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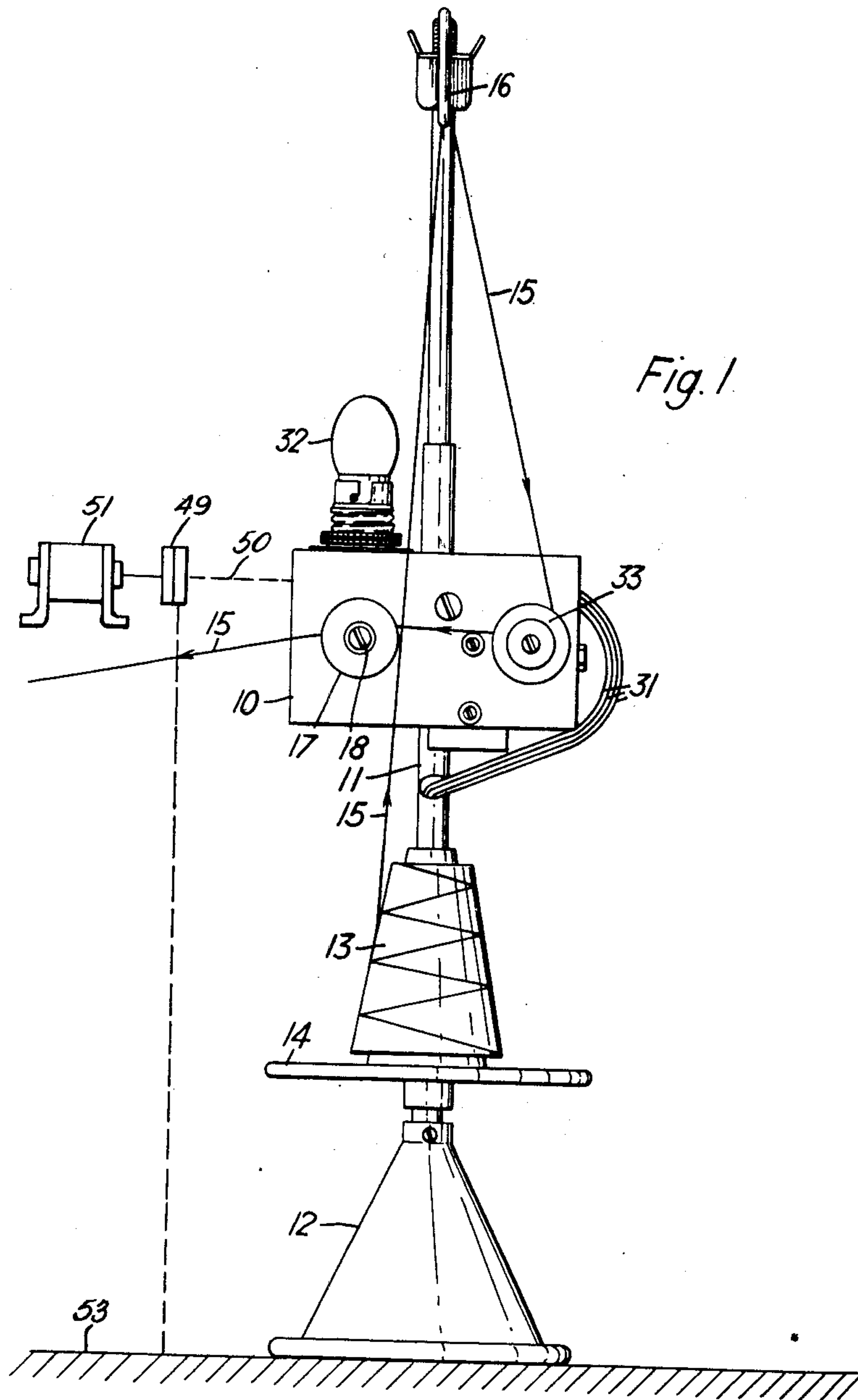
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POWER-DRIVEN SEWING MACHINES AND STOP MOTION DEVICES THEREFOR

Filed Jan. 10, 1958

2 Sheets-Sheet 1



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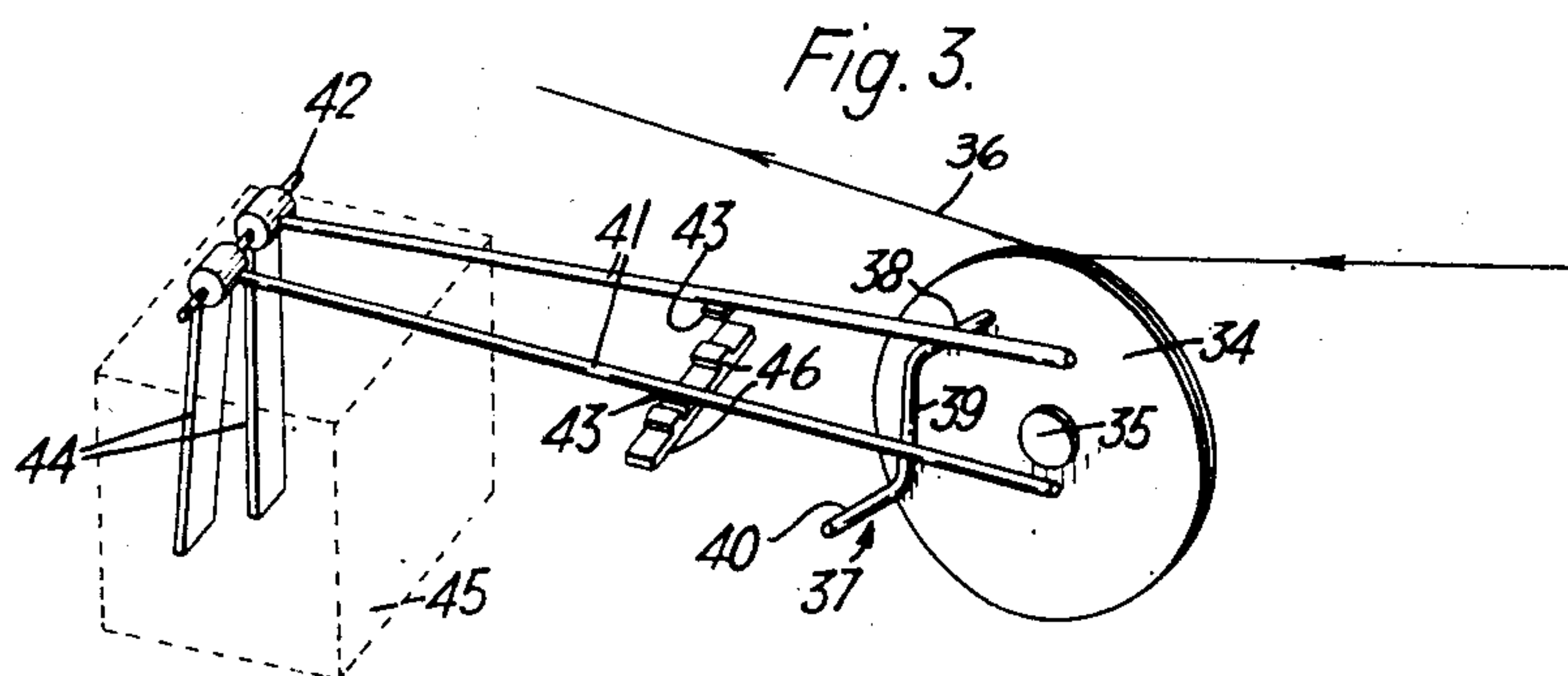
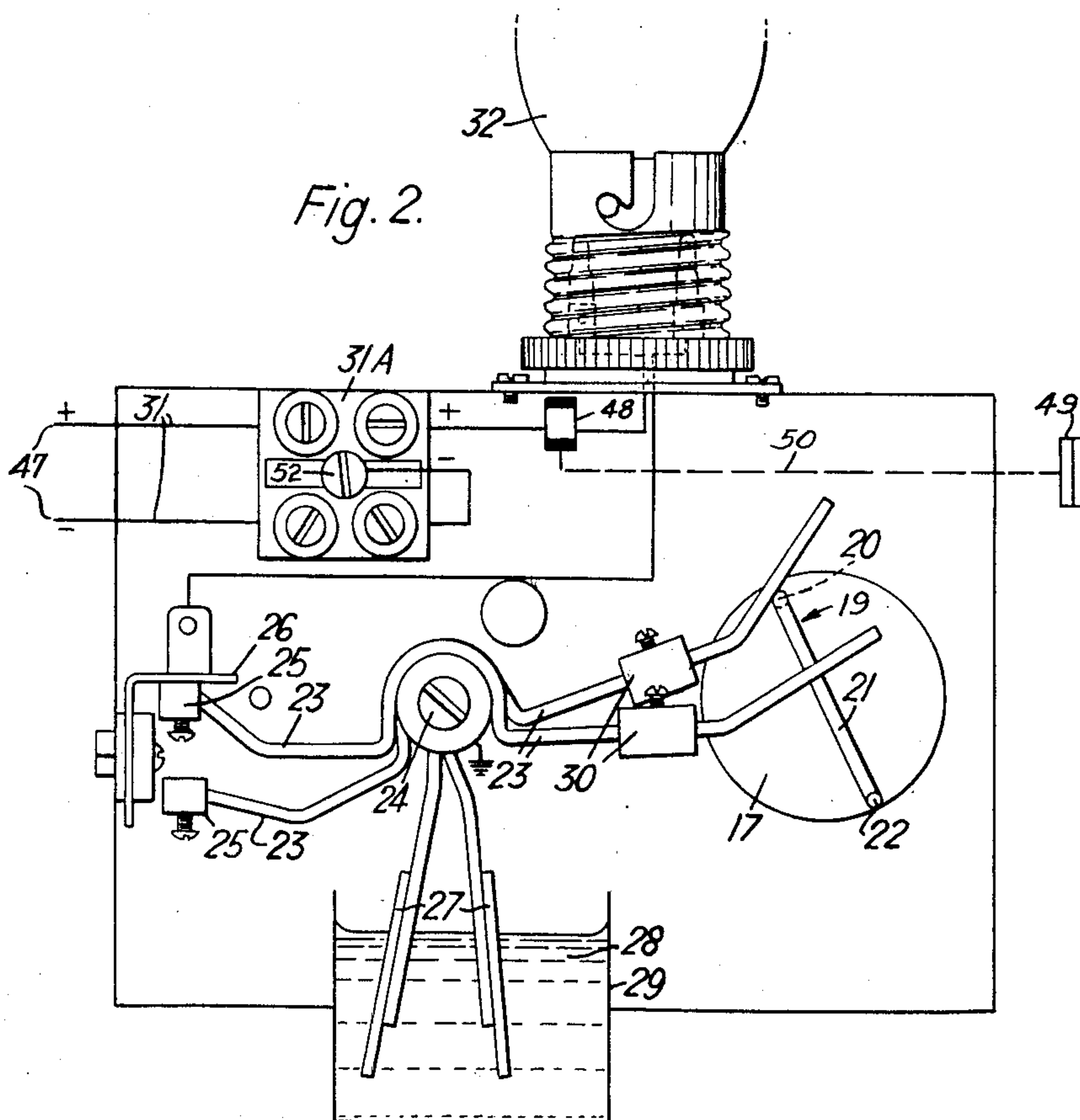
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1

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POWER-DRIVEN SEWING MACHINES AND STOP MOTION DEVICES THEREFOR

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6 Claims. (Cl. 112—219)

This invention relates to power-driven sewing machines and stop motion mechanisms therefor.

According to the present invention we provide, in or for a power-driven sewing machine, a stop motion mechanism for incorporation in an electric control circuit therefor, said mechanism comprising a circuit energizing device incorporating a fixed contact strip, a corresponding pair of movable contacts, a pulley wheel adapted to be driven by the upper thread being drawn from the cone and presenting an eccentrically anchored cranked member adapted, when rotating, to move, in turn, the movable contacts away from the fixed contacts, and the arrangement being such that, if the said thread breaks or ends or the speed of rotation of the pulley wheels is reduced below a pre-determined speed, one or other of the movable contacts engages the corresponding fixed contact and closes the circuit to stop the drive.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is an end elevation of a stop motion mechanism according to the present invention;

Fig. 2 is a part sectional view of the circuit energizing device of the stop motion mechanism; and,

Fig. 3 is a perspective view of a modified circuit energizing device.

Referring to Figs. 1 and 2 of the drawings, the stop motion mechanism comprises a casing 10 rigidly mounted on a hollow post 11 supported in a fixed mounting 12. The upper thread supply cone or bobbin 13 is rotatably mounted on the post 11 and is carried by a sprocket wheel or the like 14 adapted to be suitably rotated to feed off the upper thread 15. A hook 16 is mounted at the top of the post 11.

The stop motion mechanism also comprises a circuit energizing device including a lightweight pulley wheel 17 mounted on the casing 10 for rotation about a horizontal axis 18. The pulley wheel 17 is driven by the upper thread 15 being drawn therearound prior to passing to a sewing machine (not shown). The pulley wheel 17 carries a cranked pin 19 inside the casing 10 and which is anchored at one end eccentrically thereon (Fig. 2). From said end, the pin 19 has a first portion 20 which projects horizontally outwards, a second portion 21 extending diametrically of and spaced from the pulley wheel 17, and a third portion 22 projecting outwardly parallel to the first portion 20.

The stop motion circuit energizing device further comprises two side-by-side contact arms 23 which are pivotally mounted intermediate their ends about a horizontal axle 24 and at one end lie respectively in the paths of rotation of the first and third portions 20 and 22 of the pin 19. As the pulley wheel 17 rotates the pivotal arms 23 are alternately knocked upwards by the pin 19. The other end of each arm 23 mounts a contact 25 adapted to engage a fixed contact strip 26 located thereabove. Each arm 23 mounts at the horizontal axle 24 a fin 27 extending downwards into a viscous liquid 28

2

in a container 29 so as to damp the fall of each arm 23 under its own weight after being struck by the pin 19. The damping may alternatively be effected by air. Each arm 23 moreover, carries a small weight 30 to counter-balance the weight of the contact 25.

The contacts 26 are in circuit by means of leads 31 and a junction member 31A with a source (not shown) of electrical current, a signal lamp 32, and a solenoid (not shown) which is actuable to disengage the clutch of the motor (not shown) driving the sewing machine. A solenoid-operated clutch mechanism to disengage the motor from the sewing machine is shown and described by Kleber, U.S. Patent No. 2,418,356, and by Moser, U.S. Patent No. 2,251,368. In Fig. 1 there is shown an actuating means 50 from solenoid 48 which disengages spring-biased solenoid-operated clutch 49 from motor 51 which is the power means for driving the sewing machine 53. The axle 24 is grounded or otherwise in circuit with the electrical circuit.

The casing 10 mounts a signal lamp 32 and a thread tensioning device 33.

In Fig. 2 there is shown a simplified diagram of the control circuit of the stop motion mechanism. A source of current 47 grounded at 52 is connected in series with solenoid 48, signal lamp 32 switch 26, 23, and axle 24 which is ground. Solenoid 48 when actuated disengages spring-biased clutch 49 through actuating means represented by broken line 50.

In operation, the upper thread 15 passes from the supply cone or bobbin 13 up the post 11, around the hook 16, around the tension device 33 and the pulley wheel 17 and thence to the sewing machine. Movement of the thread 15 around the pulley wheel 17 causes the latter to rotate and, as aforesaid, the pin 19 strikes each arm 23 upwardly in turn, and by virtue of the damping of the fall of each arm 23 it is struck during each revolution of the pulley wheel 17 before it can fall far enough to permit either of the contacts 25 to engage the fixed contact strip 26.

If the thread 15 breaks or ends, the pulley wheel 17 stops and one or other of the arms 23 falls so that its contact 25 engages the contact strip 26 and the electrical circuit is closed, and the drive of the sewing machine is made inoperative, for example by disengagement of the motor clutch. Simultaneously, the signal lamp 32 is illuminated to indicate that the sewing machine has stopped.

The stop motion mechanism is also effective if the thread from bobbin 13 ends or breaks, as, in this case, the speed of the upper thread 15 is immediately reduced, and this reduces the speed of rotation of the pulley wheel 17, and the rate of fall of the arms 23 can be arranged so that one of the contacts 25 will engage the fixed contact strip 26 before the wheel 17 can complete one revolution.

Modifications may be made without departing from the scope of the invention as claimed in the accompanying claims which provides a simple and efficient actuating means for the stop motion of a sewing machine which is inexpensive to make and can be easily and quickly installed, and is especially useful for high-speed sewing machines, particularly when one operator has to attend to more than one machine.

The control circuit preferably actuates the clutch through a relay system, and the arrangement is such that, when the clutch is disengaged, a separate switch has to be operated manually before the clutch can be re-engaged. The stop motion mechanism may be used in conjunction with other stop motion devices arranged to operate when, for example, the fabric finishes or folds, and the other stop motion devices may be made inoperative by the switch to enable the machine to be driven to draw

3

off the end of the fabric and feed in fresh fabric, and a warning light is then lit to signal that the devices are inoperative.

Referring now to Fig. 3 of the drawings, the circuit energizing device again includes a light weight pulley wheel 34 driven about a horizontal axle 35 by the upper thread 36. The pulley wheel 34 carries a cranked pin 37 which is anchored at one end eccentrically thereon. From said end, the pin 37 has a first portion 38 which projects horizontally outwards, a second portion 39 extending diametrically of and spaced from the wheel 34, and a third portion 40 projecting outwardly parallel to the first portion 38. Two side-by-side contact arms 41 are pivotally mounted at one of their ends about a horizontal axis 42 and at the other end lie respectively in the paths of rotation of the first and third portions 38 and 40 of the pin 37 on the pulley wheel 34, and as the latter rotates, the pivotal arms 41 are alternately knocked upwards by the pin 37. Intermediate the ends of the arms 41 are two fixed contacts 46, one below each arm 41 and adapted for engagement with two contacts 43 carried by the arms 41 and the fall of each arm under its own weight after being struck by the pin 37 is damped by means of a fin 44 extending down from the pivotal mounting of each arm 41 into viscous liquid in a container 45, or the damping may be effected by air. The contacts 46 form part of the electric control circuit as shown in Fig. 2 of the drawings.

The mode of operation of the modified stop motion mechanism is in accordance with that of the mechanism described with reference to Figs. 1 and 2 of the drawings.

I claim:

1. In combination with a sewing machine, power means for driving the sewing machine, a clutch operated by a solenoid for connecting the power driving means to the sewing machine, a circuit energizing device comprising a fixed contact in the electric control circuit, a pair of movable contacts, a pair of pivotal arms mounting the pair of movable contacts, a pulley wheel adapted to be driven by a thread used in the sewing operation, an eccentrically anchored cranked member projecting out from one side of the pulley wheel and engageable with said pivotal arms to urge the movable contacts away from the fixed contact, and means associated with said arms for controlling the rate of movement of the movable contacts into engagement with the fixed contact whereby, if the thread breaks or ends or the speed of rotation of the pulley wheel is reduced below a predetermined speed, one of the movable contacts engages the fixed contact to energize the solenoid and operate the clutch to thereby disconnect the power driving means from the sewing machine.

2. The combination as claimed in claim 1 in which the means for controlling the rate of movement of the movable contacts is a damping medium.

3. In combination with a sewing machine, power means for driving the sewing machine, a clutch operated by a

4

solenoid for connecting the power driving means to the sewing machine, a circuit energizing device comprising a fixed contact in the electric control circuit, a pair of movable contacts, a pair of pivotal arms mounting the pair of movable contacts, a pulley wheel adapted to be driven by a thread used in the sewing operation, an eccentrically anchored cranked member projecting out from one side of the pulley wheel and engageable with said pivotal arms to urge the movable contacts away from the fixed contact, and a fin associated with the pivotal axis of each arm and disposed in a damping medium to control the rate of movement of the movable contacts into engagement with the fixed contact whereby, if the thread breaks or ends or the speed of rotation of the pulley wheel is reduced below a predetermined speed, one of the movable contacts engages the fixed contact to energize the solenoid and operate the clutch to thereby disconnect the power driving means from the sewing machine.

4. The combination as claimed in claim 3 in which the damping medium is a viscous liquid in a container.

5. In combination with a sewing machine, power means for driving the sewing machine, a clutch operated by a solenoid for connecting the power driving means to the sewing machine, a circuit energizing device comprising a fixed contact in the electric control circuit, a pair of movable contacts, a pair of pivotal arms mounting the pair of movable contacts, a pulley wheel adapted to be driven by a thread used in the sewing operation, an eccentrically anchored cranked member projecting out from one side of the pulley wheel and engageable with said pivotal arms to urge the movable contacts away from the fixed contact, the cranked member being a pin having a first portion which projects horizontally outwards from the pulley wheel, a second portion extending diametrically of and spaced from the pulley wheel and a third portion projecting outwardly parallel to the first portion, and a fin associated with the pivotal axis of each arm and disposed in a damping medium to control the rate of movement of the movable contacts into engagement with the fixed contact whereby, if the thread breaks or ends or the speed of rotation of the pulley wheel is reduced below a predetermined speed, one of the movable contacts engages the fixed contact to energize the solenoid and operate the clutch to thereby disconnect the power driving means from the sewing machine.

6. The combination as claimed in claim 5, further comprising a signal lamp operable upon engagement of one of the movable contacts with the fixed contact.

References Cited in the file of this patent

UNITED STATES PATENTS

1,647,148	Rosenman	Nov. 1, 1927
1,849,847	Mitnacht	Mar. 15, 1932
2,419,006	Bryson	Apr. 15, 1947
2,667,134	Jeckert	Jan. 26, 1954
2,832,303	Farley	Apr. 29, 1958