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H. ANGEL

2,462,834

BACK SPACING TELEGRAPH PRINTER MECHANISM

Filed Aug. 6, 1946

2 Sheets-Sheet 1

FIG. 1

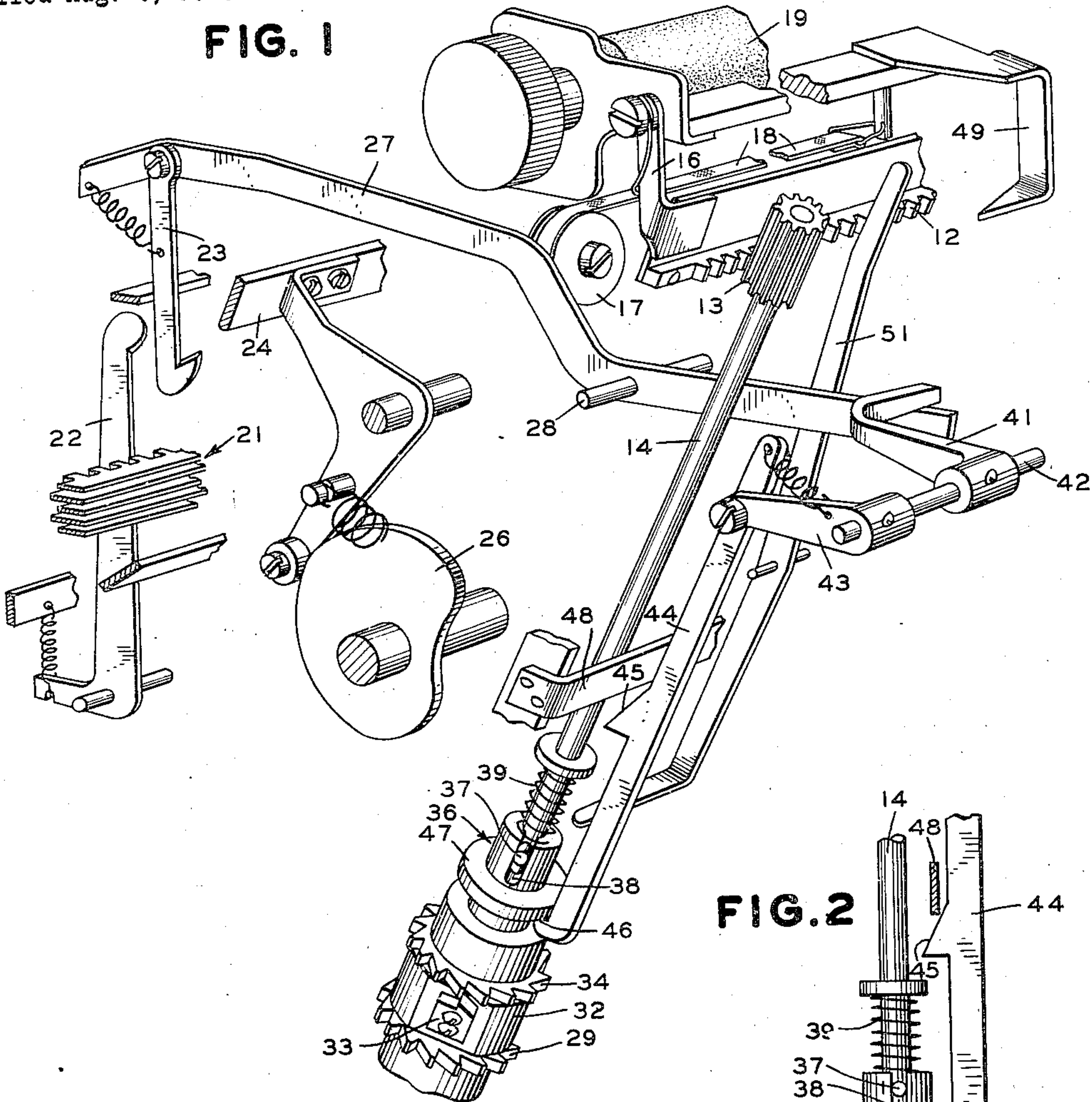


FIG. 2

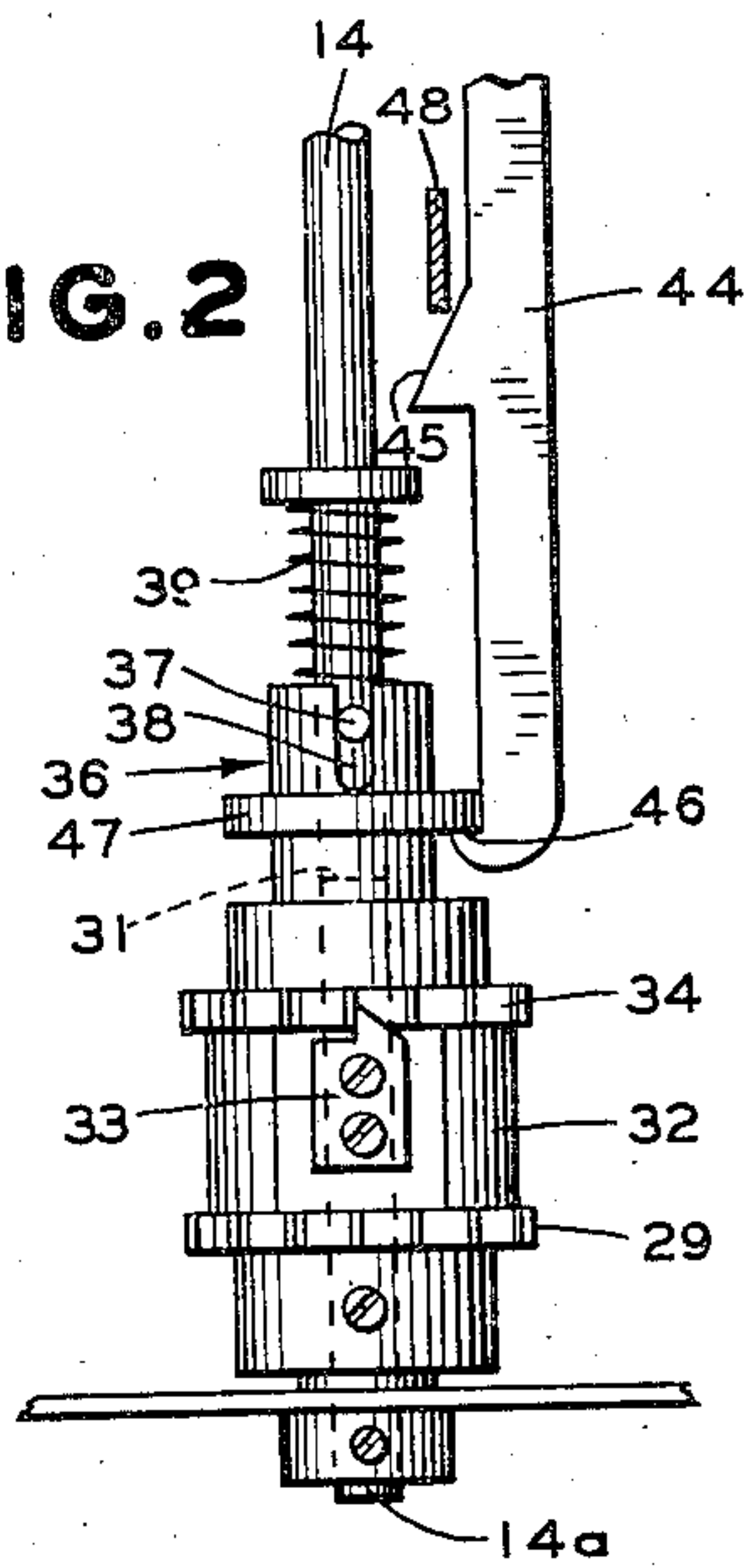
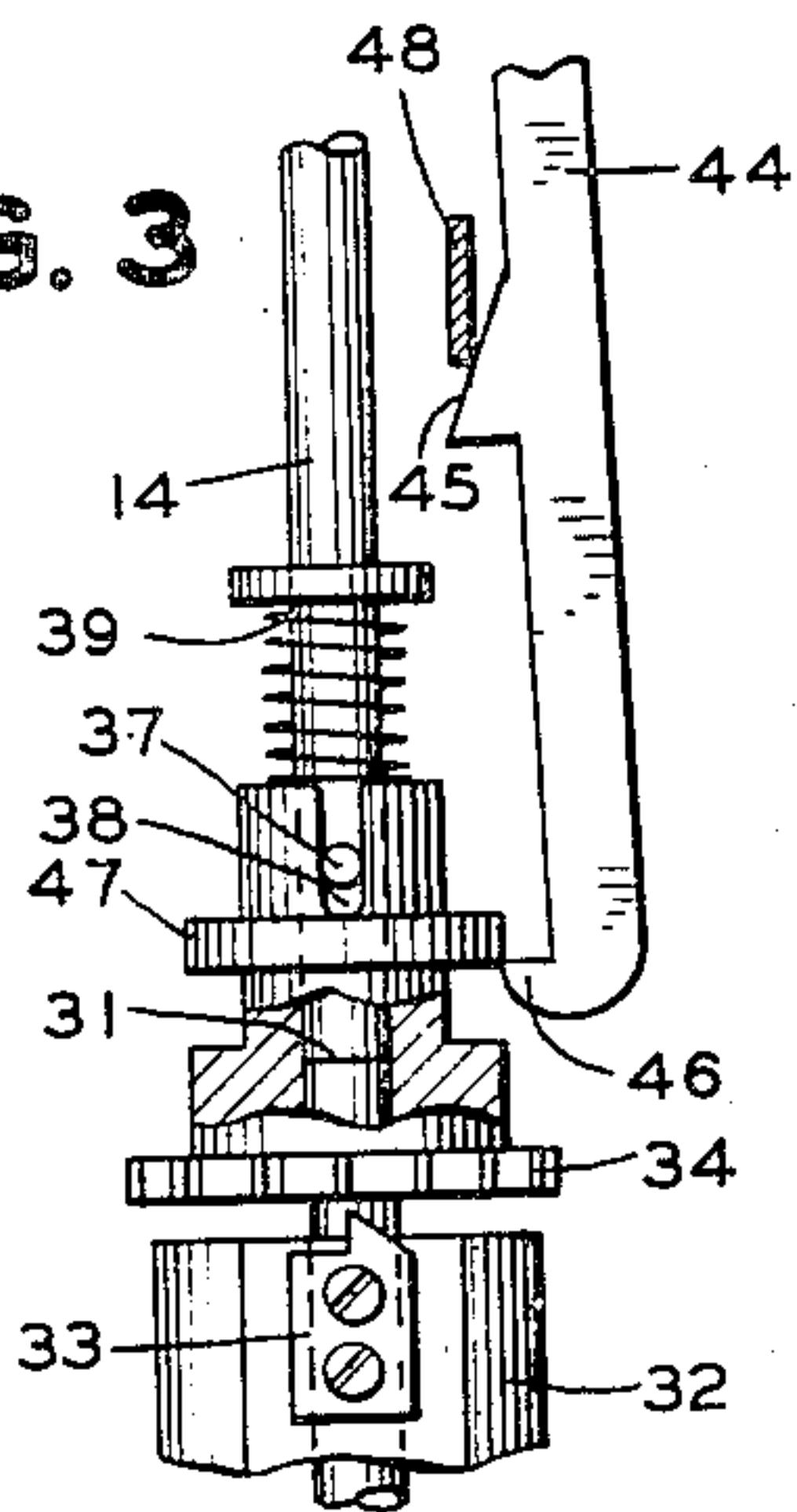


FIG. 3



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BACK SPACING TELEGRAPH PRINTER MECHANISM

2 Sheets-Sheet 2

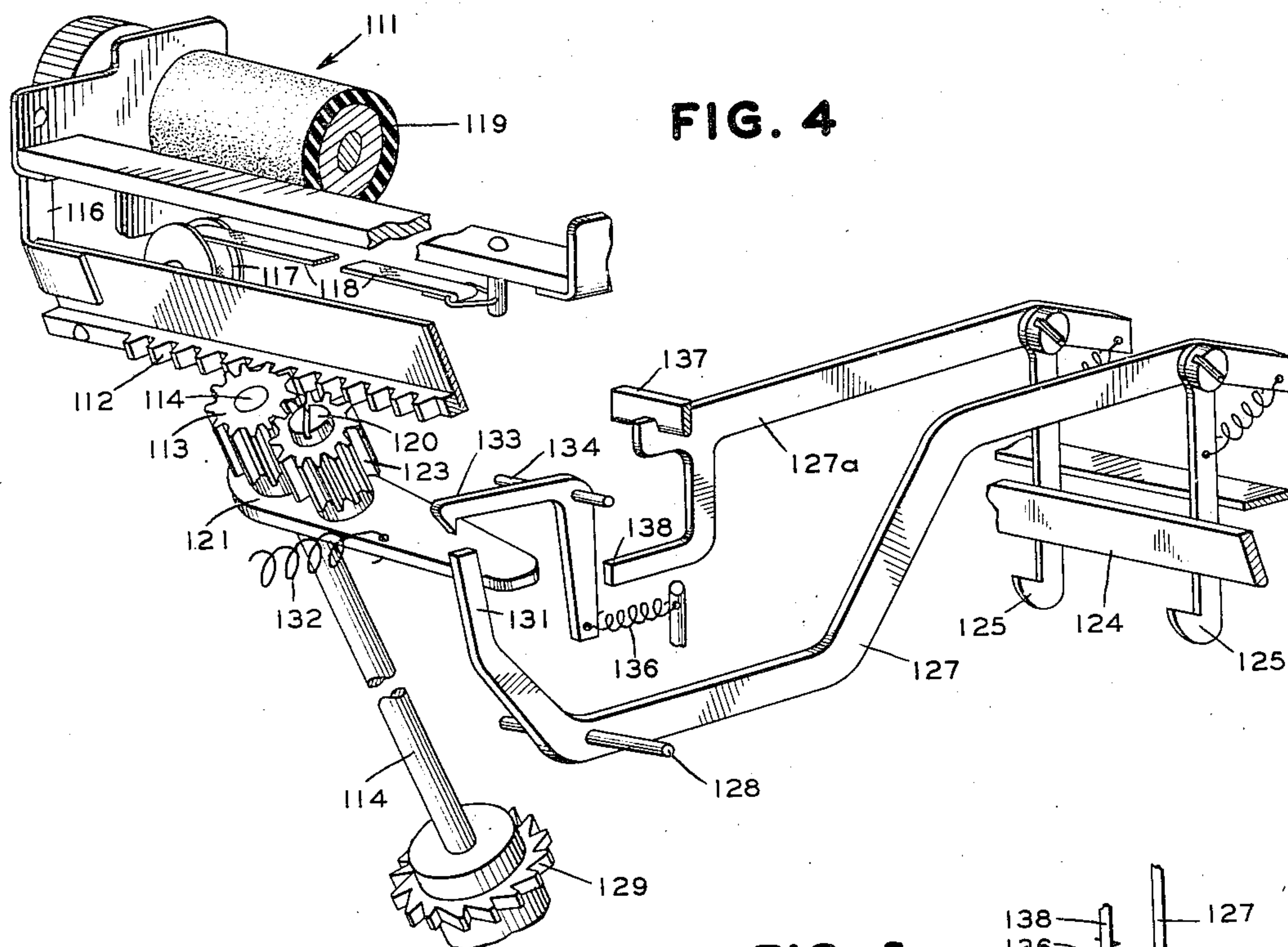


FIG. 5

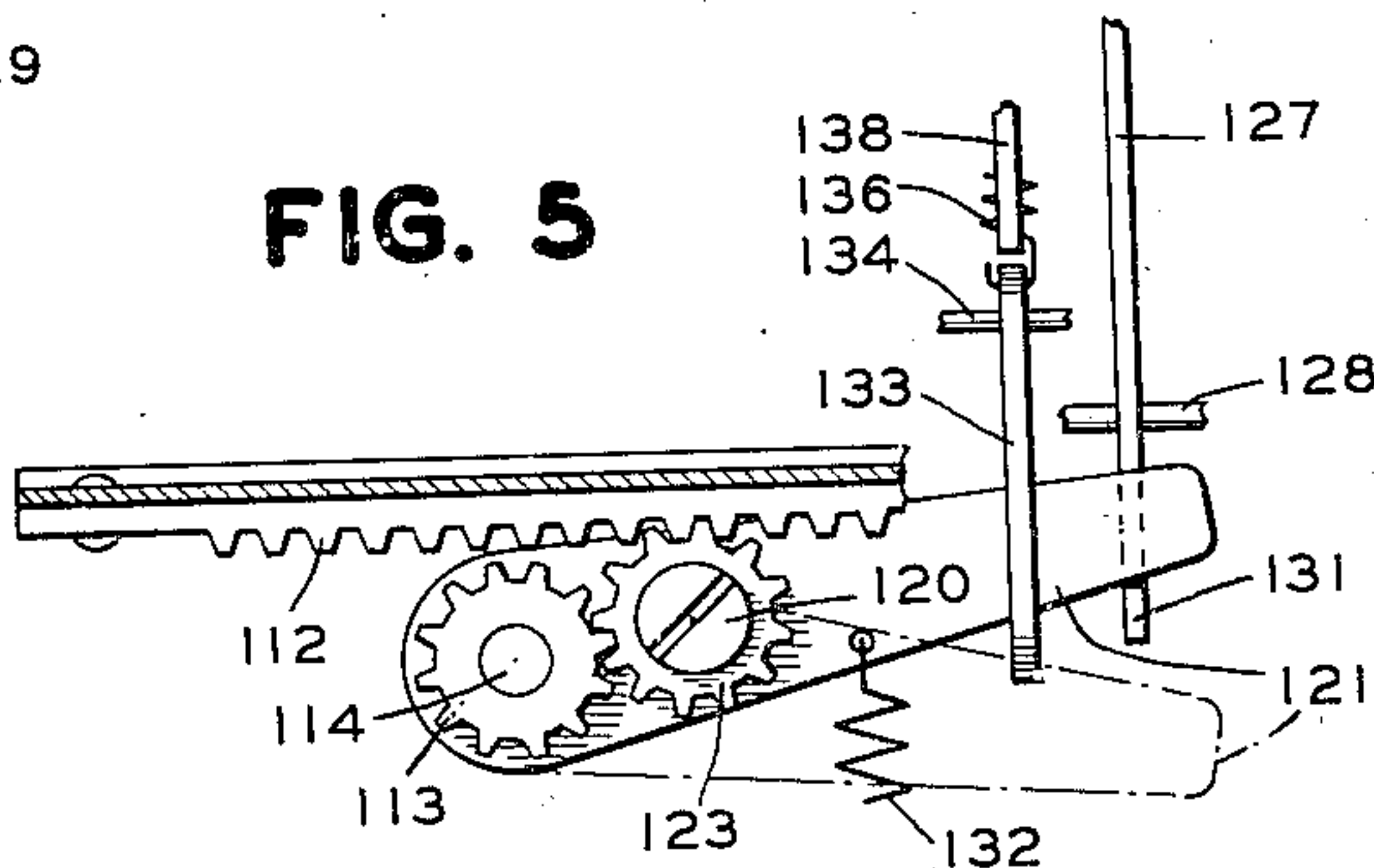
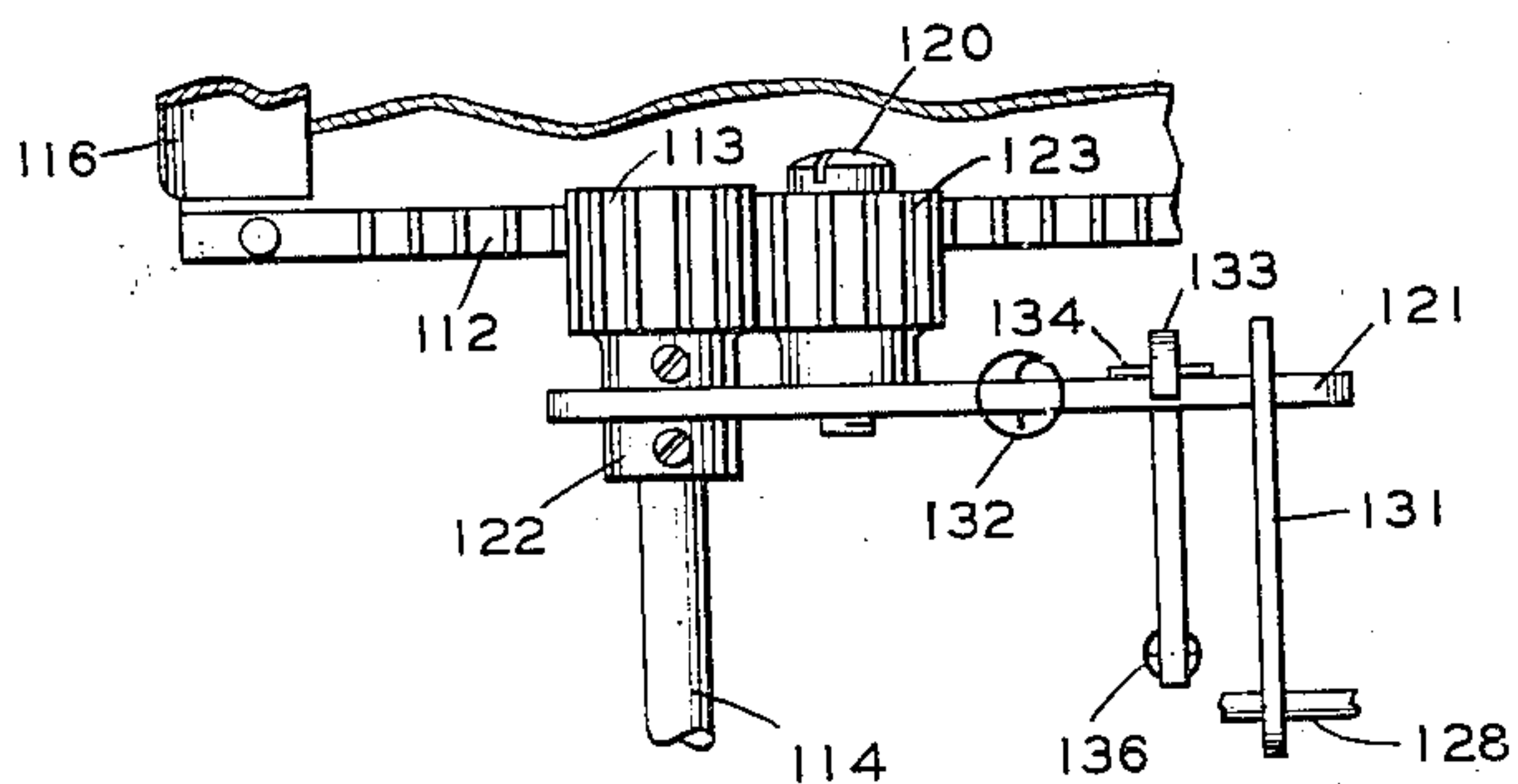


FIG. 6



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BACKSPACING TELEGRAPH PRINTER
MECHANISMHerbert Angel, Brooklyn, N. Y., assignor to The
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10 Claims. (Cl. 178—25)

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This invention relates primarily to printing telegraph mechanisms and apparatus, and more particularly to instrumentalities applicable to printing telegraph machines whereby certain printer functions may be accomplished in response to and under the control of one or more received code groups of signals.

It is an object of the present invention to provide a mechanism and control means therefor whereby either the recording medium or the recording mechanism such as the type bars or the type wheel of a page printer, whichever one is normally movable step-by-step in a letter spacing direction, to effect letter and word spacing, is moved step-by-step in a direction opposite to its normal step-by-step movement. In connection with the above, a more specific object of the invention is to provide mechanism operable in conjunction with a telegraph printer whereby the typing unit or the recording medium may be back-spaced by predetermined increments to any position in its path of travel.

A further object of the invention resides in the provision of mechanism of the above type which is readily applicable to existing printing telegraph machines and which may be applied thereto with a minimum of expense.

A still further object of the invention resides in the provision of mechanism applicable to printing telegraph machines whereby the unit normally movable predetermined increments in a letter-spacing direction may be back-spaced multiples of these increments on a cycle of operation of the machine.

In accordance with a modified form of the invention it is an object thereof to provide a mechanism which in response to a conditioning signal conditions the printing mechanism to back-space during following signals, which signals are normally effective to advance the printing mechanism in a letter-spacing direction.

In connection with the above, an object of the invention resides in the provision of mechanism to back-space the printing unit following a conditioning signal until an unconditioning signal is received.

The above and further objects of the invention will be more apparent in the following detailed description of a preferred and one modified embodiment of the invention wherein reference is made to the accompanying drawings.

In the drawings—

Fig. 1 is a perspective view of some of the elements of a page printing telegraph machine with

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the elements included in the present invention applied thereto and co-operating therewith;

Figs. 2 and 3 are detailed views of a part of the mechanism of Fig. 1 in normal and operative positions, respectively;

Fig. 4 is a perspective view of a modified form of the invention as it may be applied to a page printer; and

Figs. 5 and 6 are detailed views of part of the mechanism of Fig. 4.

The present invention is shown in the drawings in the manner in which it may be applied to a telegraph printer of the type disclosed in U. S. Patent No. 2,231,215, issued February 11, 1941 to P. A. Noxon, and the said patent is hereby made a part of the present application as if fully included herein. Only so much of the mechanism of the said Noxon patent is shown in the accompanying drawings that it is believed necessary to fully comprehend the principles of the present invention, and while the invention is shown applied to this particular printer it will be obvious that the principles thereof may readily be applied to various other specific types of printers.

Referring to Fig. 1, the carriage indicated generally by reference numeral 11 is suitably guided for to-and-fro movement relative to the stationary printing mechanism and has a feed rack 12 engaging a pinion 13 on the upper end of a shaft 14. The shaft 14 is normally rotated a predetermined amount in a clockwise direction, as viewed from above, whereby the carriage 11 is advanced in a letter-spacing direction or to the right as shown in Fig. 1. At the end of a line of print or when it is desired to effect a carriage return function for the beginning of a new line, the rack 12 supported on depending arms, such as 16, pivotally carried in the carriage is moved out of engagement with the pinion 13. Thereupon the spring drum 17 by means of the flexible band 18 is effective to return the carriage 11 to an initial position for the beginning of a new line. Concomitantly with the carriage-return function the paper supporting platen 19 is normally rotated to advance the recording medium.

The selecting mechanism of the above-described printer includes a set of permutation bars 21 which are set in various combinations in accordance with received code groups of impulses. Following the permuted setting of these permutation bars 21, a group of drop-in bars 22, only one of which is shown, is permitted to approach the notched edges of the bars and the one opposite an aligned row of notches pivots to a selected

position. The thus selected drop-in bar engages the lower end of an associated hook 23 to pivot the same beneath an operating bail 24. The bail 24, controlled by the operating cam 26, thereupon engages the selectively actuated hook 23 to effect the operation of the operating lever to which the hook is attached.

The printing mechanism includes a plurality of operating levers, such as 27, for effecting the various printer functions and somewhat similar operating levers associated with various type bars are operated to effect recording operations. The operating lever 27 shown in the drawing is pivoted at 28 and in the manner described hereinafter effects back-spacing movement of the carriage 11 one character space on each selective operation thereof.

In the mechanism as shown and described in the above-mentioned Noxon patent, the shaft 14 has on the lower end thereof a ratchet wheel which is rotated one tooth in conjunction with each letter or word-spacing operation. This ratchet of the Noxon patent corresponds to the ratchet 29, Figs. 1, 2 and 3, of the present application, but in accordance with the present invention the shaft 14 is formed in two sections, section 14 and section 14a. The upper end of section 14a terminates at the point 31 and is engaged by the lower end of the section 14.

The ratchet 29 in the present application is secured to the shaft 14a for rotation therewith and a collar 32 (also secured to the shaft 14a and rotatable with the ratchet 29) has secured thereto a toothed element 33. Normally the toothed element 33 engages a tooth of another ratchet wheel 34 located thereabove which is secured to a sleeve 36 surrounding the upper end of the shaft 14a and the lower end of the shaft 14. An axial slot 38 in the sleeve 36 engages a pin 37 through the shaft 14 whereby the sleeve rotates with the shaft but is movable along the axis thereof. A spring 39 pressing against the top of the sleeve 36 urges the same in a downward direction.

During the normal letter and word spacing operations of the printing mechanism, rotation of the ratchet wheel 29 effects corresponding rotation of the pinion 13 at the upper end of the shaft 14 through the engagement of the toothed element 33 with a tooth on the ratchet wheel 34.

Some of the function performing levers of the printer, when selected and operated, such as those effecting shift and unshift conditioning of the printer, do not during corresponding cycles of operation effect rotation of the ratchet 29, and the function lever 27, which may be termed the back-spacing function lever, is similar in this respect. Accordingly, when the backspacing function lever 27 is selected and operated, the ratchet wheel 29 will not be rotated to advance the carriage 11 but through mechanism about to be described effects back spacing of the carriage.

The right-hand end of the function lever 27 as shown in Fig. 1 engages an arm 41 secured to a rock shaft 42. The latter also has secured thereto a second arm 43 which has pivotally mounted in the outer end thereof a hooked member 44. The selective operation of the operating lever 27 through the described elements effects upward movement of the hooked member 44. A hook 46, as shown in Fig. 2, at the lower end of the member 44 in the normal position thereof is below and in operative relation with a flange 47 of the sleeve 36. Accordingly, as the hooked member 44 moves in an upward direction the sleeve 36 and

ratchet 34 also move upwardly to disengage the ratchet 34 and the toothed element 33. Thereupon the spring drum 17 is effective to move the carriage 11 in a back-spacing direction and through the rack 12 and pinion 13 rotate the shaft 14 and sleeve 36 in a reverse direction. Should the ratchet 34 be held out of engagement with the toothed element 33 for a sufficient length of time, the carriage 11 would effect a complete carriage return function and assume a position for the beginning of a new line. However, the ratchet 34 is only momentarily disengaged from the toothed element 33 or only long enough for the ratchet 34 to escape the toothed element 33 one tooth. The hooked element 44 has thereon a cam surface 45 engageable with a fixed element 48 of the printer and as the hooked member moves in an upward direction, the engagement of the cam surface 45 with the fixed element 48 pivots the member 44 and causes disengagement the hook 46 thereon from the flange 47. This action occurs just as the sleeve is raised sufficiently for the ratchet 34 to clear the toothed element 33 whereupon the sleeve 36 immediately moves in a downward direction so that the toothed element 33 engages the next tooth of the ratchet 34. Thus the ratchet 34 is permitted to rotate in a reverse direction one tooth at a time and during this movement the carriage is back-spaced a corresponding distance.

By having the same number of teeth on the ratchets 29 and 34, the back-spacing of the carriage 11 during the operation of the back-spacing operating lever 27 is equal to the distance the carriage is moved in a letter-spacing direction during normal operations. By different arrangements in the number of teeth upon the two ratchets, the amount of back-spacing of the carriage 11 could be varied. For example, if the ratchet 34 had one-half as many teeth as the ratchet 29, the carriage 11 would back-space two character spaces at time.

In order to prevent back-spacing of the carriage 11 when it is in or very near its initial position for the beginning of a new line of print, the carriage 11 carries a member 49 adapted with the carriage in such a position to pivot a lever 51 whereby the lower end thereof engaging the hooked member 44 pivots the same and withdraws the hook 46 from out of operative engagement with the flange 47. Thus, even though the back-spacing operating lever 27 may be operated with the carriage in or near its initial position, the hook 46 cannot engage the collar 47 to lift the sleeve 36.

In the modified embodiment of the invention as shown in Figs. 4, 5 and 6, the carriage 111 supporting the platen 119 is advanced in the same manner and by similar elements as disclosed in the above-mentioned Noxon patent. This advancement of the carriage is effected by rotating the ratchet wheel 129 on the shaft 114 to which is also secured the pinion 113 engaging the rack 112 carried by arms such as 116 of the carriage. Rotation of the ratchet wheel 129 effects advancement of the carriage 111 in a letter-spacing direction against the action of the spring drum 117 and a carriage return function is effected by moving the rack 112 out of engagement with the pinion 113 to permit the spring drum 117 and flexible band 118 to return the carriage to an initial position for the beginning of a new line.

In accordance with the modified form of the

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invention, a plate 121 is pivotally mounted adjacent the left-hand end thereof, as best shown in Fig. 6, on the shaft 114 just below the pinion 113. The plate 121 is held in place on the shaft 114 by a collar 122 and to the right of the pinion 113 is an idler pinion 123 pivotally mounted on a shoulder screw 120 in the plate 121. In the normal position of the plate 121 the teeth of the idler gear 123 do not engage the teeth of the rack 112 but do engage the teeth of the pinion 113.

In the modified arrangement, a back-spacing conditioning signal is employed to condition the printer for back-spacing, and following the receipt of such a signal, all other signals which normally are effective on the printer to advance the carriage in a letter spacing direction are effective to back-space the carriage a corresponding distance, and the carriage will continue to be back-spaced by such signals until a restoring signal is received. The back-spacing conditioning operating lever 127 is selected and operated on the receipt of the back-spacing conditioning signal. This lever is selected by pivoting its associated hook 125 beneath the cyclically operating bail 124. The operating lever 127 is pivoted at 128 and the selective operation thereof through its upwardly extending arm 131, normally engaging the plate 121, effects counterclockwise rotation of the plate 121, as viewed in Fig. 5, against the action of spring 132. This pivoting motion of the plate 121 brings the teeth of the idler pinion 123 into engagement with teeth of the rack 112 and continued movement of the plate 121 causes the rack 112 to move an amount sufficient to withdraw the teeth thereof out of engagement with the teeth of the pinion 113. The amount of movement of the rack 112, however, is not sufficient to permit the same to be latched in the position to which it is operated in conjunction with the carriage return function.

As the plate 121 is moved into the position shown in full outline in Fig. 5, a latch 133, pivoted at 134 and having an operating spring 136, latches the same in this position. With the rack 112 in engagement with only the idler pinion 123, which rotates in a direction opposite to that of the pinion 113, each following cycle of operation of the printing mechanism wherein the ratchet wheel 129 is advanced will cause the carriage 111 to back-space a distance equivalent to the distance it normally would be advanced. This backward movement of the carriage while being effected primarily by the spring drum 117 is governed by the idler pinion 123.

When the carriage 112 is back-spaced the desired amount by the transmission of the necessary number of code groups which normally effect advancement of the carriage, the restoring code group is transmitted to effect operation of the restoring operating lever 127a. The operation of the restoring lever 127a by its hook 125 and operating bail 124 causes the same to pivot in a clockwise direction about the pivot bar 137. Such pivoting of the lever 127a causes the end 138 thereof to engage the depending arm of a latch 133 to operate the same and withdraw the hooked arm from out of engagement with the plate 121. Thereupon the spring 132 is effective to restore the plate to its normal unoperated position and in moving to this position the teeth of the idler gear 123 move out of engagement with the rack 122 and permit the rack to move toward the pinion 113 whereby the teeth thereof re-engage those of this pinion. Thus the carriage moving mechanism is restored to its normal posi-

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tion and may be advanced in conjunction with the receipt of the following letter and word spacing signals.

While the invention has been described in but a preferred and one modified embodiment thereof, it will be obvious that various other modifications may be made therein without departing from the spirit or essential attributes thereof, and it is desired therefore that only such limitations be placed thereon as are specifically set forth in the appended claims.

What is claimed is:

1. In a printing telegraph machine, a selector mechanism, a printing unit, a carriage supporting a recording web, movable relative to said printing unit step-by-step in an advancing letter spacing direction and continuously in an opposite and backward direction to effect line-by-line recording on said web, a selectively operable element, means operative by said element to effect backward movement of said carriage relative to said recording unit a predetermined distance on each operation thereof, and means operative by said carriage during a predetermined part of its travel with respect to said printing unit to disable said element to cause backward movement of said carriage.
2. In a telegraph recorder, a carriage normally movable step-by-step in an advancing letter spacing direction in conjunction with printing operations and continuously in a reverse direction to an initial position, a back spacing mechanism for moving said carriage in said reverse direction a predetermined distance on each operation thereof and means controlled by said carriage in a predetermined part of its path of travel for disabling said back spacing mechanism to back space said carriage.
3. In a telegraph recorder, a carriage movable step-by-step in an advancing letter spacing direction and continuously in a reverse direction from any point in its path of travel to an initial position in response to a carriage return signal, a signal controlled back spacing mechanism and means operated by said mechanism for back spacing said carriage a predetermined distance on each operation thereof only when said carriage is in a predetermined part of its path of travel.
4. In a telegraph machine, a carriage, a rack on said carriage, a pinion engageable with said rack and rotatable step-by-step to advance said carriage in a letter spacing direction, said rack being disengaged from said pinion to effect the normal carriage return movement of said carriage, an element rotatable in only one direction coupled to said pinion for rotating the same to advance said carriage, means for uncoupling said element from said pinion to permit rotation of said pinion in a reverse direction a predetermined amount and corresponding return movement of said carriage, and means for recoupling said element to said pinion after the reverse rotation thereof whereby rotation thereof in said one direction effects advancement of said carriage.
5. In a telegraph machine, a carriage, a rack on said carriage, a first pinion engageable with said rack and rotatable step-by-step to advance said carriage in a letter spacing direction, said rack being disengaged from said pinion to effect the return movement of said carriage, a second pinion, means for interposing said second pinion between said rack and first pinion whereby rotation of said first pinion in a direction to normally advance said carriage effects corresponding movement of said carriage in a reverse direction.

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6. In a telegraph machine, a carriage, a rack on said carriage, a first pinion engageable with said rack and rotatable step-by-step to advance said carriage in a letter spacing direction, said rack being disengaged from said pinion to effect the return movement of said carriage, a second pinion engaged with said first pinion and normally disengaged from said rack, means responsive to a first code group of signals to engage said second pinion with said rack and disengage said rack and said first pinion whereupon rotation of said first pinion in a direction to normally advance said carriage effects corresponding movement thereof in a reverse direction and means responsive to a second code group to re-engage said rack with said first pinion and disengage said second pinion therefrom.

7. In a telegraph machine, a carriage, a carriage advancing mechanism normally operative to advance said carriage in a letter spacing direction a predetermined distance on each operation thereof, a signal controlled device and means operated by said device to condition said carriage advancing means to effect movement of said carriage in a reverse direction in conjunction with the receipt of code groups normally effecting advancement thereof.

8. In a telegraph machine, a carriage, a carriage advancing mechanism normally operative to advance said carriage in a letter spacing direction a predetermined distance on each operation thereof, a control for said mechanism, means responsive to one predetermined code group to operate said control to condition said carriage advancing means to cause movement of said carriage in a direction opposite to said letter spacing direction in response to code groups normally causing advancement thereof and means responsive to a second predetermined code group to operate said control to restore said carriage advancing means to a normal condition.

9. In a telegraph machine, a carriage, a car-

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riage advancing mechanism normally operative to advance said carriage in a letter spacing direction a predetermined distance on each operation thereof, a control for said mechanism, means responsive to one predetermined code group to operate said control to condition said carriage advancing means to cause movement of said carriage in a direction opposite to said letter spacing direction distances corresponding to the advancement thereof in a letter spacing direction in response to code groups normally causing such advancement and means responsive to a second predetermined code group to operate said control to restore said carriage advancing means to a normal condition.

10. In a telegraph machine, a carriage, a rack on said carriage, a pinion engageable with said rack and rotatable step-by-step to advance said carriage in a letter spacing direction, said rack being disengaged from said pinion to effect the normal carriage return movement of said carriage, an element rotatable in only one direction, coupling means including said pinion between said element and said rack for advancing said carriage on rotation of said element, signal controlled means and means including said signal controlled means for controlling said coupling means to effect return movement of said carriage predetermined distances.

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REFERENCES CITED

The following references are of record in the file of this patent:

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