

Feb. 15, 1944.

F. J. MAUS ET AL

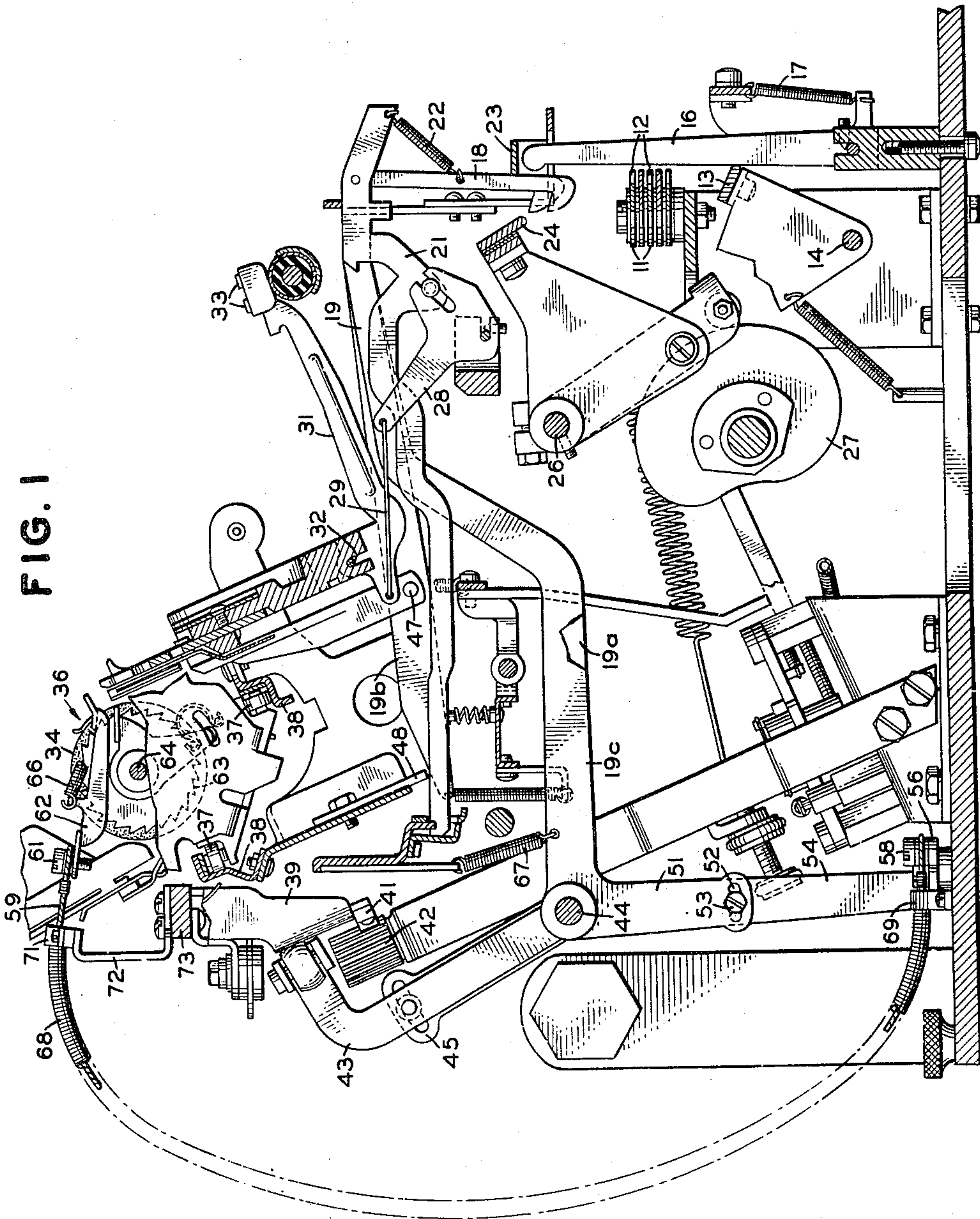
2,341,935

TELEGRAPH APPARATUS

Filed March 9, 1940

2 Sheets-Sheet 1

FIG. 1



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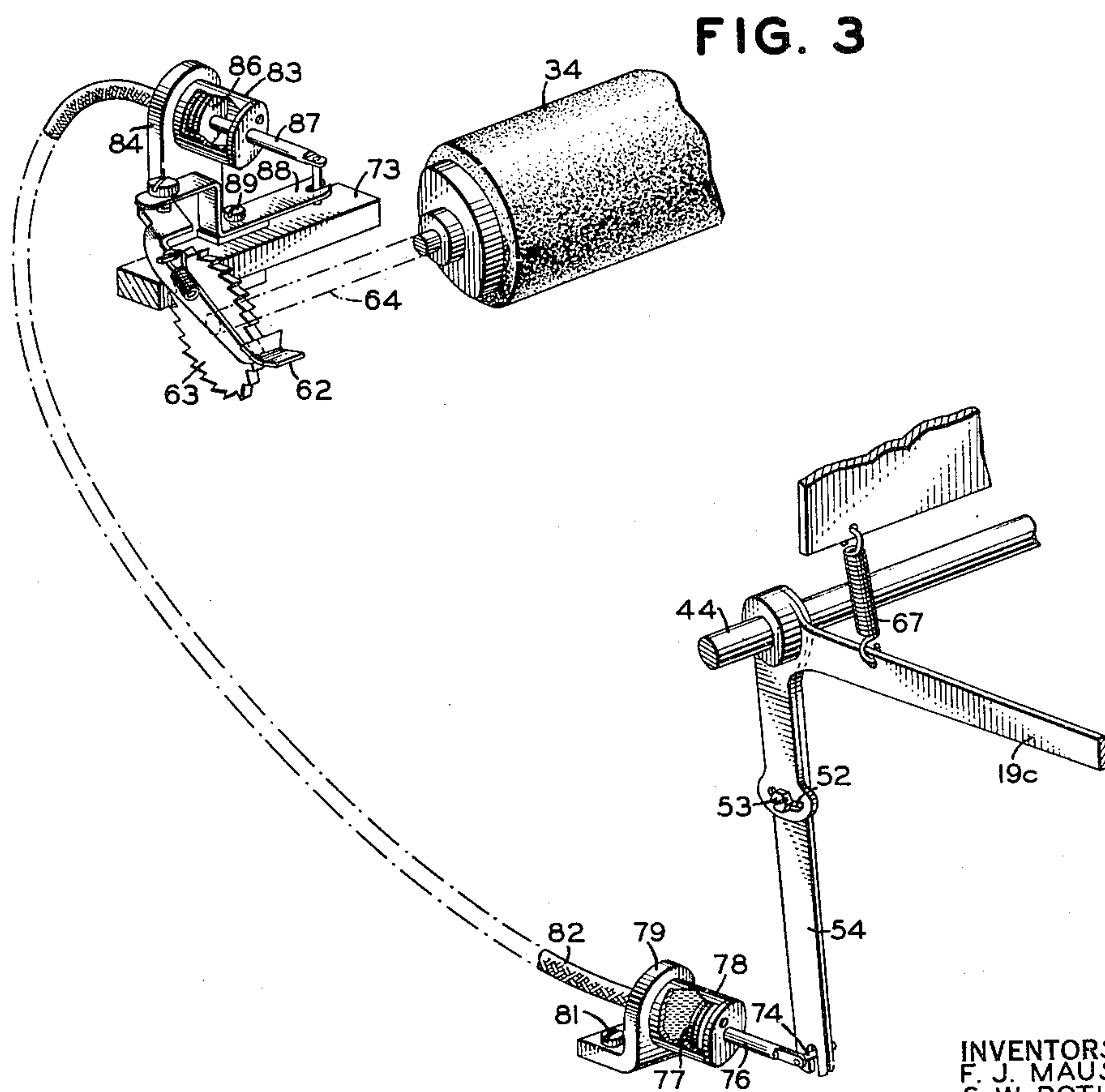
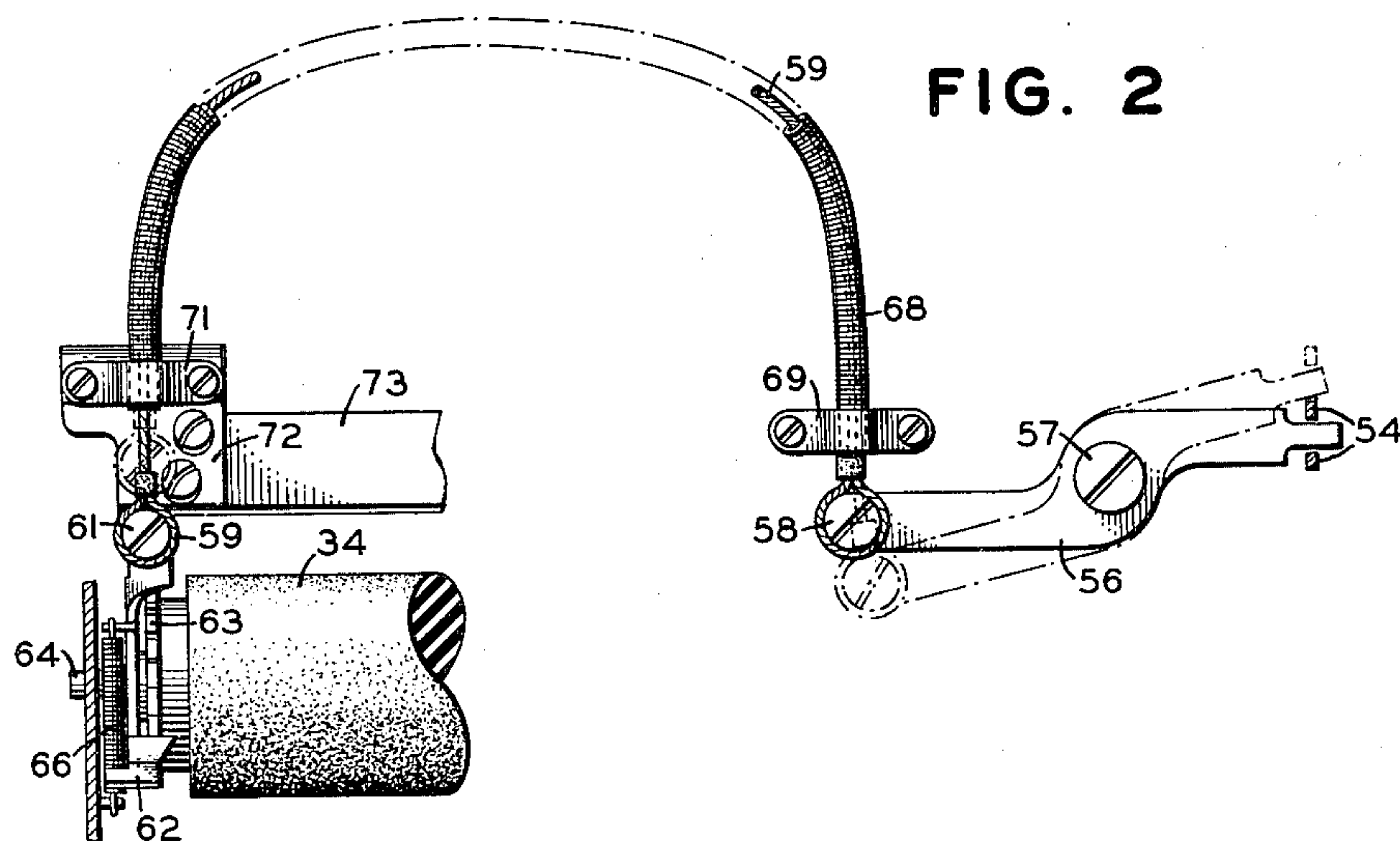
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2 Sheets-Sheet 2



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TELEGRAPH APPARATUS

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Application March 9, 1940, Serial No. 323,100

9 Claims. (Cl. 197—114)

This invention relates primarily to telegraph receivers and more particularly to that type of telegraph receiver known in the art as movable carriage page printers.

In the above type of printers the recording paper, which is usually in the form of a continuous strip, is carried by the carriage back and forth past a printing position to effect letter spacing and return of the carriage at the beginning of a new line of print. The movement of the carriage is usually step-by-step in a letter spacing direction to effect the letter spacing and in one continuous movement in a reverse direction to move the paper for the beginning of a new line of print. Following the printing of one line of print and prior to the beginning of a new line the paper has to be advanced in the direction of its length to present a clean surface at the printing position and this line feed operation is usually performed concomitantly with and preferably during the carriage return operation. The carriage usually comprises a cylindrical platen with pressure rolls pressing the paper thereagainst and in frictional engagement therewith so that when the platen is rotated the paper is advanced. In telegraph practice it is very necessary that the paper be advanced uniformly with each line feed operation as attendants are not apt to be watching the receiver at all times and hence the pressure between the platen and pressure rolls has to be a considerable amount to minimize the possibility of slippage between the platen and the recording paper. Consequently an appreciable load is imposed upon the line feed mechanism when a line feed operation is performed. To distribute the load on the operating mechanism incident to the line feed operation over a period of time and not require exclusive line time, the line feed operation is usually performed during the carriage return operation. However, for certain types of services it is very desirable and oftentimes necessary that the line feed operation be performed independent of a carriage return and for any position of the carriage.

The average travel of the carriage is substantially that of the width of a recording strip, the strips varying in width for various services and the line feed mechanism usually comprises a bail member on the stationary part of the printer engageable with an operating element carried on the carriage. As the power required to perform a line feed operation is considerable, for reasons pointed out above, and the operation must be capable of being performed for any position of the carriage, the line feed bail must be of sturdy construction and be capable of operating without undue bending or flexing. With such a sturdy and heavy member operating, the noise of operation is likely to be excessive

and the inertia of such an element is appreciable, causing vibration and excessive wear. The line feed operation is further complicated by the fact that in some receivers the carriage moves up and down in response to case shift signals.

In view of the above, it is one of the primary objects of the present invention to provide a mechanism for performing certain functions in a telegraph receiver such as the line feed function, by a flexible power transmitting means extending between the carriage and the stationary section of the receiver, such as a Bowden wire or a hydraulically operated mechanism, which are light in weight, efficient in operation, capable of operating for any position of the carriage and requiring a minimum number of parts.

Other objects of the invention reside in its simplicity, ease in manufacture, minimum number of parts required, flexibility, ease of attaching to telegraph page receivers of the present day type, quiet operation, and others, as will appear hereinafter in the following detailed description thereof when taken in conjunction with the accompanying drawings in the latter of which:

Fig. 1 is a vertical sectional view taken substantially through the transverse center of a telegraph receiver, showing the receiver in conjunction with and adapted for line feed operation in accordance with the invention;

Fig. 2 is a plan view of a platen, together with an operating element therefor and the operating elements for the Bowden wire; and

Fig. 3 is a fragmentary perspective view showing a modification of the invention wherein a hydraulically operated line feed mechanism is employed in accordance with the invention.

In accordance with the preferred form of the invention, a line feed operating lever is arranged and adapted to operate one end of a Bowden wire, the other end of which is attached to an element on the carriage adapted to step the platen in a manner hereinafter pointed out. As the Bowden wire with its casing is flexible and readily adapted to operate in various positions, the line feed function may be performed for any position of the carriage or while the carriage is stationary or moving, the Bowden wire with its casing being of sufficient length to eliminate any cramping thereof or excessive tension or pull on the carriage during movement of the carriage. The elements for operating and those operated by the Bowden wire are relatively small, easily and cheaply manufactured and readily attached to telegraph receivers. In the modification of the invention the Bowden wire is replaced by a set of pistons and a flexible hydraulic connection between the line feed operating lever and the carriage. Although the principal application of the invention is shown and hereinafter described in detail as cooperating in performing the line

feed operation on a movable carriage page printer various other functions of telegraph receivers could be performed advantageously by employment of the invention.

The particular printer or receiver with which the invention is shown and employed to illustrate the principles thereof is fully shown and described in a copending application of P. A. Noxon et al. filed March 3, 1936, bearing Serial No. 66,906, and entitled "Telegraph printer." However, the application of the invention is not limited to this particular receiver as it could be equally well applied to various other receivers. In the following, the description of the receiver referred to above will be limited to main operating elements and the elements cooperating with the invention.

Extending transversely in the receiver are a set of notched permutation bars 11, Fig. 1, mounted so as to permit movement thereof in the direction of their length. The permutation bars are set in permuted settings in accordance with the operation of a selector mechanism (not shown) which in turn is selectively operated in response to received code combinations of impulses. Along the front side of the permutation bars 11 are arranged notches 12, the notches in each bar being different from those in each of the others, and for each permuted setting of the permutation bars a notch in each one is in alignment with a notch in each of the others, only one row of aligned notches usually occurring in the permutation bars at a time. Following the positioning of the permutation bars 11 in accordance with the received code group of impulses, a cyclically operable bail 13 pivoting about a rod 14 in a counter-clockwise direction allows a set of drop-in bars 16 to approach and engage the notched sides of the permutation bars 11. The drop-in bars 16 are biased to an operated position by associated individual springs 17 and the one opposite the row of aligned notches in the permutation bars 11 is allowed to enter the aligned row of notches and pivot an appreciable amount more than the others, which are stopped when they engage the edges of the permutation bars.

Associated with the upper end of each of the drop-in bars 16 are hooks such as 18, one individual to each drop-in bar. The hooks 18 are pivotally carried adjacent the right hand ends of associated operating and print control levers indicated in general by reference numerals 19 and 21, respectively. Springs 22, one individual to each hook 18, normally tend to pivot the same in a counter-clockwise direction to hold them against a fixed stop 23. When one of the drop-in bars 16 is allowed to enter an aligned row of notches in the permutation bars 11, the upper end thereof engages its associated hook to pivot the same in a clockwise direction to place the hook portion thereof beneath an operating bail 24. The operating bail 24 pivots about a shaft 26 and is operated in timed relationship to the movement of a hook 18 as controlled by a cam 27 making one revolution for each cycle of operation of the receiver. As the operating bail 24 moves downward it engages the hook portion of the selected hook 18 to perform an associated printer function or a printing operation, depending upon which of the hooks 18 is selectively moved therebeneath in accordance with the received code group.

The print control operating levers 21 are pivotally mounted adjacent their left hand hands

and the operation thereof through bell cranks such as 28, and links 29 cause the operation of associated type bars 31. The type bars 31 are pivotally mounted at 32 and carry two type elements 33 adjacent the free ends thereof. The operation of a type bar 31 moves the type elements to engage the cylindrical platen 34 which carries the recording paper. Suitable means such as an inking ribbon (not shown) is placed between the recording papers and the type elements 33 in conjunction with each printing operation to ink the type. The platen 34 is suitably carried and pivotally mounted in a carriage indicated in general by reference numeral 36, the carriage being guided for transverse movement relative to the receiver by rollers such as 37, rolling on tracks such as 38. Depending from the rear side of the carriage 36 are arms such as 39, which carry a rack 41. The rack 41 normally engages a pinion 42 which is rotated or stepped a predetermined amount in conjunction with the recording of each character or a word space function to advance the carriage in a letter spacing direction against the action of a resilient carriage return means, such as a spring (not shown). At the end of one line of print or to perform a carriage return function, the rack 41 is pivoted out of engagement with the pinion 42 whereupon the resilient means returns the carriage 36 to its initial position for the start of a new line of print. The pivoting of the rack 41 out of engagement with the pinion 42 is controlled by an arm 43 pivotally mounted on a rod 44. The arm 43 is adjustably attached to the left hand arm 45 of a printer function operating lever referred to as the carriage return operating lever 19a, also mounted on the rod 44. The right hand end of the carriage return-operating lever 19a carries a hook 18 operated by the bail 24 in a manner pointed out above.

To effect the printing of either one or the other of the two type elements 33 on a type bar 31, the carriage 36 is elevated and lowered in response to shift and unshift signals, respectively. The elevation of the carriage from an unshift position is effected by the engagement of the hook 18 on the right hand end of a shift operating lever 19b with the operating bail 24. The shift lever 19b is pivotally mounted at 47 adjacent its center and the left hand end thereof is in operative engagement with a plate 48. The plate 48 is fixed to the carriage cradle and pivoting of the shift lever 46 in a clockwise direction causes the engagement of the left hand end thereof with the plate 48 to elevate the carriage cradle and the carriage 36. A latch (not shown) latches the cradle in an elevated position and the selective operation of an unshift operating lever (not shown) operates the latch to unlatch the cradle to allow the carriage to return to its unshift position.

A line feed operating lever 19c is pivotally mounted on the rod 44 and the rightwardly extending arm thereof is similar to the rightwardly extending arm of the carriage return operating lever 19a. Depending from the line feed operating lever 19c is an arm 51 at the lower end of which is a curved slot 52. A clamping screw 53 extends through the curved slot 52 and is threaded into a lever 54. The lever 54 is pivoted at its upper end on the rod 44 and by means of the screw 53 and slot 52 is clamped to the line feed operating lever 19c for movement therewith. The lower end of the lever 54 is bifurcated and straddles the right hand end of a lever 56, Fig. 2,

which is pivoted adjacent its center on a shoulder screw 57, extending from the base of the printer. The left hand end of the lever 56 has engaged therewith by means of a screw 58 one end of a flexible link, such as the core 59 of a Bowden wire. The other end of the flexible link or core 59 is attached by a screw 61 to an operating pawl 62 in operative relation with a ratchet 63 fixed together with the platen 34 on the platen shaft 64. The operating pawl 63 is normally held in retracted position by an attached spring 66.

When the line feed operating lever 19c is operated by the bail 24 in a clockwise direction against the action of its retractile spring 67, Fig. 1, the lower end of the lever 54 is moved toward the left. The lever 54 engages the lever 56 and on movement thereof causes the said lever 56 to pivot in a counterclockwise direction as shown in Fig. 2 to withdraw the end of the flexible member 59 out of the associated casing 68. The right hand end of the casing 68 as shown in Fig. 2 and the lower end as shown in Fig. 1 is clamped in fixed position to the base of the receiver by a clamping yoke 69. The left hand end of the casing 68 as shown in Fig. 2 and the higher end as shown in Fig. 1 is clamped by a clamping yoke 71 to a bracket 72, which in turn is attached to a transverse member 73 of the carriage 36. The transverse member 73 forming a part of the carriage 36 moves to and fro and up and down therewith and carries with it the upper end of the flexible member 59 and casing 68. As the lower end of the flexible member 59 is drawn out of the casing 68 by the operation of the line feed operating lever 19c, the upper end is drawn into the casing and during such movement the operating pawl 62 is moved toward the left as shown in Fig. 1. This movement of the operating pawl engages it with the ratchet wheel 63 to rotate the same and the platen 34 a predetermined amount on each operation thereof. Thus for each operation of the line feed operating lever 19c, the platen 34 is rotated a predetermined amount and during rotation thereof advances the recording paper a distance equal to that between two successive lines of print.

In the modification shown in Fig. 3 wherein a hydraulic connection is employed in place of the flexible member or Bowden wire, the lever 54 at its lower end engages a pin 74 in the end of a piston rod 76. At the other end of the piston rod 76 is a piston 77 in a cylinder 78, which is supported by a bracket 79 clamped by screws such as 81 to the base of the telegraph machine. Extending from the end of the cylinder 78 opposite the piston rod 76 is a flexible hydraulic coupling 82. The other end of the hydraulic coupling 82 terminates in a cylinder 83 carried in a bracket 84 clamped to the longitudinal member 73 of the carriage 36. A piston 86 in the cylinder 83 has a piston rod 87 connected to one end of a lever 88 which is pivotally mounted by a shoulder screw 89 on the longitudinal member 73. The other end of the lever 88 has loosely pivoted thereto the ratchet wheel operating pawl 62. A suitable liquid is placed in the cylinders 78 and 83 and in the coupling 82, the cylinder 78 being nearly full of the liquid whereas the cylinder 83 has but little therein in the normal position of the line feed operating lever 19c. When the line feed operating lever is operated, the piston 77 is moved toward the left and through the liquid transmits the pressure to the piston 86 within the cylinder 83 causing the operation of the piston rod 87, the lever 88 and the pawl 62. The

pawl advances the ratchet wheel 63 and causes rotation of the platen 34 to advance the recording paper in engagement therewith. The flexibility of the coupling 82 permits the above operation for any position of the carriage 36 and for certain operating conditions this modification of the invention has advantages over the first modification employing the Bowden wire. The return of the line feed operating lever 19c to its normal position by its attached spring 67 causes the liquid to return to the cylinder 78, whereupon it substantially empties out of the cylinder 83, and the line feed mechanism is returned to its normal position readily for operation in conjunction with the next line feed signal.

It is obvious, of course, that various modifications of the invention other than those shown and described herein may be made without departing from the spirit or 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 telegraph receiver having a carriage movable to and fro to effect letter spacing and return of said carriage for the beginning of a new line of print, said carriage comprising a cylindrical platen, means including a ratchet and a pawl on said carriage for rotating said platen to advance a recording web in the direction of its length to effect line spacing thereof, a selectively operable line feed operating lever in said receiver, an elongated Bowden wire including a core and an enclosing casing extending between said line feed operating lever and said pawl on said carriage, means including said line feed operating lever for pulling on the end of said Bowden wire core associated therewith, and means including said Bowden wire for transmitting the pull on the end of said core associated with said line feed operating lever to said pawl on said carriage to thereby rotate said ratchet and platen, said pull being effective to rotate said platen to advance said recording web for any position of said carriage.

2. In a telegraph receiver having a carriage movable to and fro to effect letter spacing and return of said carriage for the beginning of a new line of print, said carriage comprising a cylindrical platen rotatable to advance a recording web in the direction of its length to effect line spacing thereof, a permutation selecting means including a selectively operable line feed operating lever in said receiver, a flexible pressure differential transmitting means extending between said line feed operating lever and said carriage, means including said line feed operating lever for creating a pressure change at one end of said flexible pressure transmitting means, and means responsive to the pressure change at the opposite end of said flexible pressure transmitting means to rotate said platen to advance said recording web, said pressure responsive means being operative to rotate said platen for any position of said carriage.

3. In a page printing telegraph receiver employing a platen carrier movable to and fro in one plane to effect letter spacing and the return of said carriage for the beginning of a new line of print and movable back and forth in a direction substantially perpendicular to said to and fro movement to effect case character recording, a rotatable cylindrical platen in said platen car-

rier for advancing a recording web held in engagement therewith on rotation of said platen, a ratchet wheel rotatable with said platen, an operating pawl associated with said ratchet and adapted to rotate the same by pulling thereon, a source of power and permutation selecting means in said telegraph receiver, an operating lever selectable by said selecting means and operable by said source of power, a flexible power transmitting element including a casing for transmitting power longitudinally thereof extending between said operating lever and said movable platen carrier, means including said operating lever to apply power at the end of said flexible power transmitting means associated therewith, and means including said flexible power transmitting means to transmit said applied power to said platen carrier to pull said pawl to rotate said ratchet wheel and said platen to advance said recording web for any position of said platen carrier.

4. In a page printing telegraph receiver employing a platen carrier movable to and fro in one plane to effect letter spacing and the return of said carriage for the beginning of a new line of print and movable back and forth in a direction substantially perpendicular to said to and fro movement to effect case character recording, a rotatable cylindrical platen in said platen carrier for advancing a recording web held in engagement therewith, a ratchet wheel rotatable with said platen, an operating pawl associated with said ratchet and adapted to rotate the same by pulling thereon, a selectively operable line feed function controlling means in said receiver, a Bowden wire comprising a thrust and tension transmitting core and a casing, one end of said casing being fixed to said platen carrier and the other to said receiver and one end of said core operatively associated with said line feed function controlling member and the other with said platen ratchet wheel operating pawl to transmit by tension on said core movement of said line feed function controlling member to said operating pawl, said operating pawl thereby being effective to rotate said ratchet and platen and advance said recording web during movement of or while said platen carrier is at rest in any position thereof.

5. In a page printing telegraph receiver employing a platen carrier movable to and fro in one plane to effect letter spacing and the return of said carriage for the beginning of a new line of print and movable back and forth in a direction substantially perpendicular to said to and fro movement to effect case character recording, a rotatable cylindrical platen in said platen carrier, a recording web held in engagement with said platen whereby said web is advanced on rotation of said platen, a ratchet wheel rotatable with said platen, an operating pawl associated therewith, a permutation selecting means including a selectively operable line feed lever in said receiver, a pressure changing piston operated thereby, a pressure responsive piston associated with said operating pawl on said platen carrier for rotating said ratchet wheel, a flexible pressure transmitting member for transmitting pressure differences between said pistons, and means including said pistons and said pressure transmitting member for operating said platen ratchet wheel operating pawl to advance said recording web on the operation of said line feed lever for any position of said platen carrier.

6. In a telegraph receiver having a cylindrical

platen rotatable to advance a recording web in the direction of its length to effect line spacing of said web, a function controlling selecting device, a line feed operating lever selectively operable under the control of said selecting device in said receiver, a flexible pressure differential transmitting means extending between said line feed operating lever and said platen, means including said line feed operating lever for creating a pressure change at one end of said flexible pressure transmitting means, and means responsive to the pressure change at the opposite end of said flexible pressure transmitting means to rotate said platen to advance said recording web.

7. In a page printing telegraph receiver employing a rotatable cylindrical platen for advancing a recording web held in engagement therewith, a ratchet wheel rotatable with said platen, an operating pawl associated therewith adapted to rotate the same by pulling thereon, a source of power and a permutation selecting means including a set of notched members in said telegraph receiver, an operating lever selectable by said notched members for operation by said source of power, a flexible power transmitting element including an outer casing for transmitting power longitudinally thereof extending between said operating lever and said pawl, means including said operating lever to apply power at the end of said flexible power transmitting means associated therewith, and means including said flexible power transmitting means to transmit said applied power to said pawl to pull the same to rotate said ratchet wheel and said platen to advance said recording web.

8. In a page printing telegraph receiver employing a platen carrier and a rotatable cylindrical platen in said platen carrier for advancing a recording web held in engagement therewith, a ratchet wheel rotatable with said platen, an operating pawl associated therewith and adapted to rotate the same by pulling thereon, a selectively operable line feed function controlling means in said receiver, a Bowden wire comprising an inner core and an outer casing for transmitting movement thereover, one end of said casing being fixed to said platen carrier and the other to said receiver and one end of said core operatively associated with said line feed function controlling member and the other with said platen ratchet wheel operating pawl to transmit thrust and tension movement of said line feed function controlling member to said operating pawl to pull on and rotate said platen and advance said recording web.

9. In a page printing telegraph receiver employing a platen carrier with a rotatable cylindrical platen in said platen carrier, a recording web held in engagement with said platen whereby said web is advanced on rotation of said platen, a ratchet wheel rotatable with said platen, an operating pawl associated therewith, a selectively operable line feed lever in said receiver, a pressure changing piston operated thereby, a pressure responsive piston associated with said operating pawl on said platen carrier for rotating said ratchet wheel, a flexible pressure transmitting member for transmitting pressure differences between said pistons, and means including said pistons and said pressure transmitting member for operating said platen ratchet wheel operating pawl to advance said recording web on the operation of said line feed lever.

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