

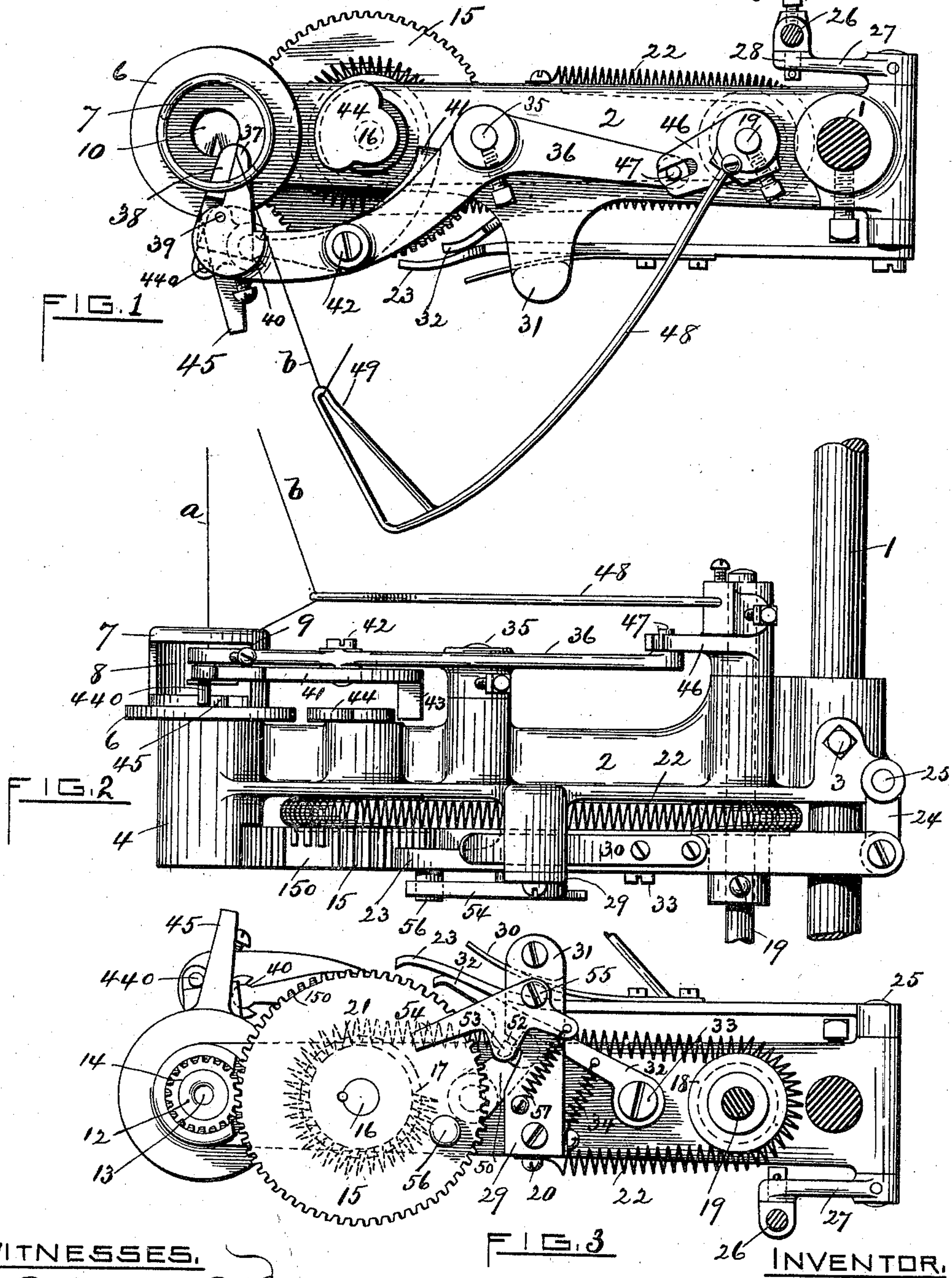
(No Model.)

2 Sheets—Sheet 1.

J. E. ROWE.
KNITTING MACHINE.

No. 581,887.

Patented May 4, 1897.



WITNESSES.

Charles J. Hannigan
Irma L. Fish

FIG. 3

INVENTOR.

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By Wilmarth D. Thurston
Atty.

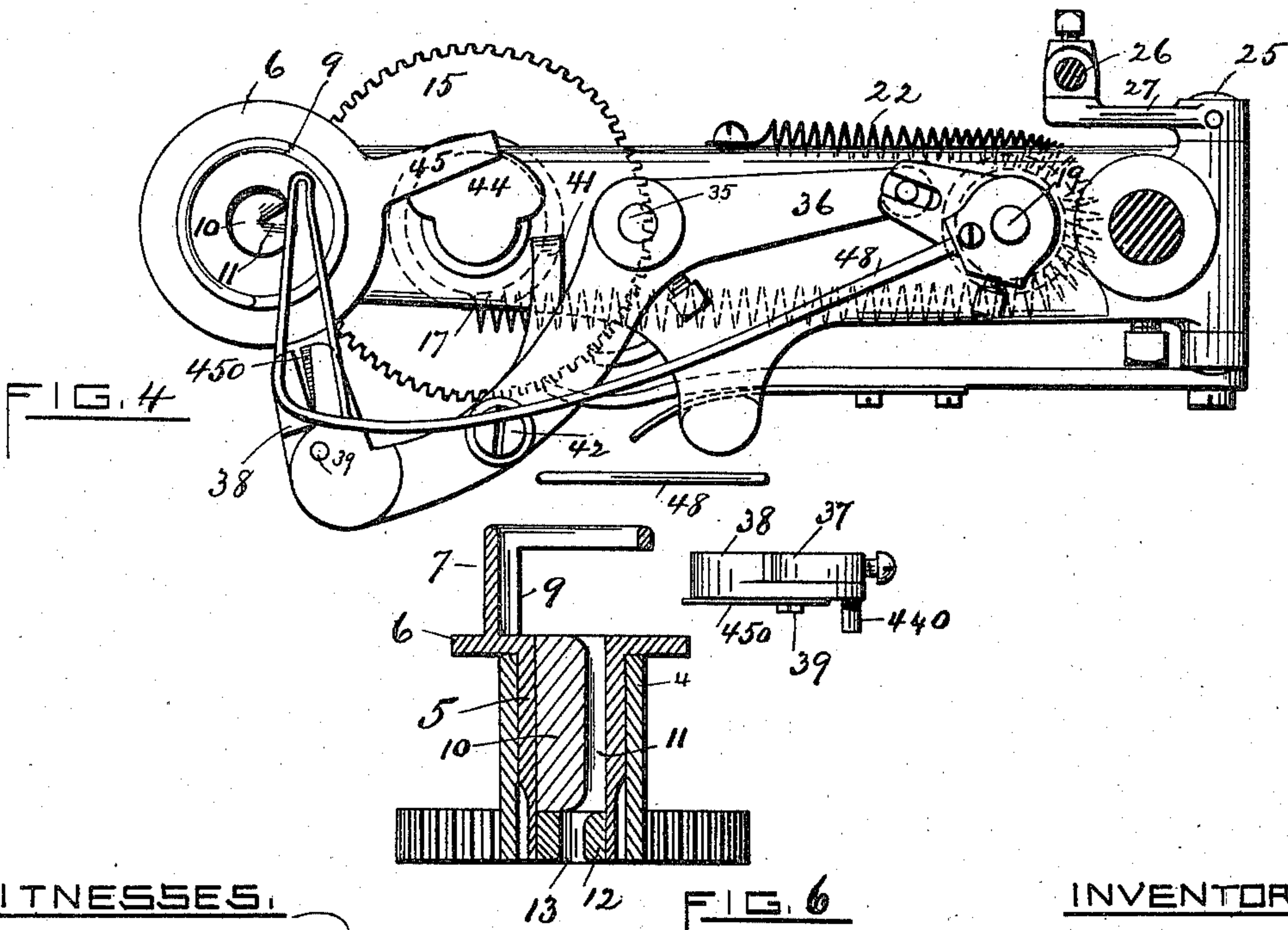
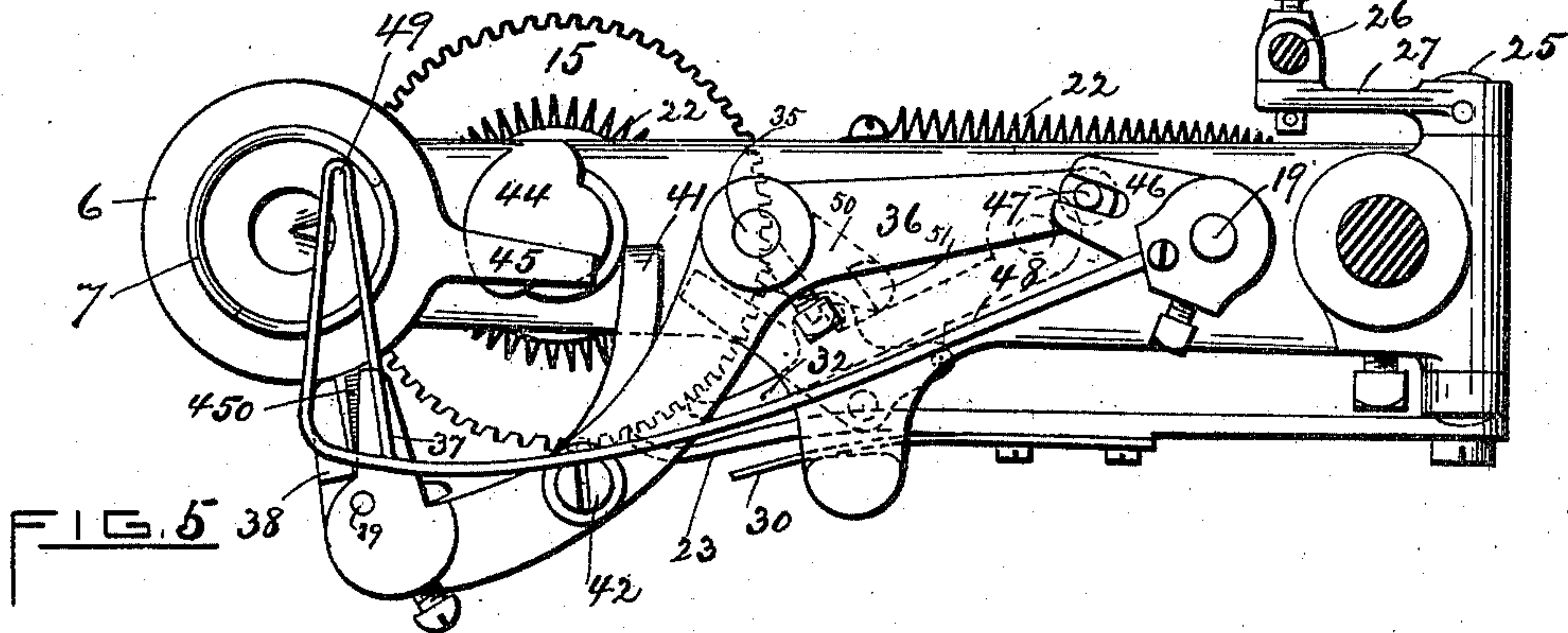
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KNITTING MACHINE.

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WITNESSES.

Charles T. Hannigan
Sam L. Fish

FIG. 6

INVENTOR.

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UNITED STATES PATENT OFFICE.

JAMES E. ROWE, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO THE
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KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 581,887, dated May 4, 1897.

Application filed April 4, 1896. Serial No. 586,153. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. ROWE, of Pawtucket, county of Providence, State of Rhode Island, have invented certain new and useful
5 Improvements in Knitting-Machines; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming part of the same, to be a full, clear, and exact description thereof.
10 In knitting-machines in which a mechanism is used for inserting a thread to strengthen or reinforce the fabric at intervals it has been found that in order to insure the drawing forward of the said thread by the knitting-thread
15 it is desirable to twist or wind the threads one or more times about each other, and the present invention relates to mechanism for inserting a thread by thus winding or twisting the threads together. Since the knitting-thread
20 is being drawn forward into the machine continuously, it is desirable that the threads should be wound or twisted about each other as quickly as possible, and in order that the threads shall not untwist or become separated
25 it is desirable that they should be twisted or wound a number of times about each other and at some distance from the end of the thread to be inserted; and it is the object of the present invention to provide a mechanism
30 which shall accomplish these results.

To that end one feature of invention consists in the combination of a thread-carrier with an automatic motor, preferably a spring-motor, which motor is energized and then released to operate the carrier, and so far as
35 this feature of invention is concerned it is immaterial whether the carrier be of the form shown in the patent to Swinglehurst, No. 459,260, granted September 8, 1891, in which
40 the carrier supports the thread-bobbin, or of the form shown in the patent to Williams, No. 491,327, granted February 7, 1893, in which a gripper carries the free end of the thread about the knitting-thread, or of any
45 other form which will wind or twist the threads together. It is preferred to use a carrier which engages the free end of the thread to be inserted and winds the same about the knitting-thread.

50 The further features of the present inven-

tion consist in the combinations hereinafter described and claimed.

In the accompanying drawings is shown a mechanism for inserting an extra thread which embodies the present improvements in
55 their preferred form.

Referring to the drawings, Figure 1 is a top plan view. Fig. 2 is a side elevation. Fig. 3 is a bottom plan view. Figs. 4 and 5 are top plan views with the parts in different po-
60 sitions. Fig. 6 is a sectional view.

A vertical rod 1 is secured in a desired manner to the frame of the knitting-machine to which the present device is to be attached, and secured to this rod by means of the set-
65 screw 3 is the bracket or arm 2 for supporting the devices hereinafter described. The arm 2 is provided at its outer end with a boss 4, in which is mounted a hollow stud or sleeve 5, provided with a projecting flange 6, which
70 rests upon the top of boss 4 and supports said sleeve. Secured upon the upper face of the flange 6 and preferably made integral therewith is a short cylinder 7, provided with a cut-away portion or slot 8 in its periphery,
75 one edge 9 of which is adapted to engage the thread *b* and forms a carrier for carrying said thread one or more times about the thread *a*, as will be hereinafter more fully explained. A plug 10, provided with a V-shaped slot 11
80 in its side, is secured within the sleeve 5 and forms a thread-guide. A second plug 12 is secured in the lower end of the sleeve 5, and is provided with a hole 13 slightly out of line with the apex of the V above referred to, so
85 that the thread will be held in the apex of said V as it passes through the plugs 10 and 12. The thread-carrier is actuated by an automatic motor, which in the form shown consists of a spring-motor and is constructed and
90 arranged as follows:

Gear-teeth are cut in the end of the sleeve 5 to form a pinion 14, which is engaged by a gear 15, secured to the end of a stud 16. A spiral spring 22 has one end secured to the
95 pulley 21 at 17 and passes around a pulley 18, loosely mounted on a shaft 19, and has the other end secured to the arm 2 at 20. A pulley 21, around which the spring 22 is adapted to be wound, is secured to the upper face of
100

the gear 15. The gear 15 may be rotated to wind the spring upon the pulley 21 and thus energize the motor by any suitable means, and in the form shown is so rotated by means of the pawl 23, which is pivoted to a crank-arm 24, secured to the end of stud 25. The stud 25 is rocked to reciprocate the pawl 23 by means of a reciprocating rod 26, to which an arm 27, secured to the stud 25, is pivoted at 28. The rod 26 may be reciprocated by any suitable mechanism. The pawl 23 is supported on a plate 29, secured to lugs depending from the arm 2, and carries a spring 30, which engages one of said lugs 31 and tends to keep the pawl in engagement with the gear 15. A stop-pawl 32 is pivoted to the under face of the arm 2 at 33 and is held in engagement with the gear 15 by the spring 34. The gear 15 is provided with a blank space 150, in which the pawl 23 works idly after the spring has been wound upon the pulley 21.

The devices for severing and holding the thread *b* and releasing said thread and the manner in which said devices cooperate with the thread-carrier and motor above described will now be described.

Secured to a stud 35 is an arm 36, which is provided at its outer end with a gripping-jaw 37, which coacts with a gripping-jaw 38, pivoted at 39 to said arm 36. The tail of said jaw 38 is provided with a circular recess 40, in which is fitted the end of a lever 41, pivoted at 42 to the arm 36, and having its other end bent downward at 43. The end 43 is engaged by a cam 44 on the end of stud 16 at the proper time to rock the lever 41 and open the jaw 38, as will more fully appear. The tail of the jaw 38 is also provided with a pin or stop 440, which is engaged at the proper time by an arm 45, secured to the flange 6, thus closing the jaw 38 to grip the thread. The jaw 37 is provided with a projecting blade 450, which coacts with the lower edge of the jaw 38 to sever the thread. The arm 36 is swung on its pivot to carry the gripper toward and from the thread-guide and thread-carrier by means of a slotted arm 46, which engages a pin 47 on the end of the arm 36, and is secured to the shaft 19. The shaft 19 is rocked at the proper time by any suitable mechanism. (Not shown.) Projecting from the hub of arm 46 is an arm 48, carrying a thread-engaging eye or guide 49. Secured to the lower end of the stud 35 is an arm 50, provided at its end with a depending pin or projection 51, which is adapted to engage the stop-pawl 32 and move said pawl back out of engagement with the gear 15, said pawl 32 engaging and moving pawl 23 out of engagement. The stop-pawl 32 is provided with a notch 52, which is engaged by a catch or pin 53 on a lever 54, pivoted at 55 to the under face of the plate 29, said catch serving to hold the pawls out of engagement until released by the pin 56 on the gear 15, as here-

inafter more fully explained. A spring 57 serves to hold the catch 53 in the notch 52.

The operation is as follows: When the machine to which the above mechanism is applied is on rotary knitting, the parts are in the position shown in Figs. 1, 2, and 3. The thread *a* passes through the thread-guide 11 and the thread *b* passes through the guide 49 to the gripper 37 38, which projects through the slot 8 and holds the end of said thread. The spring 22 is wound upon the pulley 21 and the pawls 23 and 32 are held out by the catch 53. The sleeve 5 is held from rotation under the tension of spring 22 by the arm 45, which engages the pin 440, the tension on the spring serving to hold the jaws 37 and 38 firmly closed. When the thread *b* is to be inserted—as for instance, when the machine passes onto the heel or toe—the shaft 19 is rocked into the position shown in Fig. 4. This movement swings the gripper back out of the slot 8, carrying the thread *b* through the slot 8 and across the path of the side 9, and also carries the pin 440 beyond the end of the arm 45, allowing the spring 22 to quickly revolve the gear 15, which motion is transmitted to the sleeve 5 and the cylinder 7. At the same time the arm 48 has been moved in toward the thread-guide 11 to give up slack thread. As the sleeve 5 revolves the side 9 of the slot 8 engages and carries forward the thread *b*, the gripper still retaining the end of said thread, and said thread wrapping about the periphery of the cylinder 7. When the sleeve 5 has made nearly a revolution, the cam 44 engages the end 43 of the lever 41 and opens the jaw 38, thus releasing the end of the thread *b*, which is now free to be carried onward by the thread *a*, about which it is wound (in the present case three times) by the continued rotation of the sleeve 5 and cylinder 7. By reason of the fact that the gripper does not release the end of the thread *b* until the sleeve 5 has nearly completed a revolution the said thread will be wound about the thread *a* at some distance from the end of thread *b*, so that there is little or no danger that the said thread will unwind from the thread *a*, as would be the case if there were a short free end of thread beyond the wind. When the gear 15 has made nearly a revolution, the pin 56 strikes the lever 54, thus moving the catch 53 out of the notch 52 and allowing the pawls 23 32 to engage the gear 15. The pawl 23 now acts to turn the gear 15 and wind up the spring 22 until the blank space 150 comes under the end of the pawl 23, when said pawl works idly in said space. The parts remain in this position, Fig. 5, until the time arrives for withdrawing the thread *b*, when the shaft 19 is rocked into the position shown in Fig. 1. This movement carries the jaws 37 38 through the slot 8 and on opposite sides of the thread *b* and also carries the pin 440 into the path of arm 45 and at the same time swings the arm

48 outward to draw slack thread from the thread-supply. As the arm 36 reaches the limit of its movement and after the jaws 37 38 have straddled the thread *b* the pin 51 engages the pawl 32 and moves said pawl and pawl 23 out of engagement with the gear 15, as shown in Fig. 3. The sleeve 5 then flies around under the tension of spring 22 until the arm 45 strikes the pin 440, thus closing the jaw 37 and severing the thread *b* and also arresting the movement of said arm and sleeve. The parts are now in the position shown in Figs. 1, 2, and 3, ready for the operation to be repeated.

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

1. The combination of a guide for a plurality of threads, means for winding one of said threads about the other, and a spring-motor for driving said winding means, substantially as described.

2. The combination of a thread-guide, a thread-carrier, and a spring-motor for rotating said thread-carrier, substantially as described.

3. The combination of a thread-carrier, a spring, connections between said spring and carrier, means for holding said spring under tension, and means for releasing said spring, substantially as described.

4. The combination of a rotary thread-carrier, an automatic motor for operating said carrier, means for energizing said motor, and means for holding and releasing said motor substantially as described.

5. The combination of a thread-carrier, a pinion secured to said carrier, a gear engaging said pinion, and a spring connected to said gear for rotating the same, substantially as described.

6. The combination of a thread-engaging device, a spring-motor for rotating said thread-engaging device, and a holder for holding the free end of the thread, substantially as described.

7. The combination of a thread-engaging device a motor for rotating said thread-engaging device, means for holding and releasing

said motor, and means for holding the free end of the thread, substantially as described. 50

8. The combination of a rotary thread-carrier, a motor for rotating said carrier, means for energizing said motor, a stop for holding said carrier against the action of said motor, and means for moving said stop to release the carrier and allow the motor to act, substantially as described. 55

9. The combination with a rotary thread-carrier a motor for operating said carrier, a gripper movable to and from said carrier comprising a movable jaw, a stop on said jaw, and a projection on said carrier for engaging said stop to operate said jaw, substantially as described. 60

10. The combination of a rotary thread-carrier, a thread-holder and means for moving said holder to carry the thread into the path of said thread-carrier, substantially as described. 65

11. The combination of a rotary thread-carrier, a thread-holder, means for moving said holder away from said carrier, and means for releasing the thread from said holder after said carrier has begun to rotate, substantially as described. 70

12. The combination of a rotary thread-carrier, means for holding and releasing said carrier, a gear for rotating said thread-carrier, a spring connected to said gear, means for energizing said spring a catch for holding said means out of operation and a projection on said gear for releasing said catch, substantially as described. 75

13. The combination of a rotary thread-carrier, a motor for operating said carrier comprising a gear, provided with a blank space, a reciprocating pawl engaging said gear and arranged to play in said blank space, a stop-pawl engaging said gear, and means for moving said stop-pawl out of engagement with said gear, substantially as described. 80

JAMES E. ROWE.

Witnesses:

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IRA L. FISH.