

March 17, 1942.

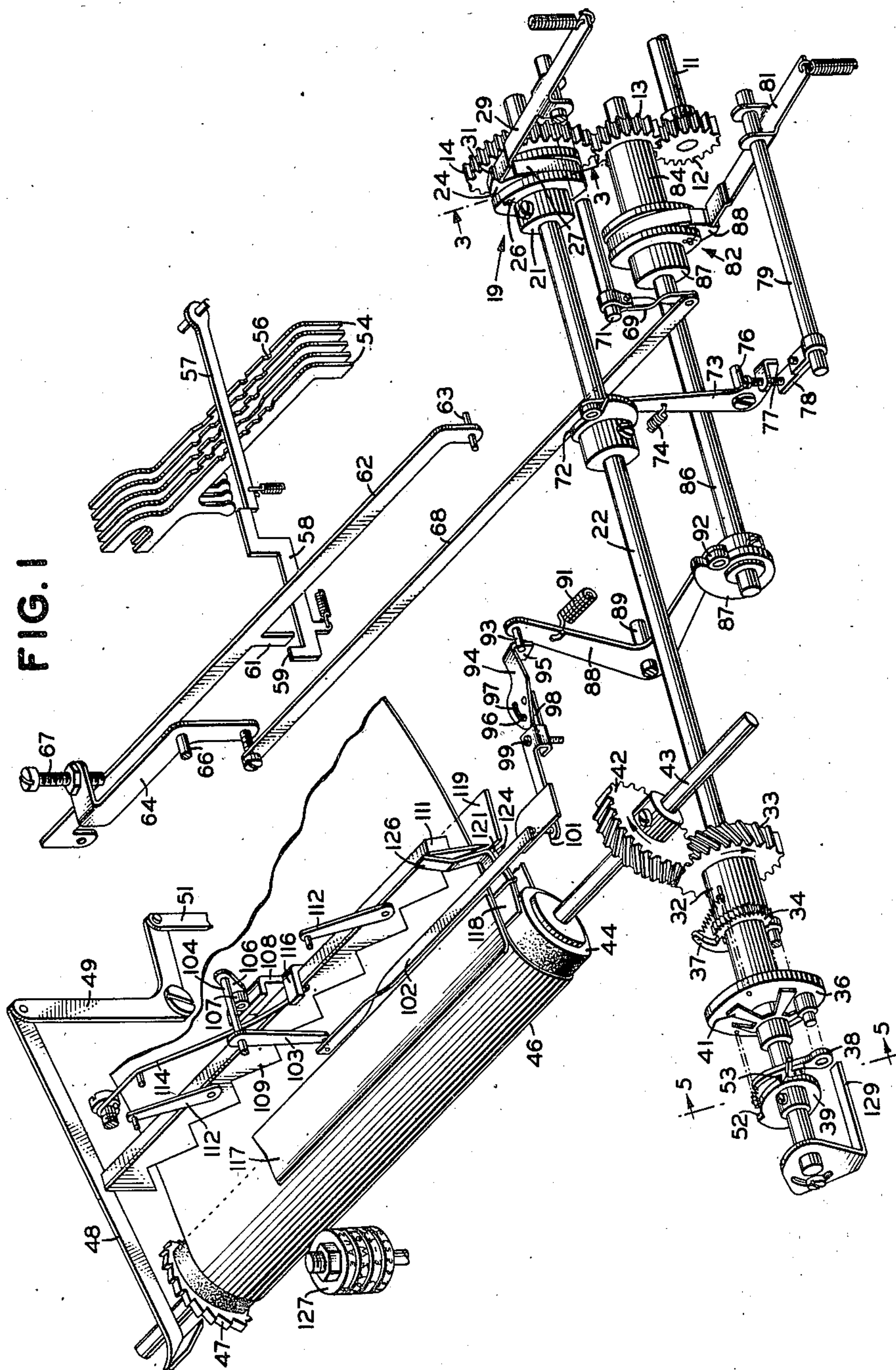
J. W. LONG ET AL

2,276,991

TELEGRAPH APPARATUS

Filed June 9, 1939

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 2

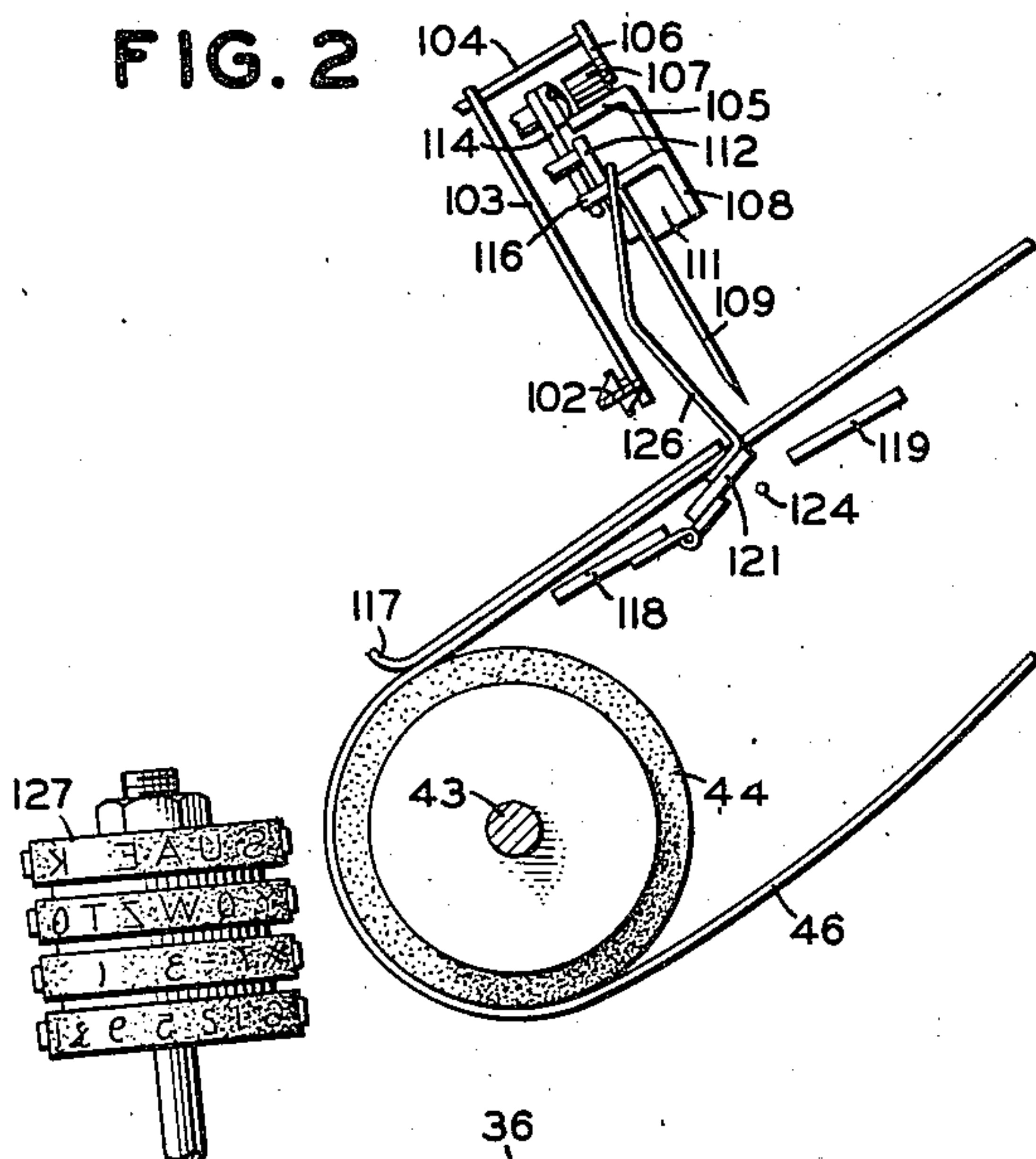


FIG. 3

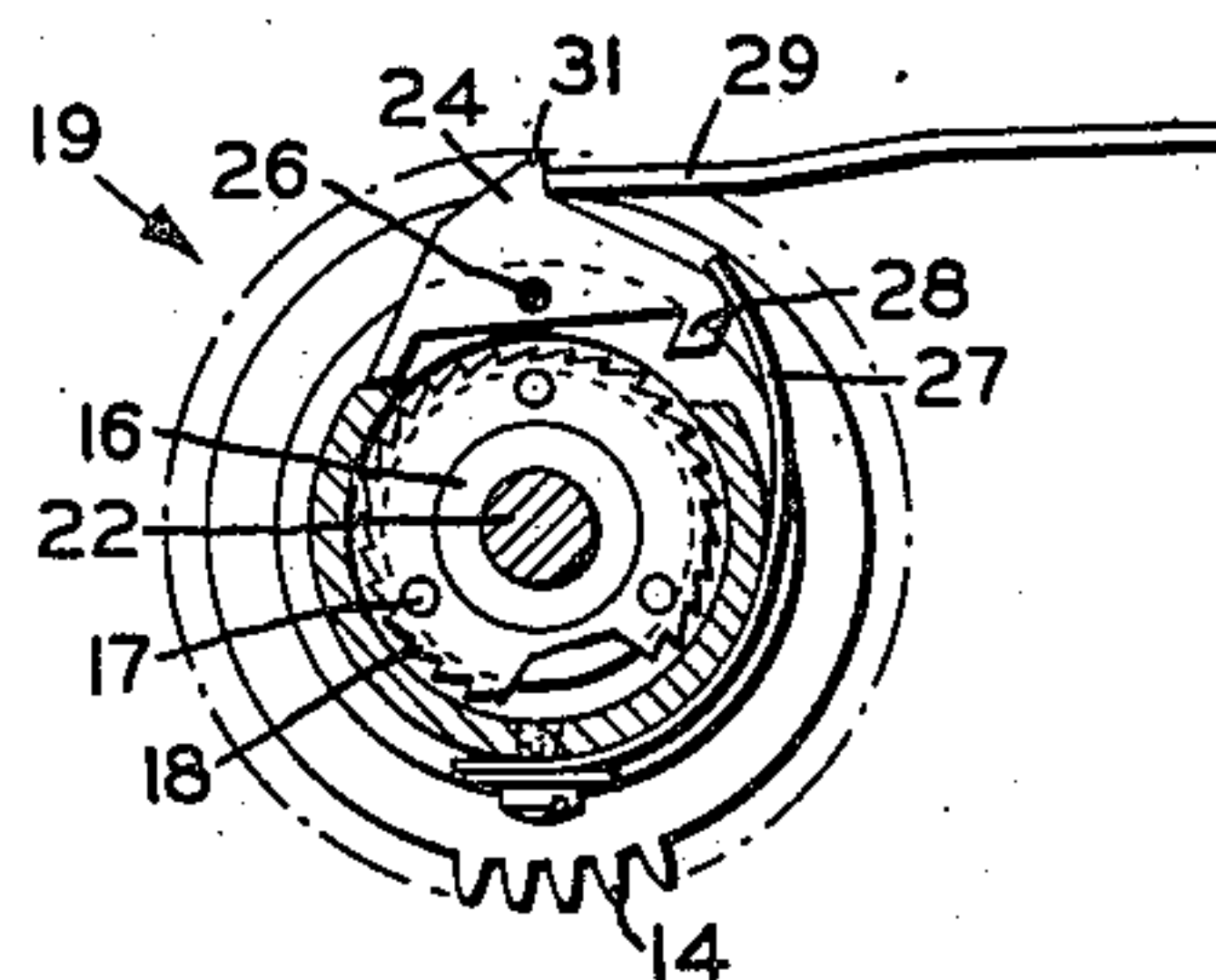


FIG. 4

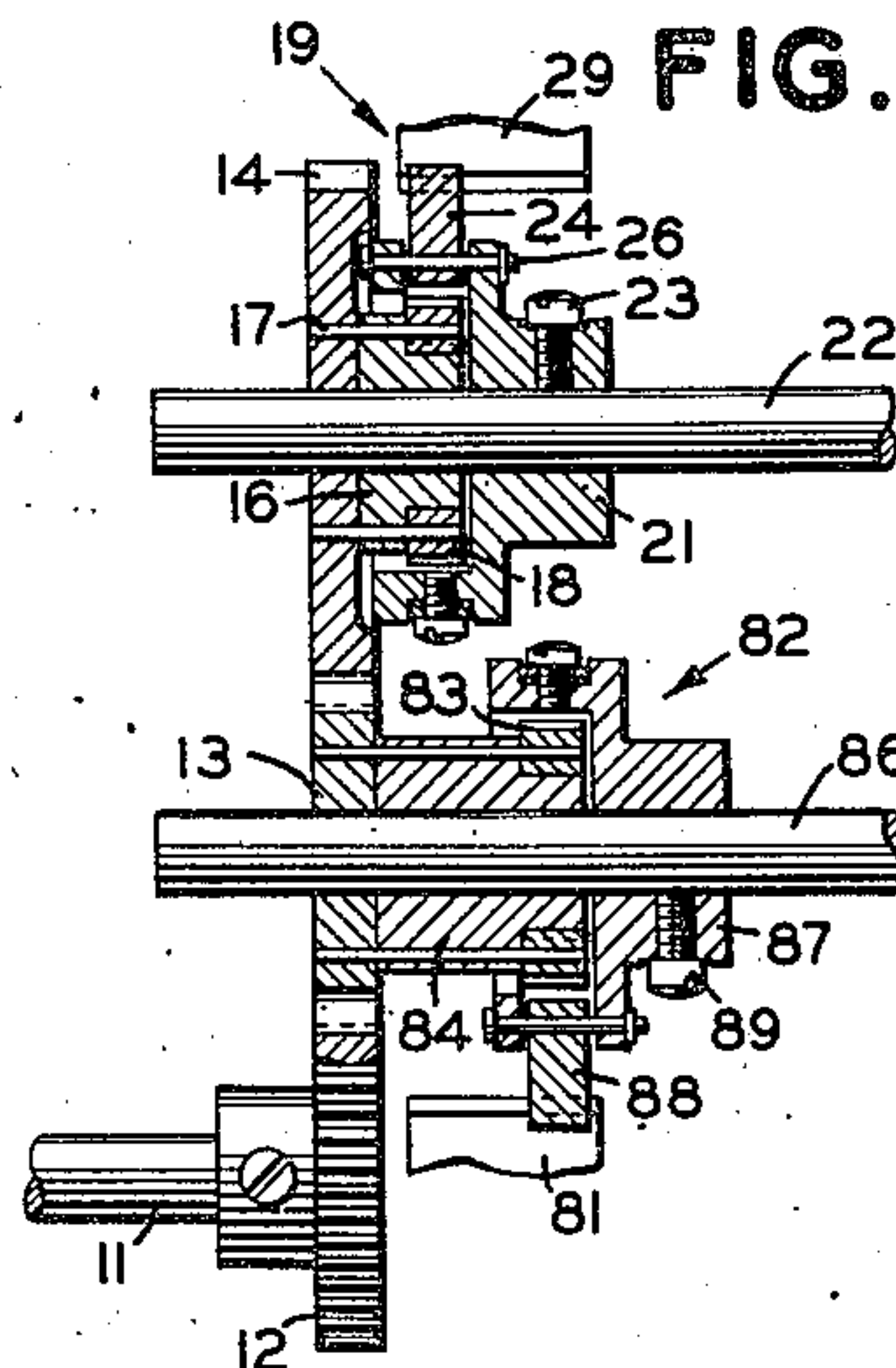


FIG. 5

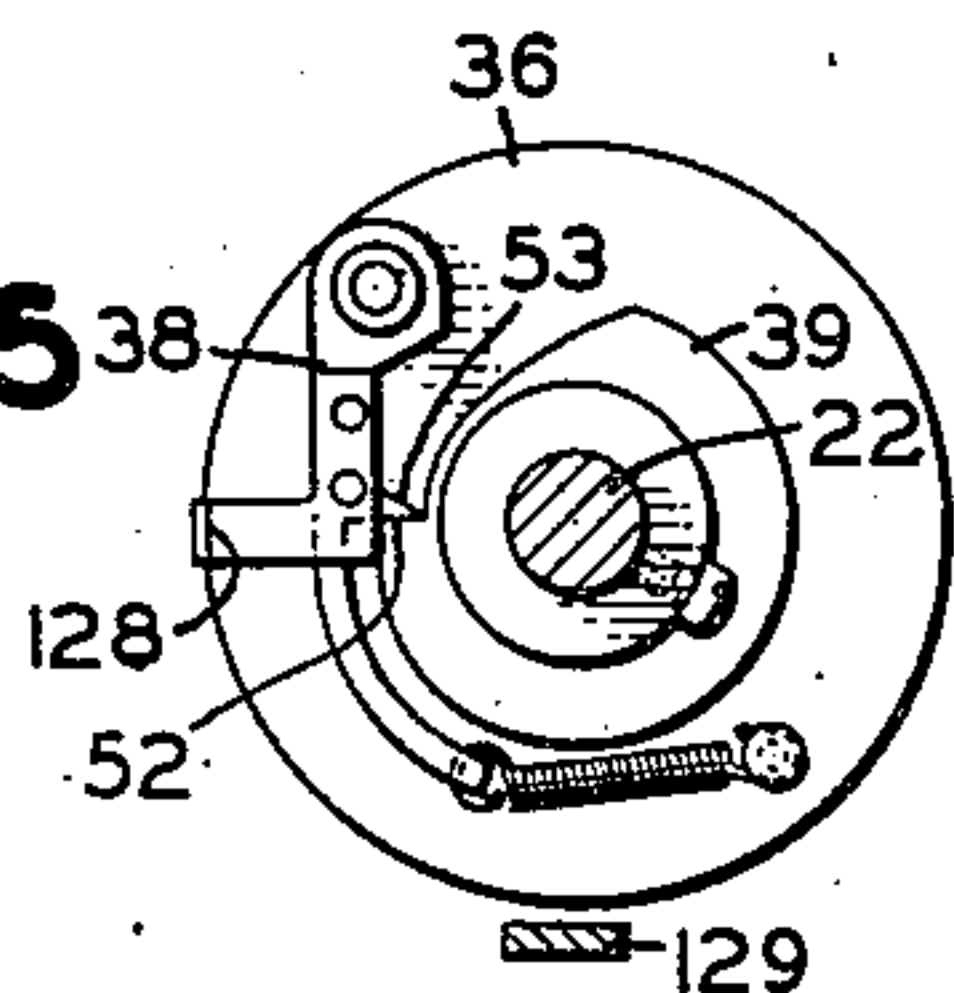


FIG. 6

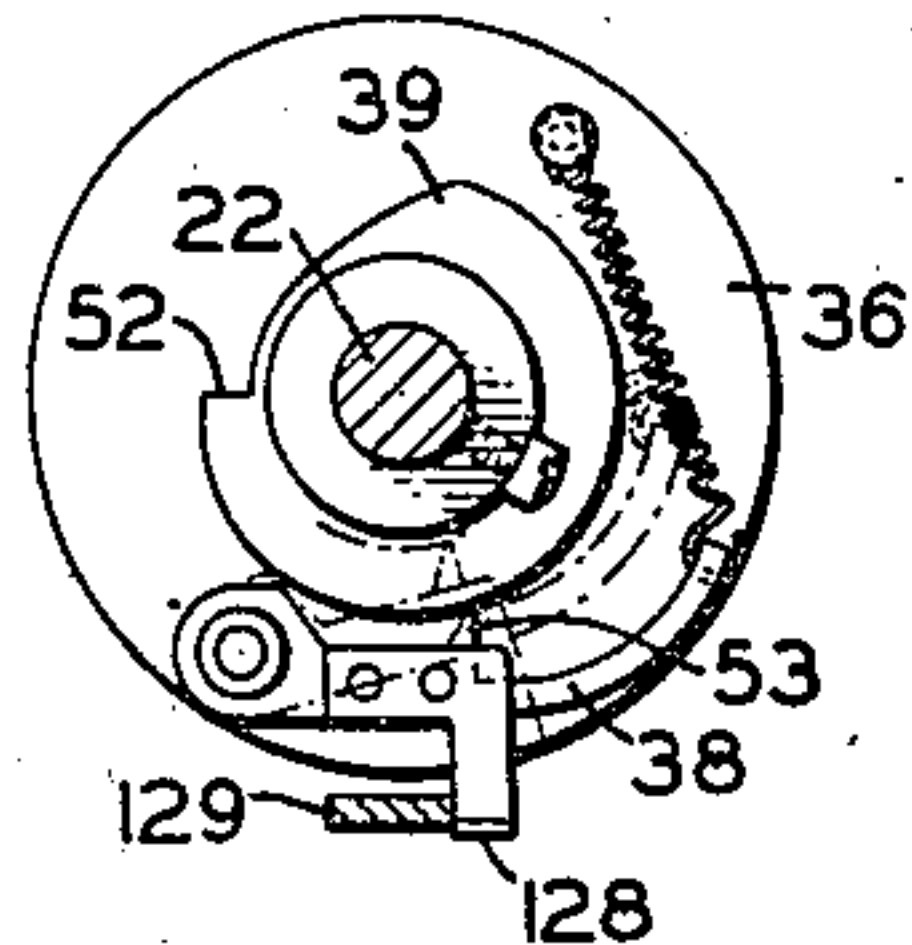


FIG. 7

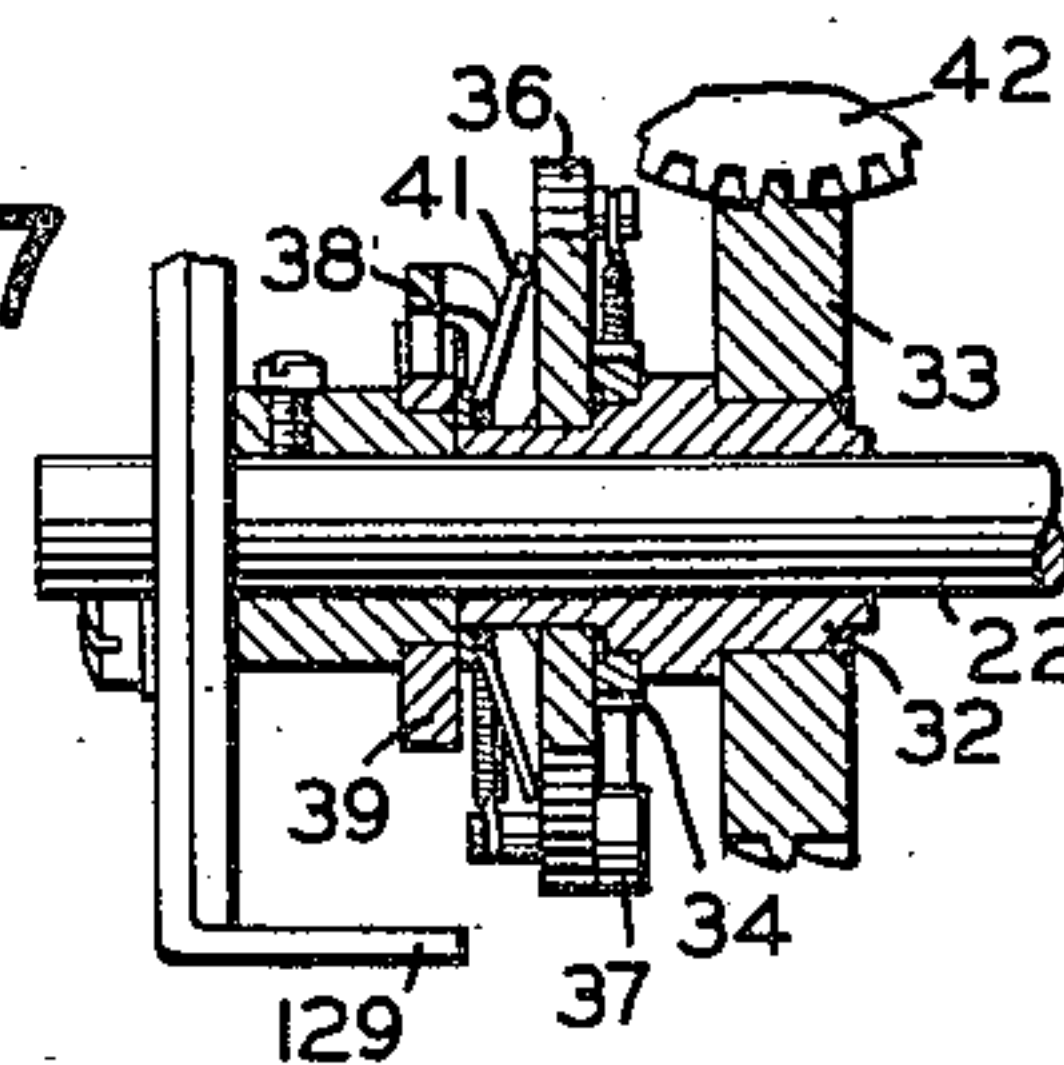
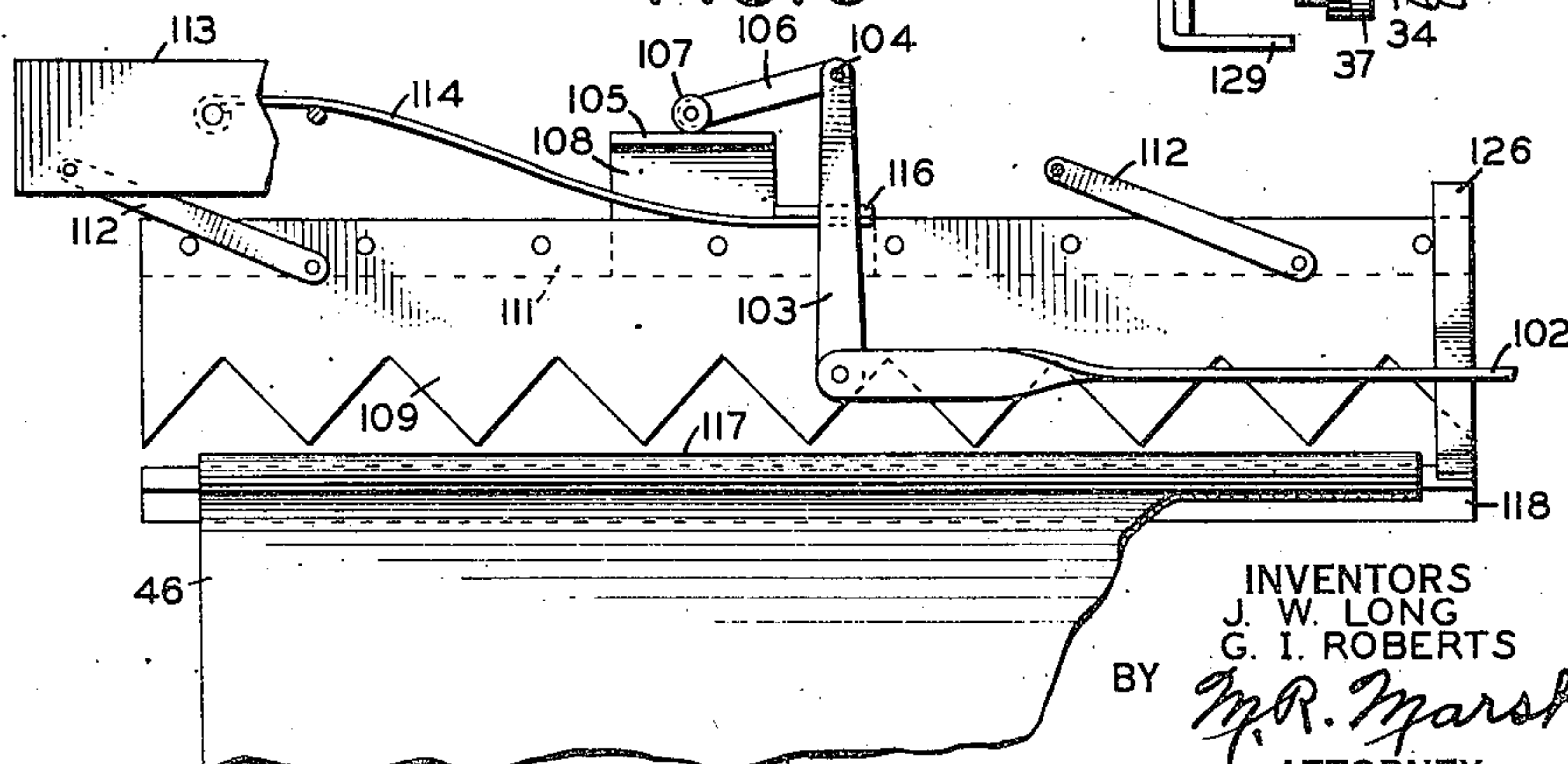


FIG. 8



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2,276,991

TELEGRAPH APPARATUS

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Application June 9, 1939, Serial No. 278,260

19 Claims. (Cl. 178—42)

This invention relates primarily to telegraph apparatus and more particularly to apparatus for association with telegraph printers or receivers which are selectively controlled by received code combinations of impulses to provide an auxiliary signal controlled paper feeding means for assisting in a predetermined manner the advancement of the recording paper through the associated printers or receivers.

The principles of the invention are shown and hereinafter described as cooperating with a stationary platen page printer, such printers, as well known in the art, having a stationary printing platen and a type of printing mechanism movable to and fro in front of the platen to effect letter spacing and carriage return functions in conjunction with the printing of characters representative of received code combinations in successive transverse lines or rows on the recording paper or web, the platen being rotated or stepped a predetermined amount at the completion of one line of print to advance the recording paper and present a clear section thereof to the printing mechanism. The invention is shown associated with the above type of printing merely for the purpose of illustration and it will be evident hereinafter that the principles of the invention could be equally well applied to various other types of printers, such as for example a printer having a stationary printing mechanism and a platen which moves to and fro to effect the letter spacing and carriage return functions.

Telegraph page printers or receivers commonly used at present, such as those employed in telegraph central offices wherein it is advantageous to have each telegram or message recorded on a separate sheet of paper or telegraph blank of substantially uniform size or of not less than a predetermined minimum size, generally have the paper supplied thereto in the form of separate sheets or blanks of uniform size or from a continuous roll. When the paper is supplied in the form of separate sheets which are usually the size of an ordinary telegraph blank an attendant is required to place each blank in the receiving printer prior to the receipt of each message and at the end of each message remove the blank from the printer. After being removed from the printer the messages are usually deposited or placed on a belt or some such conveying means for conveyance to a central distributing point where they are routed to their proper destination. An appreciable length of time is required for the above manual operations

of removing one blank from the printer and the insertion of the next for the proper recording of the next message thereon and obviously during such times it is necessary that the transmitting station remain idle which results in lost line time. Although the time required to accomplish the above operations between two consecutive messages may be very short, a certain minimum is required to insure that the operations are completed and in the course of a day the total line time thus lost may be a considerable amount. With printers supplied with a continuous roll of paper the paper may be advanced between messages by the transmission of a sufficient number of line feed signals or it may be manually advanced by an attendant at the receiving printer who also cuts or tears the paper at the proper places to separate the messages into blanks of substantially uniform size. The arrangement of transmitting the necessary number of line feed signals at the end of a message needlessly consumes line time and places an additional burden on the transmitting operator of having to keep an account or record of the number of line feed signals transmitted during the message so as to be able to determine the number that should be transmitted at the end of a message, such an arrangement also being tedious for the operator and susceptible of errors. Where the transmitting operator has to wait for the attendant at the receiving printer to manually advance the paper the proper amount, line time is also lost and if the attendant is not watching the printer closely this operation is apt to be neglected resulting, where the messages are comparatively short, of two or more messages appearing on a blank where there should be only one. Thus it is evident that any of the above arrangements generally used have the disadvantage of wasting an appreciable amount of line time between messages and also requires a considerable amount of an attendant's time and attention at the receiving printer and the number of printers one attendant can efficiently supervise is therefore limited.

Accordingly, one of the primary objects of the present invention is to provide an attachment for page printers of the above type so that when the printers are used in services where it is advantageous for the purpose of distribution, etc. to have each recorded message appear on a separate sheet or blank, or on a strip that can be easily separated into separate sheets or blanks of substantially uniform size or of not less than a minimum size, a predetermined signal trans-

mitted at the end of each message automatically advances the paper varying amounts so that the amount of paper advanced in conjunction with each message is substantially the same or not less than a predetermined minimum amount. In the above arrangement the recording paper will obviously be supplied to the printer from a roll, fanfold arrangement or other means providing a continuous length of paper.

In accordance with the above, another object of the invention is to provide a mechanism operating in conjunction with the automatic signal controlled paper advancing means which, depending upon the adjustment thereof, severs or partially severs the paper to form separate message blanks or a partially severed strip which may easily be separated into separate message blanks of substantially a uniform size or of not less than a minimum size.

Another object of the invention is to provide a mechanism for automatically advancing the recording paper in a printer so that when the length of a message exceeds a predetermined length or more than what can be printed on an ordinary size blank, the paper is advanced to bring the last printed line a predetermined distance past the severing point.

Another object of the invention in accordance with the above is to provide means for varying the amount that the last printed line of a message is advanced past the severing point when the length of the message exceeds a predetermined length.

Another object of the invention is to accomplish the advancement of the paper through the printer and the severing or partial severing thereof in less time than would be required to ordinarily transmit a number of line feed signals to advance the paper an equal amount.

Other objects of the invention reside in the simplicity of operation thereof, the minimum number of parts required, and the ease of attaching the same to printers of the above type.

These and other objects of the invention will be apparent hereinafter when taken in conjunction with the following detailed description thereof and the accompanying drawings, in the latter of which—

Fig. 1 is a diagrammatic perspective view of the invention, together with some of the elements of a page printer showing the cooperation of these elements with the invention;

Fig. 2 is an elevational view partly in section showing the printing platen of the printer and the paper severing mechanism;

Fig. 3 is a sectional view taken substantially on lines 3—3 of Fig. 1, showing the clutch employed to drive the auxiliary paper advancing means;

Fig. 4 is a sectional view showing the drive and the clutches employed for the auxiliary paper advancing and severing mechanisms;

Fig. 5 is a fragmentary sectional view taken substantially on line 5—5 of Fig. 1, showing one of the operating cams and the associated elements;

Fig. 6 is a view showing the mechanisms of Fig. 5 in different operated positions;

Fig. 7 is a sectional view showing a part of the auxiliary paper advancing means and the control elements cooperating therewith; and

Fig. 8 is a fragmentary elevational view of the paper severing mechanisms.

The invention is hereinafter described in detail and shown in the drawings as being attached

to operate in conjunction with and under the control of a stationary platen page printer disclosed in a copending application of J. W. Long et al., Serial No. 229,672, filed September 13, 1938. However, it will be evident that the principles of the invention may be readily applied to other types of printers. In the drawings only so much of the parts of the above mentioned printer are shown as cooperate with the elements of the invention and are thought necessary for a thorough understanding of the operation thereof.

In general the invention consists of a so-called paper metering or measuring device which is advanced from a normal position during line feed operations of the printer in response to line feed signals. The metering device comprises an auxiliary paper advancing mechanism and determines the amount of paper that is advanced by the end-of-message signal invariably transmitted at the end of each message. As the messages usually vary in length the number of line feed signals contained therein are variable and therefore in order that the blanks upon which each message appears be of substantially uniform size, the distance the paper has to be advanced at the end of each message is variable. The manner in which the metering device determines the variable length of paper advanced at the end of each message will hereinafter be described in detail.

After the recording paper has been advanced a variable amount in accordance with the position of the metering device at the time the end-of-message signal is transmitted, a knife is operated which cuts the paper. Depending upon an adjustment the movement of the knife is variable so that it may completely sever the paper or form a series of cut sections therein at which point the blanks may be easily separated if and when it is desired.

Occasionally there are longer messages than the average and in such instances it is advantageous for them to appear on a single blank as a single message appearing on more than one blank is confusing. Accordingly the metering device is so adapted that when a message is of such a length that it cannot be recorded on a blank of the regular size, the metering device operates to advance the paper only enough to bring the last line of the message past the paper-cutting knife. The metering device may be adjusted so that the amount of paper advanced at the end of a message of unusual length may be varied so that the last line recorded on the message blank may be advanced variable distances past the cutting knife.

A more thorough and complete description of the invention may be had in the following detailed description taken in conjunction with the accompanying drawings.

Referring first to Fig. 1, a constantly rotating shaft 11 which may be for example the selector cam shaft of the associated printer, has fixed thereon for rotation therewith a gear 12. The gear 12 meshes with and drives another gear 13 located directly thereabove which in turn meshes with and drives a third gear 14. The gear 14 is pinned to a hub 16, Figs. 3 and 4, by pins 17 to which is also pinned a ratchet 18. The ratchet 18 comprises the driving member of a grab clutch indicated in general by reference numeral 19, Figs. 1, 3 and 4, and the driven member of the clutch comprises a recessed or hollow ended sleeve 21 which is fixed to a shaft

22 for rotation therewith by a set screw 23. The hub 16 with its attached elements is freely mounted on the shaft 22. The recess of the sleeve 21 surrounds the ratchet 18 and carried at a radial opening in the recess is a ratchet dog 24. The dog 24 is pivotally mounted on a pin 26 in the sleeve 21 and a spring 27 attached to the outside of the sleeve normally urges the projection 28 of the dog to engage the teeth of the ratchet 18. However, a stop or trip lever 29 normally engages a shoulder 31 on the dog 24 to hold the projection 28 from engaging the teeth of the ratchet 18 whereby the driven member of the clutch 19 is held at rest in its normal rest position.

When the stop or trip lever 29 is actuated, as hereinafter described, the end thereof is disengaged from the shoulder 31 on the dog 24, whereupon the spring 27 pivots the dog in a clockwise direction as shown in Fig. 3 to cause engagement of the projection 28 with the teeth of the rotating ratchet 18. Thereupon the sleeve 21 rotates with the constantly rotating ratchet for one revolution, it being stopped at the end of a revolution by the trip lever 29 engaging the shoulder 31 on the dog to pivot the same and withdraw the projection 28 from engagement with the teeth of the rotating ratchet 18. As the trip lever 29 is only momentarily operated, it will invariably be back in its normal position to reengage the projection 31 of the dog 24 and stop the rotation of the sleeve 21 after each revolution thereof. Thus the sleeve 21 and the shaft 22 rotatable therewith are released for one and only one revolution at a time and during the rotation thereof control the function of the above mentioned metering device as will be described.

Loosely mounted on the forward end of the shaft 22 is a sleeve 32, Figs. 1 and 7, which has fixed thereto for rotation therewith a helical gear 33 and a tooth ratchet wheel 34. Loosely mounted at the left hand end of the sleeve 32 is a friction plate 36 which has pivotally mounted on the right and left hand faces thereof spring biased pawls 37 and 38, respectively. The pawl 37 is adapted to cooperate with the teeth of the ratchet 34 in a manner hereinafter described, while the pawl 38 cooperates with a disc cam 39 fixed to the shaft 22 for rotation therewith at the left of the friction plate 36. A flat friction spring 41 disposed between the cam 39 and the friction plate 36 creates a friction on the plate so that it normally rotates with the sleeve 32, however, for certain conditions hereinafter described this friction is ineffective.

Meshing with the helical gear 33 and located directly thereabove is another helical gear 42 which is fixed for rotation therewith to the platen shaft 43. Mounted on the platen shaft 43 is the platen 44 of the above mentioned printer which has the recording paper 46 in frictional engagement therewith by means (not shown) so that when the platen rotates the paper is advanced. Rotatable with the platen 44 and shaft 43 is a ratchet 47 which is operated by a pawl 48 to step the platen one line space in response to each line feed signal. The pawl 48 is operated through the instrumentalities of the associated bell crank 49 and lever 51 and they comprise in part what may be called the main paper advancing mechanism.

Let it be assumed that the paper 46 is in position to record the first line of a message or as it will be before any line feed signals have

been received since the transmission of the end-of-message signal at the end of the preceding message. For such a condition the relative positions of the cam 39 fixed to the shaft 22 and the pawl 38 on the friction plate 36 will be such that as shown in Fig. 5, a radial surface 52 on the cam will be in engagement with a projection 53 on the pawl 38. Following the first line of print of the message a line feed signal is received which, as previously described, rotates the platen shaft 43 and its attached members to advance the recording paper 46 a distance of one line space. During this movement of the platen shaft 43 the gear 42 rotating therewith in mesh with the gear 33, causes the sleeve 32 fixed to the gear 33 to rotate on the shaft 22. As the sleeve 32 is thus stepped or rotated, the friction plate 36 held in frictional engagement therewith by the spring 41 also rotates. The pawl 38 on the left hand side of the friction plate 36 moving therewith, causes the projection 53 on the pawl to move away from the radial surface 52 on the cam 39, the cam 39 obviously remaining stationary during the rotation of the sleeve 32 and the associated elements in response to a line feed signal. Each subsequent line feed signal causes the sleeve 32 to be rotated an equal amount and during such movement of the sleeve the pawl 38 continues to move around the cam 39.

If the number of lines of print in the message are sufficient to cause the recording paper 46 to be advanced approximately one-half the distance of a regular size blank, then the sleeve 32 will have made approximately one-half a revolution during the receipt of the associated line feed signals. This movement of the sleeve 32 and friction plate 36 will have rotated the pawl 38 sufficiently to bring the projection 53 thereon out of operative relation with the notch in the cam 39 and into operative relation with the section of maximum radius. As hereinbefore described, following the receipt or transmission of a complete message an end-of-message signal is transmitted which is received on the selector mechanism of the associated printer to initiate the advancement of the recording papers variable amounts, the amounts depending upon the number of line feed signals in the previous message as will be apparent hereinafter.

The selector mechanism of the above mentioned printer comprises a group of five longitudinally movable levers such as 54, Fig. 1, which are selectively positionable into one or two positions in accordance with received signals. The levers 54 have formed along the length thereof a series of notches 56 which cooperate with pivoted levers such as 57 to control the operation of slidable members 58, only one each of the levers 57 and members 58 being shown. When the levers 54 are selectively positioned in response to the end-of-message signal, a row of the notches 56 therein will be in alignment with the pivoted lever 57, whereupon the attached spring urges the lever into the row of notches. Such movement of the lever 57 permits the slidable member 58 to move toward the right under the action of its attached spring and place an upwardly extending projection 59 thereon beneath a depending projection 61 on an associated floating or function lever 62. The floating levers such as 62, as described in the copending application, have pivotally attached at their left hand end the various operating levers (not shown) and the right hand ends are

all pivoted on a pin 63 carried in a cyclically operated member (not shown) which depresses the right hand ends of the levers 62 once during each cycle of operation of the printer.

Normally or during cycles of operation in which none of predetermined functions are performed, the floating levers such as 62 pivot idly about the operating links attached to their left hand ends and obviously do not perform their respective functions. However, when a projection such as 59 on a slidable member 58 moves beneath the depending section such as 61 adjacent the center of a floating lever 62, that particular floating lever pivots about the center thereof when the right hand end cyclically moves downward. The floating lever 62 shown, is used or employed to initiate the advancement of the paper at the end of the message and in response to the end-of-message signal as will now be described.

A bell crank 64 pivotally mounted at 66 carries in the horizontal arm thereof an adjustable screw 67 which is in operative relation with the upper edge of the floating lever 62 adjacent the left hand end thereof. When the floating lever 62 pivots about its left hand end, there is no appreciable movement of the bell crank 64, but when it pivots about the end of the depending section 61 adjacent the center thereof, the bell crank is caused to pivot in a clockwise direction. This pivoting movement of the bell crank 64 causes a substantially horizontal link member 68, the left hand end of which is attached to the depending arm of the bell crank 64, to move a slight amount toward the left. The right hand end of the link 68 is attached to a depending arm 69 fixed for movement therewith to a pivotable rod 71. Also fixed to the rod 71 for pivotable movement therewith is the trip lever 29 and when the link 68 moves toward the left, the rod 71 is pivoted which causes the end of the trip lever 29 to be disengaged from the surface 31 on the dog 24 of the above described grab clutch 19. Thus the trip lever 29 is actuated to release the shaft 22 to make one revolution in conjunction with each selective operation of the floating lever 62.

It is obvious that any signal control device could be employed to trip the clutch 19 for one revolution at a time, the above described mechanisms being employed as they advantageously and conveniently fit in with the particular selector mechanism of the above mentioned printer.

If it is assumed that the message received prior to the selective operation of the floating lever 62 had a sufficient number of line feed signals therein to cause, as described, about one half a revolution of the sleeve 32, then the pawl 38 will have rotated approximately one-half a revolution and the projection 53 thereon will be substantially diametrically opposite the radial surface 52 on the cam 39. With the pawl 38 in this position at the time the shaft 22 is released for one revolution by the operation of the trip lever 29, the cam 39 will then have to make approximately one half a revolution before the radial surface 52 engages the projection 53 on the pawl. During this approximate one half revolution of the shaft 22 and the cam 39 there will be no rotative movement of the sleeve 32 and its associated elements as the friction created by the spring 41 which tends to rotate the sleeve with the shaft 22 is not sufficient to rotate the platen shaft and its attached elements through the gears 33 and 42. When the radial surface 52 of the cam 39 has rotated sufficiently to engage the projection 53 on

the pawl 38, which will be some time prior to the completion of a revolution of the cam 39, or after approximately one half a revolution for the above assumed set of conditions, further rotation thereof causes the pawl 38 to rotate with the cam 39. The pawl 38 in rotating also rotates the friction plate 36 together with the pawl 37 on its right hand face and during such rotation of the pawl 37 it engages the teeth of the ratchet 34 to rotate the same. The ratchet 34 being fixed to the sleeve 32 rotates the same with the gear 33 which in turn rotates the gear 42 fixed to the platen shaft 43. As the platen 44 is attached to the shaft 43 it will be rotated with the gear 42 and in such a direction as to advance the recording paper 46. The amount of such rotation of the platen 44 is dependent upon the amount of the rotation of the cam 39 after the radial surface 52 thereon engages or picks up the projection 53 on the pawl 38, and as above described the place of engagement is normally determined by the number of line feed signals transmitted or received during the previous message. Thus the sleeve 32 is adapted to normally make one complete revolution during the advancement of the recording paper an amount sufficient to form a blank of the standard size. The gears 33 and 42 and the size or circumference of the platen 44 are so arranged that the above is accomplished during one revolution of the sleeve 32. The sleeve 32 as described, is rotated during the first part of its revolution by line feed operations and during the remainder of a revolution in response to the end-of-message signal.

Fixed to the shaft 22, Fig. 1, for rotation therewith is a disc cam 72 which is adapted during the latter part of a revolution of the shaft 22 to pivot a bell crank 73 in a clockwise direction against the action of its attached spring 74. The bell crank is pivoted at 76 and the rightwardly extending arm thereof carries an adjustable screw 77 which is in operative relation with and normally engaged with a leftwardly extending arm 78 attached to the rod 79 for pivotal movement therewith. Also attached to the rod 79 is a trip lever 81 which controls the operation of a grab clutch indicated in general by reference numeral 82 Figs. 1 and 4 similar in construction and operation to the grab clutch 19 hereinbefore described employed to rotate the shaft 22. The driving member of the grab clutch 82 comprises a ratchet 83 which is pinned to the normally rotating gear 13 for rotation therewith, both of which together with a spacing collar 84 are loosely mounted on a shaft 86. The driven member of the clutch 82 comprises a recessed sleeve 87 and associated dog 88, the sleeve 87 being fixed to the shaft 86 for rotation therewith by a set screw 89. Thus through the above described mechanisms and the clutch 82 the shaft 86 is adapted to make one revolution concomitantly with each revolution of shaft 22 and because of the fact that a clutch 82 is tripped late in the cycle of operation of the shaft 22 substantially all of its rotation occurs after the shaft 22 has been brought to rest. The reasons for such arrangement will be obvious hereinafter.

In accordance with the invention the recording paper is severed or partially severed after it has been advanced to form a blank of standard size and the mechanism for severing the paper is controlled or operated from a cam 87 fixed to the shaft 86 for rotation therewith. Associated with the cam 87 is a follower 92 which is carried

in the rightwardly extending arm of a bell crank 83 pivoted at 89. An attached spring 91 keeps the follower 92 on the rightwardly extending arm of the bell crank in engagement with the periphery of the cam 87. The upwardly extending arm of the bell crank carries in the end thereof a pin 93 which is in operative relation with a depending section 95 of a substantially horizontal plate 94. The plate 94 is adjustably attached by a screw 96 extending through a curved slot 97 therein to the right hand end of a lever 98 pivotally supported adjacent its center on a shoulder screw 99. The opposite end of the lever 98 carries a vertical pin 101 to which is pivotally attached the right hand end of a pull bar 102, Figs. 1, 2 and 8, the left hand end of which is pivotally attached to the lower end of a depending arm 103. The arm 103 is mounted on the left hand end of a pivot rod 104 for pivotable movement therewith and mounted on the right hand end of the rod 104 is a second arm 106. The arm 106 carries in the free end thereof a roller 107 which is in operative relation with the upper surface of a bent over portion 105 of a bracket 108. The bracket 108, together with a knife member 109, extending slightly more than the full width of the recording paper 46, are attached to a longitudinal member 111. The longitudinal member 111 extends the full length of the knife 109 and prevents bending thereof as the knife is comparatively thin and by itself would be more or less flexible. Pivotally attached to the knife 109 and longitudinal member 111 are two similar links 112 which are pivoted at their upper ends in a stationary transverse member such as 113 of the associated printer. The links 112 are attached and arranged so that during movement of the knife in a downward direction as herein-after described it remains substantially horizontal. A spring wire 114, one end of which is fixed in the member 113, has the other end extending beneath a projection 116 of the bracket 108 to hold the knife in its upper normal position and to return the same to its normal position after being actuated. As shown in Figs. 1, 2 and 8, the knife 109 is normally above the recording paper 46 and in such a position permits the free passage of the paper thereunder. The paper 46 in leaving the platen passes underneath a top guide plate 117 and over two stationary guide members 118 and 119. A third guide member 121 is located between the guide members 118 and 119 and assists in the guiding of the paper as will be hereinafter described.

Let it be assumed that the recording paper 46 has been advanced in accordance with the operation of the metering device and it is desired to sever the same at a point directly beneath the knife 109. The cam 87 for operating the knife as described is so arranged that its operating portion comes in engagement with the roller 92 after the paper has been advanced as obviously the paper should not be moving during the severing operation. As the cam 87 operates the bell crank 83 to pivot the same in a counter-clockwise direction the lever 98 is also pivoted in a counter-clockwise direction. This movement of the lever 98 moves the pull bar 102 toward the right which in turn pivots the arms 103 and the roller 107 in a counter-clockwise direction. This movement of the rod 104 pivots the arm 106 and during such movement the roller 107 forces the bracket 108 with the attached knife 109 downward. The knife comprises a comparatively thin blade which has formed on its lower edge a series

of sharpened points about an inch apart with cutting edges sloping upwardly therefrom at approximately forty-five degrees. During the first part of the downward movement of the knife blade 109 the points thereof puncture the paper and then during further movement the sharpened cutting edges cut the paper. The paper 46 offers some resistance to the downward movement of the knife 109 and causes the pivotable guide 121 on the under side of the paper to pivot a slight amount or until it is stopped on engagement with a fixed stop 124. The stop 124 is so arranged that when the pivotable guide 121 comes in contact the three guides 118, 119 and 121 are in substantial alignment. The knife then passes between the small space formed between the two opposite edges of the guides 119 and 121 to cut the paper as described above.

The distance the knife moves downward is determined by the adjustment of the plate 94 on the lever 98 and with this adjustment such as to give maximum movement of the knife 109, the paper is completely cut. By adjusting the plate 94 to other positions the amount of movement of the knife 109 can be varied so that the distance the points of the knife pass through the paper may be only a slight amount or more as desired.

After the knife has been moved to its downward position and is moving back into its normal position under the action of the spring 114, the upper edge thereof engages the free end of a slightly flexible member 126 which is attached to the pivotable guide 121. This engagement pivots the guide 121 back into its normal position as shown in Fig. 2 so that the free edge thereof is a slight amount above and out of line with the guides 118 and 119. This movement of the pivotable guide 121 raises the paper slightly and prevents the slightly curled edge incident to the cutting operation on the leading edge of the paper from curling down in the knife slot between the opposite edges of the guides 121 and 119 when the paper is subsequently advanced. While this feature of the movable guide 121 is obviously not necessary when the paper is not completely cut, it is advantageous in assisting the proper passage of the paper through the associated printer when the adjustment of a knife of the above type is such to completely sever the paper thereat.

In the above described cycle of operation of advancing the paper to form a blank of a standard size it was assumed that the main or line feed signal controlled paper advancing means advanced the paper for a comparatively few lines and that the amount of paper remaining to be advanced by the metering device or auxiliary paper advancing means was sufficient to bring the last printed line of the message past the cutting knife 109. As physical limitations require that the typewheel 127 and the knife have to be separated by a substantial distance it is necessary that the recording paper be advanced at least an amount equal to this distance in order that the last printed line is past the knife 109. Where the messages comprise only a few lines of print, this condition is automatically taken care of as the distance the paper is advanced by the auxiliary advancing means is more than enough to bring the last printed line beyond the knife. However when a message exceeds a predetermined length or more than could be printed on a blank of standard size, the last line of print must be moved beyond the knife if all the message is to appear on one blank, such a blank

obviously being larger than the standard size. Accordingly, the following will be a description of the operation of the metering device operating in conjunction with a message that would be too long to be recorded on a blank of the standard size. In general this is accomplished by insuring that the metering device on the printing platen 44 rotates at least a predetermined amount in conjunction with or in response to each end-of-message signals.

Let it be assumed that a sufficient number of line feed operations have been performed so that the friction plate 36, Figs. 1, 5, 6 and 7, has made approximately three-quarters of a revolution, relative to its normal position where a projection 128 extending from the pawl 38 engages with a stop 129 as shown by the full outline thereof in Fig. 6. This engagement stops further rotation of the friction plate 36 and further line feed operations of the printer are not effective to rotate or step the same as they were heretofore. However, since the sleeve 32 on the shaft 22 is positively driven from the platen shaft 43, it will continue to be stepped each time a line feed operation is performed. During these line feed operations following the engagement of the projection 128 with the stop 129, the ratchet 34 rotates or steps past the pawl 37, the notches on the ratchet 34 being arranged to permit this movement of the ratchet relative to the pawl. Each subsequent line feed operation continues to advance or step the sleeve 32 but has no effect to rotate the friction plate 36 as the same is positively stopped by the pawl 38 engaging the stop 129 and only frictionally coupled to the sleeve 32. Thus the plate 36 remains in an off-normal position such as that shown in Fig. 6 until the receipt of an end-of-message signal as will be described.

Now let it be assumed that the message is completely recorded and an end-of-message signal is received, which as hereinbefore described releases the shaft 22 and the mechanisms attached thereto for one revolution. As the cam 39 rotates with the shaft 22 the notch therein comes into operative relation with the projection 53 on the pawl 38. This allows the pawl 38 to pivot a slight amount in a counterclockwise direction and in so doing withdraw the projection 128 from engagement with the stop 129. Therefore when the radial section 52 of the cam 39 subsequently engages the projection 53, the projection 128 is clear of the stop 129 and the pawl 38 rotates with the cam 39 for the remaining part of its revolution. The friction plate 36 rotates this part of a revolution with the cam 39 and during such rotation thereof, as hereinbefore described, the platen 44 is rotated. The resistance to rotation of the pawl 38 and its associated elements is sufficient to prevent the same from rotating the instant the projection 128 clears the stop 129 and rotation thereof does not begin until the surface 52 engages the projection 53. Thus the paper is advanced at least a predetermined amount in response to each end-of-message signal regardless of the number of line feed signals in the preceding message and this amount is sufficient to bring the last line of print beyond the cut-off knife 109. The stop 129, which engages with the projection 128 on the pawl 38 when the messages exceed a predetermined amount, is adjustable and therefore the minimum amount that the paper will be advanced in response to the end-of-message signal may be varied. Thus when the messages exceed a predetermined length only

enough paper is advanced to bring the last printed line an adjustable distance beyond the knife and the length of the blank of such messages exceeds the length of the standard size blanks by an amount proportional to the length of the message.

It will be obvious, of course, that various modifications of the apparatus shown and described herein may be made to accomplish the same results without departing from the spirit of essential attributes thereof, and it is desired therefore that only such limitations be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

What is claimed is:

1. In a printing telegraph machine responsive to received permutation signals, a recording paper, a main paper feeding mechanism operative in response to an associated signal and adapted to feed said paper a predetermined amount on each operation thereof, an auxiliary paper feeding mechanism operative in response to an associated signal and adapted to feed said paper variable amounts consisting of at least a predetermined amount on each operation thereof, means controlled by each operation of said main paper feeding mechanism following an operation of said auxiliary paper feeding mechanism for invariably decreasing the amount of paper to be fed on a subsequent operation of said auxiliary paper feeding mechanism in excess of said least predetermined amount, and means operative during said subsequent operation of said auxiliary paper feeding mechanism for feeding said paper in accordance with said last mentioned means.

2. In a printing telegraph machine, a recording paper, a selectively responsive main paper feeding mechanism adapted to feed said paper a predetermined amount on each operation thereof, a selectively responsive auxiliary paper feeding mechanism adapted to feed said paper variable amounts consisting of at least a predetermined amount on each operation thereof, means controlled by each operation of said main paper feeding mechanism following an operation of said auxiliary paper feeding mechanism for progressively and invariably decreasing to within said least predetermined amount the amount of paper in excess of said least predetermined amount to be fed on a subsequent selective operation of said auxiliary paper feeding mechanism, means operative by said auxiliary paper feeding mechanism for feeding said paper said least predetermined amount plus the amount if any determined by the operations of said main paper feeding mechanism following the previous operation of said auxiliary paper feeding mechanism.

3. In a printing telegraph machine, a recording paper, a main paper feeding mechanism adapted to feed said paper a predetermined amount on each operation thereof, an auxiliary paper feeding mechanism adapted to feed said paper variable amounts consisting of at least a first predetermined amount on each operation thereof, selective responsive means for controlling the operation of said paper feeding mechanism, means controlled by the number of operations of said main paper feeding mechanism following an operation of said auxiliary paper feeding mechanism when less than a second predetermined amount of said paper has been fed by said main paper feeding mechanism for determining the amount of paper in excess of said first predetermined amount to be fed during a subsequent

operation of said auxiliary paper feeding mechanism, means operative on said subsequent operation of said auxiliary paper feeding mechanism when said paper has been fed less than said second predetermined amount by said main paper feeding mechanism for feeding said paper in one continuous movement said first predetermined amount plus the amount determined by the number of operations of said main paper feeding mechanism, and means for feeding said paper only said first predetermined amount on an operation of said auxiliary paper feeding mechanism when the amount fed by said main paper feeding mechanism following an operation of said auxiliary paper feeding mechanism is equal to or in excess of said second predetermined amount.

4. In a printing telegraph machine, a recording paper, a main paper advancing mechanism adapted to advance said paper a predetermined distance on each operation thereof, an auxiliary paper advancing mechanism adapted to advance said paper in the same direction variable distances on each operation thereof, signal controlled means for initiating into operation said paper advancing mechanisms, said variable distances consisting of at least a predetermined minimum distance, means controlled by the distance said paper is advanced by said main paper said advancing mechanism for determining the distance in excess of said predetermined minimum distance said paper will be advanced on a subsequent operation of said auxiliary paper advancing mechanism, and means for varying the predetermined minimum distance said paper is advanced on an operation of said auxiliary advancing mechanism.

5. In a printing telegraph mechanism, a recording paper, a main paper feeding mechanism adapted to advance said paper a predetermined amount on each operation thereof, an auxiliary paper feeding mechanism adapted to advance said paper variable amounts on each operation thereof, a selector mechanism for selectively controlling the operation of said paper feeding mechanisms, a paper metering device having a normal position and being arranged to make one revolution during each cycle of operation thereof wherein said paper is normally advanced a predetermined amount, said device being progressively advanceable from said normal position by predetermined increments on each operation of said main paper feeding mechanism to a predetermined off-normal position, means operative when said metering device is rotated to said off-normal position by said main paper feeding mechanism for rendering succeeding operations thereof ineffective to rotate said device, means for invariably operating said metering device to complete a cycle of operation thereof in one continuous movement on the operation of said auxiliary paper feeding mechanism irrespective of the amount of rotation thereof by said main paper feeding mechanism, means dependent upon the position of said metering device at the time of operation of said auxiliary paper feeding mechanism for determining the amount of paper fed thereby, and means for feeding said paper during a cycle of operation of said metering device an amount greater than said normal predetermined amount by an amount equal to that fed while said metering device is stopped in said off-normal position.

6. In a printing telegraph machine, a recording paper supplied to said machine from a roll

of considerable length, a printing mechanism, a recording paper severing mechanism in definite spaced relation relative to said printing mechanism, a signal controlled main paper advancing mechanism adapted to advance said paper a predetermined amount on each operation thereof, a signal controlled auxiliary paper advancing mechanism adapted to advance said paper variable amounts on each operation thereof, both of said advancing mechanisms advancing said paper in a direction so as to move it past said printing and severing mechanisms in the order named, means invariably operative by said auxiliary paper advancing mechanism to advance the last printed portion of said paper at least a predetermined distance beyond said paper severing mechanism, means controlled by the number of operations of said main paper advancing mechanism for determining the distance the last printed portion of said paper is advanced beyond said severing mechanism, and means operative following the operation of said auxiliary paper advancing mechanism to operate said paper severing mechanism to sever the paper thereat.

7. In a printing telegraph machine, a recording paper supplied to said machine from a supply of considerable length, a printing mechanism, a recording paper severing mechanism in definite spaced relation relative to said printing mechanism, a main paper advancing mechanism adapted to advance said paper a predetermined amount on each operation thereof, an auxiliary paper advancing mechanism adapted to advance said paper variable amounts on each operation thereof, signal controlled means for operating said paper advancing mechanisms, both of said advancing mechanisms advancing said paper in a direction so as to move it past said printing and severing mechanisms in the order named, means for controlling the operation of said auxiliary paper advancing mechanism so that when the distance said paper is advanced past said severing mechanism by operations of said main paper advancing mechanism occurring between operations of said auxiliary paper advancing mechanism is less than a first predetermined distance, said auxiliary paper advancing mechanism invariably advances said paper past said severing mechanism a second predetermined distance plus a distance equal to the difference between said first predetermined distance and the distance advanced by said main paper advancing mechanism, and means operative following the advancement of said paper by said auxiliary paper advancing mechanism to render said paper severing mechanism operative.

8. In a page printing telegraph machine, a recording strip, a recording mechanism for recording message groups of signals on said strip, said message groups of signals being separated by predetermined signals, a strip severing mechanism, a strip feeding mechanism adapted to feed said strip a predetermined amount in response to each strip feeding signal, said strip feeding signals being included in said message group of signals, means including said strip severing mechanism initiated into operation in response to said predetermined message separating signals for feeding said strip and severing the same to form separate sheets of substantially uniform size when the number of strip feeding signals included in a message group is less than a predetermined number.

9. In a page printing telegraph machine, a recording strip, a recording mechanism for re-

recording message groups of signals on said strip, said message groups of signals being separated by predetermined signals, a strip severing mechanism, a strip feeding mechanism adapted to feed said strip a predetermined amount in response to each strip feeding signal, said strip feeding signals being included in said message group of signals, means including said strip severing mechanism initiated into operation in response to said predetermined message separating signals for feeding said strip and severing the same to form separate sheets of substantially uniform size when the number of strip feeding signals included in a message group is less than a predetermined number, and means operative when the number of strip feeding signals in a message group exceeds said predetermined number for feeding said strip and operating said severing mechanism to form separate sheets which are longer than said substantially uniform size by an amount equal to the distance said strip is fed in response to said strip feeding signals in excess of said predetermined number.

10. In combination, a recording web, a printing mechanism for recording in transverse lines on said web, a web severing mechanism, a selecting mechanism responsive to received signals for controlling said printing and severing mechanisms, said signals normally being in message groups with each of said groups separated by an end-of-message signal, means controlled by said selecting mechanism operative in response to said end-of-message signal whereby said web is advanced a predetermined amount for each message group of signals, and means for operating said web severing mechanism concomitantly with said last mentioned means to sever said web whereby each of said messages appears on a separate blank of substantially uniform size.

11. In combination, a recording web, a printing mechanism for recording in transverse lines on said web, a web severing mechanism, a selecting mechanism responsive to received signals for controlling said printing and severing mechanisms, said signals normally being in message groups with each of said groups separated by an end-of-message signal, means responsive to said end-of-message signals when the number of signals in a message group is less than a predetermined number for advancing said web so that the amount advanced during the receipt of the message and the amount advanced in response to said end-of-message signal is substantially the same for each message group of signals and said end-of-message signal, means responsive to said end-of-message signal when the number of signals in a message group is greater than a predetermined number for advancing said web only a predetermined amount, and means for operating said severing mechanism following the operation of said last mentioned means to sever the printed portion of said web from the unprinted portion thereof.

12. In a printing telegraph machine, a recording web, a selectively responsive printing mechanism for recording received signals in successive transverse lines on said web, a signal controlled web severing mechanism adapted to sever said web transversely thereof, a signal controlled web advancing mechanism, means including said signal controlled web severing mechanism for separating said web into separate message blanks of at least a predetermined length, and means including said signal responsive printing mechanism and said severing mechanism whereby the

first printed line on each blank is a predetermined distance from the top.

13. In a printing telegraph machine, a selector mechanism, a recording web, a printing mechanism controlled by said selector mechanism for recording received signals on said web, a web cutting knife located in spaced relation relative to said printing mechanism, said knife having a series of spaced serrations engageable with said web to sever the same, selector controlled means for advancing said web past said printing mechanism and said knife in the order named, selector controlled operating means for said knife, and means for adjusting said knife operating means to vary the amount said cutting serrations engage said paper.

14. In a printing telegraph machine, a selector mechanism, a recording web, a web advancing mechanism, a printing mechanism for recording received signals on said web and a web cutting knife located in spaced relation relative to said printing mechanism and opposite one surface of said web the operations of which are selectively controlled by said selector mechanism, said knife having a series of spaced cutting serrations, a pair of spaced longitudinal members on the opposite side of said web from said knife with co-operating edges adapted to form a slot for said knife, the leading one of said members relative to the direction of movement of said web by said advancing mechanism normally being out of alignment with the second one of said members, means for bringing said first member into alignment with said second member at the beginning of the cutting stroke of said knife and means operative during the return stroke of said knife for returning said first member to a normal position out of alignment with said second member to withdraw the leading edge of said web from said knife slot.

15. In a printing telegraph mechanism, a recording paper, a signal controlled main paper feeding mechanism adapted to advance said paper a predetermined amount on each operation thereof, a signal controlled auxiliary paper feeding mechanism adapted to advance said paper variable amounts on each operation thereof, a paper metering device having a normal position and being arranged to make one revolution during each cycle of operation thereof wherein said paper is normally advanced a predetermined amount, means normally operative for progressively advancing said metering device from said normal position by predetermined increments on each operation of said main paper feeding mechanism, means for stopping the rotation of said metering device in an off-normal position after a predetermined amount of rotation thereof by said main paper feeding mechanism, means for completing the revolution of said metering device irrespective of the position thereof on the operation of said auxiliary paper feeding mechanism, and means dependent upon the amount of rotation of said metering device by said auxiliary paper feeding mechanism for determining the amount said paper is fed thereby.

16. In a printing telegraph machine, a signal controlled selector mechanism, a recording web, a web advancing mechanism, a printing mechanism for recording received signals on said web and a web cutting knife located in spaced relation relative to said printing mechanism and opposite one surface of said web selectively controlled by said selector mechanism, a pair of spaced longitudinal members on the opposite side

of said web from said knife adapted to form a support for said web and a slot for said knife, means for moving said knife through said web and into said slot to sever said web thereat, and means including the position of said pair of longitudinal members after an operation of said knife to prevent the leading edge of said web from entering said slot on a subsequent operation of said web advancing mechanism.

17. In a printing telegraph mechanism, a recording paper, a main paper feeding mechanism adapted to advance said paper a predetermined amount on each operation thereof, an auxiliary paper feeding mechanism adapted to advance said paper variable amounts on each operation thereof, signal responsive means for selectively controlling the operation of said paper feeding mechanisms, a paper metering device having a normal position and being arranged to make one revolution during each cycle of operation thereof wherein said paper is normally advanced a predetermined amount, said device being progressively advanceable from said normal position by predetermined increments on each operation of said main paper feeding mechanism to a predetermined off-normal position, means operative when said metering device is rotated to said off-normal position by said main paper feeding mechanism for rendering succeeding operations thereof ineffective to rotate said device, means for invariably operating said metering device to complete a cycle of operation thereof in one continuous movement on the operation of said auxiliary paper feeding mechanism irrespective of the amount of rotation thereof by said main paper feeding mechanism, and means dependent upon the position of said metering device at the time of operation of said auxiliary paper feeding mechanism for determining the amount of paper fed thereby.

18. In a printing telegraph machine, a selector mechanism, a recording paper, a main paper advancing mechanism adapted to advance said paper a predetermined distance on each operation thereof, an auxiliary paper advancing mechanism adapted to invariably advance said paper in the same direction variable distances on each operation thereof, said variable distances consisting of

at least a first predetermined minimum distance and not more than a second predetermined maximum distance, means including said selector mechanism for controlling the operation of said paper advancing mechanisms, means operative on successive operations of only said auxiliary paper advancing mechanism for advancing said paper said second predetermined maximum distance, and means for decreasing the distance said paper is advanced on an operation of said auxiliary paper advancing mechanism in excess of said first predetermined minimum distance by an amount equal to the distance said paper is advanced by operations of said main paper advancing mechanism occurring between operations of said auxiliary paper advancing means.

19. In a printing telegraph mechanism, a recording paper, a selectively controlled main paper feeding mechanism adapted to advance said paper a predetermined amount on each operation thereof, an auxiliary selectively controlled paper feeding mechanism adapted to invariably advance said paper variable amounts on each operation thereof, a paper metering device having a normal position and being arranged to make one revolution during each cycle of operation thereof wherein said paper is normally advanced a predetermined amount, said device being progressively advanceable from said normal position by predetermined increments on each selective operation of said main paper feeding mechanism to a predetermined off-normal position, means operative when said metering device is rotated to said off-normal position by selective operations of said main paper feeding mechanism for rendering succeeding operations thereof ineffective to rotate said device, means dependent upon the position of said metering device at the time of selectively operating said auxiliary paper feeding mechanisms for determining the amount of paper fed thereby, and means for completing the revolution of said device to said normal position on the selective operation of said auxiliary paper feeding mechanism.

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