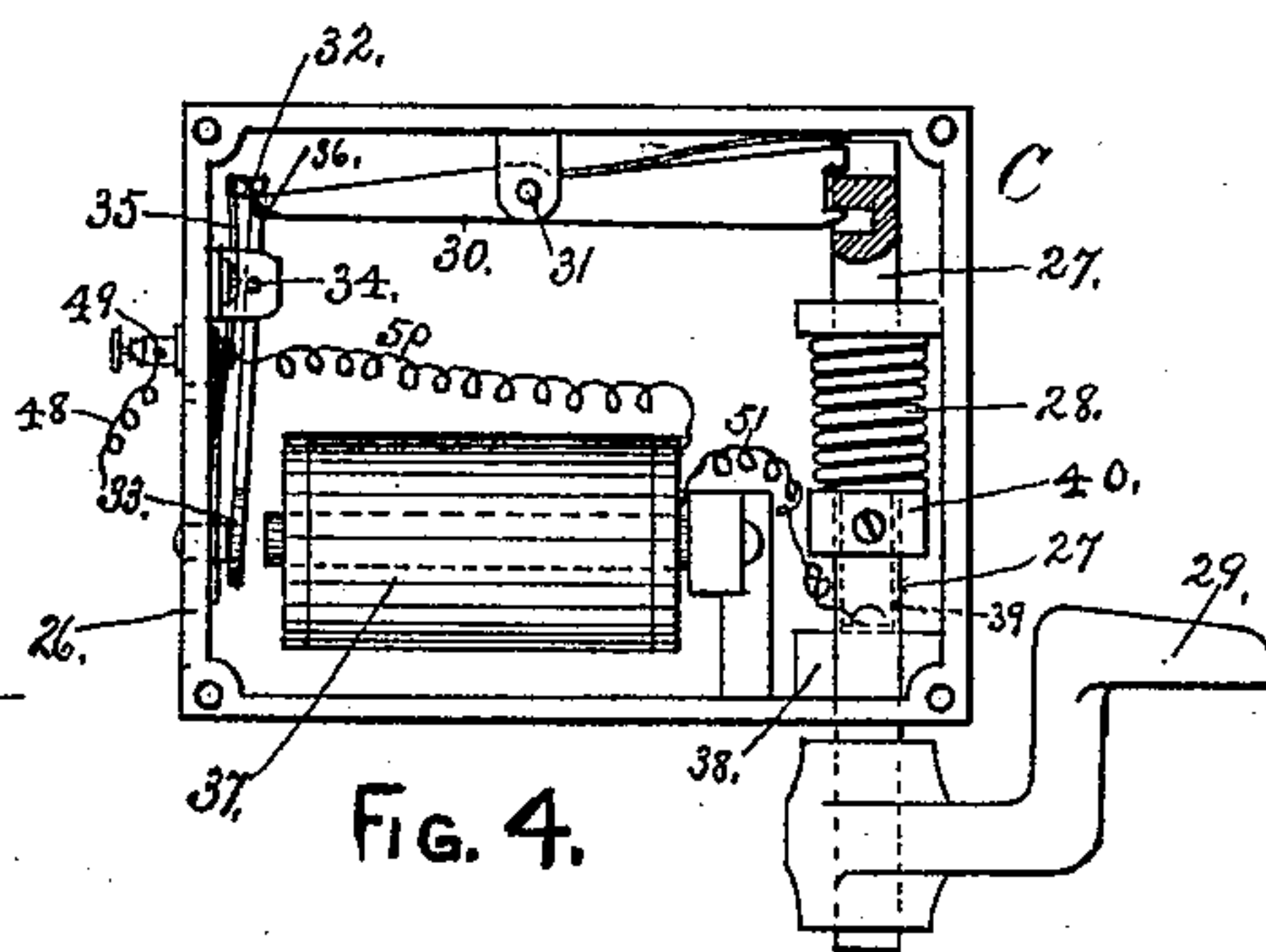


FIG. 4.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## ELECTRICALLY-CONTROLLED STOP-MOTION FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 481,726, dated August 30, 1892.

Application filed October 28, 1891. Serial No. 410,099. (No model.)

*To all whom it may concern:*

Be it known that I, VEEDER S. CLUTE, of Cohoes, in the county of Albany and State of New York, have invented new and useful Improvements in Electrically-Controlled Stop-Motions for Knitting-Machines, of which the following is a specification.

My invention relates to electrically-controlled stop-motions for knitting-machines; and its object is to provide facilities for effecting a stoppage of the machine whenever by reason of the breaking of a thread or an overstrain on said thread it is desirable to effect a stoppage. This object I attain by the mechanism illustrated in the accompanying drawings, which, being herein referred to, form part of this specification, and in which—

Figure 1 is a skeleton outline of a knitting-machine provided with my invention, the details of the knitting mechanism being omitted. Fig. 2 is a central vertical section of my automatic thread-guide. Fig. 3 is a vertical section of the casing of said thread-guide, taken at a right angle to Fig. 2 and showing the sleeve or tension-drop in side elevation. Fig. 4 is a front elevation of the electrically-controlled mechanism for releasing the belt-shipper of the machine, and Fig. 5 is an enlarged and detached elevation of the brush mechanism which forms an electrical connection between a generator of electricity and a vertical shaft of the knitting-machine.

As represented in the drawings, A designates a knitting-machine of an old and well-known construction, which forms no part of my invention. Said machine is provided with a central vertical shaft 1, that carries a spider 2 for bobbins 3, a single one of said bobbins being shown in the drawings. Said shaft also carries a guide 4 for threads leading downwardly into the knitting-machine, and a spider 5 for the electrically-controlled guides for guiding the threads from the bobbins to the guide 4, and said shaft also serves as an electrical conductor for carrying a current of electricity into the framework of the knitting-machine under the conditions hereinafter explained.

B designates an electrically-controlled thread-guide, of which there is one provided for each bobbin of the knitting-machine.

Said guide consists of a metallic casing 6, which must be a good conductor of electricity and which must be made sufficiently tight in its joints to exclude the dust and dampness from its interior. Said casing is provided with a lug 7, by which it is secured to the spider 5, so as to allow the cylindrical body of the casing to project beyond the periphery of said spider.

The casing 6 is provided with a lateral branch 8, having an insulating-nut 9, into which an adjustable contact-point 10 is screwed. The latter is provided with a metallic washer 11 and a metallic binding-nut 12 for forming a clamping device for holding an electrical conductor in electrical contact with the body of the contact-point 10.

A sleeve 13 is fitted to slide loosely in the bore of the casing 6 and is supported by a delicate spring 14, which will sustain the weight of said sleeve when not exposed to an overstrain. The spring 14 is connected to an adjusting-screw 15, by which the tension of said spring can be regulated as occasion may require, and a nut 16 is fitted on said screw for effecting said regulation. At the lower end of said sleeve a pair of oppositely-located lugs 17 is formed, and each of said lugs is provided with an opening 18, through which runs the thread, which passes upwardly from a bobbin 3 through the openings 18 and thence downwardly through the guide 4 to the knitting mechanism. The downward strain of the thread tends to pull down the sleeve 13 against the resistance of the spring 14.

In one side of the sleeve 13 there is a short slotted opening 19, into which the point of a screw 20 takes for the purpose of limiting the movement of said sleeve in both directions. In the side of said sleeve, which corresponds to the contact-point 10, there is a slotted opening 21, into which the inner end of said contact-point enters, and a pendent platinum spring 22 is fixed in the slotted opening 21 in such manner that when the sleeve 13 is drawn downward by reason of an overstrain on the thread said spring will engage with the contact-point 10 and effect a closing of the electrical circuit, as hereinafter set forth. A drop 23 is fitted to slide in the bore of the sleeve 13 and is provided with an eye 24 on its lower



end, and through said eye the part of the thread which extends between the lugs 17 is passed to form a support for said drop while a proper strain is maintained on said thread; 5 but when said thread is broken said drop will fall down and bring a platinum lug 25 to bear against the contact-point 10, thereby effecting an automatic closing of the electric circuit. Said platinum lug is attached to the 10 upper end of the drop 23, and it is so arranged that when said drop is in its raised position, as shown in Figs. 2 and 3, the electric circuit will be broken or open.

C designates the electrically-controlled 15 mechanism for releasing the belt-shipper of the knitting-machine. Said mechanism is inclosed in a casing 26, of which one of the side plates is removed in Fig. 4 for the purpose of exposing interior parts. Said mechanism consists of a sliding bolt 27, provided with a compressible spring 28, arranged to force said 20 sliding bolt downwardly. On the lower end of the latter there is a tappet 29, which when said sliding bolt descends takes against a projecting end of a spring-actuated sliding rod of the belt-shipper. A lever 30 is fulcrumed, 25 as at 31, to the casing 26 and is fitted to engage with the sliding bolt 27 for the purpose of retaining the latter in its raised position. The opposite end of said lever is fitted to engage with a lip 32, formed on the upper end of an armature 33, that is fulcrumed, as at 34, 30 to the casing 26. A spring 35 forces the upper end of said armature toward the lever 30 to insure the engagement of the lip 32 with the corresponding end of said lever. A bevel-face 36 is formed on the lower side of the lever 30 and a corresponding bevel is formed on the upper face of the lip 32 for the purpose 40 of insuring the engagement of said armature with the lever 30. A pair of electro-magnets 37 of ordinary construction, made by surrounding the cores of said magnet with helices of electrically-insulated wires, is secured to the 45 casing 26 and is arranged in relation to the armature 33 in such manner that when said magnets are electrically excited, which can only be accomplished by passing an electrical current through the helices of electrically-insulated wire which surround the cores of the 50 electro-magnets, said armature will be drawn toward the magnets to effect the release of the lever 30 from the control of said armature. The casing 26 is secured in metallic contact 55 with the framework of the knitting-machine, so that when an electrical current is conducted into said framework through the shaft 1 said current will enter the casing 26, and in order to prevent the formation at all times of 60 a complete electrical circuit through said electro-magnets a block 38, of insulating material, is fixed in said casing, and to said block is attached a contact-spring 39, (shown in dotted lines in Fig. 4,) and which when the sliding 65 bolt 27 is raised, as shown in said figure, comes in electrical contact with a collar 40 on said sliding bolt. The parts are in position to com-

plete the electrical circuit through said helices the instant that either the spring 22 or lug 25 is carried into contact with the point 10; but 70 when the sliding bolt 27 is in a depressed position said collar will fall below the lower end of the spring 39, and thereby the electrical circuit will be automatically broken at that point. 75

D designates a generator of electricity, which may be an ordinary battery, as shown in the drawings, or any other preferred form of such generators. From one pole of said generator a conducting-wire 41 extends to a metallic 80 hanger 42, carrying a brush 43, that is in electrical contact therewith. The outer end of said brush is fitted to bear in electrical contact with a metallic hub 44, secured to the shaft 1 of the knitting-machine A, and said 85 hub is electrically insulated from said shaft, as shown at 45 in Fig. 5. The hub 44 is provided with binding-screws 46, whose number should equal the number of bobbins 3 used on the knitting-machine, and to each of said 90 binding-screws there is attached a conducting-wire 47, whose opposite end is connected to the contact-point 10 of the corresponding thread-guide B. The latter is in electrical 95 contact with the spider 5, which is in electrical contact with the shaft 1, through which, in connection with the framework of the knitting-machine, the current of electricity is conducted into the casing 26. From the opposite pole of the generator D a conducting- 100 wire 48 connects with a binding-post 49, electrically insulated from the casing 26, and to the inner end of said binding-post is connected a conducting-wire 50, which is electrically connected to one pole of the electro- 105 magnets 37. The opposite pole of said magnets is connected by a conducting-wire 51 to the contact-spring 39.

E designates the belt-shipper of the knitting-machine, which consists of an arm provided at its outer end with a loop 52, through 110 which a belt for driving said machine passes. Said arm is mounted on a rock-shaft 53, which has attached to its opposite end a short arm 54, to the outer end of which is jointed a rod 115 55, which is fitted to slide in a bracket-eye 56, secured to the framework of the knitting-machine. A spring 57 surrounds said rod and is interposed between said bracket-eye and a collar 58, secured on said rod. Said spring is 120 fitted to force the belt-shipper in a direction to carry the driving-belt of the machine onto the loose pulley 59 for the purpose of stopping the operation of the knitting-machine. A tight pulley 60 is fixed on the driving-shaft 125 of the knitting-machine, and in order to maintain the driving-belt on said tight pulley against the action of the spring 57 the rod 55 is provided with a notch which engages with the bracket-eye 56, as at 61 in Fig. 1, and 130 thereby the belt-shipper is locked in position to retain the driving-belt on said tight pulley until said rod is automatically released in the manner hereinafter explained.



My invention operates in the following manner: The thread from each bobbin is carried upwardly and passed through the oppositely-located openings 18 of the corresponding thread-guide B, said thread passing, also, through the eye 24 of the drop 23 of said thread-guide, said drop being supported on the thread passing through its eye and the required tension being maintained on the thread by reason of the spring 14. If from any cause the regulated tension is exceeded, the downward strain on the thread will cause the sleeve 13 to be drawn downwardly, so as to bring the spring 22 against the contact-point 10, and thereby the electrical circuit will be closed to excite the electro-magnets 37, whereby the armature 33 will be drawn toward said magnets to effect the release of the mechanism by which the sliding bolt 27 is retained in its raised position. Said sliding bolt will be forcibly pushed downward to carry the tappet 29 into contact with the protruding end of the rod 55, thereby releasing the latter, so that the spring 57 will cause the belt-shipper E to move into position to carry the driving-belt onto the loose pulley 59, and thereby the operations of the knitting-machine will be terminated. When the drop 23 falls by reason of the breaking of the thread on which it is supported, the lug 25 will be carried against the contact-point 10, thereby closing the electrical circuit and effecting the stoppage of the knitting-machine by the release of the belt-shipper E in the manner above described.

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

1. In a knitting-machine, a thread-guide consisting of a metallic body-piece provided with an insulating-plug having an adjustable electrical contact-point fixed therein, a sleeve fitted to slide loosely in said body-piece and provided with pendent lugs that have oppositely-located openings for the thread therein, said sleeve being provided with a contact-spring fitted to form an electrical contact with the contact-point of said body-piece, a tension-spring whereby said sleeve is supported in its normal position, and an adjusting-screw whereby the tension of said spring can be regulated, as and for the purpose herein specified.

2. In a thread-guide, the combination of a sleeve fitted to slide in a loose manner in the body-piece of the device, said sleeve being provided with pendent lugs having oppo-

sitely-located openings for the passage of the thread therethrough, and a drop fitted to slide loosely in said sleeve and provided with an eye through which the thread passes to normally retain said drop in its raised position, said drop being provided with a lug which when the drop falls takes against a contact-point in the body-piece of the device, as and for the purpose herein specified.

3. The combination of a spring-actuated belt-shipper provided with a sliding bar fitted to engage with a stationary point of the machine, and electrically-controlled mechanism, as herein described, whereby said sliding bar will be released from its engagement with said stationary point, and a thread-guide consisting of the following elements: a metallic body-piece having an electrical contact-point, a sleeve fitted to slide loosely in said body-piece and having eyes for passing the thread through, said sleeve having a contact-spring fitted to take against said contact-point, a tension-spring fitted to normally retain said sleeve in a raised position, a drop fitted to slide loosely in said sleeve and having a lug fitted to take against said contact-point, said drop being normally held in a raised position by a thread passing through its eye, so as to retain the electrical circuit in an open condition, and a generator of electricity electrically connected to said thread-guide, and the mechanism for releasing said belt-shipper, as and for the purpose herein specified.

4. The combination of a belt-shipper provided with a sliding bar to which motion is imparted in one direction by means of a spring, said bar being fitted to engage with a stationary point of the machine to retain the driving-belt on the fast pulley, and a mechanism for releasing said sliding bar from its engagement, the same consisting of a sliding bolt provided with a tappet fitted to take against the sliding bar of said belt-shipper and having a spring fitted to forcibly move said bolt downwardly, a detent-lever connected with said sliding bolt and fitted to engage with a swinging armature, and electro-magnets arranged to attract said armature and effect the disengagement of the latter from said detent-lever, as and for the purpose herein specified.

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Witnesses:

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