

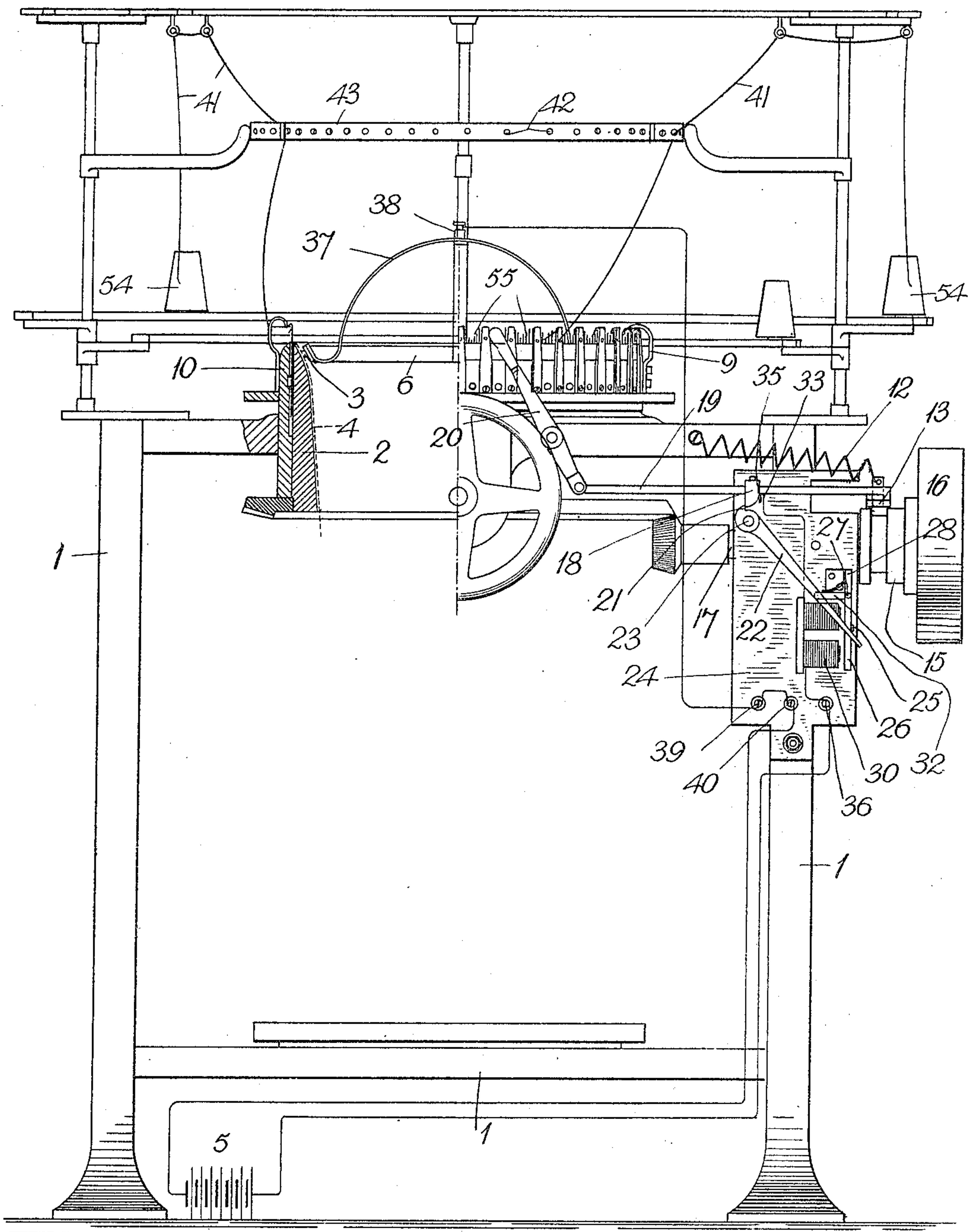
No. 803,042.

PATENTED OCT. 31, 1905.

C. H. & E. C. WYNNE.
KNITTING MACHINE.

APPLICATION FILED FEB. 7, 1905.

3 SHEETS—SHEET 1.



Witnesses
Wm. Kuchel
John A. Perival

Fig. 1.

Inventors
Charles H. Wynne
Eustace C. Wynne
Richard H. Wynne
ATTORNEYS

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3 SHEETS—SHEET 2.

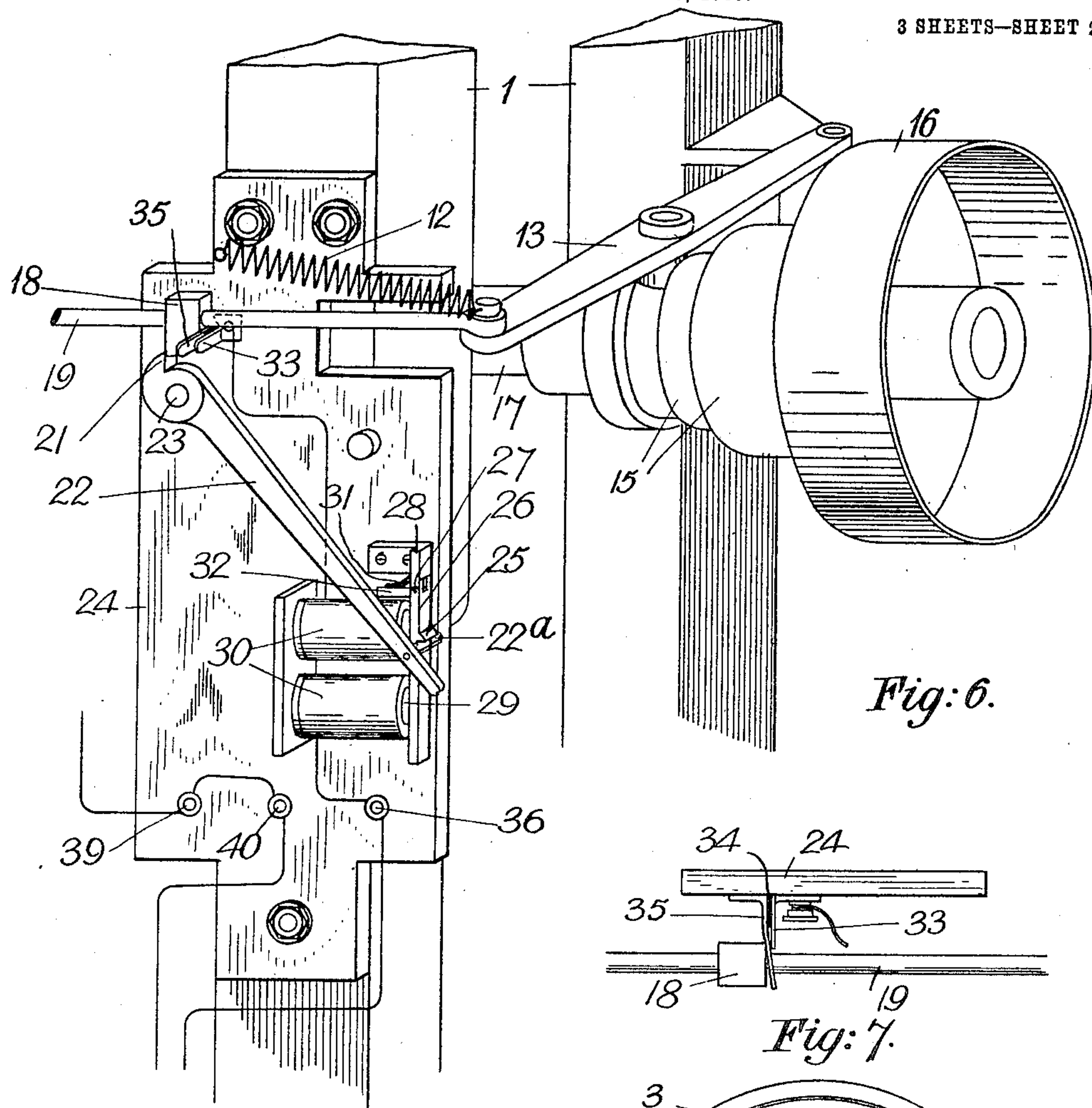


Fig: 6.

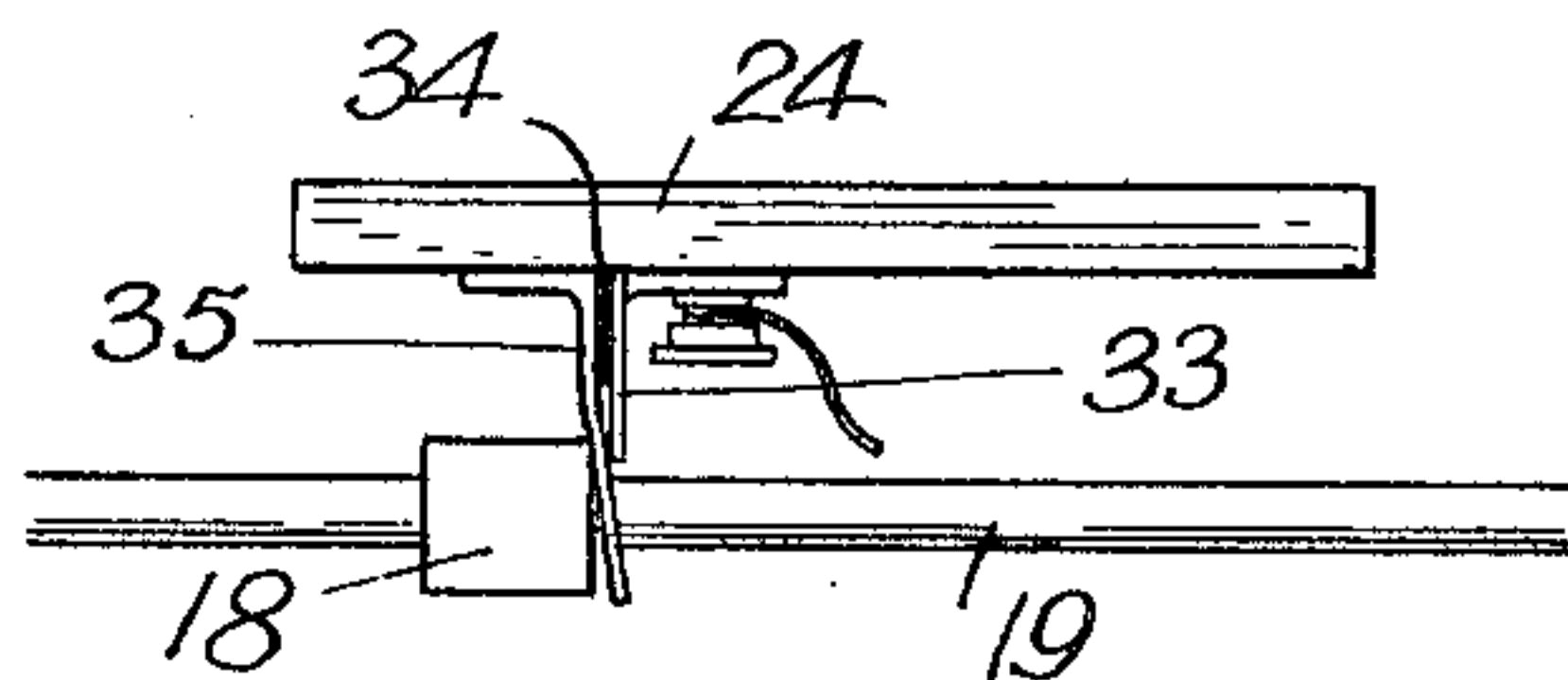


Fig: 7.

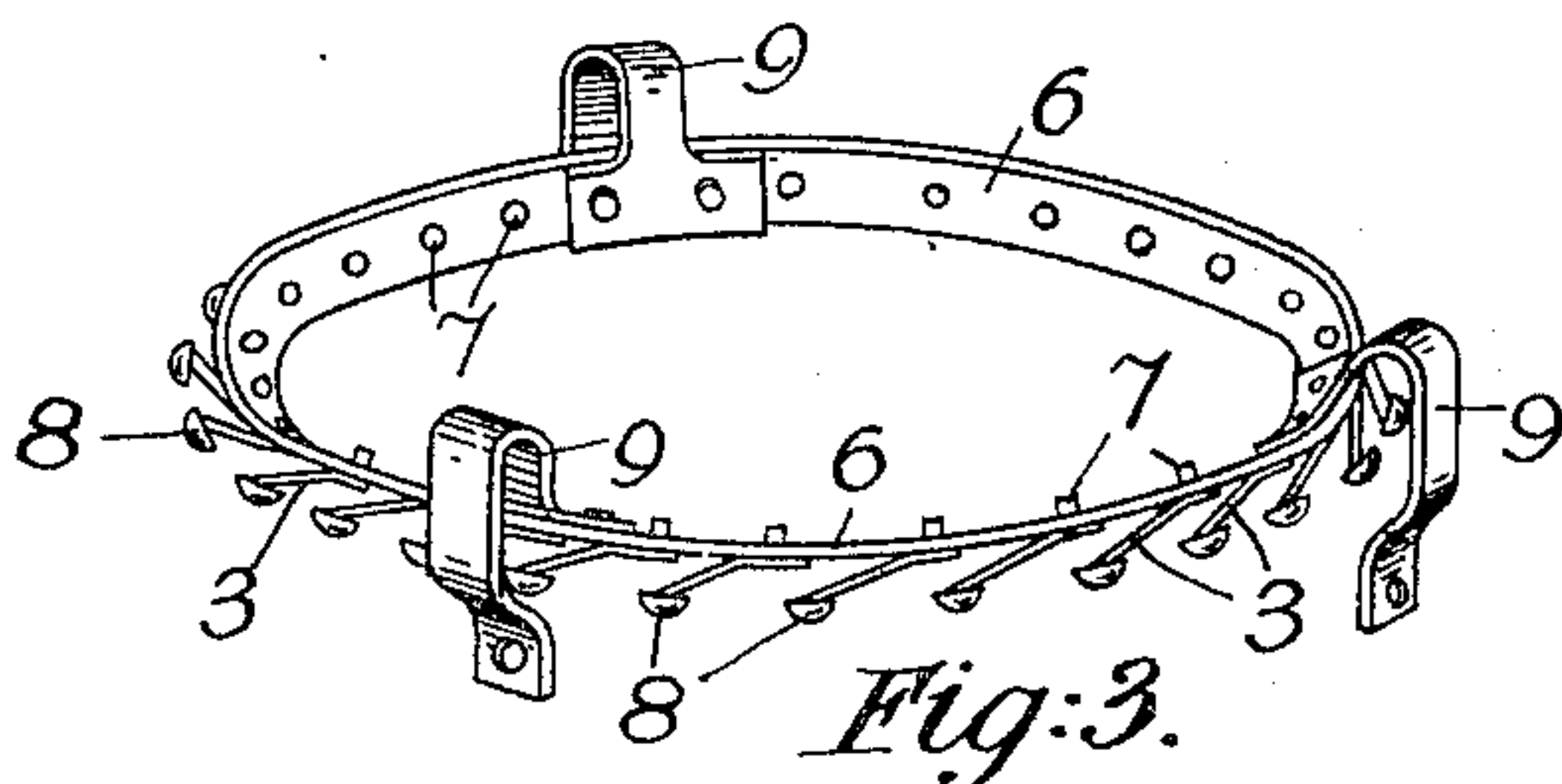


Fig: 3.

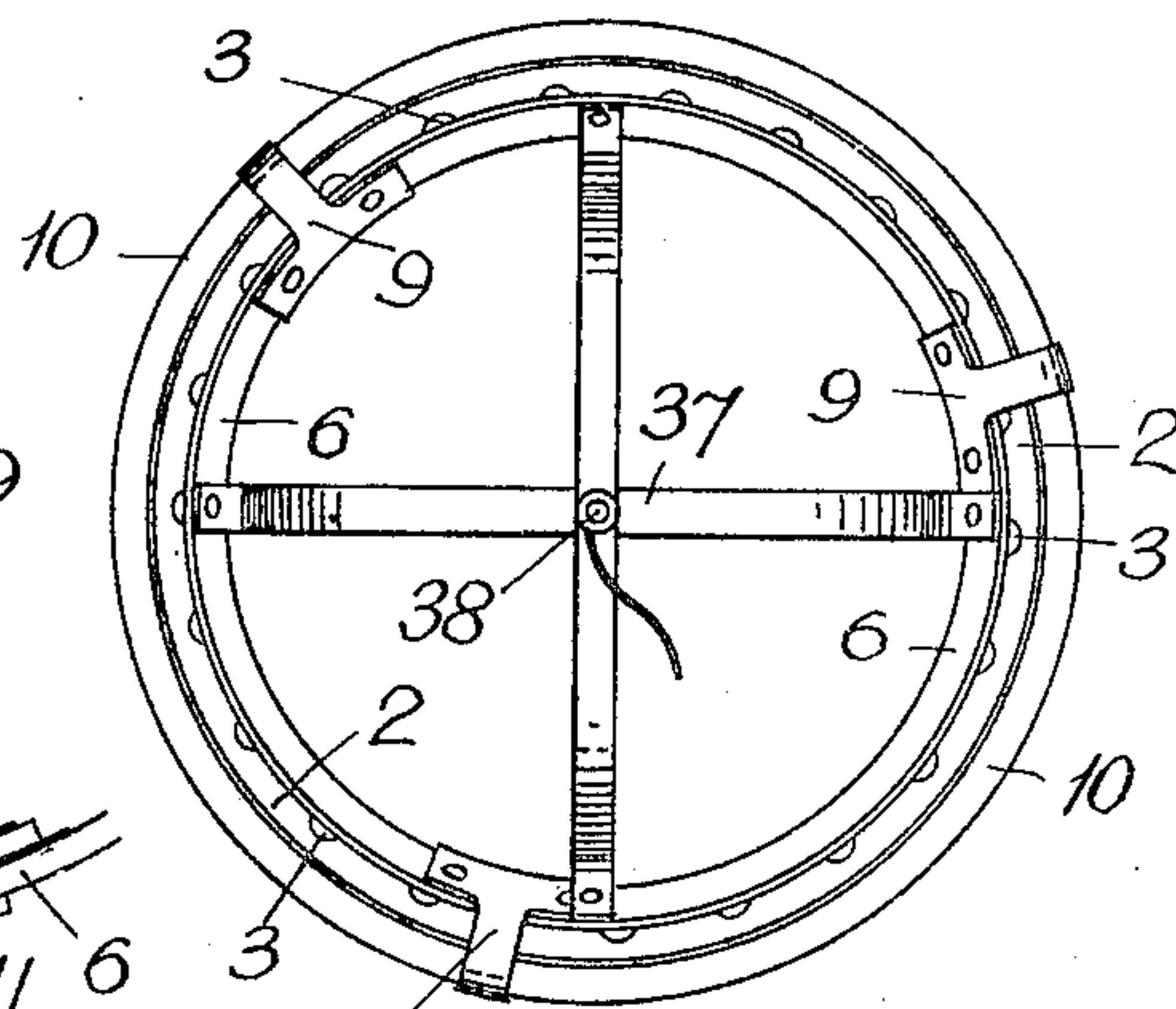


Fig: 2.

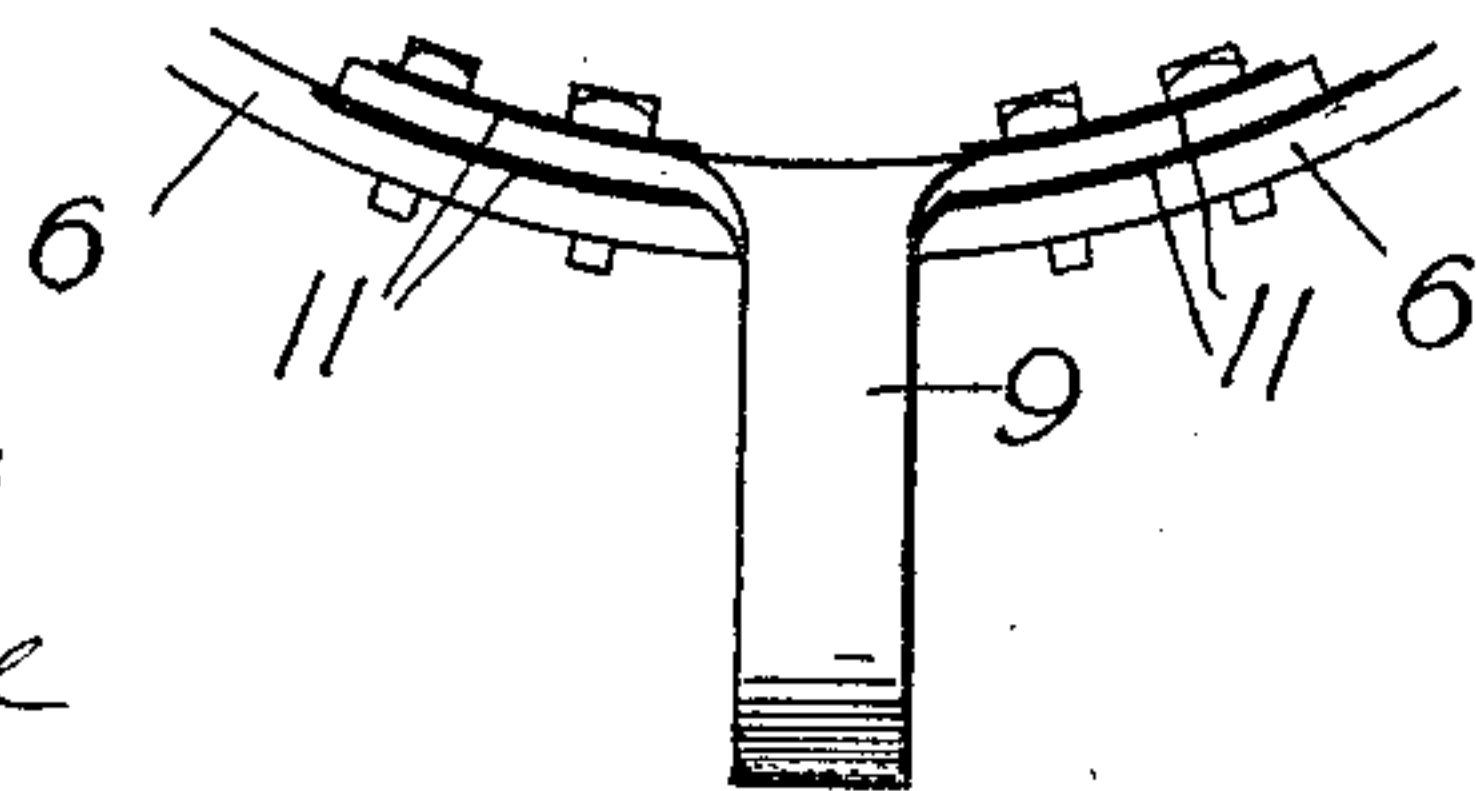


Fig: 4.

Witnesses
J. M. Kuehne
John A. Percival

Inventors
Charles H. Wynne
Eustace C. Wynne

By Richard L. [Signature]
ATTORNEYS

C. H. & E. C. WYNNE.
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3 SHEETS—SHEET 3.

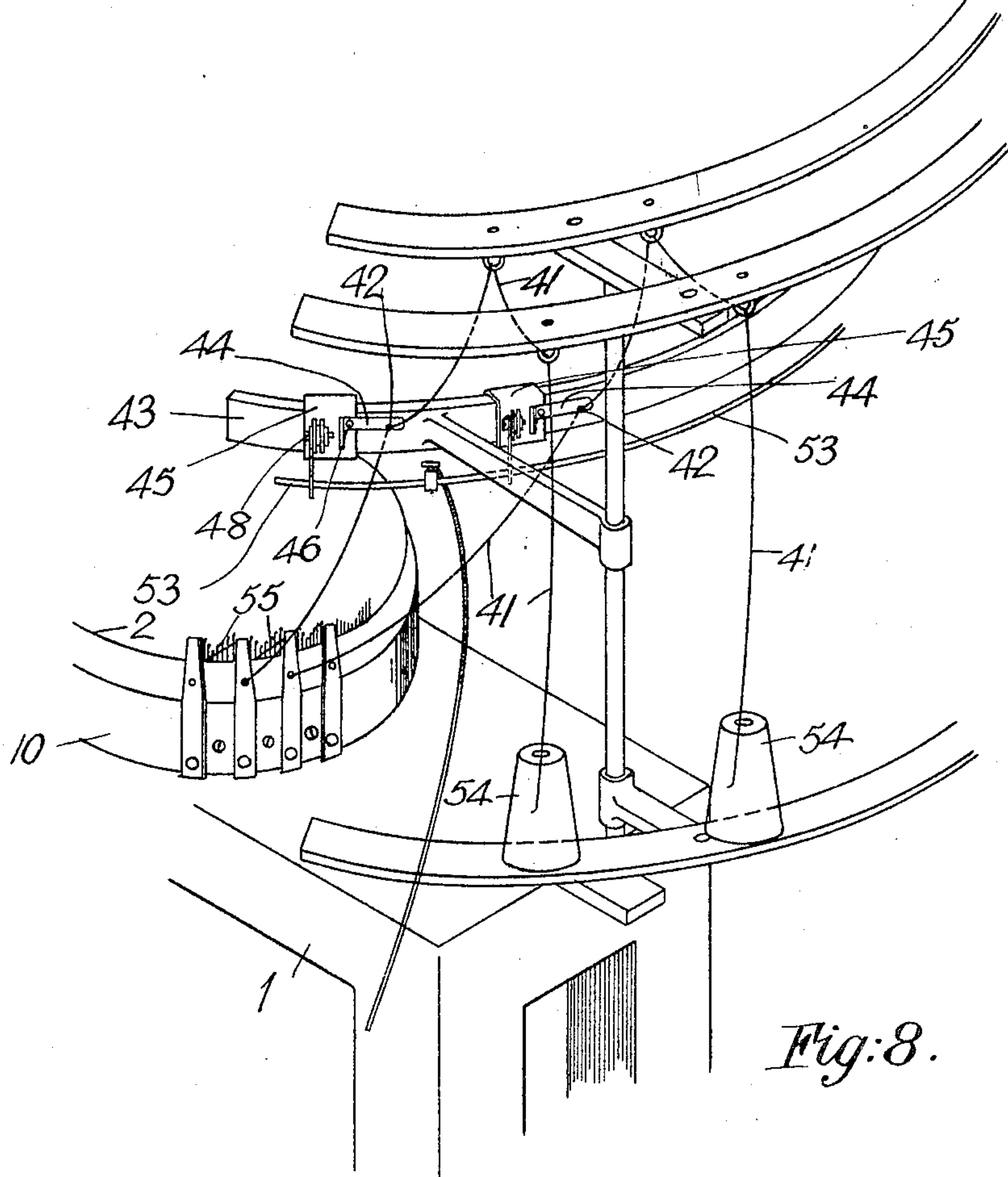


Fig:8.

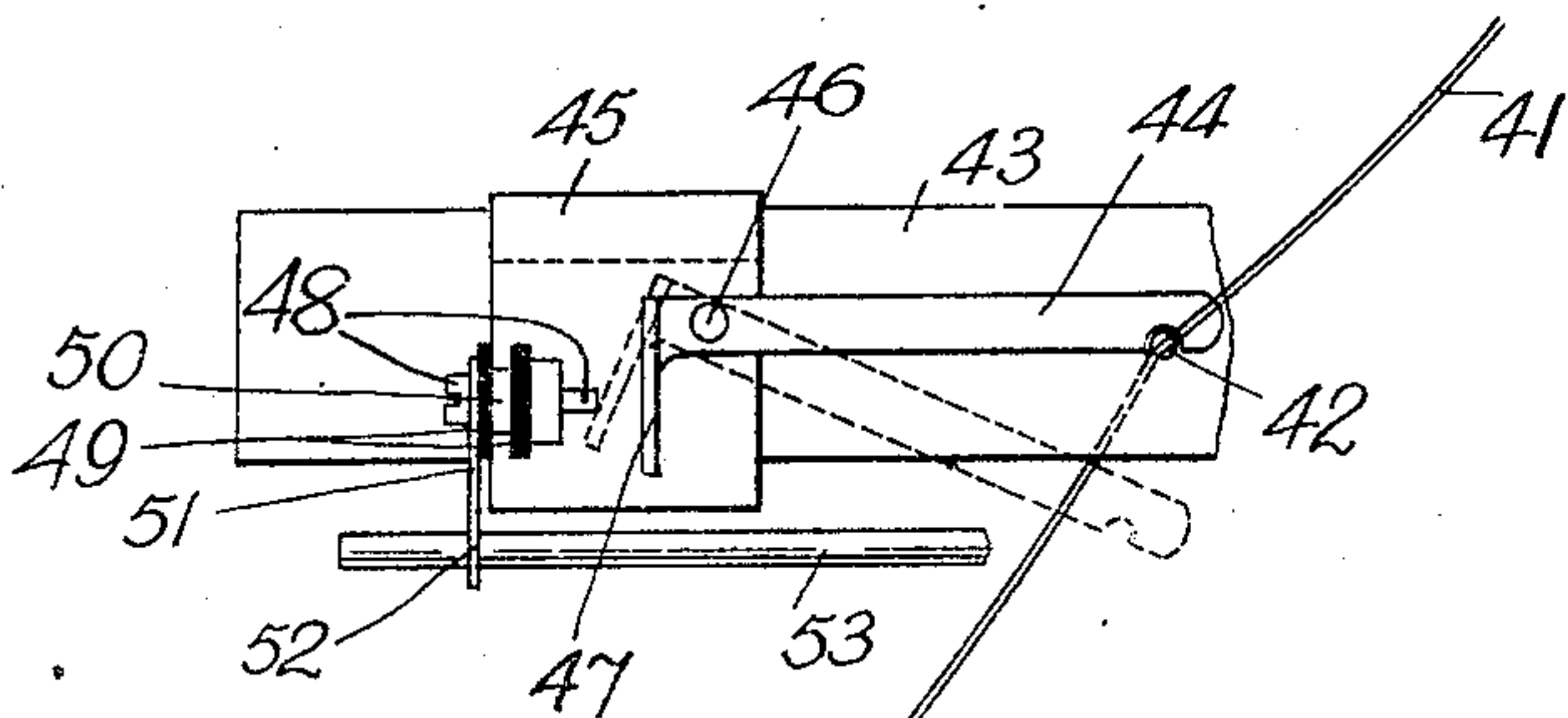


Fig:9.

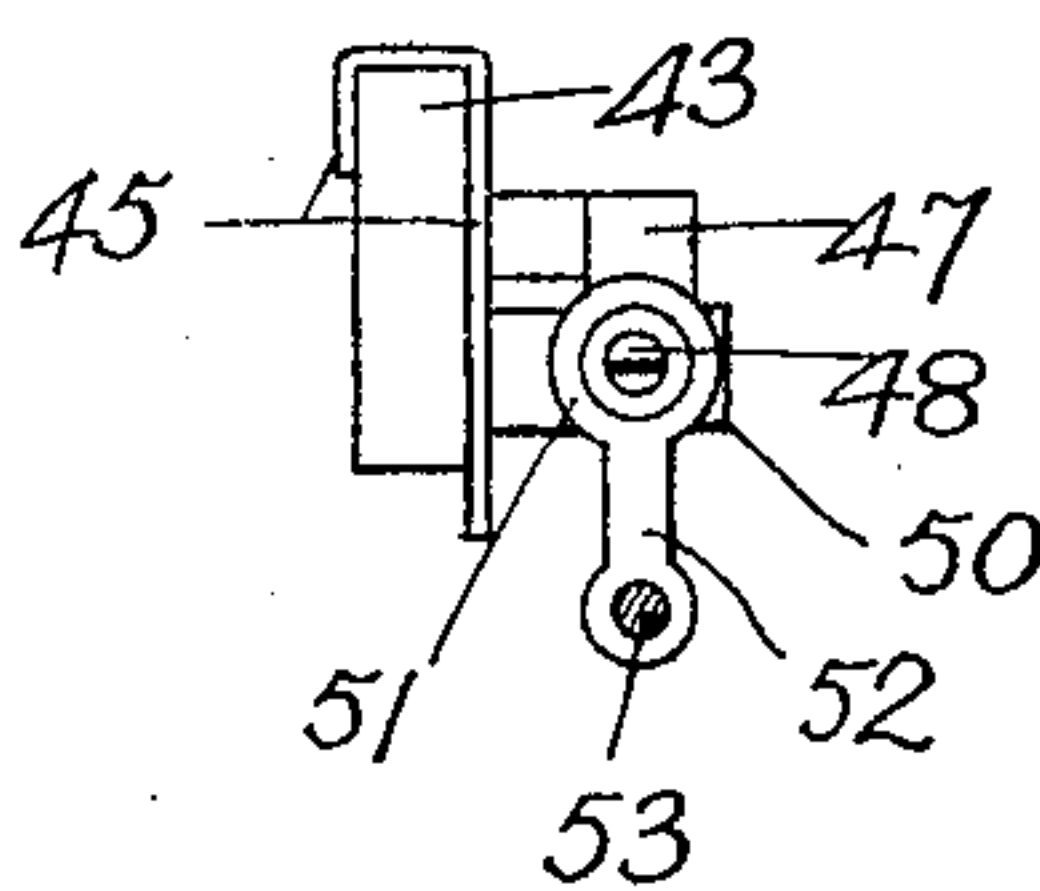


Fig:10.

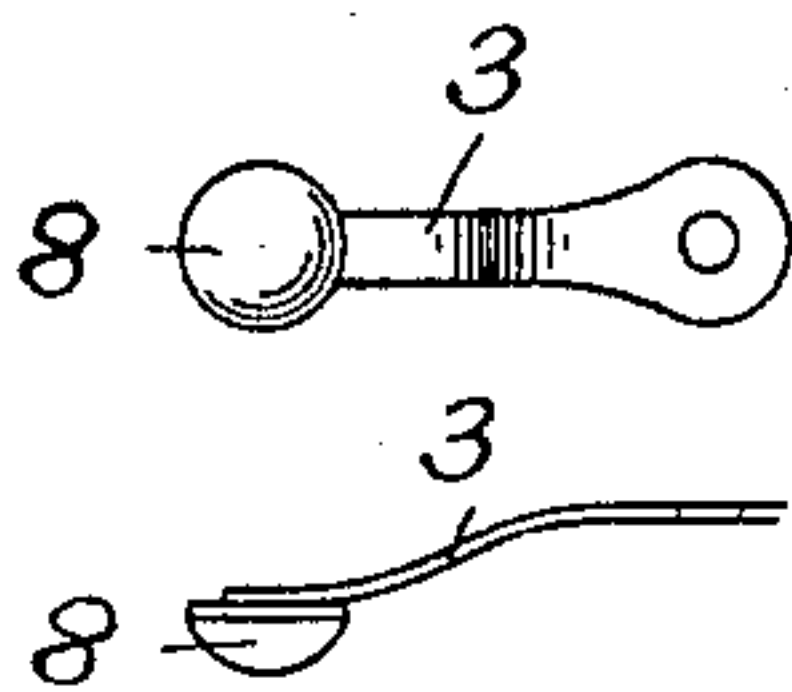


Fig:5.

Witnesses
Wm. Kuehne
John A. Percival

Inventors
Charles H. Wynne
Eustace C. Wynne

By *Richard S. [Signature]*
ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES HENRY WYNNE AND EUSTACE CECIL WYNNE, OF LEICESTER,
ENGLAND.

KNITTING-MACHINE.

No. 803,042.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed February 7, 1905. Serial No. 244,601.

To all whom it may concern:

Be it known that we, CHARLES HENRY WYNNE and EUSTACE CECIL WYNNE, manufacturers, subjects of the King of Great Britain, residing at Leicester, in the county of Leicester, England, have invented certain new and useful Improvements in or Relating to Knitting-Machines, of which the following is a specification.

10 This invention relates to knitting-machines, and has for its object to provide such machines with an electric stop-motion by which when a thread breaks or a hole occurs as the result of a press-off or otherwise the machine is instantly stopped.

15 The invention comprises two electric conductors which according to one arrangement are situated one on each side of the fabric in such a manner that immediately a hole occurs in the fabric the two conductors make contact with each other and complete an electric circuit the current of which is caused to operate mechanism whereby the machine is instantly stopped. In this arrangement one of the conductors 25 preferably consists of a carrier-ring provided with a series of contact-fingers hinged or pivoted thereto. These fingers rest lightly upon the fabric and are normally insulated thereby from the other conductor on the opposite side 30 of the fabric. The other conductor may conveniently take the form of the needle-cylinder of the machine. The said fingers are in electrical communication with one pole of a battery or other source of electric energy, and 35 the remaining pole is connected up to the cylinder or frame of the machine, so that on contact taking place between the two conductors, occasioned by the formation of a hole in the fabric, which constitutes the insulator, an electrical circuit is completed, the result of which 40 is to cause the immediate stoppage of the machine, as will be hereinafter specifically described.

45 In the above arrangement the circuit is completed immediately upon a hole occurring in the knitted fabric—*i. e.*, after the yarn has passed the needles. In an alternative or auxiliary form the machine may be brought to a standstill if a thread breaks before reaching 50 the needles by means of a series of hinged or pivoted contact levers or fingers each suspended by a thread and adapted upon the breaking of its supporting-thread to fall into

contact with a metallic part of the machine and complete the circuit, with the above-mentioned result. 55

The invention will be readily understood from the following description, wherein reference is made to the accompanying drawings— 60

Figure 1 is a view, partly in section, of so much of a circular-knitting machine as is necessary to illustrate the application thereto of our invention according to one manner of carrying out the same. Fig. 2 is a plan of 65 the carrier-ring, showing the manner in which it is supported in the cylinder. Fig. 3 is a perspective view of the ring *per se* with its attached contact-fingers. Fig. 4 is a detail of the carrier-ring. Fig. 5 represents in plan 70 and edge view one form of contact-finger. Fig. 6 is an enlarged perspective view of the catch and clutch gear. Fig. 7 shows a detail. Fig. 8 shows an alternative or additional construction of stop-motion; and Figs. 9 and 10 75 are front and end views, respectively, of a hinged or pivoted finger employed in the construction shown in Fig. 8.

Like parts are designated by the same reference characters throughout the drawings. 80

1, Fig. 1, represents the framework of the machine, which supports the needle-cylinder 2. 3 represents the contact-fingers, and 4 represents the fabric, which as it is formed passes down between the said cylinder and fingers 85 and insulates the one from the other. The cylinder and fingers are each electrically connected with a pole of a battery 5 or other source of electric current, and when contact occurs between them—*i. e.*, in the event of a hole appearing in the fabric, so that the insulation is removed—the circuit is completed and the electric current caused to operate a stopping device hereinafter described, whereby the machine is instantly brought to rest. 95 The construction of the cylinder 2 forms no part of this invention and will of course depend upon the type or class of machine to which the said invention is applied.

The contact-fingers 3, Fig. 5, are each 100 formed of a strip of spring-steel or other suitable conducting material and are supported in position relatively to the cylinder 2 by a carrier-ring 6. The said carrier-ring 6, Figs. 2, 3, and 4, is made of metal or of any other 105 good conductor of electricity and may be cast

either in one piece, as shown, or made up in segmental sections. The fingers 3 are arranged as a series about the exterior periphery of the ring 6, to which they are secured by screws 7. For this purpose one end of each finger is perforated for the passage of the said screws 7. The other free ends of the fingers carry contact-pieces 8. The ring is supported concentrically within the upper part of the cylinder 2, as shown in Fig. 1, by brackets 9, bolted to the stationary cam-ring 10 or to some other fixed part of the machine, Figs. 1 and 2. The carrier-ring is insulated from the machine by means of layers 11 of some non-conducting material inserted at the joint between the brackets 9 and the ring, as shown in detail in Fig. 3. The free ends of the fingers 3 stand out from the periphery of the ring 6 by their inherent elasticity, as shown in Fig. 4, and press lightly upon the fabric 4, so that on a hole occurring in the latter they immediately make contact with the metallic inner face of the cylinder 2, and thus complete the electric circuit.

The stopping device, which is operated by the current when the circuit is completed, as aforesaid, to stop the machine, comprises an electrically-operated catch 18, hereinafter referred to, and a spring 12, secured at one end to the belt-shifter or, as shown, to the ordinary clutch-operating lever 13, and at the other end to the frame 1 of the machine. Upon the catch 18 becoming released the spring 12 throws the clutch 15 out of action, and hence the driving-pulley 16 out of driving connection with the main shaft 17, thereby stopping the machine. The aforesaid catch 18 comprises a dog or the like secured to the rod 19, which forms part of the ordinary hand starting and stopping gear formerly operated entirely by the hand-lever 20.

In the position illustrated in Fig. 1 the catch 18 is shown in its outer position with the clutch in action and is locked in that position against the pull of the spring 12 by a projection 21 on the end of a lever 22, pivoted at 23 to a plate or panel 24 of insulating material, such as ebonite or slate. The other end of the lever is provided with an inwardly-projecting finger 22^a, Fig. 6, which when the catch 18 is locked in its outer position by the lever 22 engages beneath a projection 25, formed on or attached to one face of a plate 26. The plate 26 is hinged at 27 to a lug 28, carried by the panel 24, and is normally held out of contact with the poles 29 of an electromagnet 30 by means of a spring 31, bearing on a stud or horizontal extension 32, projecting from the upper end of the said plate and on the face thereof remote from the projection 25. The spring 31 is carried by the lug 28 and is of sufficient strength to insure the plate 26 hanging down out of contact with the electromagnet when the circuit is broken. The windings of the electromagnet 30 form part of the

electric circuit, so that on the latter becoming completed, as above described, the current energizes the electromagnet, which thereupon attracts the hinged metal plate 26 and in doing so releases the finger 22^a of the lever 22, which latter turns on its pivot 27 and allows the spring 12 to throw the clutch 15 out of action and stops the machine.

To prevent waste of electric energy, the circuit is arranged to be broken immediately the catch 18 is released. To attain this end, the current is led by wire from the electromagnet to a short finger 33, secured to and projecting from the panel 24. Attached to the panel 24 alongside this finger 33, but insulated from it by a piece of vulcanite 34, is a longer spring-finger 35, the free end of which when the catch 18 is locked by the lever 22 is pressed by the catch into contact with the free end of the finger 33, as shown in Fig. 7. Immediately the catch is released and flies back the finger 35 springs away by its own elasticity out of contact with the finger 33, and thereby breaks the circuit and saves the current until the machine is again set.

The path of the current at the instant the circuit is completed as the result of the fingers 3 making contact with the cylinder 2 through a hole in the fabric 4 is as follows: From the positive pole of the battery 5 the current passes to the terminal screw 36 on the panel 24, thence through the windings of the electromagnet, which it energizes as aforesaid, to the short finger 33. Here the current passes to the short finger and thence to the longer finger 35, which is pressed into contact with the short finger 33 by the catch 18, as above described. From the long finger the current passes through the framework of the machine to the cylinder 2, thence to the fingers 3 in contact with the latter to the carrier-ring 6. From the carrier-ring the current passes by way of the skeleton dome-like frame 37, carried thereby, to the terminal screw 38, from whence it is led by cable through the terminal screw 39 on the panel 24 to the terminal screw 40, also on the panel, and finally back by wire to the negative pole of the battery.

As an alternative or as an auxiliary to the above-described arrangement of contact-fingers 3 the motion of the machine may be arrested upon the breakage of a thread in its passage from the bobbin to the needles, and this is carried out in the following manner: In the construction shown in Fig. 8 each thread 41 as it passes through its guide 42 in the bar 43 normally supports the free end of a hinged or pivoted finger 44, carried by a clip or plate 45, attached to the said bar 43. The finger 44 is pivoted at 46 to the clip 45, which is itself hung onto the bar 43, so as to be in electrical connection therewith by means of its overhung upper edge, as shown in Fig. 10. Each finger at its pivoted end is formed or

furnished with a contact-piece 47, which on the finger swinging down, due to the breaking of its supporting-thread 41, is arranged to make contact with a screw or second contact-piece 48, carried by but insulated by vulcanite washers 49 from a lug 50, projecting from the face of the clip 45. The metal washer 51 next to the head of the screw is provided with a downward extension 52, perforated for the passage therethrough of a conductor 53, which is in electrical connection with one pole of the battery. The other pole of the battery is, as before, connected up to the framework of the machine, by which the bar 43 is supported.

In action when a thread 41 breaks on its way from its bobbin 54 to the needles 55 the finger 44, supported thereby, swings down of its own weight until the contact-piece 47 on its pivoted end makes contact with the end of the screw 48, as shown in dotted lines in Fig. 9, thus completing the electric circuit, with the result that the electromagnet 30 is energized as before to liberate the catch 18 and

ultimately to cause the stoppage of the machine.

We claim—

An electric stop-motion for knitting machinery, comprising two electric conductors consisting respectively of the needle-cylinder and a series of fingers resting on the fabric and normally insulated thereby, a carrier ring or disk for supporting the series of fingers concentrically with the inner surface of the cylinder, means for supporting and insulating the said ring from the machine, a circuit having a source of energy, a coil in said circuit, an armature, and mechanism operated by the armature on the completion of the circuit for throwing the driving-gear of the machine out of action.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES HENRY WYNNE.
EUSTACE CECIL WYNNE.

Witnesses:

E. N. LEWIS,
GEORGE LESTER.