

Jan. 19, 1943.

F. J. MAUS ET AL

2,308,563

PRINTING MECHANISM

Filed May 16, 1939

2 Sheets-Sheet 1

FIG. 2

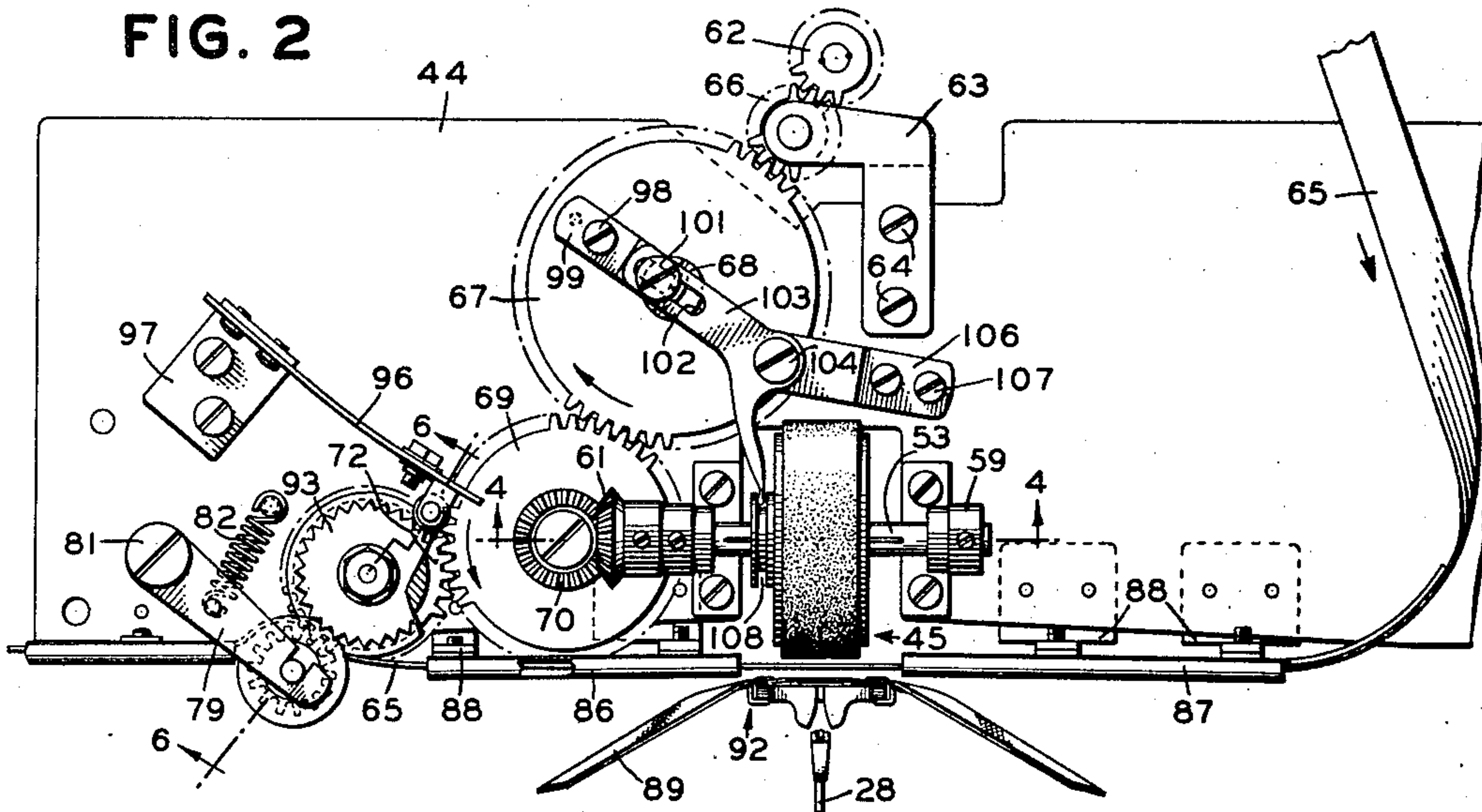
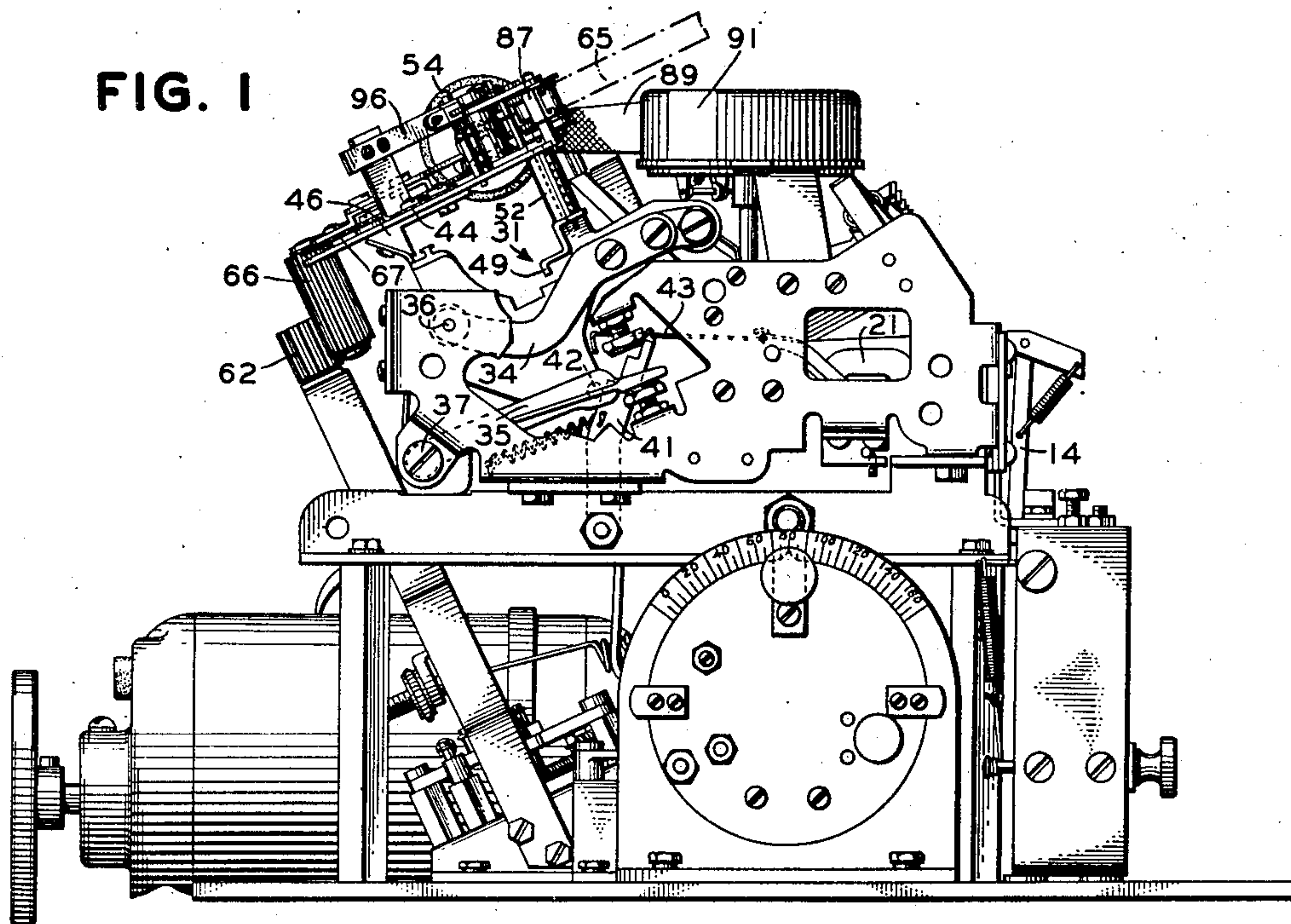


FIG. 1



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2 Sheets-Sheet 2

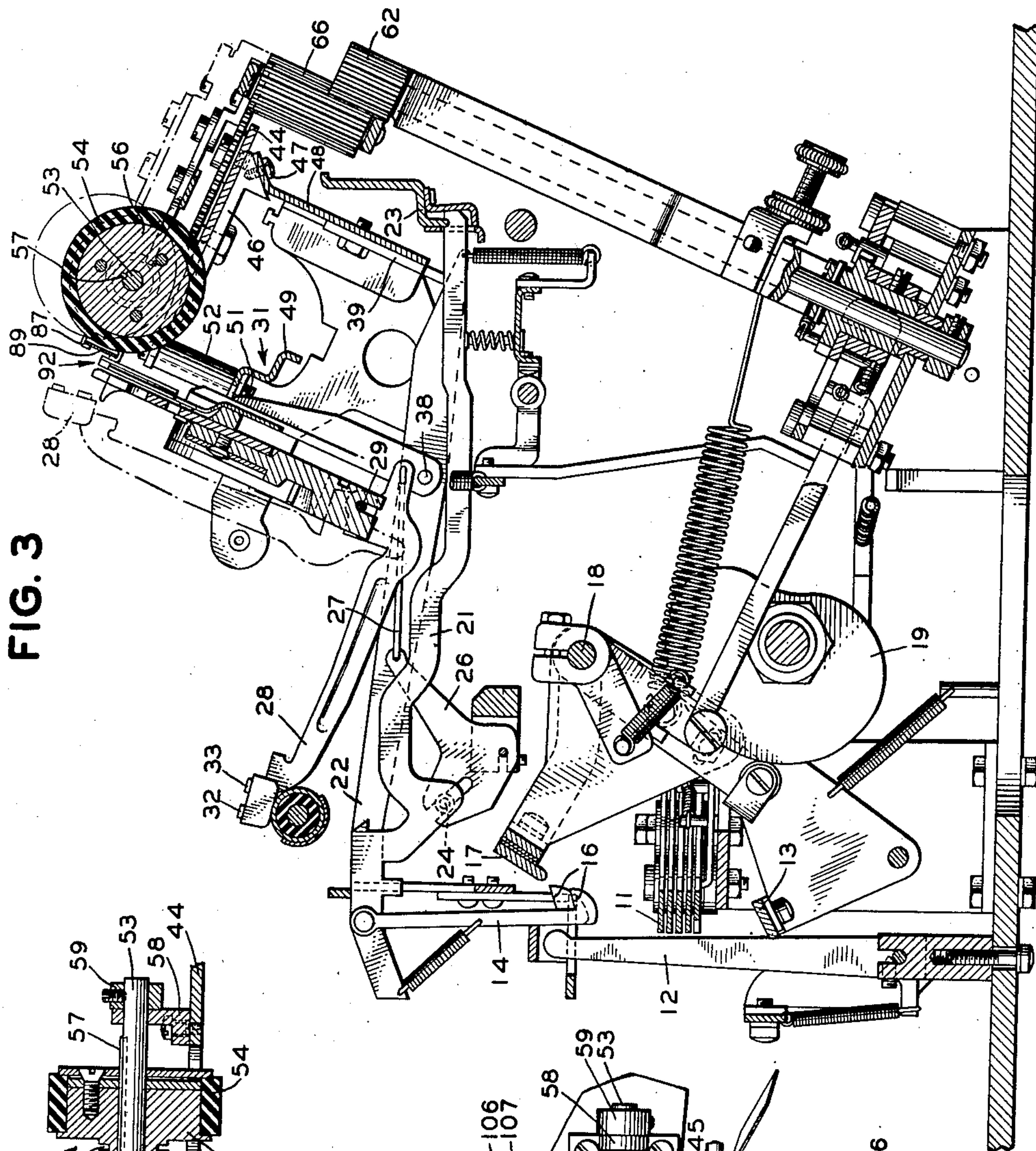


FIG. 3

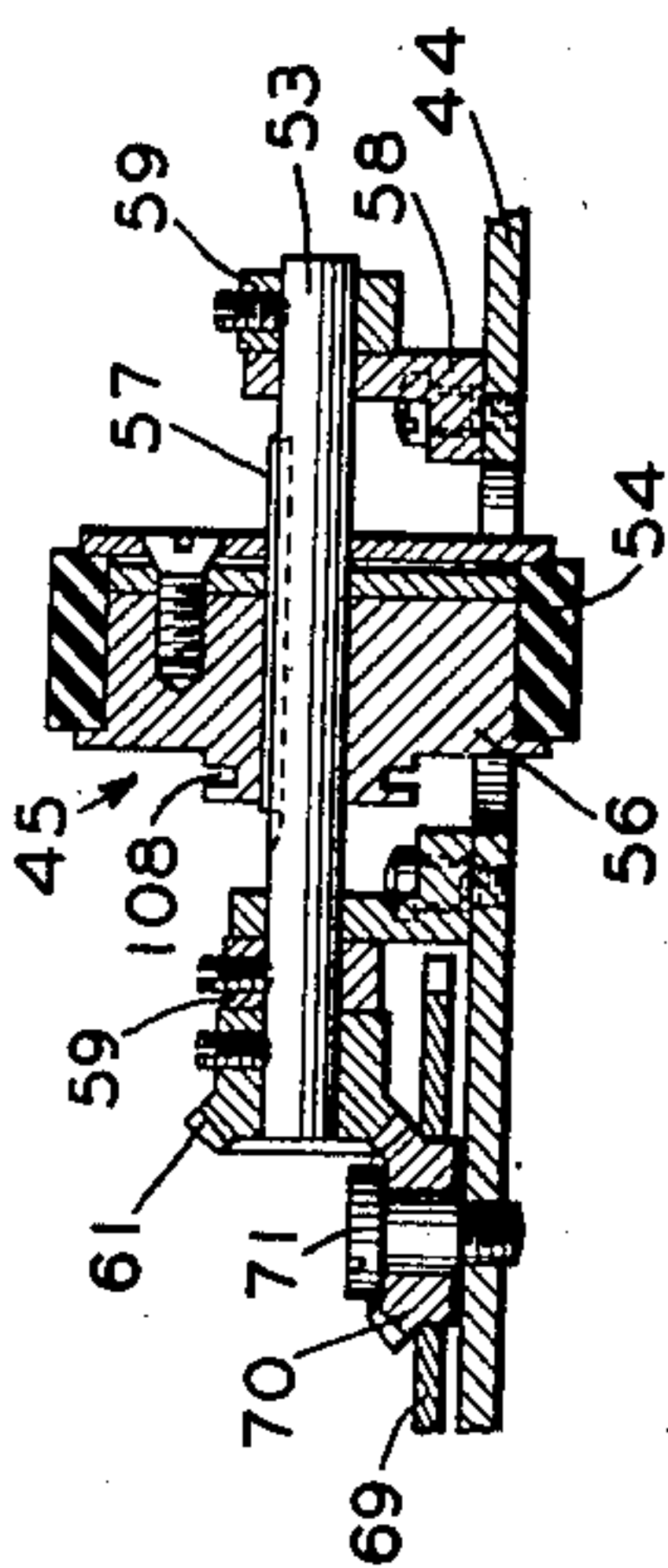
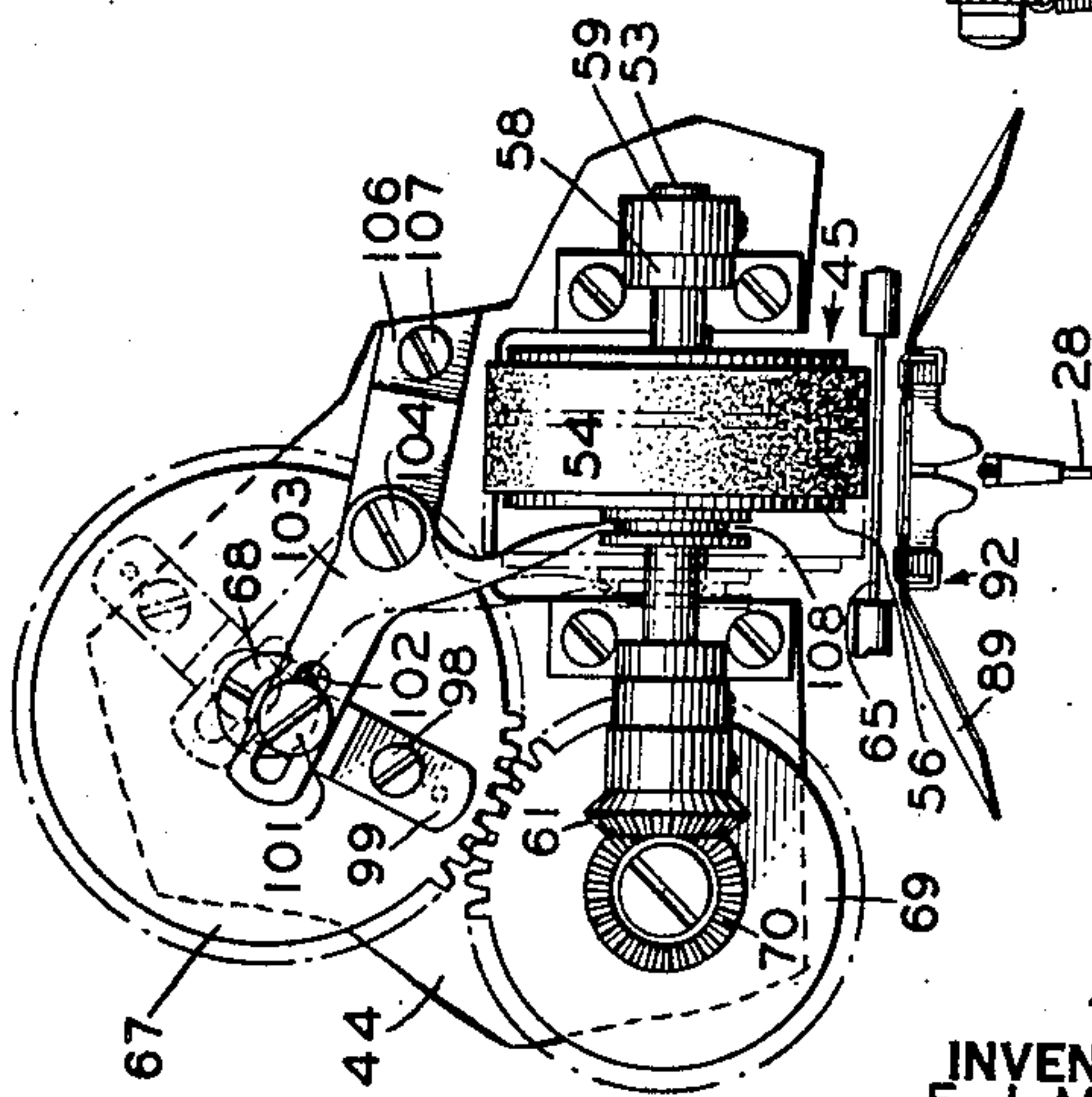


FIG. 4

FIG. 5



UNITED STATES PATENT OFFICE

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PRINTING MECHANISM

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Application May 16, 1939, Serial No. 273,842

5 Claims. (Cl. 197—125)

This invention relates primarily to telegraph receivers and more particularly to that type of telegraph receivers wherein type bars are selectively actuated in accordance with received telegraph signals to print on a recording tape or web.

Type bar telegraph receivers are generally divided into two principal types, namely, page printers and tape printers. The page printers, as the name implies, record characters representative of the received signals in successive lines on a page or web of substantial width which is advanced or line fed after each line of print, whereas a tape printer records the signals on a comparatively narrow tape, one character appearing in each transfer section of the tape and the tape being advanced concomitantly with each recording operation. Generally by making the necessary provisions such as for example, transmitting certain printer function signals, such as line feed and carriage return signals, where these functions are not performed automatically, a page printer may be employed in place of a tape printer. Similarly, a tape printer may be substituted or employed in place of a page printer. However, for certain types of services, one type of printer is to be preferred over the other. Heretofore when it was desired to substitute one type of printer for the other, the complete printer had to be changed as each type was constructed differently.

In accordance with the above, one of the primary objects of the invention is to provide an attachment which replaces some of the elements of a page printer, such as that disclosed in a co-pending application of Noxon et al., Ser. No. 66,906, filed March 3, 1936, issued February 11, 1941, Patent No. 2,231,215, which will convert such page printers into tape printers.

Another object of the invention is to provide a device of the above type which may be cheaply manufactured, efficient and quiet in operation and easily attached to printers of the above type.

In type bar printers, whether of the page or tape type, the printing is usually effected by the type bars pressing an inking ribbon onto the recording paper which is supported by a platen. In a page printer the platen extends the full width of the paper and obviously there is less wear thereof per unit of area for a given number of printing operations on a page printer platen than on the smaller platen employed in a tape printer, the platen in a tape printer being usually little wider than the tape. In a tape printer the tape is usually supported by the small platen and the

platen rotated or stepped a predetermined amount, to cause advancement of the tape through the printer on each printing operation. The tape employed in tape printers is oftentimes gummed on the back so that it may be gummed down on a blank to form a message of the regular size and in humid weather considerable difficulty is encountered by the gum on the back of the paper softening and causing the paper to stick to the resilient platen. While this trouble is obviously more likely to occur when the printer has been idle for a time, it may occur during the operation thereof. Another difficulty usually encountered in a tape printer is that with a small platen the type bars strike in the same spot comparatively frequently and soon wear the platen or cause it to become pitted resulting in uneven or poor printing.

In view of the above another object of the invention is to provide an attachment for printers of the above type whereby they may be converted to tape printers and wherein the recording tape is only in contact with the platen for a very short time or only during the actual printing upon the tape.

Another object is to provide a platen which rotates at right angles to the direction of movement of the recording tape and slowly moves back and forth along the axis thereof so that a large number of printing operations may be performed before a type bar strikes the platen in exactly the same spot.

Another object of the invention is to provide a tape printer wherein the tape is completely visible at all times even up to the last printed character and all within the normal line of vision.

These and other objects of the invention will be more apparent when taken in conjunction with the following detailed description and drawings, in the latter of which:

Fig. 1 is a left hand elevational view of a printer of the above type wherein the attachment for converting it into a tape printer is shown replacing the regular platen carriage;

Fig. 2 is a plan view of the platen and the actuating mechanism therefor together with the tape feeding mechanism;

Fig. 3 is a vertical sectional view taken substantially through the transfer center of the recorder;

Fig. 4 is a fragmentary sectional view taken substantially on line 4—4 of Fig. 2;

Fig. 5 is a plan view of the platen and the actuating mechanism therefor showing the limits of axial movements thereof; and

Fig. 6 is a fragmentary sectional view taken substantially on line 6—6 of Fig. 2.

For a detailed description of the elements of the page printer reference may be had to the above mentioned copending application, and hereinafter the description of the elements and operation thereof will be limited and only those described as will be necessary for a ready understanding of the present invention.

Referring first to Fig. 3, the selector mechanism of the printer employs a plurality of horizontal permutation bars 11 arranged in superimposed relation that are selectively positionable in the well known manner into one or the other of two positions in response to received signals. The permutation bars 11 have arranged on their front or left hand side as shown in Fig. 3 a series of notches, the notches in each bar being arranged differently from those in the others. For each combination of settings of the permutation bars 11, a notch in each of the bars is in vertical alignment with a notch in each of the other bars and following the setting thereof a group of drop-in bars 12 are allowed to approach the notched sides of the permutation bars whereupon the one opposite the aligned row of notches is allowed to enter therein and in so doing pivot a slight amount further than the rest. A bail member 13 controls the operation of the drop-in bars 12 in timed relation with the selective positioning of the permutation bars 11. Associated with the upper end of each one of the drop-in bars 12 is a depending hook 14 and when a drop-in bar 12 is selected by entering a row of aligned notches in the permutation bars 11, it causes the shoulder 16 of the associated hook 14 to move beneath a bail member 17. The bail 17 hereinafter referred to as the print or operating bail pivots about a rod 18 and is controlled by a cam 19 operating in timed relation with the movement of the drop-in bars 12. The cam 19 makes one revolution in conjunction with each received code combination and in so doing allows the bail 17 to move downward, whereupon it engages the selected one of the hooks 14. The hooks 14 are pivotally attached adjacent the ends of associated type bar operating levers such as 21 and function control levers such as 22. The type bar operating levers 21 are pivoted adjacent their right hand ends at a member 23 forming a transverse support in the printer and when one of the hooks 14 associated with a type bar operating lever is moved in a downward direction a pin 24 in the lever 21 pivots an associated bell crank 26 in a counterclockwise direction. An arm of each of the bell cranks 26 has articulated thereto one end of a link 27, the other end of which engages an associated type bar 28. The type bars are pivotally mounted at 29 and when the front end of their associated type bar operating levers 21 moves downward, the described linkages cause the type bar to move upward to perform a recording operation as will hereinafter be described.

In the above mentioned page printer the platen carriage is movable to and fro to effect letter spacing and return of the carriage for the beginning of new lines of print. The platen carriage is carried in a cradle indicated in general by reference numeral 31, Figs. 1 and 3, which as hereinafter described is movable up and down within predetermined limits so that either one or the other of the type elements 32 and 33 on a type bar 28 will be recorded when a type bar is actuated. The platen carriage cradle 31 is attached to the forward or right hand ends as shown in

Fig. 1 of levers 34 and 35, the left hand ends of which are pivoted at 36 and 37 in the printer frame structure. The pivots of the levers 34 and 35 are in substantially parallel planes and permit movement of the platen carriage 31 in substantially a straight line. With the cradle 31 in its lower position the selection of the hook 14 in response to a shift signal associated with the function lever 22 causes the cradle to be raised to its up position. The lever 22 is pivoted at 38, Fig. 3, and during its operation the right hand end engages a member 39 in the cradle 31 to raise the same. The cradle 31 is latched in its upper position by a latch member 41, Fig. 1, engaging a pin 42 in the lever 35. When it is desired to lower the cradle one of the hooks 14 is selected, in response to an unshift signal which is associated with a link 43, to withdraw the latch 41 from engagement with the pin 42 whereupon the cradle drops to its lower position.

In accordance with the invention all that is necessary to convert the above mentioned page printer into a tape printer is to remove the platen carriage and replace it with a plate 44 upon which is mounted the tape platen indicated generally by reference numeral 45 and the tape actuating mechanisms hereinafter described. The plate 44 has attached to the underside thereof brackets 46, Fig. 3, which are attached by screws 47 to a member 48 of the carriage cradle 31. The front of the plate 44 is attached to a rail member 49 of the cradle by screws 51, spacers 52 on the screws 51 spacing the plate the proper distance from the rail 49.

The above mentioned platen 45 is freely mounted on a shaft 53, which is disposed in a horizontal position with the axis thereof extending transversely of the machine. The complete platen 45 is composed of a ring of resilient material 54, such as rubber, mounted on a platen hub 56. The hub 56, as shown in Figs. 3 and 4, has formed therein a keyway which engages a key 57 on the platen shaft 53. In this manner the platen 45 is movable axially along the shaft 53, but is at all times rotatable therewith. The platen shaft 53 is pivotally mounted in brackets 58 attached to the plate 44 and collars 59 on the shaft prevent longitudinal movement thereof. Fixed to the left hand end of the platen shaft 53 for rotation therewith is a bevel gear 61 which serves to rotate the platen in a manner hereinafter described.

As fully described in the aforementioned copending application, each time a recording or a word space operation is performed the pinion 62, Figs. 1, 2 and 3, is rotated a predetermined amount to effect movement of the platen carriage in a letter spacing direction. As hereinafter described when the machine is employed as a tape printer the pinion 62 through various other gears serves to move the platen 45 and advance the recording tape 65. A bracket 63 is attached by screws 64 to the back edge of the plate 44 and pivotally supports a second pinion 66. The second pinion 66 is of substantial length so that as the cradle 31 is moved up to its shift position as indicated by the dot-dash outline thereof in Fig. 3, the pinion 66 will still remain in engagement with the pinion 62. The pinion 66 in turn meshes with a gear 67 pivotally mounted on a shoulder screw 68 in the plate 44 which also meshes with another gear 69. The gear 69 is fixed for rotation therewith to a bevel gear 70 which is pivoted on a shoulder screw 71 supported in the plate 44. The gear 70 meshes with

the gear 61 on the platen shaft 53 and through the described gear train; each time the pinion 62 rotates or steps the platen shaft 53 also rotates or steps a predetermined amount. The gear 69 also meshes with and drives another gear 72, Fig. 2, to which is fixed for rotation therewith a knurled tape advancing or feed roller 73 which is pivotally supported on a stud 74, best shown in Fig. 6, extending from the plate 44. Also meshing with the gear 72 is another gear 76, Figs. 2 and 6, which is pinned for rotation therewith to a pressure roller 77. The pressure roller 77 and gear 76 are forced on a pin 78 which is carried in the free ends of pivoted levers 79. The levers 79 are pivoted on a shoulder screw 81, Fig. 2, and a spring 82 attached thereto keeps the gears 72 and 76 in mesh and the pressure roller 77 against the knurled feed roller 73. The recording tape 65 passes between the feed roller 73 and the pressure roller 77 so that as these rollers rotate the tape is advanced. As both the pressure roller 77 and feed roller 73 are positively driven, the slippage between the peripheries and the tape 65 is reduced to a minimum. The direction of rotation of the feed and pressure rollers 73 and 77 respectively, is such that the tape 65 is advanced from right to left as is the usual practice and during the advancement thereof it is pulled from a supply reel, not shown, at the rear of the printer, past the printing platen 45. The center portions of the pressure and the feed rollers are recessed so that the center portion of the tape does not come in contact therewith thus preventing smudging of the printed matter thereat. Two channel shaped members 86 and 87 are located one each side of the platen 45 to guide the tape past the platen, they being so positioned that the tape 65 is normally a slight amount in front of the platen 45. The channel shaped members 86 and 87 are supported from the plate 44 by brackets such as 88 and the fronts are open so as to permit the printed matter on the center of the tape to be read and to facilitate easy threading of the tape through the printer.

As described in the above mentioned copending application the type bars 28 perform the printing operation through an inking ribbon 89. The ribbon 89 is supplied from supply spools 91, Fig. 1, and passes through a shuttle or ribbon guide 92, Figs. 2 and 5, located in front of the platen 45. The shuttle 92 is normally below the recording tape 84 and only during each printing operation the shuttle raises the inking ribbon to the height of the recording tape, thus giving complete visibility of the characters recorded at all times. During a printing operation a type bar 28 presses the inking ribbon 89 and the tape 65 against the periphery of the platen 45 to leave an imprint of the type bar on the tape and as the tape advancing operation occurs following the printing operation, the tape is withdrawn from engagement with the platen shortly after the printing operation. Thus the tape is only momentarily in contact with the platen and because of this gummed tape is much less likely to stick to the platen than it would if in contact therewith for longer intervals. The fact that the direction of movement of the tape 65 is at right angles to the direction of rotation of the platen 45 also assists in preventing the gummed tape from sticking to the platen.

Fixed to the feed roller 73 and rotatable therewith is a star wheel 93, Figs. 2 and 6, which co-operates with a detent roller 94 carried in the

end of a flexible member 96. The flexible member 96 is supported at its fixed end in a bracket 97 on the plate 44. The gears hereinafter described which drive the gear 72 on the feed roller 73 are of such a size that the periphery of the feed roller is rotated an amount equal to one letter space concomitantly with each printing operation. Thus the tape 84 is advanced one letter space for each printing or word space operation. The star wheel 93 rotatable with the feed roller 73 rotates one tooth for each tape feed operation and the roller 94 cooperating therewith insures that the feed roller 73 rotates the same amount for each tape feed operation, holds it and eliminates any back lash or play that might be present in the gears employed to drive the same.

The gear 67 has fixed to the upper side thereof by a screw 98 a bracket member 99 which carries in an offset portion thereof a shoulder screw 101. The bracket 99 is so positioned that the shoulder screw 101 is a slight amount off center with respect to the center of the shoulder screw 68 upon which the gear 67 is mounted. The shoulder screw 101 engages a slot 102 in an arm of a bell crank 103 pivotally mounted on a shoulder screw 104 in a bracket 106 affixed to the plate 44 by screws 107. The other arm of bell crank 103 engages a groove 108 formed on the left hand side of the platen hub 56 and as the gear 67 rotates the bell crank 103 oscillates within the limits shown by the dot-dash and full outline thereof in Fig. 5 to slide the platen 45 back and forth along the platen shaft 53. As the gear 68 is comparatively large it requires a considerable number of tape feed operations for it to make one revolution during which time the platen 45 makes one complete oscillation along its shaft 53. The beveled gears 61 and 70 serve to rotate the platen 45 a predetermined amount for each tape feed operation and the two movements of the type wheel occur simultaneously. Thus the platen 45 is rotated about and laterally moves along the axis simultaneously. The size of the gears employed to rotate and axially move the platen 45 are so proportioned that several revolutions and several oscillations occur before the printing blow takes place in exactly the same spot on the periphery of the platen. Thus the small platen 45 is much less likely to become pitted and any wearing thereof occurs over a surface substantially wider than the width of a type element on a type bar 28.

It will be obvious of course that various modifications of the invention 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 printing machine, a plurality of separately operable type bars for performing recording operations in invariable position, a rotatable printing platen against which said type bars strike to perform said recording operations, means including gear means for positively rotating said platen to invariably make one revolution during a first predetermined number of printing operations, and means including gear means for positively moving said platen back and forth in an axial direction to invariably make one complete oscillation during a second predetermined number of printing operations whereby a plurality of revolutions and oscillations of said platen

occur before a printing operation occurs at the same spot on said platen.

2. In combination with a printing machine having a plurality of type bars selectively operable one at a time to perform printing operations on a recording tape, a gear adapted to rotate a predetermined amount on each printing or word space operation of said printing machine, a first means operated by said gear to advance said tape a predetermined amount concomitantly with each printing or word space operation, a circular platen against which said type bars strike to perform said printing operations, a second means operated by said gear to positively rotate said platen a predetermined amount for each printing or word space operation and a third means operated by said gear to positively oscillate said platen in an axial direction at a non-uniform rate relative to the rotation of said gear.

3. In a printing machine, a plurality of type bars selectively operable one at a time to perform printing operations on a recording tape in an invariable vertical printing plane relative to said telegraph machine, each of said type bars having a plurality of type elements arranged along the length thereof, a rotatable printing platen against which said type bars strike to perform said printing operations, the axis of said platen being perpendicular to said vertical printing plane, means guiding said recording tape for movement through said printing plane between said platen and said type bars, means for rotating said platen and advancing said tape predetermined amounts concomitantly with each printing operation, means for moving said platen back and forth along the axis thereof to make one complete oscillation in a predetermined number of printing operations different from that required to rotate said platen one revolution, means for moving said platen and tape so as to change the positions thereof in said vertical printing plane to permit the printing of one of said type elements on said type bars at a time, and means for maintaining said platen rotating and axially moving means operative during the operation of said last mentioned means.

4. In a printing machine, a plurality of type bars selectively operable one at a time to perform printing operations on a recording tape in an invariable vertical printing plane relative to

said machine, an inking ribbon passing through said vertical plane normally out of the path of movement of said type bars, a rotatable printing platen in said printing plane, tape guides for supporting said tape for movement in the direction of its length in front of and out of engagement with said platen and in the path of movement of said type bars, means operative during the operation of any one of said type bars to move said inking ribbon into the path of movement thereof whereby said operated type bar presses said ribbon onto said tape and said ribbon and tape against said platen to effect a recording operation, and means operative following each recording operation to advance said tape a predetermined amount, said tape being withdrawn from engagement with said platen as an incident to said advancing operation.

5. In a printing machine, a plurality of type bars selectively operable one at a time to perform printing operations on a recording tape in an invariable vertical printing plane relative to said machine, an inking ribbon passing through said vertical plane normally out of the path of movement of said type bars, a rotatable printing platen in said printing plane, means for supporting said tape for movement in the direction of its length in front of and out of engagement with said platen and in the path of movement of said type bars, means operative during the operation of any one of said type bars to move said inking ribbon into the path of movement thereof whereby said operated type bar presses said ribbon onto said tape and said ribbon and tape against said platen to effect a recording operation, a first positively acting means operative to pull said tape away from said platen and through said printing plane a predetermined amount following each printing operation, and a second and third positively acting means operable with said first means to rotate said platen and move the same back and forth along the axis thereof to make one revolution in a first predetermined number of printing operations and one oscillation in a second predetermined number of printing operations whereby a plurality of revolutions and oscillations of said platen occur before a printing operation takes place at the same spot on said platen.

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