

Nov. 28, 1933.

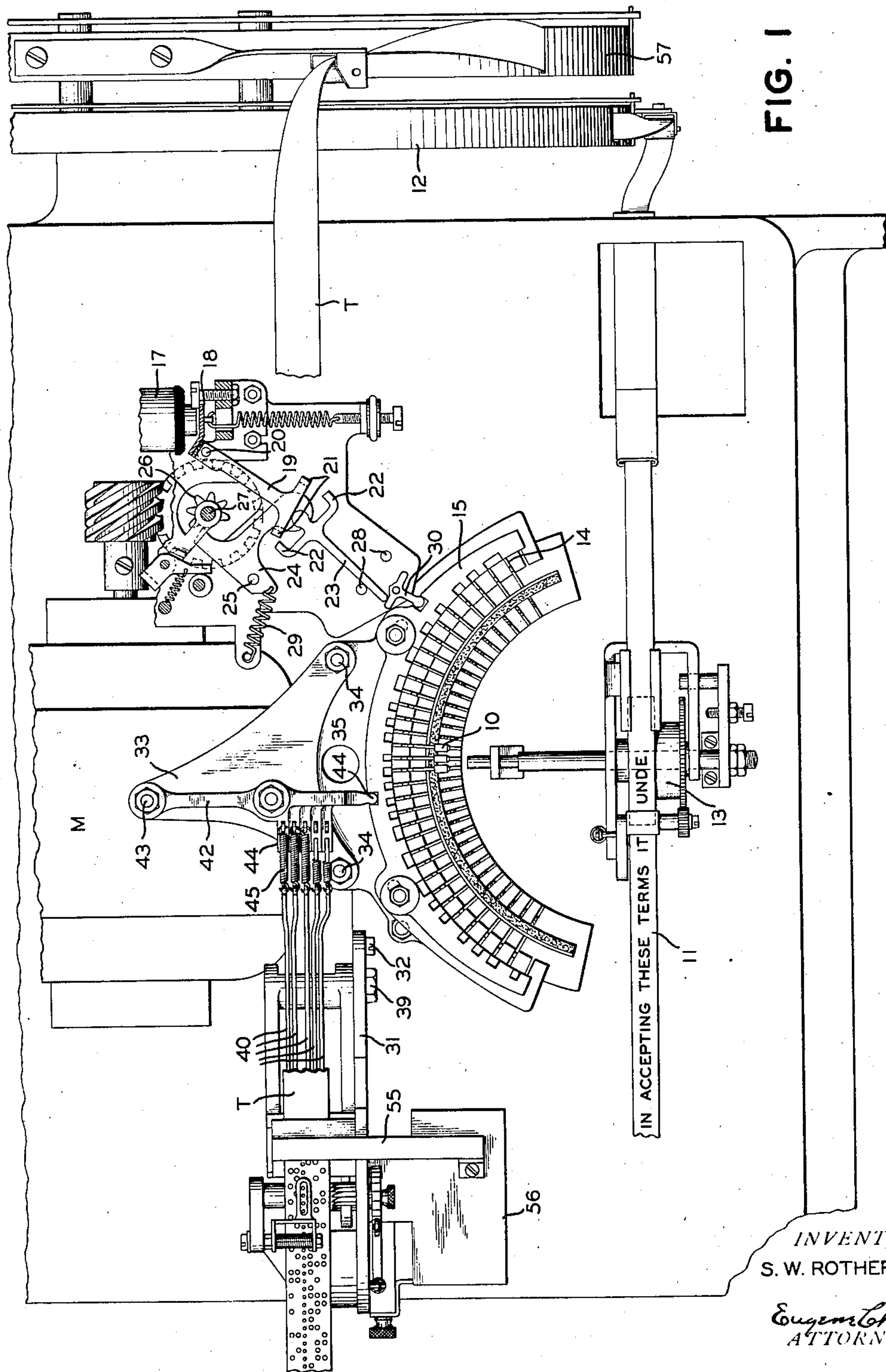
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1,936,956

COMBINED PERFORATING AND PRINTING MECHANISM

Filed May 28, 1932

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 2

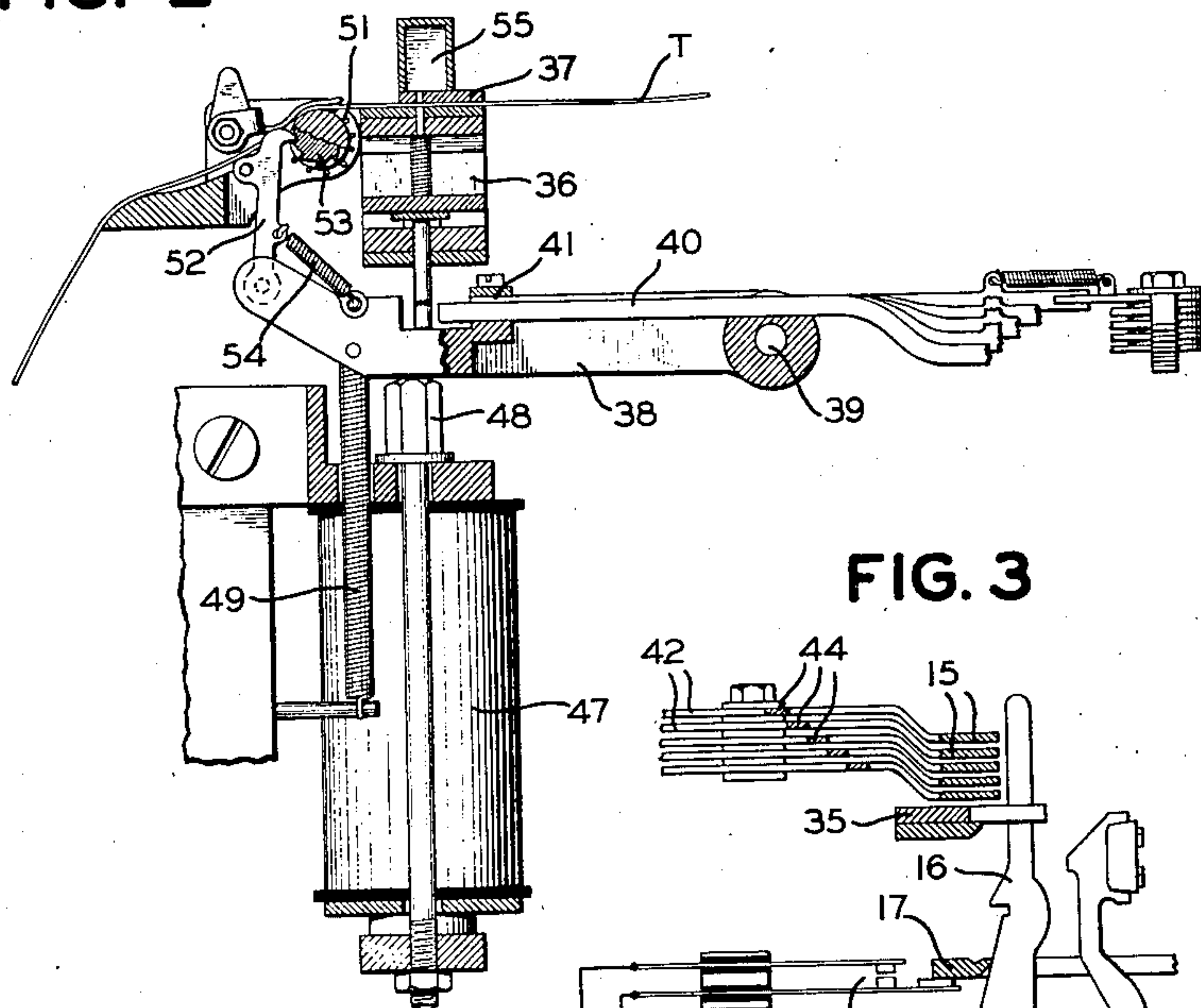


FIG. 3

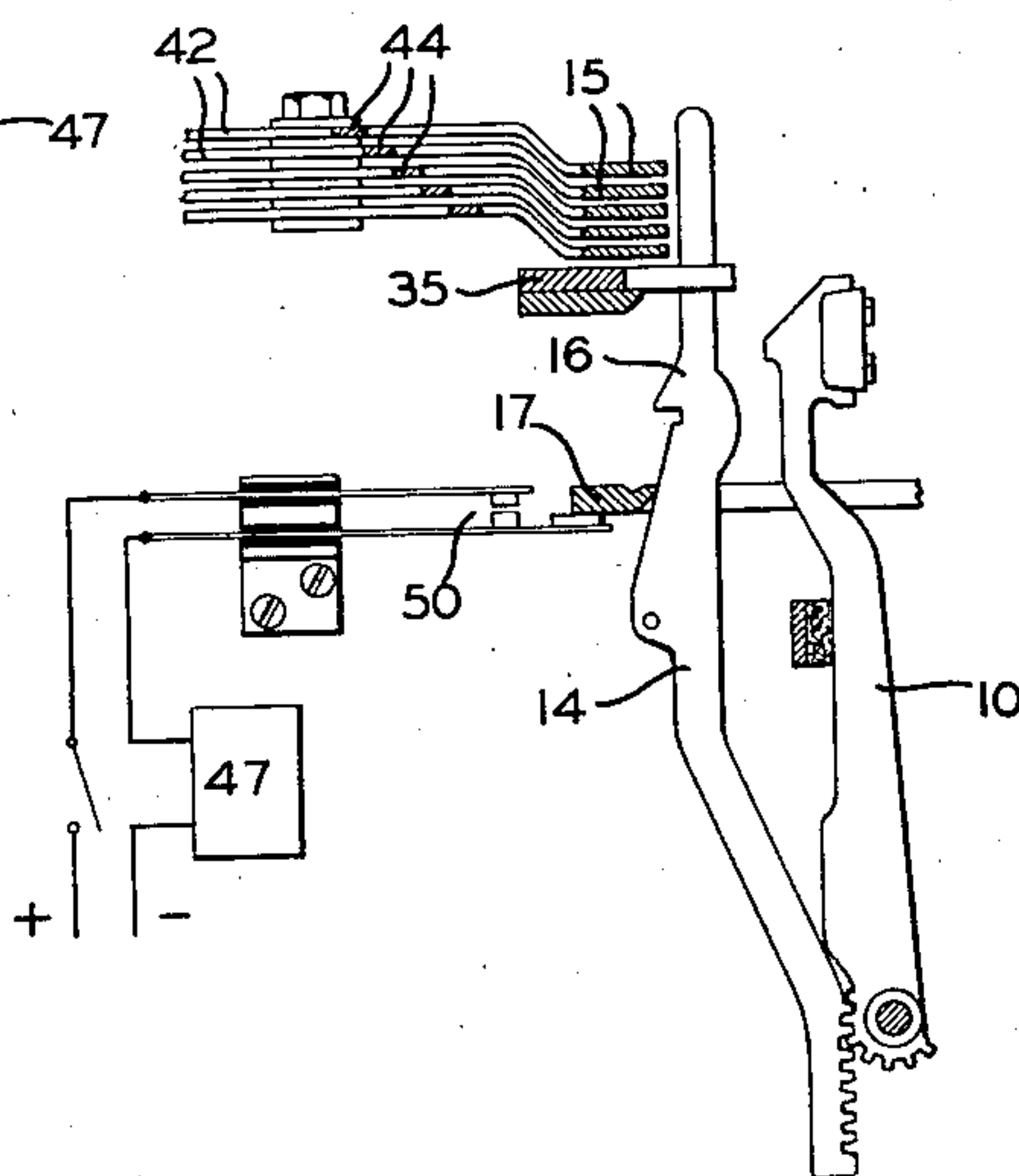


FIG. 4

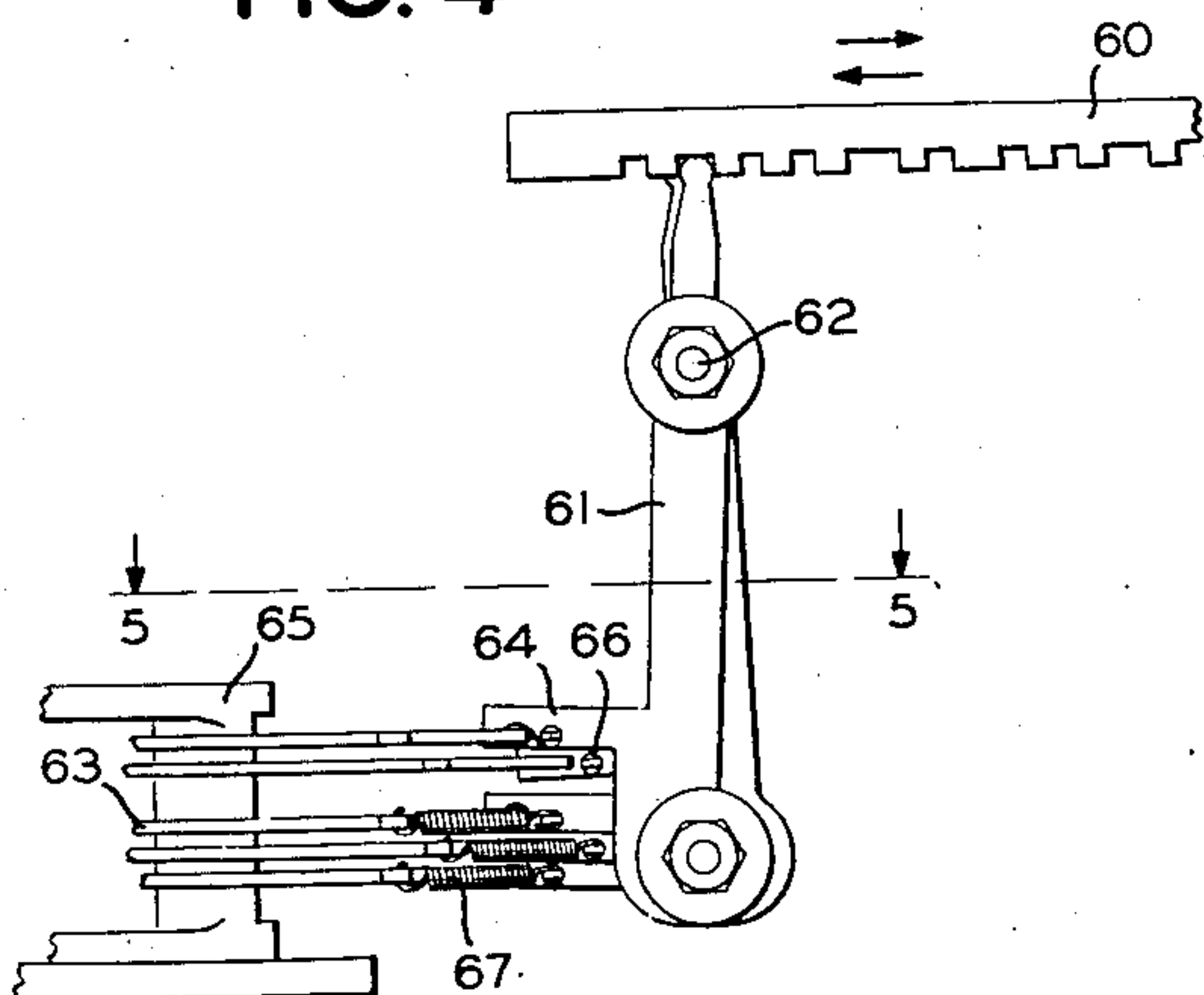


FIG. 6

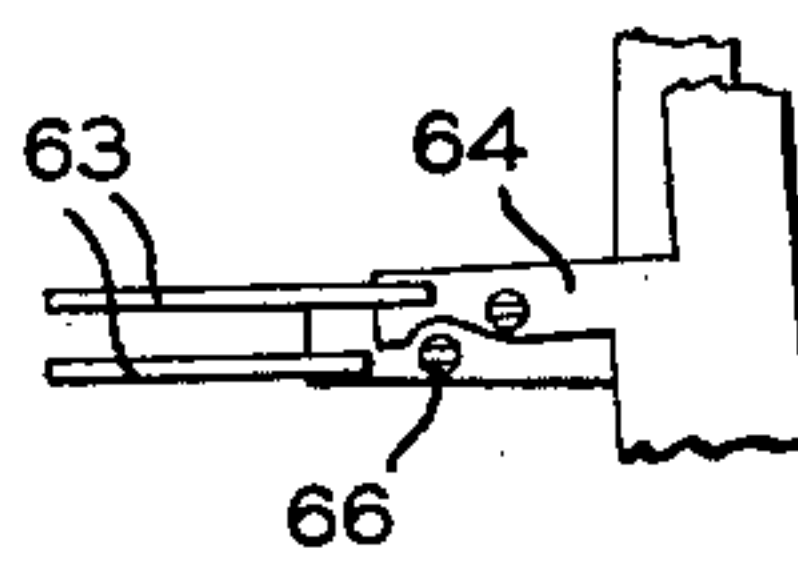
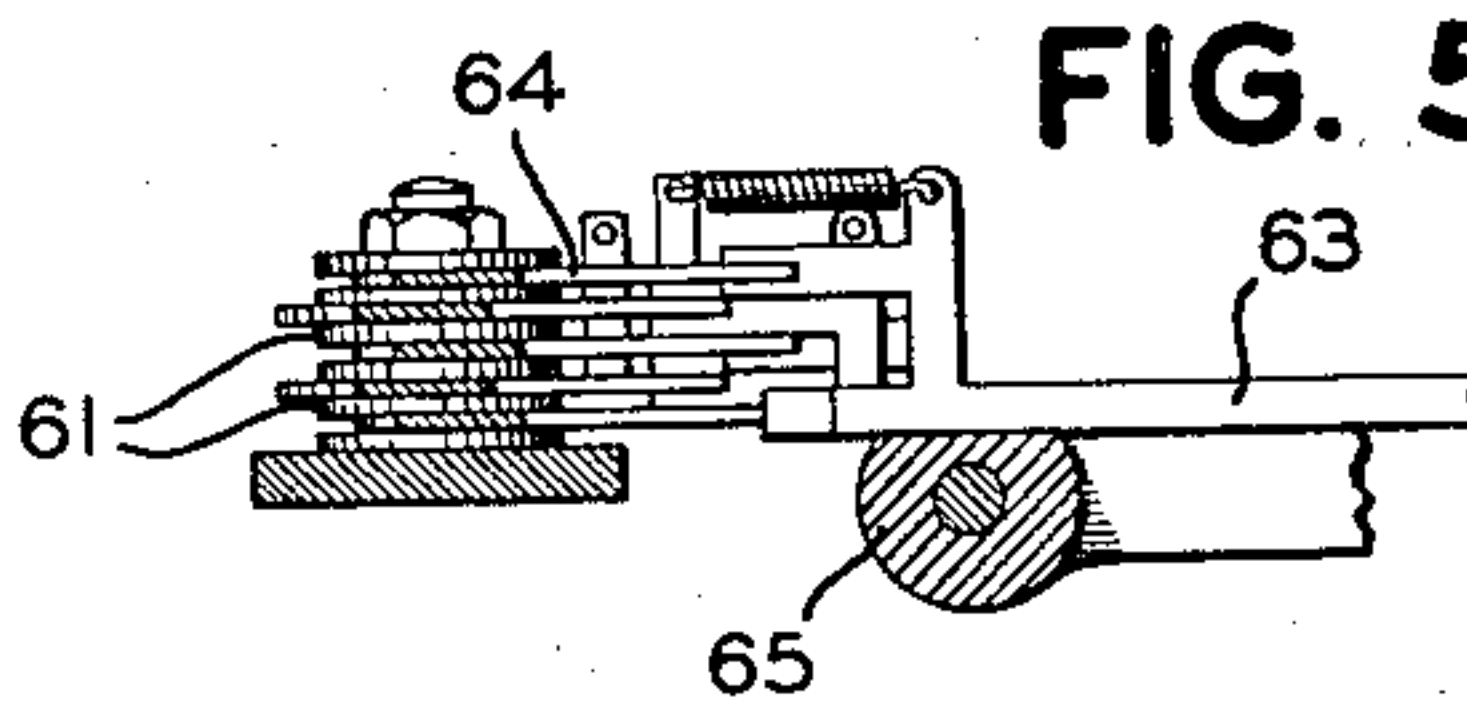


FIG. 5



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COMBINED PERFORATING AND PRINTING
MECHANISMSamuel W. Rothermel, Lynbrook, N. Y., assignor
to The Western Union Telegraph Company,
New York, N. Y., a corporation of New York

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11 Claims. (Cl. 178—33)

This invention relates to a combined telegraph printer and receiving perforator and more particularly to apparatus of this nature in which both the printing and perforating occur on separate tapes, although it is to be understood that if desired, the printing may take place on a page or web or may be entirely dispensed with.

In certain types of subscribers' telegraph service, of which the so-called "timed wire service" is an example, it is a practice to record intelligence, originating at a transmitter located in a subscriber's office, on a printer located in a second subscriber's office which may be in a remote city. Because of the expense, maintenance and attention required to keep multiplex apparatus in operation, the equipment provided in such subscriber's offices is necessarily of the start-stop or simplex type. If the lines of both subscribers between which it is desired to carry on telegraphic communication, terminate at the same central office, it is entirely feasible to make a direct switchboard connection between the lines. However, ordinarily the subscribers are located in remotely separated localities so that they are associated with separate central stations. In such case the signals must be transmitted between the central offices over a connecting trunk line. Due to the slow speed of operation of start-stop systems as compared with multiplex equipment, it is not desirable to directly connect the subscriber between such central offices over a simplex circuit but it is more desirable to employ one channel of a regular multiplex circuit extending between such offices.

It is entirely possible to repeat the signals received at the central office from one simplex circuit directly to the multiplex channel and to extend the channel at the other office directly to the subscriber through his simplex circuit. However, when a call is received from a subscriber indicating a desire to communicate with another subscriber, a certain length of time is required to complete such through connection during which time the transmitting subscriber must stand by idly. If the called subscriber's printer is busy at this time, the completion of the through circuit may be delayed for a substantial period, and after the connections are made, the rate of transmission over the start-stop system may be far below the maximum speed of the multiplex channel so that the channel is not efficiently utilized. Moreover, in order that a multiplex channel will be immediately available for making such through connections, it is necessary to provide a large number of normally idle multiplex circuits.

It has been found, therefore, that such messages can be handed more expeditiously and economically by providing signal storage devices at each central office adapted to receive signals from the subscriber at any desired rate and from which the signals can be subsequently retransmitted over the first available multiplex channel at the maximum speed thereof. At the opposite central office these signals are again stored and repeated over the second subscriber's line, the multiplex circuit being thus immediately freed for other service. By this arrangement the calling subscriber, immediately upon calling the central office with which he is associated, may begin the transmission of his message. Any short delays incident to the retransmission of such message over the multiplex channel do not in any way inconvenience or delay the calling subscriber nor are they known to him.

In addition to the signal storage device it is necessary to employ at each central office, a telegraph printer by which the calling subscriber can communicate to the office, the identity of the called subscriber and by which general telegraph business not destined to another subscriber can be transacted. The printer is also required for record and check purposes.

Heretofore it has been the practice to employ both a tape printer and a separate tape or metallic storage transmitter at each central office. In such cases, however, the printed record on the tape, even if correct, gives no assurance that the perforator and its selecting mechanism is properly functioning. Moreover, the use of two separate machines for this purpose is expensive and occupies considerable space.

The apparatus at one central station must be of the start-stop variety and that at the other central station must respond to multiplex signals. Both start-stop and multiplex printers are in common use in standard telegraph practice and readily available and at the present time there is a large overproduction of such machines. Suitable receiving perforators however, are not in use in large numbers and can be secured only at considerable expense.

It is, therefore, one of the objects of this invention to provide a tape perforating attachment for standard types of simplex and multiplex printing telegraph apparatus by which such machines may be adapted for the production of a printed record and a perforated record of the incoming message simultaneously.

Another object is to provide such an attachment which does not materially increase the size

of the printing mechanism or require modification or alteration thereof.

Another object is to produce a suitable telegraph recording and reperforating apparatus for use in the type discussed and is reliable and inexpensive and which is in keeping with the condition of affairs set forth.

A still further object is to provide a combined perforator and printer responsive to signals of the start-stop variety.

Other objects and advantages of the invention will hereinafter appear.

The invention will be best understood by reference to the accompanying drawings, in which:

Figure 1 is a plan view of a simplex printing having a perforating mechanism, constructed in accordance with my invention, attached thereto;

Figure 2 is a vertical sectional view of the perforating attachment;

Figure 3 is a fragmentary detail of the type bar and type bar operating mechanism of the printer;

Figure 4 is a plan view of a modified form of perforator attachment; and

Figure 5 is a sectional view on the line 5—5 of Figure 4.

Figure 6 is a fragmentary view of adjacent interponent bars and operating levers.

Referring first to Figure 1, I have shown the perforator attachment applied to a simplex printer of the type disclosed in Patent No. 1,796,378, granted March 17, 1931, to H. L. Krum. Since the printer itself forms no part of the present invention, it has not been illustrated in detail. Briefly, it comprises an arcuate row of type bars 10 striking downwardly upon a tape 11 drawn from a reel 12 and moving horizontally across the machine from right to left over a platen 13. The type bars 10 are operated by individual pull bars 14 (Fig. 3) positioned in an arcuate row immediately behind their associated type bars. The pull bars 14 are selected by a group of five arcuate code bars 15 notched in the usual manner, so that when the notches are aligned, one of the pull bars drops therein, thus bringing a shoulder 16 into the path of a universal pull bar bail 17, as it rises, to actuate the pull bar and thereby to move the typebar against the paper. The code bars 15 are set up in a predetermined combination by a single magnet selecting mechanism comprising a magnet 17, the armature 18 of which has attached thereto a lever 19 pivoted at 20 and movable so as to bring one of a pair of lugs 21 opposite one or the other of the offset ends 22 of a group of selecting fingers 23. The selecting fingers are carried by individual bell crank levers 24 pivoted at 25 and adapted to be engaged in succession by cams 26 carried by a shaft 27 driven by a motor M.

The signals to which the printer responds comprise a start impulse, a group of code impulses, and a rest impulse. The cam shaft 27 is normally at rest and upon receipt of the start impulse, it is released for one revolution. The armature lever 19 is vibrated in accordance with the received code impulses and the cams 26 engage their respective levers 24, in synchronism with the received impulses, to draw the selecting fingers 23 backward so as to pivot the same about one or the other of the lugs 21 and thereby to move the finger against one or the other of a pair of stop pins 28. As each of the cams 26 passes beyond the lever 24, the lever is returned to its forward position by a spring 29, thereby forcing

the selecting finger 23 against one arm of a pivoted T-lever 30, which engages the corresponding code bar 15 to shift the same in accordance with the nature of the received impulses. After the code bars have been shifted, the pull bar bail 17 is raised mechanically by a mechanism not shown, to effect the printing.

The perforating attachment which forms the subject matter of the present invention is carried jointly by a bracket 31 secured to the frame of the machine as by screws 32, and a triangular plate 33 secured by bolts 34 to the segmented metal plate 35 upon which the code bars are mounted.

Referring to Figure 2, the perforating mechanism comprises a punch block 36 having a group of five punch pins 37 extending therethrough and having their lower ends positioned above a hammer 38 pivoted to the plate 31 at 39. A group of five interponent bars 40 are slidably mounted in slots 41 in the upper face of the hammer 38 and are adapted to be moved beneath the punch pins in various combinations so as to permit the pins to be raised upon an upward movement of the hammer.

The interponent bars are actuated in accordance with the movement of the code bars 15 through a set of five levers 42 pivoted to the plate 33 at the point 43 and having their free ends fitted in slots 44 on the back side of each of the corresponding code bars. Each of the levers 42 has an offset arm 44, the outer end of which is forked and which is received in the forked end of the corresponding interponent bar 40. The interponent bars are held in engagement with the offset arms 44 by individual springs 45.

With the arrangement shown, it will be obvious that as the code bars are shifted to the right or left, the interponent bars are withdrawn from beneath the punch pins or selectively positioned thereunder.

The punch hammer 38 is operated by a magnet 47 having a plunger 48 resting against the underside of the hammer. The hammer is lowered by a spiral spring 49. The circuit for the magnet 47 is completed through a contact 50 positioned so as to be closed as the pull bar bail 17 is raised (see Figure 3). Consequently, the hammer 38 is raised simultaneously with the operation of the type bar 10.

After each perforating stroke the tape T is moved through the punch block by a star wheel 51 engaging in the feed perforations of the tape. The star wheel is rotated by a pawl 52 carried by the outer end of the punch hammer. The pawl is held in contact with the ratchet teeth 53, which are integral with the star wheel shaft, by a spring 57.

A chute 55 for the particles punched from the tape extends from the top of the punch block downwardly into a receptacle 56.

The tape T is drawn from a second reel 57 mounted on the casing of the reel 12 and passes substantially parallel to the tape 11 over the top of the printer selecting mechanism to the punch block 36.

The only modification required in the printer construction to adapt the perforating attachment thereto is the formation of the slots 44 in the rear of the code discs. Since the code discs are readily removable in machines of this type, this change can be readily effected.

In Figs. 4 and 5 I have shown a perforating mechanism adapted for application to a printer,

employing straight code bars, such as used in a multiplex printer of the type known in the art as the 21A printer. In this printer the code bars 60 are moved longitudinally by individual magnets controlled from the multiplex distributor. In this modification the code levers 61 are pivoted at 62 and engage the interponent bars 63 adjacent their outer ends. In place of the double fork connection between the interponent bars 40 and the right-angled extensions 44 of the levers employed in the modification shown in Fig. 1 I have illustrated the extensions 64 of the levers 61, arranged to slide within the forked end of the interponent bar as the levers pivot, thereby enabling pure rectilinear movement of the interponent bars. The interponent bars are guided in notches formed in the hub 65 of the punch hammer as well as in the forward guide 41. Since the interponent bars move only rectilinearly they may be disposed close together at their outer ends and in order to provide clearance for the pins 66 to which the springs 67 are attached, certain of the extensions 64 are cut out as shown at 68, thereby enabling the adjacent levers to be rocked in opposite directions without interference between the extension 64 and an adjacent pin 66.

It will be appreciated of course that the lever arrangement and the connection thereof to the interponent bars shown in Fig. 4, may be employed equally well in the simplex printer attachment shown in Fig. 1.

Obviously various other adaptations of this invention will occur to those versed in the art and therefore I do not desire to be limited to the particular details shown and described except as required by the appended claims.

What I claim is:

1. In a telegraph recorder, the combination with a printing mechanism comprising a plurality of permutation code bars arranged to be set into predetermined combinations by received code signals and a printing mechanism controlled by said code bars, of a perforating attachment associated with said printing mechanism comprising a plurality of punch pins, a hammer for operating said pins and actuating means for said hammer controlled by the printing mechanism as an incident to the printing of each character.

2. In a telegraph recorder, the combination of a selector arranged to be positioned in accordance with received code combinations, a printing mechanism controlled by said selector, a perforating mechanism having selectable means positioned in accordance with said selector and means controlled solely by said printing mechanism for operating the perforating mechanism.

3. In a combined perforating and printing machine, the combination of a printing platen, a punch block, a plurality of tape reels mounted at one side of said machine, means for feeding tape from said reels across said machine to said platen and punch block respectively, means for effecting printing on one of said tapes, and means controlled by said last means for perforating the other tape.

4. In a combined perforating and printing machine, the combination of a selector, a printing mechanism and a perforating mechanism jointly controlled thereby and means operated by a

common moving part of said machine for simultaneously effecting the operation of the printing and perforating mechanism.

5. In a combined perforating and printing machine, a printing mechanism, a perforating mechanism, a plurality of tape reels mounted to one side of the machine in substantially parallel relation and means for directing tape from said reels across said machine in substantially parallel paths, to the printing and perforating mechanisms, respectively.

6. In a telegraph recorder, a printing mechanism having a selector responsive to telegraph code signals, a perforating mechanism controlled by said selector and means normally at rest, movable through a pre-determined path, following each setting of said selector for controlling both the printing and perforating mechanism.

7. In a telegraph recorder, a printing mechanism having a selector responsive to telegraph code signals, a perforating mechanism controlled by said selector, and a printing bail movable through a pre-determined path following each setting of said selector for controlling both the printing and perforating mechanisms.

8. A telegraph recorder, having a plurality of code bars, means responsive to code signals for setting said bars in predetermined combinations, a printing mechanism controlled by the selector, a perforator comprising a plurality of punch pins, a punch hammer and interponent bars arranged to be selectively inserted between said punch pins and punch hammer, each of said code bars being provided with a notch and a pivoted lever individual to each code bar having a free end thereof engaged in the notch in its associated code bar, said levers being operatively connected to the interponent bars so as to actuate the same in accordance with the setting of the code bars and means for operating the punch hammer following each setting of said code bars.

9. A telegraph recorder, having a plurality of code bars, means responsive to code signals for setting said bars in predetermined combinations, a printing mechanism controlled by the selector, a perforator comprising a plurality of punch pins, a punch hammer and interponent bars arranged to be selectively inserted between said punch pins and punch hammer, a pivoted lever individual to each code bar having one end thereof in engagement with its associated code bar, said levers being operatively connected to the interponent bars to actuate the same in accordance with the setting of the code bars and a movable bail for simultaneously operating the printing mechanism and controlling the operation of said punch bar.

10. In a telegraph recorder, a printing mechanism, a perforating mechanism, an electro-magnetic device for operating said perforating mechanism and a single electro-magnetic device responsive to code signals for controlling the selective operation of both the printing mechanism and the perforating mechanism.

11. In a telegraph recorder, a printing mechanism, a perforating mechanism and a single line magnet responsive to code signals for controlling the selective operation of both the printing mechanism and the perforating mechanism.

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