

July 17, 1934.

R. HOOVER ET AL

1,967,177

TAPE TAKE-UP CONTROL MECHANISM

Filed May 4, 1931

2 Sheets-Sheet 1

FIG. 2

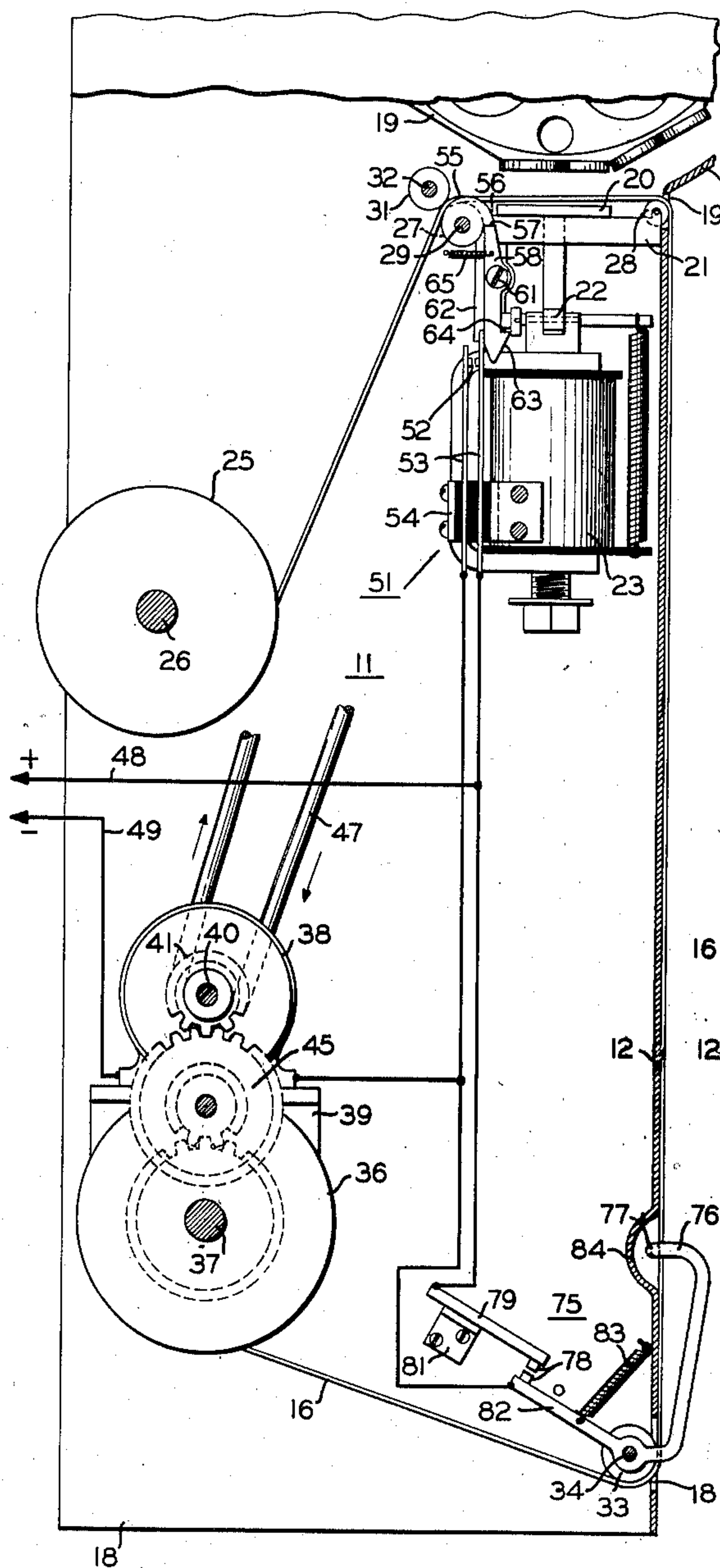
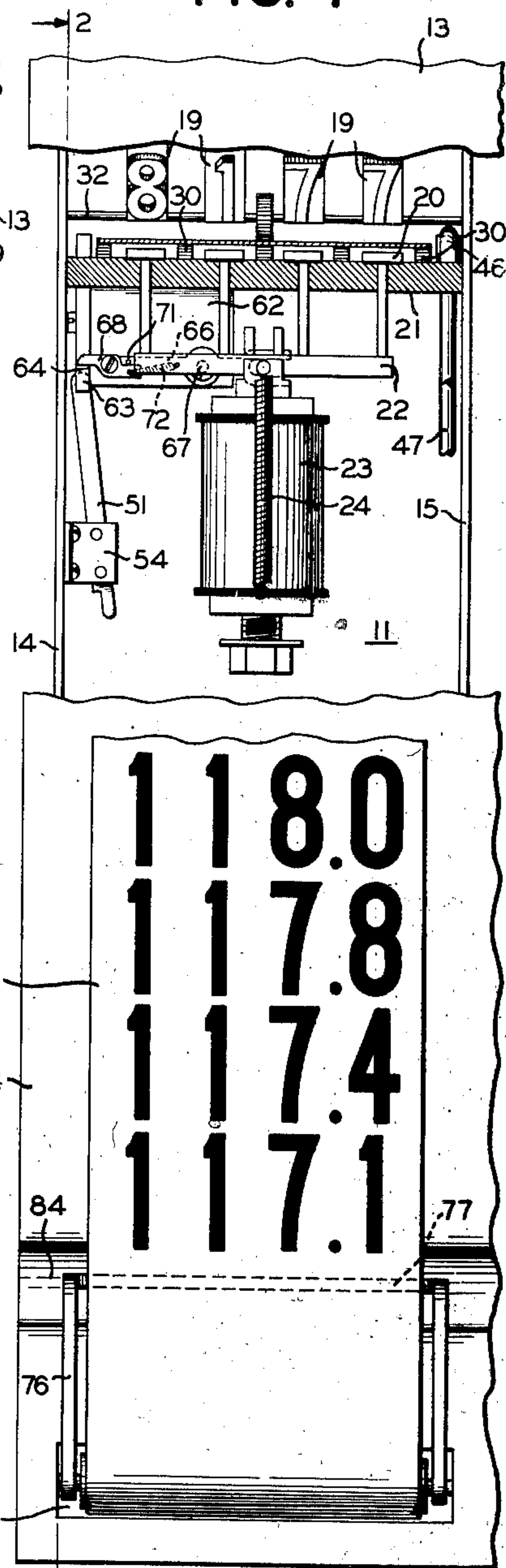


FIG. 1



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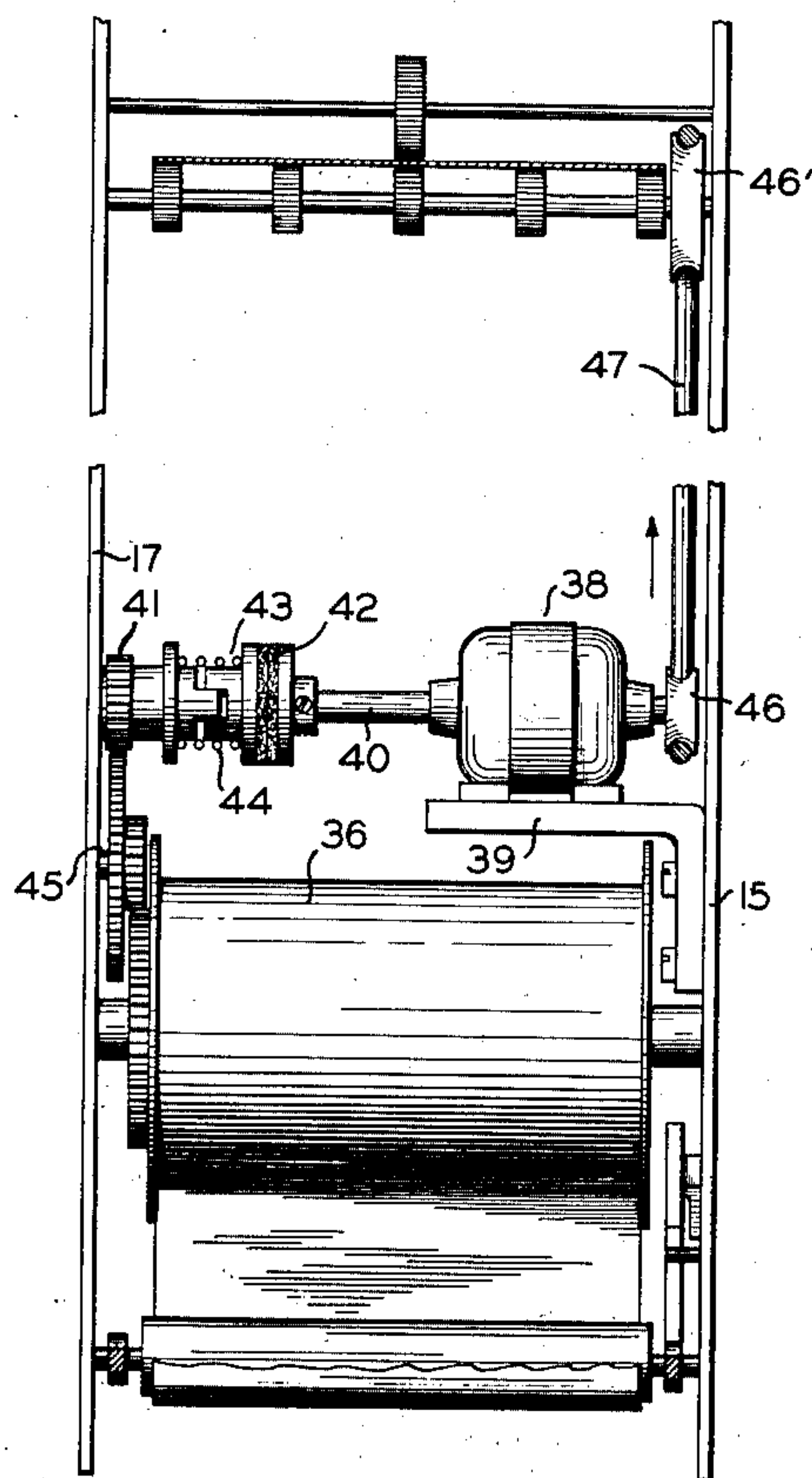
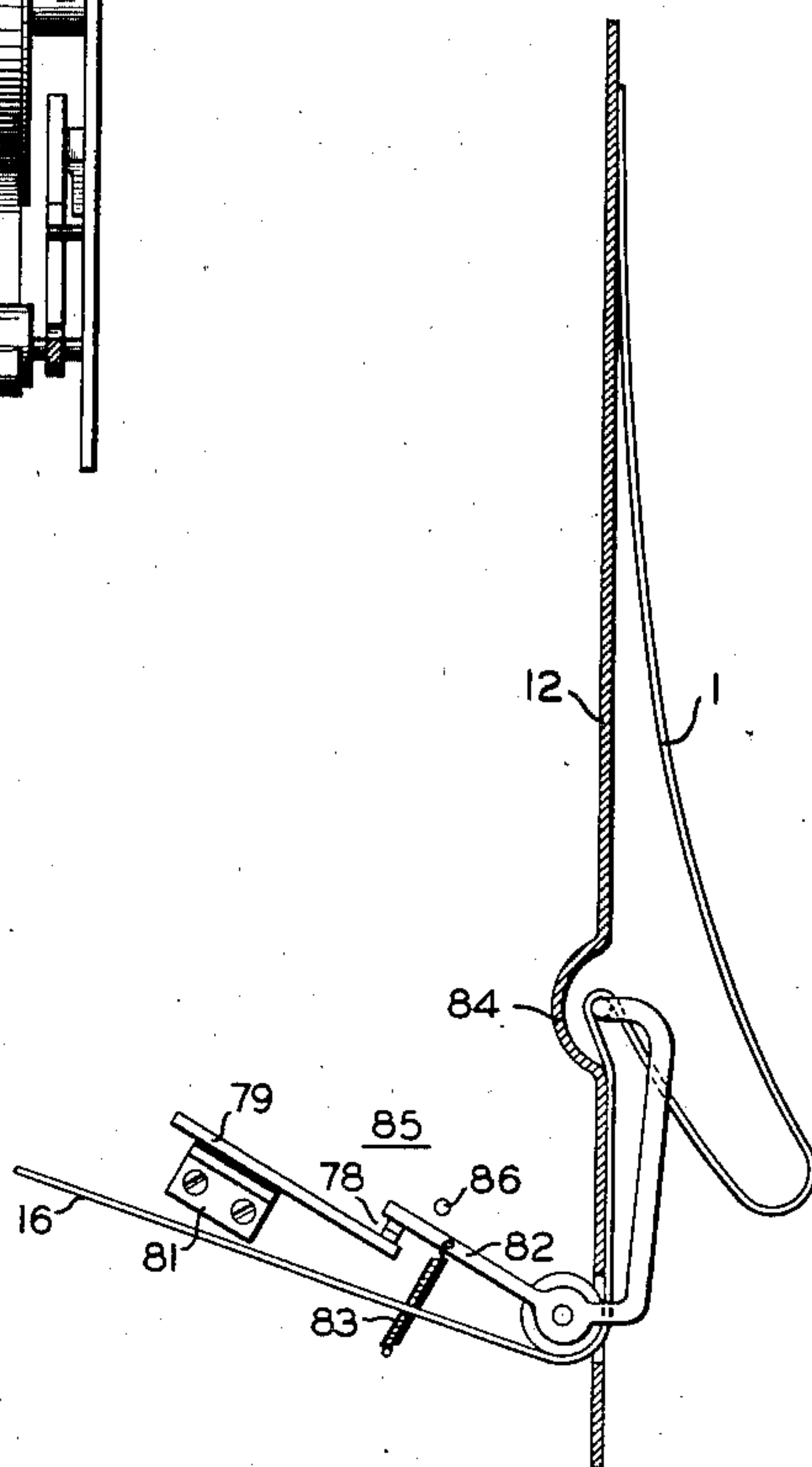
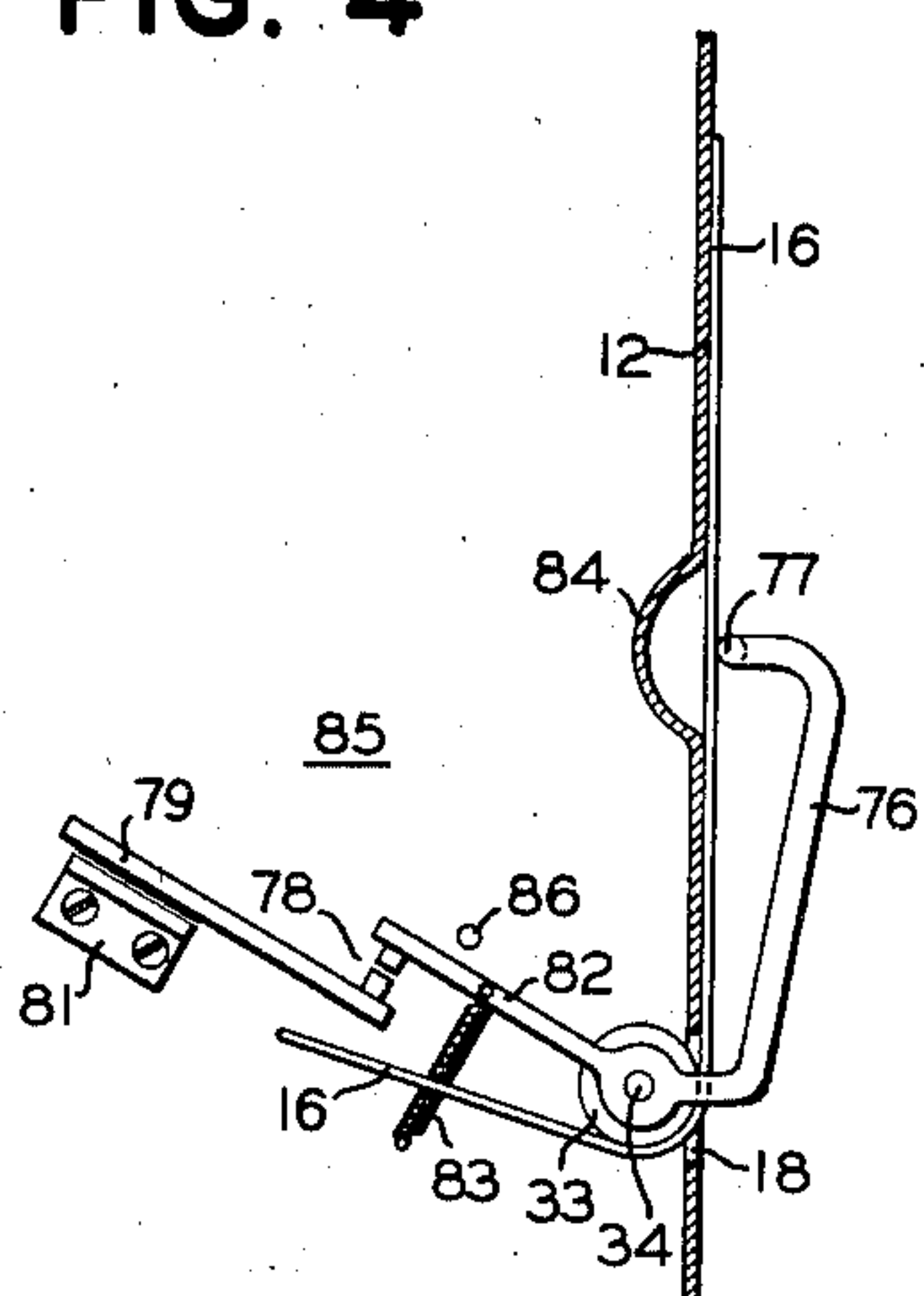


FIG. 3

FIG. 5

FIG. 4



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TAPE TAKE-UP CONTROL MECHANISM

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poration of New York

Application May 4, 1931, Serial No. 535,066

9 Claims. (Cl. 178—24)

This invention relates to printing units for re-
ceiving quotations, more particularly to the rec-
ord tape which is employed in connection with
the printing unit for making a printed record of
the quotations as they are received; and it has
for an object to provide for examining or refer-
ring to portions of the tape which have passed
beyond view on its way from the printing unit to
the take-up or receiving means provided for the
tape.

Ordinarily, such printing units are provided
with a tape upon which the quotations are printed
or recorded as they are received, the tape being
arranged to be drawn across the front of a dis-
play panel or "black board" to expose a section
of the tape in order that several of the quotations
may remain in view for an extended length of
time as the new quotations are received and
printed. Obviously, the number of quotations
which may be maintained in view at any one mo-
ment may be determined by the length of the
exposed section of the tape and the size of type
used to record the quotations on the tape. How-
ever, it sometimes happens that the broker, his
customer, or other interested person might have
occasion to desire to refer to quotations which
have passed out of view beyond the black-board
section, for a better determination of the price
"trend" of the commodity being quoted upon.

Being able to refer to the section of the tape
which has passed out of view would be especially
advantageous, when the transactions in connec-
tion with the commodity were taking place in
rapid succession resulting in extremely frequent
posting or printing of quotations on the tape caus-
ing a corresponding rapid advancement of the
tape beyond view at the front of the quotation
board. Moreover, it might conceivably be quite
necessary to refer to the portion of the tape which
has become invisible to intelligently judge the
trend of the stock or commodity being quoted
upon or to determine the exact price or value in
connection with a certain transaction.

A printing unit of this character may be con-
structed as an independent quotation unit of a
suitable size to be placed on a broker's desk or in
some other convenient location to report on a
particular stock or commodity or give other in-
formation or it may be embodied in a quotation
board system including several other types of
display units in addition to printing units for
reporting on many stocks or commodities.

A quotation board system having a printing
unit similar to that outlined above but having no
provision for examining the tape that has passed

out of view beyond the front of the "black board"
has been described and claimed in an application
by R. Hoover and E. R. Wheeler entitled "Printing
quotation board", filed May 9, 1930, Ser. No. 451,-
140 and assigned to the The Western Union Tele-
graph Company. The usefulness of such a sys-
tem as described in that application will be ma-
terially extended by the application of the pres-
ent invention thereto.

Another object of this invention is, therefore,
to provide a stock quotation printing unit with a
tape which may be withdrawn or unwound from
the take-up or receiving mechanism and which
will be automatically rewound upon being re-
leased.

Another object of this invention is to provide
for controlling the rewinding action of the take-
up mechanism in accordance with the tension of
the tape across the face of the display panel.

Still another object is to provide for controlling
the rewinding mechanism in accordance with
either the tension of the tape across the face of
the display panel or in accordance with whether
the tape is in its normal position flat against the
front of the display panel or is being held away
from the same for examination, or in accordance
with both conditions.

Still another object of the invention is to pro-
vide means for maintaining a slight resistance to
the withdrawing or rewinding of the tape from
the take-up mechanism.

A still further object of the invention is to pro-
vide a control which will start the rewinding
mechanism of the receiver or take-up upon re-
lease of the tape by the person examining the
same and stop the rewinding mechanism when
the tape has resumed its normal or taut position
across the face or front of the display panel.

These and other objects are effected by our
invention, as will be apparent from the following
description and claims taken in connection with
the accompanying drawings, forming part of this
application in which:

Fig. 1 is a fragmentary view, in elevation, of
the front panel or face of one printing unit and
its record tape, a part of the face of the board
and tape being cut away to show the printing
mechanism;

Fig. 2 is a sectional view taken along the line
2—2 of Fig. 1 of the part of the printing unit in-
cluding the printing mechanism and the take-up
mechanism;

Fig. 3 is a view showing the take-up roll drive
and control switch;

Fig. 4 is a fragmentary detail view of a section

of the display panel showing a modified form of the take-up roll control switch, with the contacts open;

Fig. 5 is the same view as Fig. 4 with the control switch contacts closed, the tape hanging slack, and the contact bar depressed into the recess in the display panel.

In general, this invention comprises a stock quotation printing mechanism provided with recording tapes for displaying the quotations in printed form, which in its preferred form is arranged similar to the printing unit described in the aforesaid application. A supply roll is provided for supplying the tape to the printing mechanism. A metering or feeding roller and a take-up or winding roll are provided with a motor or other drive means for feeding the tape to and drawing the same from the printing mechanism, as the quotations are printed thereon, across the face of the display panel where it is visible. The winding mechanism is provided with means which will permit any desired amount of the tape to be withdrawn or unwound from the take-up roll and pulled outward to the front of the quotation board where it may be examined in general or where a particular quotation may be referred to. It is further provided with means for automatically rewinding the tape on the take-up roll after the examination has been completed.

Referring now to the drawings, Figs. 1, 2 and 3 show a fragmentary portion of a printing unit 11 embodying the invention. The printing unit 11 is housed behind a display or front panel portion 12 and a hood portion 13 and between side plates 14 and 15 supported against the panel 12. A record tape 16 is drawn down the front of the display panel so as to visibly display the quotations printed thereon. The tape emerges near the upper edge of the panel through a slot 17 and returns near the lower edge of the panel through a slot 18.

The printing of the quotation upon the tape 16 is accomplished by means of a type wheel or wheels 19 or other suitable type carrying members having mounted at their periphery a series of type characters which may be disposed in printing position in response to telegraphic signals. The printing position, as shown in the drawings, is the extreme downward position with the type character or characters disposed horizontally and substantially parallel to a portion of the tape. A series of platen blocks 20, having depending stem portions projecting through guide openings in a guide block 21, are disposed below the printing position of the type characters. The record tape 16 passes between the platen blocks and the type characters. The platen blocks are engaged by a universal bar 22, which is in turn secured to the plunger of a solenoid 23 supported on a plate carried by the housing. When the solenoid 23 is actuated the core or plunger of the solenoid raises the universal bar 22 and causes the platens to carry the record tape up against the characters, the latter having been set in printing position, where the quotation is imprinted thereon. After the imprinting of the quotation, the platens and the plunger of the solenoid are returned to their normal position by means of a retractable spring 24.

The record tape 16 is preferably a strip of paper of sufficient width to receive the desired number of characters representing the quotation and is supplied from a supply roll 25 suitably mounted on a shaft 26 extending between the side plates 14 and 15 and passes from the supply roll over

a metering or feed roller 27 and an idler roller 28. The metering roller 27 and idler roller 28 are arranged to hold a section of the tape in a substantially horizontal position between the platen and the printing position of the type characters as described above. The metering roller is supported from the side plates on a suitable shaft or bearing 29 and the idler roller is supported on brackets forming a part of the guide block 21. The paper is prevented from slipping on the metering roller by means of knurled sections 30 provided thereon and by a knurled gripping roller 31 supported on a suitable shaft 32 in position to grip the paper against one or more of the knurled sections of the metering roller. From the idler roller 27 the tape passes down the front of the quotation board 12 and reenters the housing over a second idler roller 33 mounted on a shaft 34. From the lower idler roller the tape passes to a take-up roll 36 suitably mounted on a shaft 37 between the side plates.

The metering roller 27 and the take-up roll 36 are driven by a motor 38 which is supported from the side 15 of the framework on a bracket 39. A drive shaft 40 extends from both ends of the motor. A pinion 41 for driving the take-up roll is mounted on one end of the drive shaft and a pulley 46 for driving the metering roller on the other. The pinion 41 is loosely mounted at the outer end of the drive shaft and is connected thereto through a slip-clutch of a well known type comprising a driving disc 42 and a driven disc 43 held in engagement by means of a compression spring 44. The pinion is connected with the take-up roll through a gear train 45. The pulley 46 drives the metering roller through a belt 47 and a driven pulley 46 at one end of the metering roller. The drive belt 47 is arranged to have sufficient tension to drive the metering roller and at the same time allow slippage when the metering roller has made one revolution and come to rest as will be presently explained. The take-up roll is arranged to keep the tape under tension and to wind the tape as the later is fed out by the metering roller after each quotation is printed so as to draw the newly printed quotation into view, out over the display panel at the front of the printing unit.

The drive motor 38 is supplied with power from power lines 48 and 49. One of the lines runs direct to the motor, the other is connected to the motor through either of the switches 51 and 75. These switches together provide dual control means for the motor. The switch 51 comprises contacts 52 carried at the outer end of a pair of arms 53 which are mounted upon a supporting block 54 secured to the framework of the solenoid 23. The contacts of the switch 51 are arranged to be closed by mechanism controlling the metering roller to cause the winding roll to draw the tape forward at the end of each printing portion. The switch 75 controls the rewinding action of the winding motor as will presently be described.

Referring now to the arrangement for permitting the metering roller to pay out a predetermined amount of the tape after each printing operation, it will be observed by referring to Fig. 2, that the metering roller is provided at one end with stop cam 55 having an inclined face portion 56 terminating with a shoulder 57. A stop arm 58 is provided to rest against the shoulder 57 to restrain the movement of the metering roller against the action of the driving belt 47 and the tension maintained in the tape. The stop arm 58 is pivotally mounted at 61 on a brack-

et 62. The lower end of the stop arm 58 extends beyond the pivotal mounting and terminates with an inclined face 63 and has a shoulder 64 formed at the inner end of the face. A spring 65 holds the stop arm normally in contact with the cam 55.

A lever 66 is mounted on the bracket 62 to pivot at 67, and is arranged to be actuated by the movement of the plunger of the solenoid 23 as it carries the platens upward for the printing action. The left end of the lever has a pivotally mounted click or dog 68 secured thereto and held against a stop pin 71 by means of a spring 72. The outward end of the dog 68 is arranged to normally rest on the shoulder 64 of the stop arm 58.

An upward movement of the solenoid plunger to print a quotation will swing the left end of the lever downward and the dog will slide off the shoulder and click over into contact with the inclined face 63 of the stop arm. The downward movement of the plunger will move the left end of the lever upward and the dog being held rigid with respect to the lever by means of the pin 71 will force the stop arm to rotate a slight amount in a clockwise direction. The movement of the stop lever accomplishes two results. The first of these is to disengage the stop lever from the cam shoulder 57 and release the metering roller, permitting the same to rotate and feed the tape forward. The second result accomplished is to simultaneously close the contacts of the switch 51 and start the drive motor 38, which through the slip-clutch pulls the tape forward and down the front of the quotation board and through the drive belt 47 rotates the metering roller to pay out the proper length of tape. It will be observed, that the spring 65 will again bring the stop arm 58 against the stop cam as soon as the dog 68 has passed beyond the inclined face 63 and that as the metering roller revolves the upper end of the stop arm will come into contact with the shoulder 57 on the cam and bring the metering roller to rest as soon as it has completed one revolution. As the stop arm rides down the face of the stop cam the contacts of the switch 51 will be opened. The arrangement is such that this occurs before the metering roller has come to rest, the momentum of the motor being sufficient to complete the movement of the metering roller and the take-up roll to draw the tape across the display panel and establish proper tension in the tape. The circumference of the metering roller is of sufficient size to feed out the required amount of the tape to bring the last quotation printed thereon out against the panel section 12 of the quotation board where it is immediately displayed to view.

It will be observed, that, after a substantial number of quotations have been printed on the tape with the resultant feeding forward of the tape after each operation, the quotations are advanced by the tape down the front of the quotation board and pass back through the slot 18 to be wound around the take-up roll. As heretofore pointed out, it may be desirable, at times, to refer to quotations that have passed beyond the front of the display panel onto the take-up roller. This invention is directed toward means for making this feasible, by permitting any desired amount of the tape to be pulled forward or pulled out through the slot 18 thereby unwinding the same from the take-up roller 36. Means for accomplishing this is provided by a switch 75 operated by a control arm 76 having a loop or bar portion 77 in engagement with the back surface of the tape when it is in its taut or tensioned

position at the front of the quotation board. A recess or depression 84 is provided in the front panel 12 to provide free space for the bar 77. The switch 75 comprises a pair of contacts 78, one of which is carried on a rigid arm 79 mounted on a bracket 81, the other of which is carried on a movable arm 82 formed as an extension or bell crank portion of the control lever 76. The control lever 76 and movable switch arm 82 are pivoted about the lower idler roller shaft 34. A retractable spring 83 is secured to the movable arm 82 in such a manner as to tend to rotate the arm and control lever 76 in a clockwise direction. Normally the tension of the tape engaging the loop portion 77 of the control lever will be sufficient to hold the control lever back toward the face of the panel 12 and hold the switch contacts open, against the tension of the spring 83.

Anyone desiring to examine any portion of the tape which has disappeared from view may do so by firmly grasping the tape in the hands, preferably near the lower visible portion thereof, and pulling the same forward, withdrawing it through the slot 18 causing the take-up roll 36 to be rotated in a reverse direction. As soon as the tape is grasped and portion of the tape in engagement with the loop 77 is moved away from the face of the quotation board, the retractable spring 83 will close the contacts of the switch 75 and start the drive or winding motor 38. This will produce and maintain a tension on the tape of an amount determined by the setting of the friction clutch. However, the tape will not be positively rewound but may be freely unwound by exerting a force sufficient to overcome the tension in the tape and rotate the driven disc against the effort of the driving disc and rotate the take-up roll opposite from the normal direction. The drive motor will continue in rotation as long as any portion of the tape is in the hands of the person examining the same or as long as the tape is held out of engagement with loop 77, or in other words, held away from the front of the display panel. In this manner a constant tension is maintained in the tape, and since the drive motor is tending to rotate the take-up roll in a winding direction, the observer may, with reasonable precaution permit the tape to slip through his hand and be automatically rewound on the take-up roll until all of the slack portion which was caused by this unwinding of the tape has been taken up and the tape brought again to its normal position at the front of the display panel. When the tape assumes its normal position, it will again engage the loop portion 77 of the control lever and pull the lever toward the face of the display panel, rotating the latter and the movable arm 82 in a counterclockwise direction to open the switch contacts of the switch 75. The opening of the switch contacts will stop the winding motor 38 until the tape is removed again from its normal position in front of the display panel or until the motor is started up by the switch 51 being closed in connection with the printing operation as described above.

In the meantime, however, the slackening or unwinding of the record tape does not interfere with the printing of additional quotations on the tape as they are received. Each time a quotation is received it will be set up and printed and the tape fed forward by the action of the metering driven by the motor 38 and controlled by the control switch 51 independently of the control for the take-up roll.

Referring now to Figs. 4 and 5, we have shown

a modification of the rewind control for the take-up roll shown in Figs. 1, 2 and 3. It comprises a switch 85 of substantially the same type as the switch 75 utilized in connection with the embodiment just described except that the loop 77, formed in the arm 76, instead of being positioned behind the tape in the depression 84, is, in this embodiment, positioned in front of the tape. The position of the arms 79 and 82 are reversed and the spring 83 relocated so that the contacts 78 are closed by the spring tending to rotate the interconnected arms 76 and 82 in a counterclockwise direction about the axis 34. When the tape 15 is grasped to unwind the same by pulling it through the slot 18, it will be moved away from the face of the display panel 12 which in this modification will tend to open the contacts 78 instead of permitting them to close, as in the embodiment heretofore described. Furthermore, as long as sufficient tension is maintained on the tape to overcome the action of the spring 83, the switch contacts will remain open. It is only after the tension of the tape has been slackened or the grasp released, permitting the spring 83 to pull the arm 76 and the loop 77 toward the face of the display panel a sufficient distance to permit the loop 77 to be carried beyond its normal position into depression 84, that the switch contact will be closed.

As a result the action of the winding motor 38 when controlled by the modified form of switch, will be different from the action in the former case. In other words, the switch contacts having been held open during the unwinding and examination of the tape, the motor 38 will not exert any effort toward rewinding the tape on the take-up roll until the switch contacts close and start the winding motor. This having taken place, the winding motor continues, to rotating the take-up roll rewinding the tape until all of the slack resulting from the unwound portion has been taken up and the tape restored to its normal position at the front of the display panel. In coming to its normal position the tape raises the loop 77 from the depression 84 carrying the arms 76 and 82 in a clockwise direction to again open the contacts 78 and stop the winding motor 38.

It will be observed, that by the utilization of the modified form of control switch, the tape may be unwound without the necessity of overcoming the rewinding effort of the winding motor 38, since this motor is not being actuated. On the other hand, the motor is free to be rotated in reverse direction as the tape is unwound from the take-up roll and pulled out for examination. A reasonable amount of tension will be maintained in the tape due to the resistance of natural friction in the mechanism, or friction which may be introduced into the mechanism. This tension will be sufficient to maintain the switch contact 78 open and yet will be considerably less than that required to overcome the winding action of the motor as in the case of the foregoing embodiment. Under certain conditions where it would be objectionable to maintain an appreciable amount of tension in the tape during the time that portions thereof are unwound for examination, it will be advantageous to employ the modified form of control switch.

From the foregoing description, it will be observed that we have devised an automatic rewind mechanism and control adapted to be employed in connection with the record tape for quotation board printing units which will permit any desired portion of the tape, which has passed from

view at the front of the quotation board, to be withdrawn or unwound from the take-up or receiving apparatus for examination of the quotations recorded on that part of the tape or for comparison of any of those quotations with the quotations then in view at the front of the quotation board. The utilization of this arrangement will change the character of the ordinary type of printing unit, from one showing a relatively small number of the most recent quotations posted, to virtually a continuous record of the quotations posted over a considerable period of time, any portion of which record it would be possible to refer to.

While we have shown our invention as embodied in a specific type of printing unit, it is obvious that it may be embodied in other types of printing units.

Moreover, while we have shown our invention in but two forms, it will be obvious to those skilled in the art that it is not so limited but is susceptible to various other changes and modifications without departing from the spirit thereof, and we desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

We claim:

1. In telegraphic printing apparatus, the combination of a display panel, a record tape, means to direct the tape over the front of the display panel for exposing a section of the tape to view, a take-up roll for the tape, drive means for the take-up roll, a control for the drive means, and means disposed in a predetermined position with respect to the portion of the tape lying across the panel for actuating the control in accordance with the position of the tape with reference to the front of the panel.

2. In telegraphic printing apparatus, the combination of a front panel, a record tape, means to record information on the tape, means to direct the tape over the front of the panel for exposing a section of the tape to view, a take-up roll for the tape, electric drive means for the take-up roll, a control for the drive means arranged for dual actuation, means for actuating the control in accordance with the operation of the recording means and means for actuation of the control in accordance with the position of the portion of the tape normally disposed across the panel with reference to the plane of the front of said panel.

3. In quotation printing apparatus, the combination of a display panel, a record tape, means to direct the tape over the front of the display panel for exposing a section of the tape to view, the front of said panel being provided with a recess disposed behind the tape and transversely thereof, a take-up roll for the tape, drive means for the take-up roll, a control for the drive means, a member disposed to engage the portion of the tape traversing the recess for actuating the control in accordance with the position of the portion of the tape over the recess with reference to the front of said display panel.

4. In quotation printing apparatus, the combination of a display panel, a record tape, means to direct the tape over the front of the display panel for exposing a section of the tape to view, said panel being provided with a recess disposed behind the tape and transversely thereof, said tape normally being held taut across said recess, a take-up roll for the tape, an electric drive motor for driving the take-up roll, a control switch for

the drive motor, said switch embodying an operating lever disposed in engagement with the portion of the tape located over the panel recess, said operating lever being arranged to operate the switch when slack occurs in the portion of the tape over the recess.

5. In quotation printing apparatus, the combination of a display panel, a record tape, means to direct the tape over the front of the display panel for exposing a section of the tape to view, said display panel being provided with a recess disposed behind the tape and transversely thereof, said tape normally being held taut across said recess, a take-up roll for the tape, an electric drive motor for driving the take-up roll, a control switch for the drive motor, said switch embodying an operating lever disposed in engagement with the outer surface of the portion of the tape located over the panel recess, said operating lever acting to hold the switch open when the tape is in normal position over the recess, and being arranged to close the switch when the tape is disturbed or slackened to permit the portion over the recess to swing inward.

6. In quotation printing apparatus, the combination of a display panel, a record tape, means to direct the tape over the front of the display panel for exposing a section of the tape to view, said display panel being provided with a recess disposed behind the tape and transversely thereof, said tape normally being held taut across said recess, a take-up roll for the tape, an electric drive motor for driving the take-up roll, a control switch for the drive motor, said switch embodying an operating lever disposed in engagement with the inner surface of the portion of the tape located over the face of the panel, said operating lever acting to hold the switch open while the tape is in normal position over the face of the panel and arranged to close the switch when the tape is disturbed or slackened to permit the section over the face of the panel to swing outward therefrom.

7. In a quotation board printing apparatus, the combination of a display panel, a printing mechanism disposed behind said panel, a record tape upon which quotations are impressed in successive order by the printing mechanism, a supply roll for supplying the tape, a metering roller for feeding the tape forward a predetermined amount after each quotation is printed thereon, drive means for the metering roller, means to provide for passing the tape across the front of the display panel as it is fed forward, a take-up roll for receiving the tape as it passes beyond the front of the panel, drive means for the take-up roll, means associated with the take-up roll for permitting the tape to be unwound

therefrom by lifting the tape from panel and exerting a suitable force on the tape acting to withdraw the same toward the front panel, control means operative upon a slackening of the withdrawal force for causing the drive means for the take-up roll to rotate the same to rewind the tape and return it to normal position on the panel, and separate control means for controlling the metering roller drive to cause same to feed the tape forward independent of the position of the tape with regard to the front panel.

8. In a printing unit for recording information embodying a display panel, a record tape, a mechanism for printing successive quotations on the tape, means to direct the tape over the display panel for maintaining a section of the tape in view, a take-up roll for the tape, electrically operated drive means for the take-up roll, a switch embodying dual sets of contacts for starting and stopping the drive means, means operated by the printing mechanism to close one set of contacts in the dual switch for starting the driving means as quotations are printed on the tape, and means operated by a lever controlled by the portion of the tape in view to close the other set of contacts in the dual switch in accordance with the position of the tape with reference to the front surface of the display panel.

9. In apparatus for recording information, the combination of a record tape, mechanism for printing on the tape and for feeding the tape forward as the printing occurs, a take-up mechanism for the tape, guide means for the tape disposed between the printing mechanism and the take-up mechanism, a motor arranged to drive the take-up mechanism, a slip clutch between the motor and the take-up mechanism for permitting the motor to rotate and impart a tension to the tape in accordance with the friction of the slip clutch, dual controls for the motor, means for operating one of said controls in accordance with the printing operations so as to take up the tape and maintain the same substantially at the condition of tautness determined by the friction of said slip clutch, the other of said controls having means disposed to engage the portion of the tape between said guide means in such a manner as to hold said other control out of operation as long as the tape maintains substantially its predetermined condition of tautness and position between the guide means, the tape engaging means of said other control being operable to operate said motor whenever the predetermined condition of tautness or position of the tape with respect to said latter means is disturbed.

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