

Aug. 7, 1934.

R. F. DIRKES ET AL

1,969,297

TAPE CONTROL FOR PROJECTORS

Filed Dec. 2, 1930

2 Sheets-Sheet 1

FIG. 1

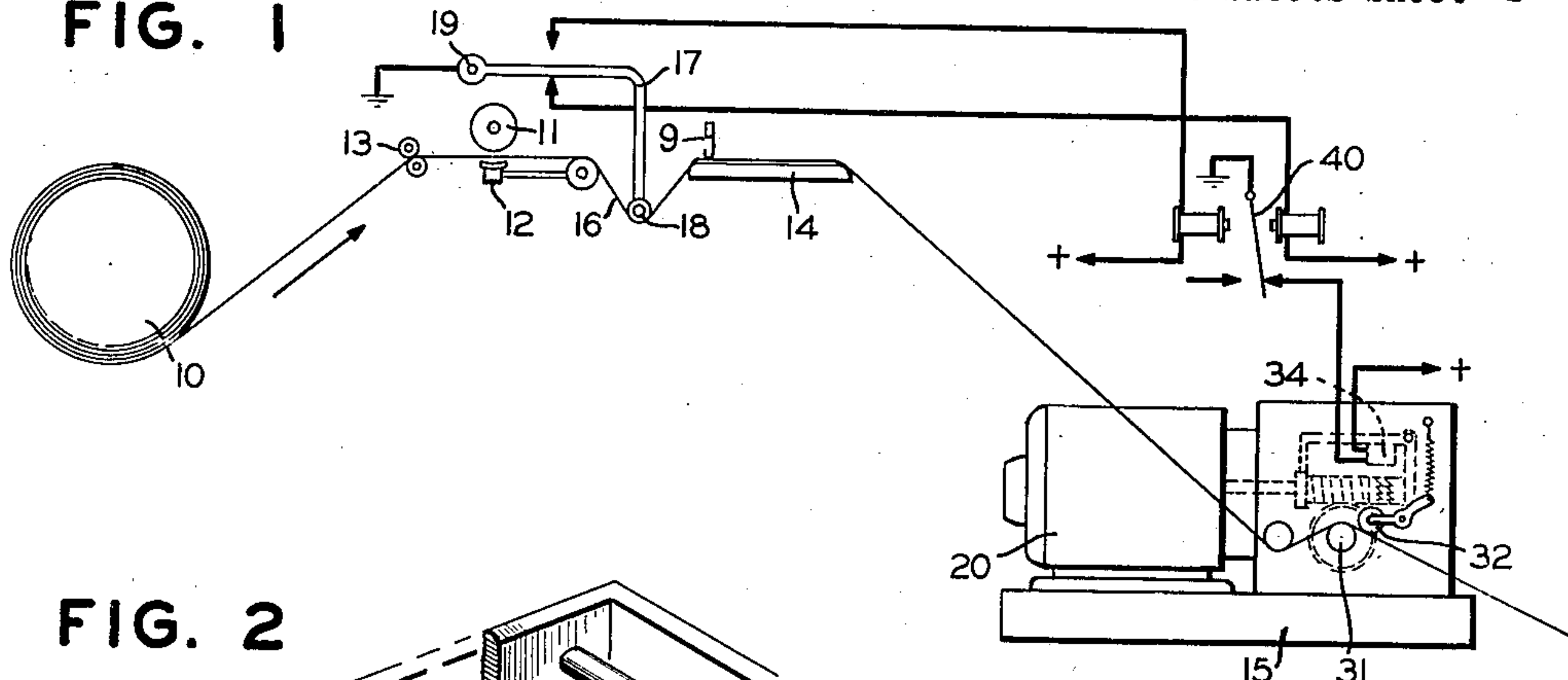
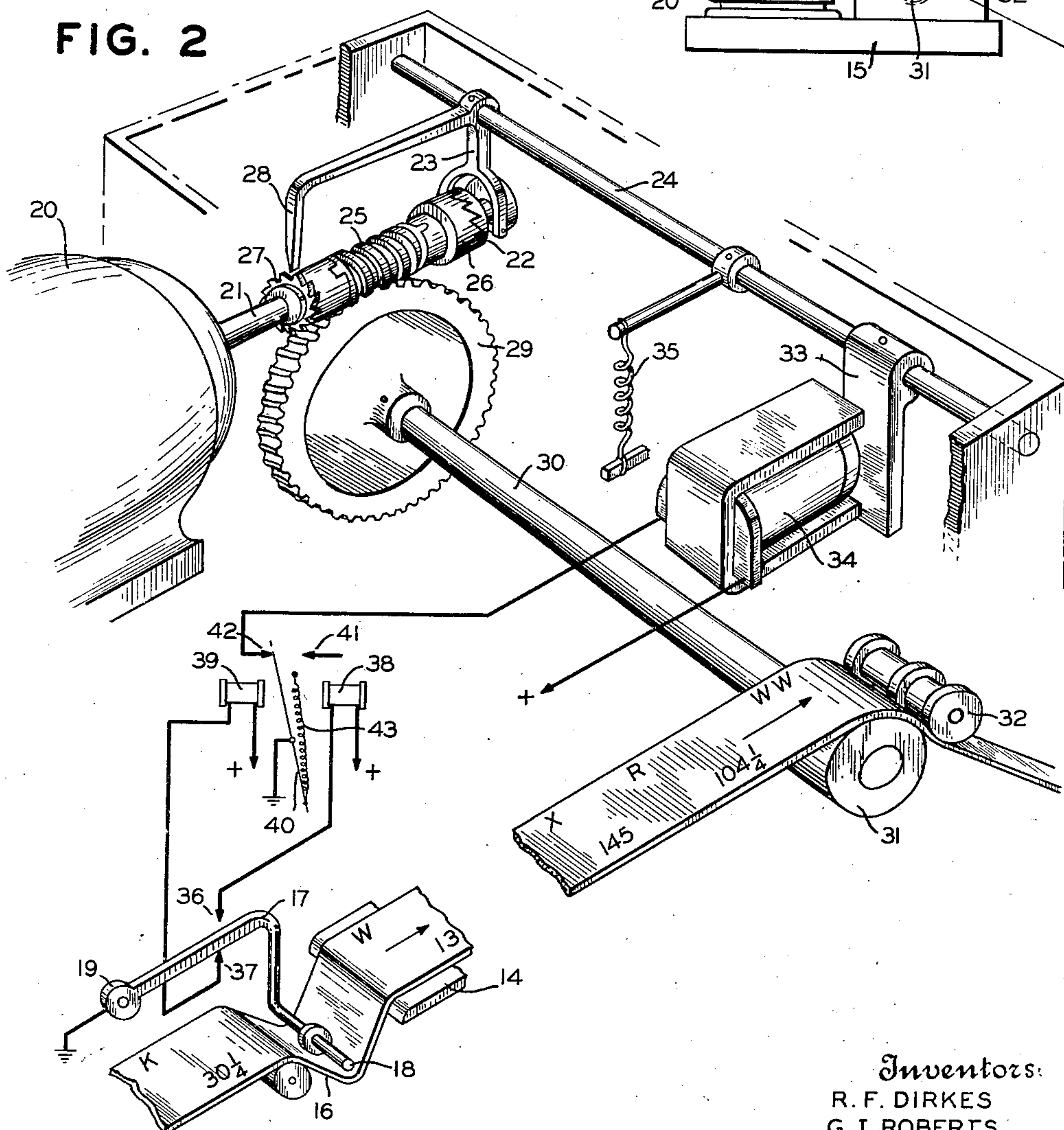


FIG. 2



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2 Sheets-Sheet 2

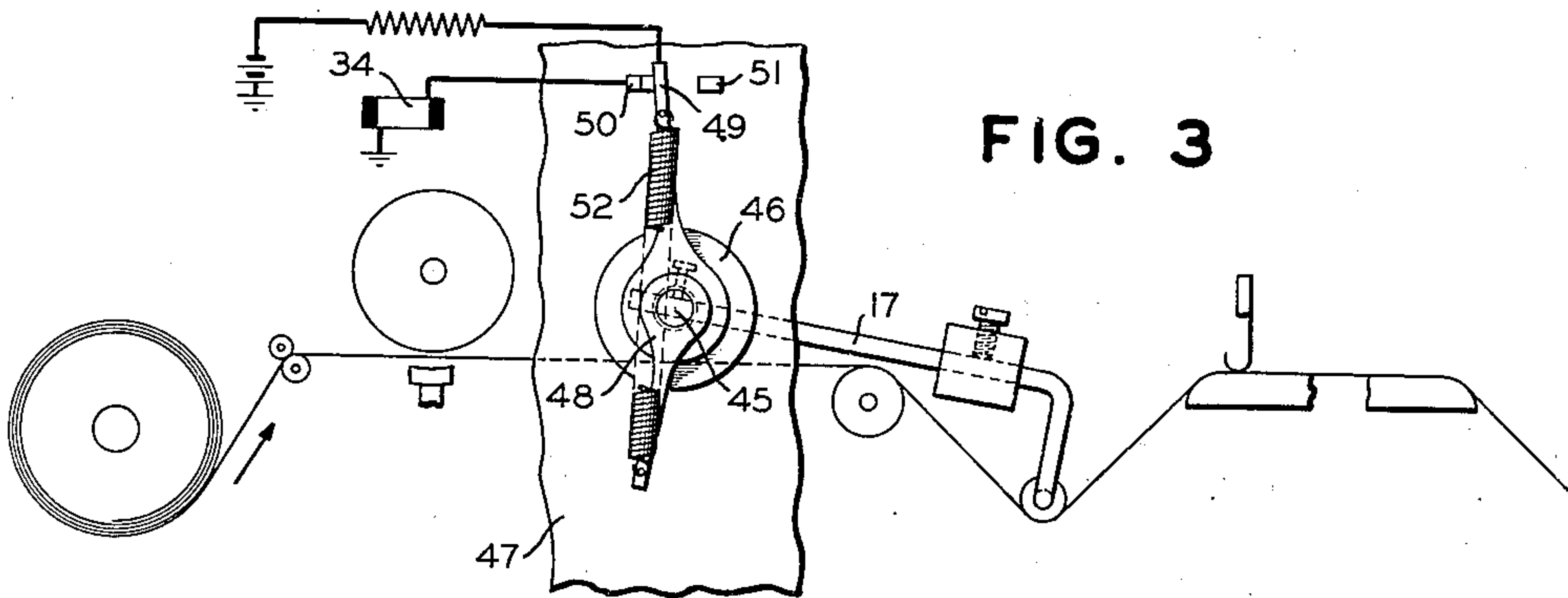


FIG. 4

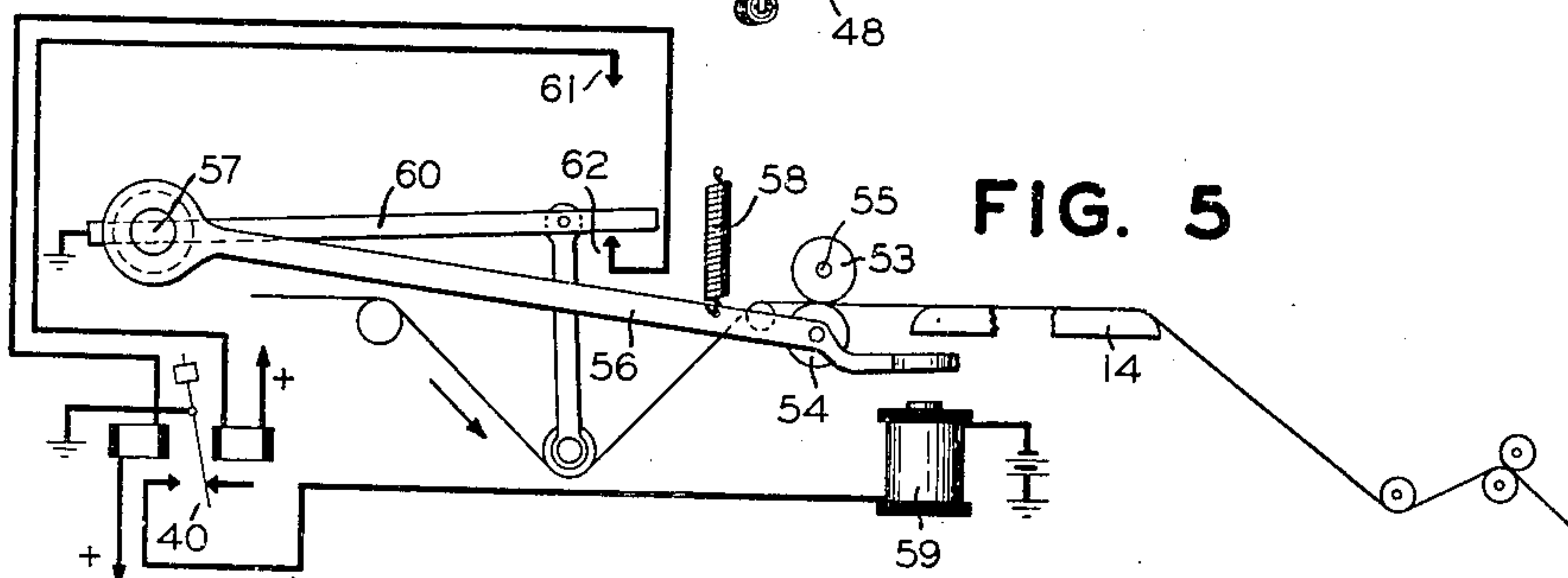
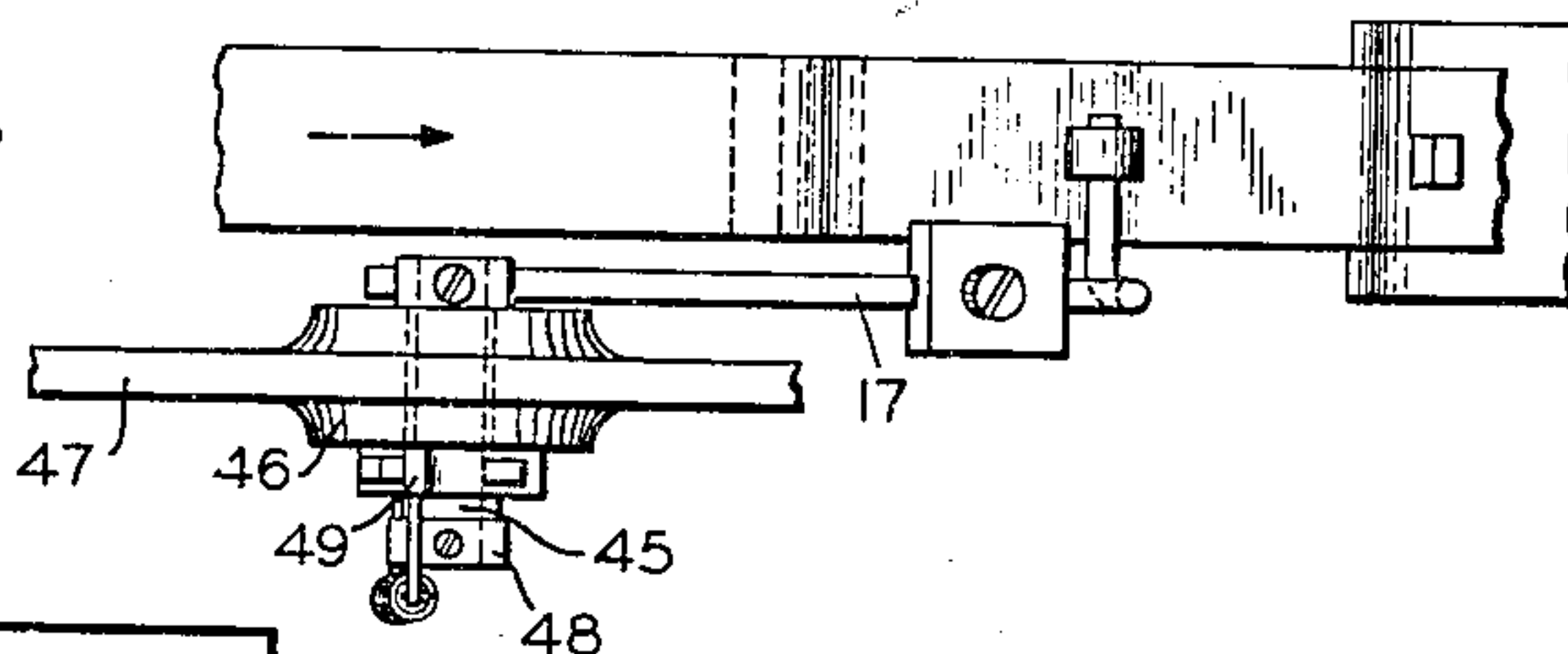


FIG. 7

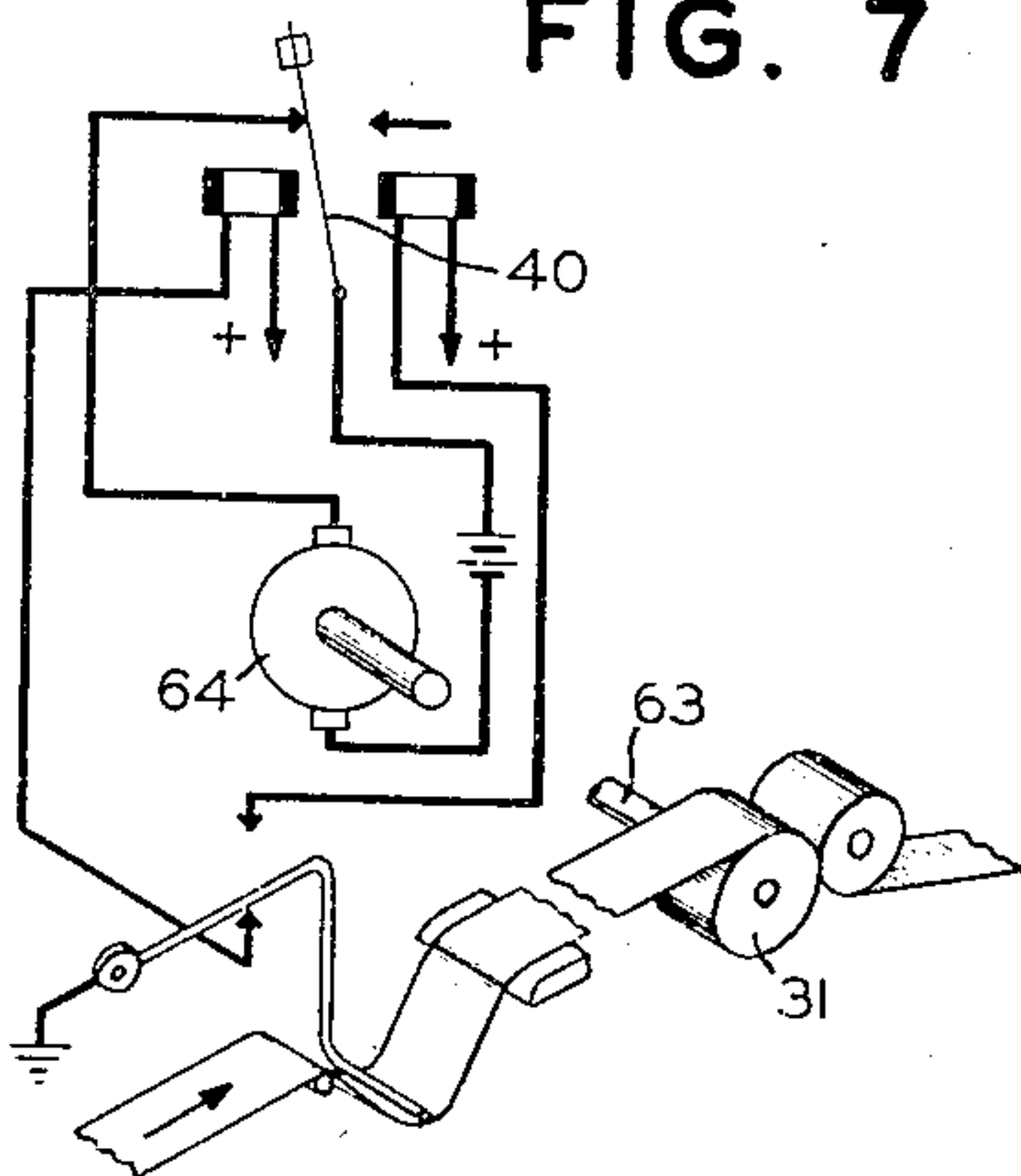
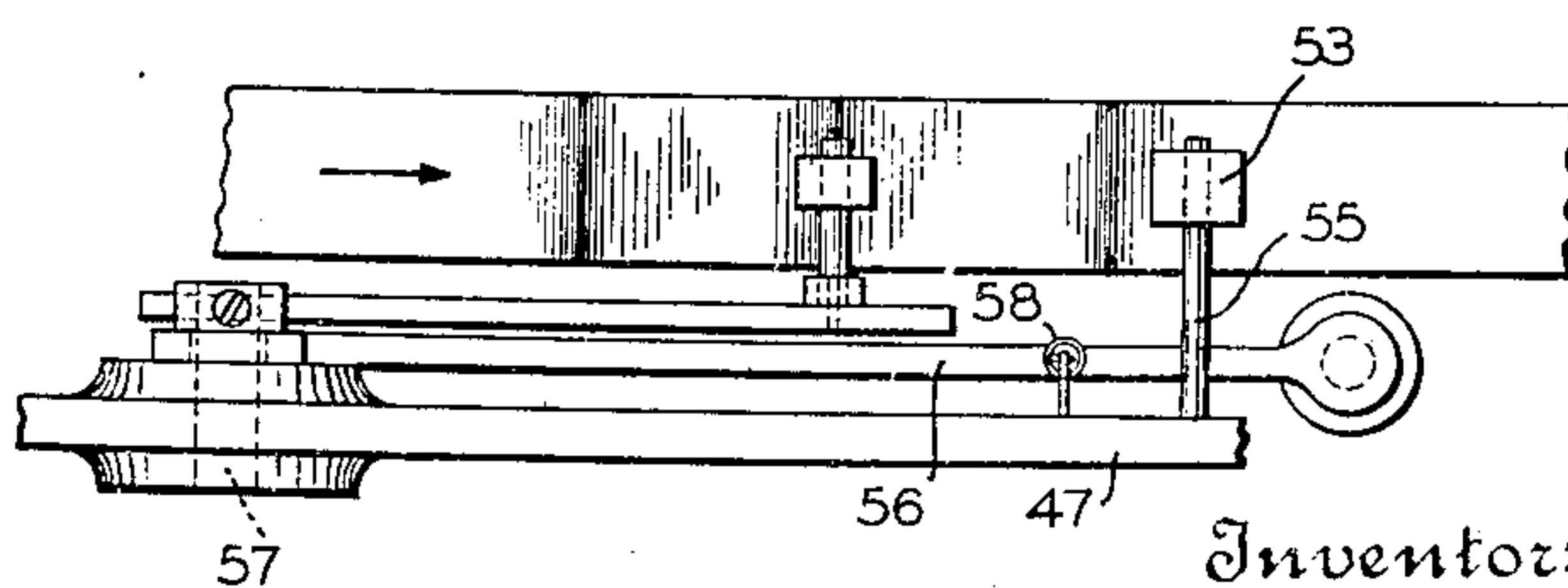


FIG. 6



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1,969,297

TAPE CONTROL FOR PROJECTORS

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Application December 2, 1930, Serial No. 499,588

14 Claims. (Cl. 178—42)

This invention relates to a telegraph printing and projecting system in which information printed upon a tape is projected upon a screen for observation. More particularly the invention relates to means for controlling the feeding of the tape through the projector so that the projected images will advance across the screen with an even movement so that they may be easily discerned.

Several projection systems are in general use in connection with stock or news items, the ticker printing the quotations or other items of information upon a specially prepared tape from which they are projected onto a screen for simultaneous observation by a large number of persons.

In order to eliminate a jerky motion of the projected image, it is the practice to employ a tape puller operated by an electric motor, which draws the tape through the projector in a continuous movement at substantially the speed at which the tape is ejected from the ticker. A light leaf spring bears on the tape so that a loop is formed between the ticker and the projector to absorb the jerky motion by which the tape is fed out of the ticker. A switch lever having its free end resting in the loop controls the operation of the tape puller, either through contacts in the motor circuit or through a clutch intermediate the motor shaft and the tape puller, or in some other suitable manner. One of these arrangements is disclosed in a patent to R. F. Dirkes, Serial No. 1,684,309.

At certain relative speeds of operation of the ticker and of the tape puller, however, the switch lever may take a critical position with relation to its contacts, so that the tape puller starts and stops for each character printed, thereby producing a jerky image on the screen.

One of the objects of the present invention is to provide a control for the tape puller which is not subject to this condition and which, when operation of the tape puller is once started, will cause it to continue to operate until at least a predetermined plural number of characters have progressed through the projector.

Other objects and advantages of the invention will hereinafter appear.

In accordance with one embodiment of our invention, we operate the tape puller by a continuously running motor through a clutch, and disengage the clutch by means of a magnet or other electromagnetic device to stop the operation of the tape puller. The circuit of the magnet is either opened or closed to effect engagement

of the clutch whenever a loop of sufficient size has accumulated. When the circuit has been conditioned so as to start the tape moving through the projector, it cannot be altered, to disengage the clutch, until the loop has decreased to a size, below that at which it caused engagement of the clutch, equivalent to a predetermined number of characters, which for convenience may be five or six. Conversely, once the tape puller has been stopped, it cannot be started again until the loop increases in length an amount equivalent to said predetermined number of characters.

A number of different ways of obtaining this lag between the starting and stopping of the tape puller may be devised, several of which are disclosed in the accompanying drawings, which will now be referred to for a more complete understanding of the invention, and wherein:

Figure 1 is a diagrammatic view showing the relation of the ticker and projector and embodying the present invention;

Figure 2 is a partially diagrammatic perspective view of the embodiment shown in Figure 1;

Figure 3 is a side elevation of a modification of the invention;

Figure 4 is a plan view of the form shown in Figure 3;

Figure 5 is a side elevation of a further modification;

Figure 6 is a plan view of the form shown in Figure 5; and

Figure 7 is a diagrammatic view showing the control applied directly to the motor circuit.

Referring first to Figure 1, the tape which is contained upon a reel 10, is fed through a ticker or other printing telegraph apparatus represented conventionally by the type wheel 11, platen 12, and feed rollers 13, by the latter of which the tape is intermittently stepped forward, as each character is printed thereon. Obviously, any type of tape printer may be employed, operated either by a uniform code or by step-by-step signals.

The tape is drawn across the support or platen 14 of the tape projector, the details of which are not shown, by a tape puller 15. A J-spring 9 is positioned at the forward edge of the support 14 to maintain the tape taut across the projecting space and to permit a loop 16 of tape to form between the ticker and the projector, for the purpose of causing even travel of the tape across the support 14 and for controlling the operation of the tape puller by means of a

lever 17 having one end 18 extending across the loop and the opposite end pivoted at 19.

The tape feeding device or puller 15 comprises a continuously operating electric motor 20, the shaft 21 thereof having a clutch member 22 splined thereon and movable longitudinally by means of a yoke arm 23 carried by a rock shaft 24. A worm gear 25 carrying a driven clutch member 26 at one end and a ratchet wheel 27 at the other end, is loose on the shaft. A stop arm 28 carried by the yoke arm 23, engages the ratchet wheel 27 when the clutch members 22 and 26 are disengaged, to stop the worm gear and lock it against movement. The worm 25 meshes with a gear 29 on the shaft 30, which carries the tape pulling roller 31. A spring pressed idler roller 32 cooperates with the roller 31 to grip the tape.

The rock shaft 24 carries an armature 33 which is attracted by a magnet 34, when energized, to engage the clutch members 22 and 26 and disengage the stop arm 28, the parts being returned by a spring 35 when the magnet is de-energized.

The lever 17 is grounded and plays between two contacts 36 and 37 connected respectively to one terminal of the windings 38 and 39 of a relay 40. The opposite terminals of the windings have a source of potential applied thereto. The armature of the relay is also grounded and engages contacts 41 or 42 respectively, when the winding 38 or 39 is energized. The relay may be of any suitable construction in which the relay tongue is biased against either of its contacts, after being moved thereto, until it is positively moved to the other contact by energizing of the opposite winding. This characteristic of the relay is represented diagrammatically by the toggle spring 43. Contact 41 is idle and contact 42 is connected to the winding of the magnet 34.

When the loop 16 is of at least a predetermined size, the lever 17 rests against its lower contact, thus completing a circuit to hold the relay tongue against its contact 42, whereby the magnet is energized and the clutch 22 engaged.

The motor speed is regulated so that when the stock quotations follow each other in rapid succession, which is the normal condition, the tape is moved continuously and smoothly without any fluctuations. When the ticker slows down below the speed of the tape puller, for an interval, the loop 16 gradually decreases, rocking the lever 17 upward until it engages its upper contact 36, thereby completing a circuit to move the relay tongue against its idle contact 41 and interrupting the magnet circuit. The clutch 22 is thus disengaged by the spring 35 and the tape feed rollers 31 is brought to rest.

Due to the biasing of the relay tongue in either set position, the tape feed roller 31 remains idle, once it has stopped, until the lever 17 drops into engagement with the contact 37. The spacing of these contacts is such that there will be an increase in the length of the loop between closing of the contacts 36 and 37 sufficient to provide for a predetermined number of characters, as for instance six. Consequently after the tape feed roller stops it will not be started again until after this number of characters has been printed and having once started, it will not stop again until the tape has been advanced through the projecting apparatus a distance equal to at least this predetermined number of characters.

It will be appreciated that under normal conditions with the tape puller operating only slightly faster than the ticker, a considerable period will elapse after the tape puller starts to op-

erate, before it will gain on the ticker, six complete characters and during such periods the projected images will move evenly and smoothly across the screen.

In Figure 3 we have shown an arrangement in which a mechanical toggle is operated by the tape control lever in place of the biased relay. In this form the lever 17 is rigidly secured to a stub shaft 45 mounted in a bearing 46 carried by the frame member 47. A downwardly extending toggle arm 48 is rigidly secured to the opposite end of the shaft 45 to rock therewith, and a switch lever 49 is loosely mounted on the shaft and arranged to play between spaced contacts 50 and 51. A toggle spring 52 connects the switch arm 49 and the arm 48 at opposite sides of the pivot point.

With the tape lever 17 in the lower position the toggle arm 48 is swung to the left of the pivot point with the spring 52 in position to hold the switch arm 49 on its contact 50 and thereby to complete a circuit for the clutch magnet 34 so as to effect engagement of the clutch members 22 and 26. As the loop shortens the toggle arm 48 is rocked to the right of its pivot point until the spring 52 passes the dead center, whereupon switch lever 49 is toggled over to its dead contact 51, thereby opening the magnet circuit, to stop the tape feed.

In Figures 5 and 6 the tape is drawn through the projecting apparatus by an electric motor and friction clutch, not shown, the motion of the tape being arrested by the gripping action of a roller 53 and a cooperating fixed roller 54. Roller 53 is carried on a shaft 55 extending from the frame member 47 and roller 54 is rigidly mounted upon an arm 56 pivoted on the shaft 57. It is urged toward the roller 53 into contact with the tape, by a coiled spring 58 and is adapted to be held out of contact with the tape by an electro-magnet 59. The tape lever 60 is also mounted on the shaft 57 and plays between upper and lower contacts 61 and 62 respectively, which control the operation of the biased relay 40, to energize the magnet 59, when a loop of tape of predetermined size forms, thereby separating the rollers 53 and 54 to permit the tape to be drawn through the projector by the friction clutch. In Figure 5 the lever 60 is shown approaching its lower contact just prior to disengaging the gripping rollers 53 and 54. After the tape has started and the loop decreased sufficiently to raise the lever 60 into engagement with contact 61, relay 40 operates to the opposite side, de-energizing the magnet 59 and permitting the roller 54 to be lifted into engagement with the roller 53, to stop the tape.

In Figure 7 the tape feed roller 31 is mounted directly on the shaft 63, of the motor 64 and starting and stopping thereof is effected by closing and opening the motor circuit. In this embodiment the relay 40 closes the motor circuit when the loop attains a predetermined length and opens the motor circuit only after the loop decreases to a predetermined lesser length.

Obviously various other modifications and arrangements, embodying the invention, will occur to those skilled in the art and, therefore, we do not desire to be limited to the details shown and described, except in accordance with the appended claims.

What we claim is:

1. In combination, a tape support, tape printing telegraph apparatus, means for maintaining the tape taut across the support, means for main-

maintaining a predetermined slack in the tape between said printing apparatus and support, comprising a switch arm having spaced limits of movement, means for drawing said tape at an even pace across said support, means actuated only when the switch arm reaches one limit of movement for arresting the motion of the tape and means for maintaining said tape at rest until the switch arm reaches its other limit of movement.

2. In combination, tape printing telegraph apparatus adapted to produce a supply of printed tape, means for maintaining the tape taut across a predetermined space, means for producing a loop in the tape between said printing apparatus and said predetermined space comprising a switch arm riding in said loop and having upper and lower contacts, means for drawing said tape at an even pace across said space, circuit means completed when said switch arm comes into engagement with its upper contact for arresting the motion of the tape and means for maintaining said tape at rest until said switch arm engages its lower contact.

3. In combination, a tape support, tape printing telegraph apparatus, means for maintaining the tape taut across the support, means for producing a loop in the tape between said support and printing apparatus comprising an arm riding in the loop and having upper and lower limits of movement, means for drawing said tape at an even pace across said support, a two-position switch means biased to each set position and means controlled by said switch for arresting the motion of said tape when said arm is in its upper limit of movement and for maintaining said tape at rest until the arm reaches its lower limit of movement.

4. In combination, tape printing telegraph apparatus adapted to produce a supply of printed tape, means for maintaining the printed tape taut across a predetermined space, means for producing a loop in the tape between said predetermined space and the printing apparatus comprising an arm riding in said loop and having upper and lower limits of movement, corresponding to an increase in the length of the loop of several characters, means for passing the tape across said space, means for stopping the tape, said last means initiated into operation only when said arm is in its upper limit of movement and means for again starting the tape only when said arm reaches its lower limit of movement.

5. In combination, a tape support, tape printing telegraph apparatus, means for maintaining the tape taut across the support, means for maintaining a predetermined slack in the tape between said support and the printing apparatus comprising a switch arm having two contacts spaced apart a distance corresponding to a change in the length of the loop of several characters, means for passing the tape across said support, a relay operated to opposite positions when said switch arm engages its opposite contacts respectively, means for maintaining said relay in each set position when said switch arm is intermediate its contacts and electrically operated means, controlled by said relay, in one position for stopping the movement of said tape across the support and in the other position for starting the movement of the tape across the support.

6. In combination, tape printing telegraph apparatus adapted to produce a supply of printed

tape, means for maintaining the printed tape taut across a predetermined space, means for maintaining a predetermined slack in the tape between said predetermined space and the printing apparatus, comprising a switch arm having two contacts spaced apart a distance corresponding to a change in the length of the loop of several characters, means for passing the tape across said space, comprising a continuously running motor, a feed roller, a clutch intermediate said motor and feed roller, a relay operated to opposite positions when said switch arm engages its opposite contacts respectively, means for maintaining said relay in each set position when said switch arm is intermediate its contacts and means, controlled by said relay, in one position for disengaging said clutch and in the other position for engaging the clutch.

7. In combination, tape printing telegraph apparatus adapted to produce a supply of printed tape, means for maintaining the printed tape taut across a predetermined space, means for maintaining a predetermined slack in the tape between said predetermined space and the printing apparatus, comprising a switch arm having two contacts spaced apart a distance corresponding to a change in the length of the loop of several characters, means for passing the tape across said space, comprising a continuously running motor, a feed roller driven thereby, a relay operated to opposite positions when said switch arm engages its opposite contacts respectively, means for maintaining said relay in each set position when said switch arm is intermediate its contacts and means, controlled by said relay, in one position for driving said feed roller from said motor and in the other position for stopping the feed roller.

8. In combination, tape printing telegraph apparatus adapted to produce a supply of printed tape, means for maintaining the tape taut across a predetermined space, means for producing a loop in the tape between said printing apparatus and said predetermined space, comprising an arm riding in said loop and having upper and lower limits of movement, an electric motor for drawing the tape at an even pace across said space, a circuit therefor, means for interrupting said circuit only when said lever is in its upper limit of movement and for again closing said circuit only when said lever reaches its lower limit of movement.

9. In combination, a data recording device, a tape support, means for feeding tape over said support, and a two-position switch element controlled by said tape adapted to start and stop said feeding means in accordance with the amount of tape between said data recording device and support, said switch element on being operated to one position to stop the feeding means, retaining said position until a predetermined plural number of characters have been printed by said data recording device and, upon being operated to the other position to start the feeding means, remaining in said last position until a length of tape corresponding to at least said predetermined plural number of characters, has been advanced along said support.

10. In combination, a web, a data recording device for said web, means for feeding said web across a predetermined space, a toggle switch having two closed positions and being controlled by said web, said switch in one closed position controlling the starting of the web and in the other closed position serving to determine the stopping

of said web in accordance with the length thereof between the recording device and said space and also serving to maintain the web at rest until a predetermined greater length of tape corresponding to a plural number of characters has formed between the recording device and said predetermined space.

11. In combination, a web, a data recording device for said web, means for feeding said web across a predetermined space, a two position toggle switch having two closed positions and being controlled by said web in accordance with the length thereof between the recording device and said space, said switch in one position controlling the stopping of the web and in the other position controlling the starting thereof.

12. In combination a web, a data recording device for said web, means for feeding said web across a predetermined space, an electro mechanically operated switch having two closed positions and being adapted to retain each set position until actuated completely to the other position, means controlled by the length of tape between the recording device and said space for actuating said switch in one position thereof for stopping the web and in the other position thereof for starting the web into motion.

13. In combination, a web, a data recording device for said web, means for feeding said web across a predetermined space, a control mechanism

having two positions, toggle means for maintaining said mechanism in each set position until positively actuated to the other position, means engaging said web intermediate said recording device and space for operating said control mechanism to each position, said control mechanism in one position serving to arrest the movement of the tape and in the other position to start the movement thereof.

14. In combination, a web, a data recording device for said web, means for feeding said web across a predetermined space, a control mechanism having two positions of operation, means controlled by the web between the recording device and said space, when the web is reduced to a predetermined minimum length for actuating said mechanism to one position and when the web is increased to a predetermined greater length, to actuate said mechanism to the other position, means for retaining said control mechanism in each actuated position until said web has decreased or increased to a length sufficient to actuate the mechanism to the other position and means controlled by said mechanism in said first position to arrest the movement of the tape and in the second position to start the movement thereof.

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