

April 10, 1928.

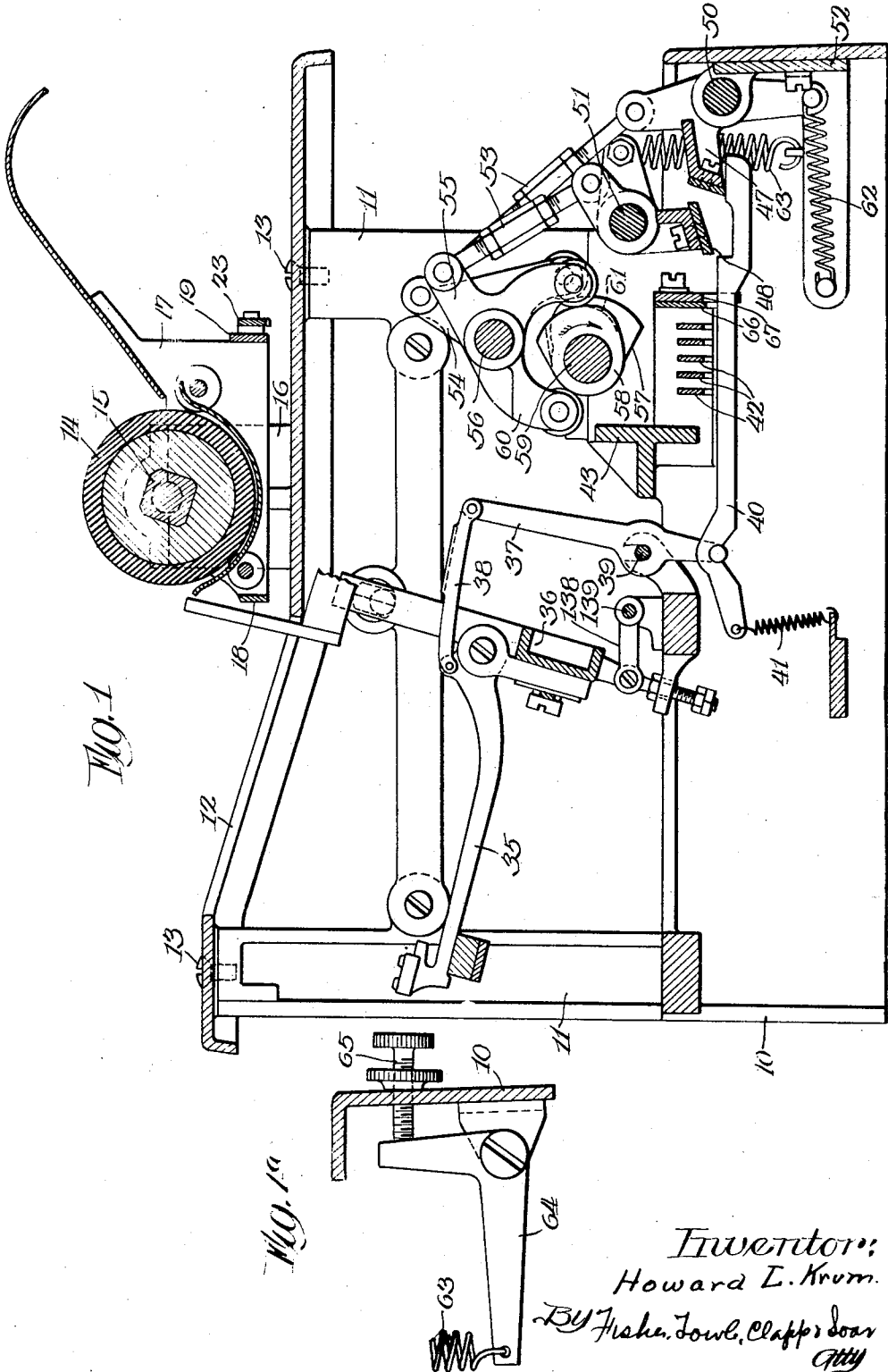
1,665,594

H. L. KRUM

TELEGRAPH PRINTER

Filed June 13, 1924

6 Sheets-Sheet 1



April 10, 1928.

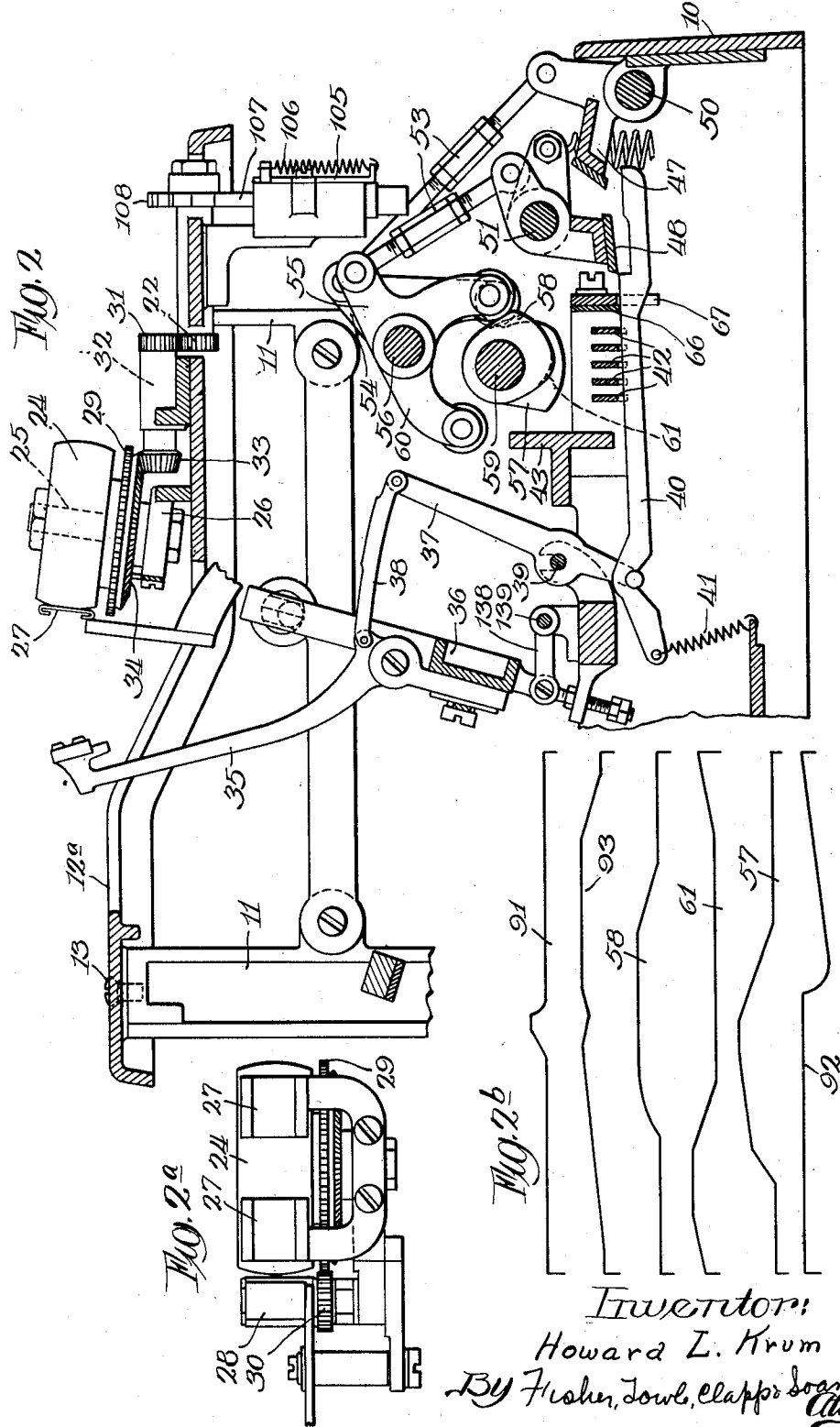
1,665,594

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TELEGRAPH PRINTER

Filed June 13, 1924

6 Sheets-Sheet 2



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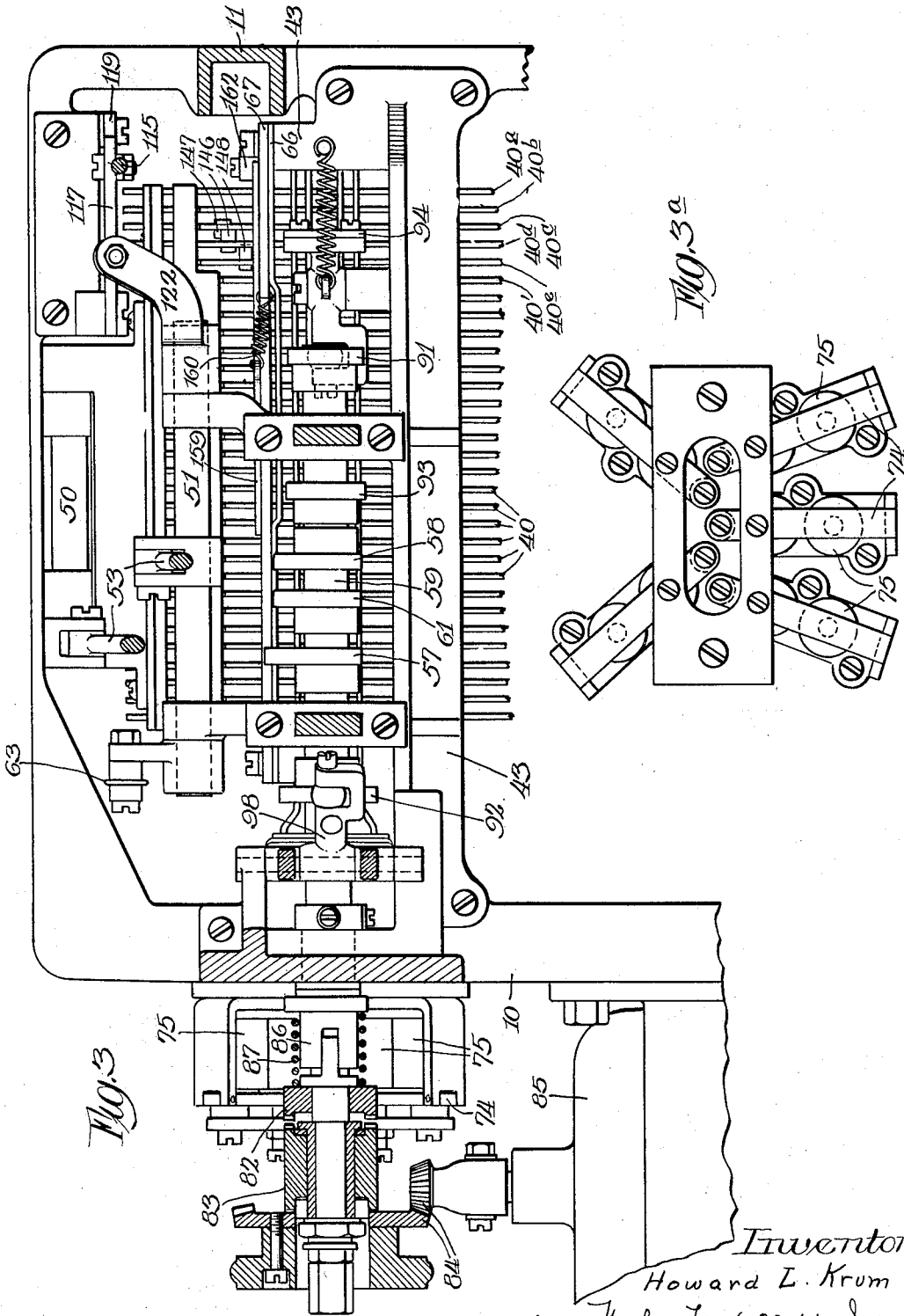
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TELEGRAPH PRINTER

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6 Sheets-Sheet 3



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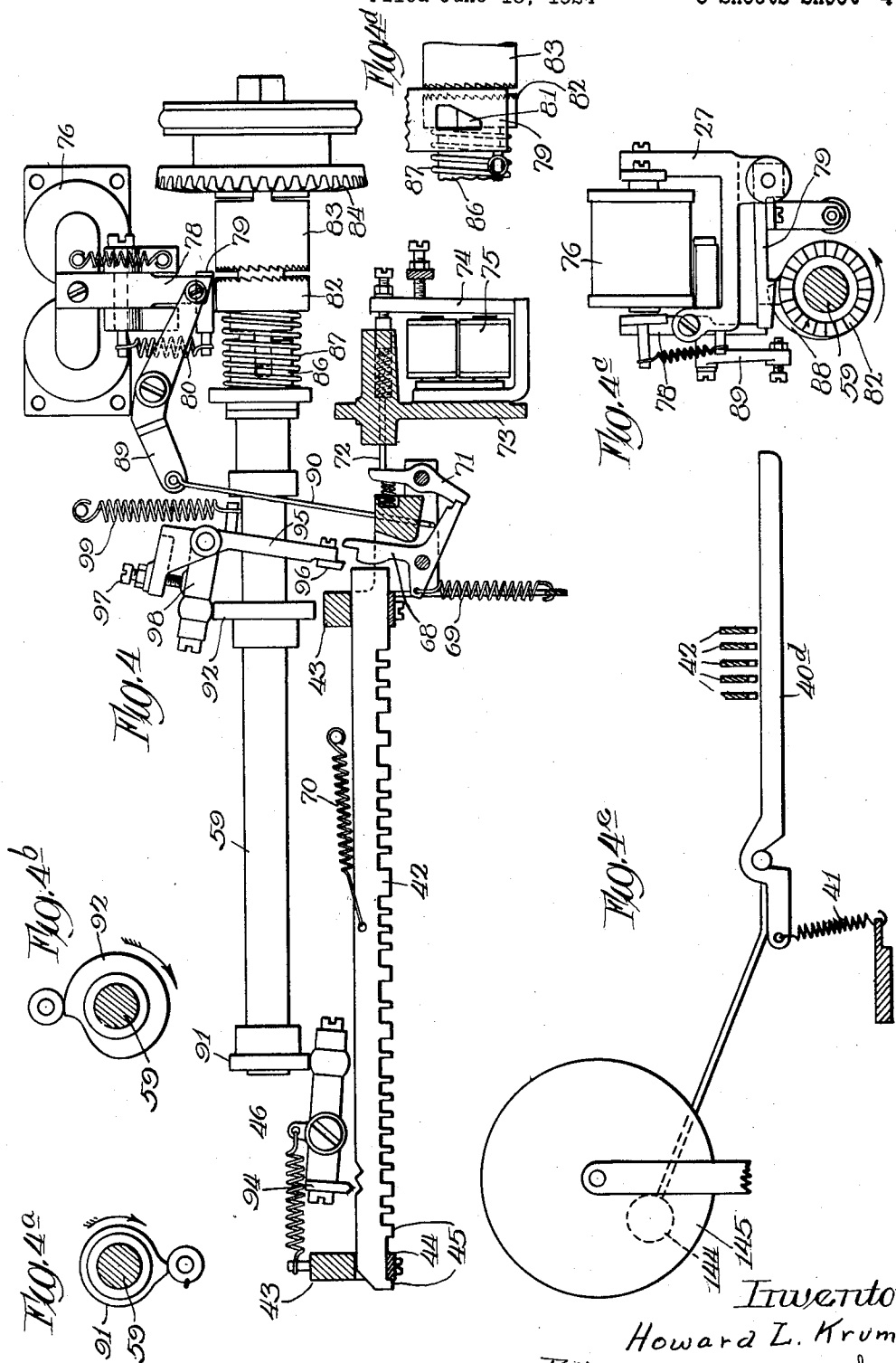
1,665,994

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6 Sheets-Sheet 4



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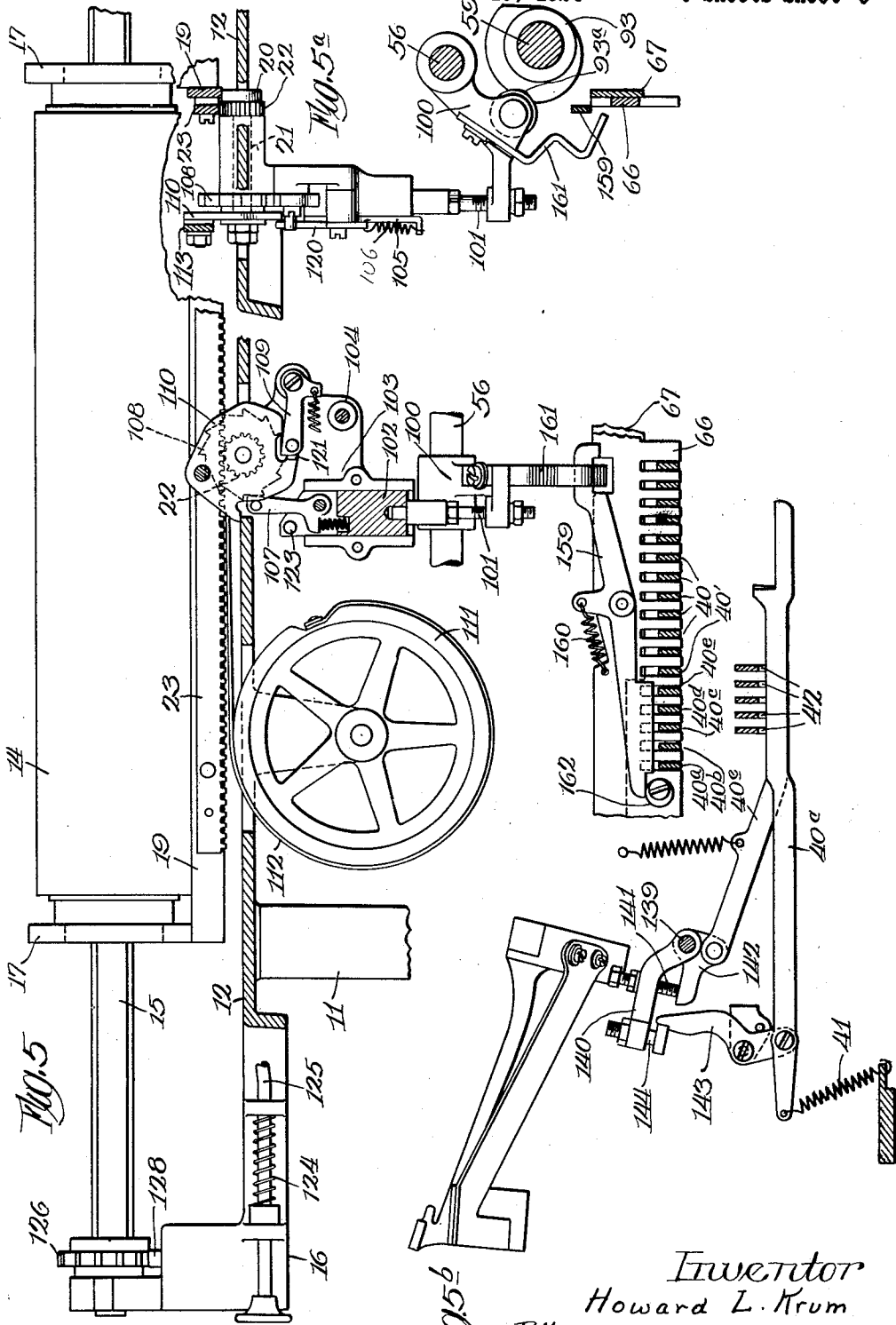
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TELEGRAPH PRINTER

Filed June 13, 1924

6 Sheets-Sheet 5



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1,665,594

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TELEGRAPH PRINTER

Filed June 13, 1924

6 Sheets-Sheet 6

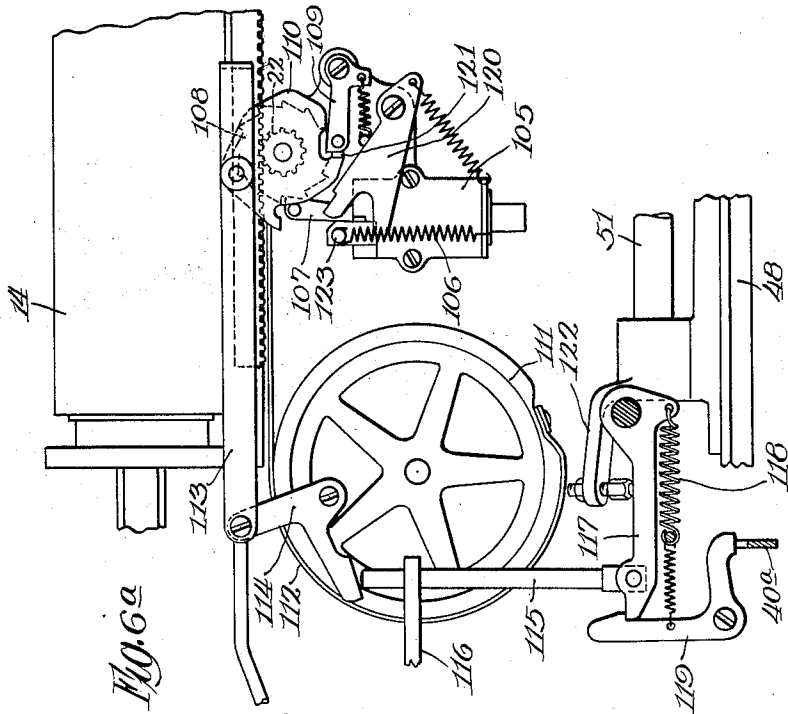


FIG. 6a

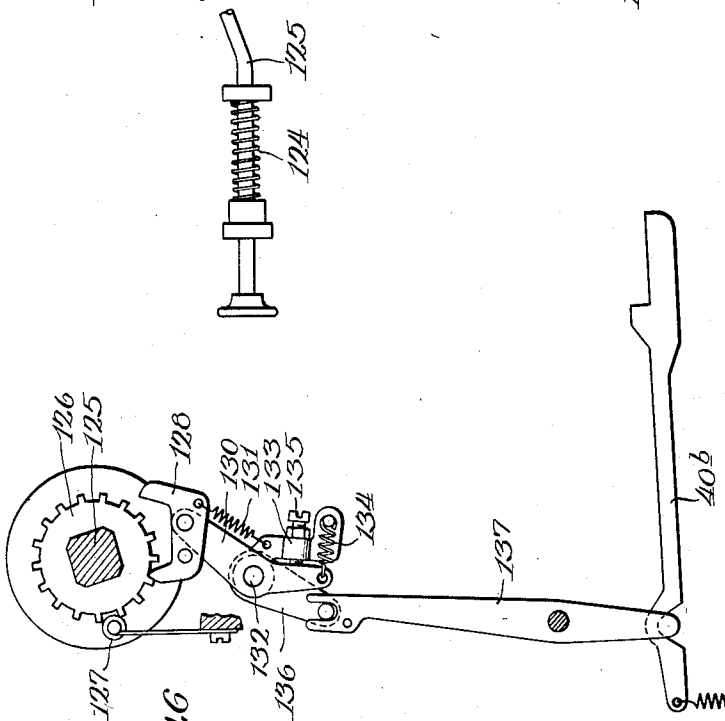


FIG. 6

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UNITED STATES PATENT OFFICE.

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TELEGRAPH PRINTER.

Application filed June 13, 1924. Serial No. 719,766.

The invention relates to telegraph printers and more particularly to a type bar printer in which the operation is effected by a motor driven cam shaft under control of a set of permutation bars and the invention seeks to provide an improved printer of this sort, and further, to improve the construction shown in the prior application filed in the U. S. Patent Office June 18, 1921, by Sterling Morton and myself, Serial No. 478,659. The invention consists in the features of improvement hereinafter set forth, illustrated in the preferred form in the accompanying drawings, and more particularly pointed out in the appended claims.

On the drawings:

Fig. 1 is a view in vertical section from front to rear of the improved machine.

Fig. 1^a is a detail view of the adjusting means for the striker bar spring.

Fig. 2 is a view similar to Fig. 1, illustrating a modified form of carriage and showing one of the type bars in shifted position.

Fig. 2^a is a detail view in front elevation of parts shown in Fig. 2.

Fig. 3 is a view partially in plan and partially in horizontal section, of the operating mechanism at the rear of the machine frame.

Fig. 3^a is a detail view in elevation of the bracket carrying the selector mechanism.

Fig. 4 is a detail view in rear elevation of the selector mechanism that sets the permutation bars and the mechanism for controlling its operation.

Figs. 4^a and 4^b are detail views of cams shown in Fig. 4.

Fig. 4^c is a detail elevation of the clutch-controlling or "6th pulse" magnet and parts associated therewith.

Fig. 4^d is a plan view of the clutch.

Fig. 4^e is a detail view of the signalling device.

Fig. 5 is a detail view in rear elevation illustrating the spacing mechanism.

Fig. 5^a is a side elevation of the spacing mechanism.

Fig. 5^b is an elevation of the case shift mechanism,

Fig. 6 is a detail elevation of the line spacing devices.

Fig. 6^a is a detail rear elevation of the carriage return mechanism.

The frame comprises a base 10, upright corner posts 11 and a top plate 12 removably secured to the upper ends of the posts 11 by screws 13. Preferably, as shown in Figs. 1 and 5, a cylindrical paper platen 14 is employed. This platen is slidably mounted upon a square shaft 15 the ends of which are journaled in brackets 16 extending outwardly and upwardly from the opposite sides of the top plate 12. Reduced portions at the ends of the cylindrical platen (see Fig. 5) are journaled in end plates 17 and the latter are connected by front and rear bars 18 and 19 (see Fig. 1) and these end plates support suitable paper feeding and guiding devices. The rear bar 19 forms a guide for the paper carriage and engages a roller 20 (see Fig. 5^a) on the rear end of a short shaft 21 that forms part of the letter spacing mechanism. This shaft is journaled in a suitable bearing formed in the top plate and adjacent the roller 20 carries a feed pinion 22 which meshes with a rack 23 fixed to the rear bar 19 of the paper carriage.

In Figs. 2 and 2^a a modified form of platen is provided which may be employed if it is desired to print upon a tape. This platen is mounted upon a top plate 12^a and may be readily substituted for the top plate previously described. The roller platen 24 is preferably in the form of a segment of a sphere and is fixed to a vertical shaft 25, the latter being journaled in its lower end in a bracket 26 rising from the top plate 12^a, the bearing being preferably so disposed that the shaft 21 is inclined slightly toward the rear. A paper guide 27 and feed roll 28 cooperate with the platen and hold the paper tape in proper relation therewith. Preferably the platen and feed roll have intermeshing gears 29 and 30 so that the feed roll is positively driven. The platen is advanced step by step to effect the letter spacing from the feed shaft 21 similar to that previously described, but in this form the pinion 22 on the feed shaft meshes with a pinion 31 on

the rear end of a short shaft 32 journaled in the top plate. A beveled pinion 33 on the forward end of the shaft 32 meshes with a beveled gear 34 fixed to the roller platen.

5 The type bars 35 are carried by suitable hangers on a segment 36, the latter being arranged in an inclined position with the pivots of the type bars in front of and below the cylindrical platen 14 so that they swing upwardly and rearwardly and strike the front of the cylindrical platen at a point somewhat above the horizontal plane extending through its axis. To permit the removal of the top plate 12 and the cylindrical platen 14 and permit the substitution of the top plate 12^a and the roller platen, the latter, in order to properly cooperate with the same set of type bars is, as stated, the section of a sphere and is mounted upon an axis that is slightly inclined to the vertical.

20 Upright sub-levers 37 arranged in rear of the type bar segments are connected at their upper end to the individual type bars by links 38. The sub-levers 37 are pivoted adjacent their lower ends upon a transverse rod 39 and the extreme lower ends of the sub-levers are provided with pivot pins engaging slots in the forward ends of a series of actuating bars 40. Individual springs 41 connected to the forward ends of the actuating bars serve to restore the type bars and actuating bars to their normal positions shown in Fig. 1, and to hold them in such positions. It should be particularly noted that the springs 41 tend to move the actuating bars 40 rearwardly and also tend to move them upwardly into engagement with the notched lower edges of a set of permutation bars 42.

40 The permutation bars are preferably five in number and extend in horizontal series above the rear ends of the actuating bars 40. At their ends the permutation bars 42 are guided in slots formed in the end portions of a transverse bracket 43 and are held in place in the guide slots by pieces 44. One of the pieces 44 forms a stop and cooperates with lugs 45 on the permutation bars to limit their longitudinal movement and a pivoted lock 46 cooperates with notches in the permutation bars to hold them, each in either one or two positions. The permutation bars, as usual, are adapted to be set in different combinations in accordance with the different code signals and are so notched on their lower edges that in any setting one of the actuator bars 40 can rise into the notches thereof.

60 The rear ends of the actuator bars are normally held depressed by a transverse bail or drop bar 47 and most of the bars are provided with shoulders and, when any actuator bar is selected and rises into the notches of the permutation bars, its shoulder extends into the path of movement of an actuating bail 48.

The bails 47 and 48 are fixed to rock shafts 50 and 51, shaft 50 being journaled in a bracket 52 fixed to the rear of the base 10 and shaft 51 being journaled in the bracket 43. The bails 47 and 48 are provided with adjustable working edge portions and are connected by adjustable links 53 to arms or rockers 54 and 55 loosely mounted on a transverse pivot shaft 56 that is carried in the upper portion of the bracket 43. Rollers mounted on these arms cooperate respectively with a drop bar cam 57 and with a striker or actuating cam 58 fixed to a transverse main operating shaft 59 that is journaled in the bracket 43 below the pivot shaft 56. The striker bail rocker 55 also has a forwardly extending arm 60 which cooperates with a cam 61 on the operating shaft (see Figs. 1 and 3). Springs 62 and 63 connected respectively to the bails 47 and 48 hold the parts in the normal or idle position shown in Fig. 1 with the rollers on rockers 54 and 55 pressed into engagement with the cams 57 and 58 respectively, and these springs shift or actuate the bails when the high portions of the cams 57 and 58 pass beyond the rollers of the corresponding rockers. Preferably, as shown, in Fig. 1^a, the striker bail spring 63 is connected at its lower end to a bell crank 64 which may be adjusted to vary the tension of the spring by a screw 65.

The type bar operating mechanism is shown in normal position in Fig. 1 with the high portions of the cams 57 and 58 engaging the corresponding rockers. In this position the drop bail 47 holds the rear ends of the actuating bars 40 depressed and the striker or actuating bail 48 is held in its rearmost position. When the permutation bars are set in response to a code combination, a single revolution is imparted to the operating shaft 59 in the direction indicated by the arrow in Figs. 1 and 2. During the initial portion of this revolution the drop bail 47 is lifted by its spring and the actuator bars are lifted by their springs, the selected bar rising into the notches of the permutation bars with its shoulder in front of the striker bail 48 and then, when the high portion of the cam 58 passes beyond the roller of the striker bail rocker, the striker bar is swung forwardly by its spring 63, correspondingly moving the selected actuating bar and throwing the associated type bar to the printing point. The upward movement of the selected actuator bar is limited by a stop bar 66 which is mounted on the forward face of a comb bar 67. The latter is fixed at its ends to the bracket 43 and forms a guide for the rear ends of the actuating bars. The stop bar 66 is adjustably connected to the comb bar, and so limits the upward movement of the selected actuator bar that, as the striking bail swings on its arc, it will be disengaged from the shoulder of the selected actuator bar, as

shown in Fig. 2, slightly before the corresponding type reaches the printing point, the movement of the type being completed by the momentum of the moving parts.

5 After the high portion of cam 58 has passed beyond the roller of the striker bail rocker, the cam 58 engages the roller of the arm 60 and if the spring 63 fails to complete the operating movement of the striker bar, such movement will be positively completed by the cam 61. The spring actuation of the striker bar is entirely sufficient to effect the operation of the actuator bars and type bars and this positive operation of the striker bar is only required when it operates certain of the function mechanisms that offer considerable resistance.

The setting of the permutation bars 42 is effected by a corresponding series of selectors or levers 68 (see Fig. 4) which are pivotally mounted in slots in the lower end portion of the bracket 43. Springs 69 connected to the selecting levers tend to move the latter and the associated permutation bars from their normal retracted positions to their advanced positions and these springs are heavy enough to overcome the return spring 70 connected to the permutation bars. But normally the selectors 68 are held retracted by a set of spring-pressed latches 71, the lower ends of which engage the lower ends of the selecting levers and lock them in retracted position. The latches are adapted to be tripped by a set of spring-pressed plungers 72 mounted in a bracket 73 and the latter in turn are controlled by the armatures 74 of a set of selecting magnets 75 also mounted on the bracket 73. The selecting magnets are variably operated as usual in different combinations in response to the selecting intervals or units of the received signals, and correspondingly trip the latches 71 to permit the operation of the selecting levers by their springs 69. At the end of each signal a 6th pulse or operating magnet 76 is energized.

In the construction shown, the operating magnet 76 is carried by a bracket 77 on one side of the machine above the end of the main operating shaft 59. Its spring-held armature 78 is pivoted between its ends and forms a latch that normally holds a clutch throw-out lever 79 in its depressed position with its spring 80 under tension. In its depressed position a V-shaped notch or seat (see Fig. 4^a) in the thickened end portion of the lever 79 engages a correspondingly shaped lug 81 on the driven member 82 of a toothed clutch. The driving member 83 of the clutch is loosely mounted on the shaft and is connected by intermeshing beveled gears 84 to the shaft of a small electric motor 85 by which it is constantly rotated when the machine is in operation. The driven clutch member 82 is keyed to a

sleeve 86 on the shaft that is free to shift axially into and out of engagement with the driving clutch member and is pressed by a spring 87 toward its engaged position. Normally, however, the clutch is held open by the lever 79. When the operating magnet 76 is energized the armature latch 78 releases the clutch throw-out lever 79, the latter is lifted by its spring 80 and the clutch members are engaged or closed by the spring 87 to start the operating shaft in motion. At the end of the revolution of the shaft, a cam 88 thereon engages a roller on an arm depending from the throw-out lever 79 and restores this lever to its depressed position and into engagement with the armature latch 78. As the revolution is completed, the V-shaped or beveled lug 81 engages the beveled edge of its seat in the lever 79 and the clutch members are disengaged.

If desired, a cut-out may be provided for preventing the operation of the shaft 59 when the magnet 76 is energized unless one of the selecting magnets 75 has previously been operated. For this purpose a lever 89 is normally spring-held in position with one end engaging the lower end of the armature latch 78 to hold it against movement. But if one of the selecting levers 68 is shifted, it engages the bent lower end of a link 90 and shifts the cut-out lever 89 to permit the operation of the armature latch.

The main operating shaft, in addition to the cams already referred to, carries cams 91 and 92, and a cam 93 (see Figs. 2, 4, 4^a, 4^b and 5^a). The cam 91 controls the permutation bar lock lever 46 and in the normal or idle position of the operating shaft holds the lock lever released, as shown in Fig. 4, so that the springs 70 tend to hold the permutation bars toward the right when viewed from the rear as in Fig. 4. A spring 94 holds a roller on the lock lever 46 in engagement with the periphery of the cam 91.

The cam 92 controls a bell crank lever 95 the lower end of which is provided with a bar 96 for engaging the selecting levers 68 and restoring them into engagement with their latches 71. The horizontal arm of the bell crank lever 95 is preferably provided with an adjustable screw 97 which engages an arm 98 loosely mounted on the pivot of the lever and having a roller engaging the cam 92. A spring 99 connected to the lever maintains the adjusting screw 97 in engagement with the arm 98 and also holds the roller on the latter in engagement with the cam. By means of the screw the position of the restoring bar 96 can be adjusted.

The cam 93 operates a letter spacing rocker 100 mounted on the pivot shaft 56 and provided at its rear end with a vertically disposed adjustable screw 101. The latter is arranged to engage the lower end of a plunger 102 which is slidably mounted in a

guide-way or casing 103 which is formed upon a bracket 104 depending from the top plate 12. A cover plate 105 (see Fig. 6^a) holds the plunger in the guide-way and a
 5 spring 106 connected to the plunger and cover plate forces the plunger downwardly into engagement with the stop screw 101 and holds the roller on the rocker 100 against the periphery of the cam 93. A
 10 spring-held feeding dog 107 pivoted upon the upper end of the plunger is arranged to engage a ratchet wheel 108 on the rear end of the letter space feed shaft 21. A spring-held holding dog 109 pivoted on the bracket
 15 104 cooperates with the ratchet wheel.

The normal or zero position of the cams on the main operating shaft are shown in Figs. 1, 4^a, 4^b and 5^a, and is also indicated in the development of the cams in Fig. 2^b. When
 20 one or more of the selecting levers 68 have been released to shift the corresponding permutation bars in response to a received signal, the main operating shaft 59 as described is thrown into operation. As soon as it
 25 starts to move, cam 91 permits the engagement of the latch lever 46 with the permutation bars to hold them in set position. Immediately thereafter an abrupt shoulder 92^a on the cam 92 permits the quick shift
 30 of the lever 95 by means of its spring 99 and the shifted selecting levers are re-engaged with their latches. The re-setting lever 95 is then moved back against the tension of its spring 99 away from the selecting
 35 levers 68 by the inclined portion 92^b of the cam 92. As soon as the re-setting lever is moved slightly away from the selecting levers, the latter are in condition to be released from their latches in accordance with the succeeding
 40 signal, and during the time that the shaft 59 is completing the printing of the character corresponding to the setting of the permutation bars 42.

On the continued movement of the shaft, 45 release or drop bail 47 is lifted and the actuating bars are moved against the permutation bars by their springs 41, the selected bar moving into the notches of the permutation bars and bringing its shoulder into the path
 50 of movement of the striker bail 48. Then, as the inclined portion 58^a of the cam 58 moves beneath the roller of the rocker 55, the spring 63 will actuate the striking bail and throw the selected type to the printing point. As
 55 already noted, the bail disengages the shoulder of the selected actuating bar before the type reaches the printing point and the latter portion of this movement is effected by the momentum of the moving parts. The
 60 type bar spring 41 is so arranged that it offers little resistance to the upward throw of the type bars but is tensioned sufficiently to promptly restore the type bars and the associated actuating bar. While the inclined
 65 portion 58^a of the cam 58 controls

the operation of the striker bail spring 63, it permits the sufficiently quick operation of this spring to effect the operation of the type bars in the manner described. At the
 end of the first half of the revolution of the shaft 59, spacing cam 93 lowers the plunger 102 so that the feeding dog 107 engages the next succeeding tooth and, during the second half of the revolution of the shaft, the cam again elevates the plunger and
 75 advances the carriage one step in letter space direction. At the end of the revolution of the shaft 59, the roller on the spacing rocker 100 is forced into a notch 93^a in the spacing cam and holds the shaft 59
 80 accurately in zero or idle position. As the roller drops into the notch the feeding dog moves away from one of the teeth of the ratchet wheel and a tooth on the latter snugly engages a holding dog 109. It is
 85 noted that the holding dog always positions the carriage as the platen receives the impact of the type and so insures good spacing. Also as the shaft approaches the end of its revolution, the releasing and striking bails
 90 are restored to their normal positions and just prior to the completion of the movement of the operating shaft, the permutation lock 46 is released and the latter, if they have been shifted, can be restored by their
 95 springs 70.

In the meantime, if the levers 68 have been set according to a signal, this setting will be transferred to the permutation bars as soon as the permutation latch 46 is thus
 100 released. That is to say, if one of the permutation bars has been advanced and the next signal also requires that it be shifted, it will be retained in its advanced or shifted position by the corresponding selecting le-
 105 ver and will not be returned to normal by its spring 70. It is also noted that the selecting levers are normally spaced from the permutation bars, so that the levers can be set for operation even though the corre-
 110 sponding bar is locked in position. In such a case, the bar will be shifted as soon as it is released.

The five bars at the right hand side of the machine (see Fig. 3) are not connected
 115 to type bars but control or operate the function mechanisms. Thus the bar 40^a controls the carriage return mechanism. This mechanism comprises a cam plate 110 pivoted on the feed shaft 21 which, when ro-
 120 tated in right hand direction (when viewed from the rear as in Fig. 6^a) is arranged to engage pins on the feeding and holding dogs 107 and 109 and disengage them from ratchet wheel 108. The carriage will then
 125 be returned by a spring drum 111 journaled in a bracket depending from the top plate and connected to the carriage by means of a strap 112. The cam plate 110 is connected by a link 113 to a bell crank 114 pivoted on
 130

the top plate and, adapted to be engaged by a rod 115 which slides through a guide arm 116 on the main frame and is connected at its lower end to a lever 117 pivoted on the main frame. A spring 118 tends to lift the lever 117 but the latter is normally held in depressed position by a pivoted spring-held latch 119.

When the actuating bar 40^a is selected and allowed to rise into the notches of the permutation bars it will, as it rises into the notches of the permutation bars, engage and trip the latch 119 so that the spring 118 shifts the throw-out cam 110 through the medium of the connections described and initiates the carriage return movement. When the cam 110 is shifted, it is locked in shifted position by a spring-held latch 120 having a shoulder thereon arranged to engage a projecting lug 121 on the cam plate. The arm 117 can then be restored into engagement with its latch 119 and this is effected by a rearwardly projecting arm 122 on the striker bail 49 (see Figs. 2 and 6^a). By quickly shifting the cam plate 110 and locking it in shifted position, ample time is afforded for the carriage return movement. The locking latch 120 is released at the next operation of the machine when a pin 123 on the escapement plunger 102 engages a lug on the latch and depresses it. The cam plate and parts connected thereto are then restored by a spring 124 that surrounds a rod 125 and which is connected to the bell crank 114. The spring 118 operates the carriage release mechanism in opposition to the spring 124 and is necessarily stronger than the spring 124. A finger piece on the end of the rod may be used by the attendant to effect the carriage return manually. It should be noted that the bar 40^a is not provided with a shoulder and is not shifted by the striker bail, but merely serves to trip the latch 119 when it is selected and lifted by its spring into the notches of the permutation bars. The striker bail does however reset the actuating arm 117 of the carriage return mechanism as described.

The line space mechanism comprises a ratchet wheel 126 fixed to the square shaft 15 upon which the platen slides. This ratchet wheel cooperates with a detent roller 127 and with feeding and holding teeth on a dog 128. The latter is pivotally mounted upon the upper end of an arm 130 and a spring 131 connected to the dog holds its feeding tooth in engagement with the ratchet wheel. The arm 130 is loosely mounted on a shaft 132 on the top plate and its lower end is connected to an arm 133 by a spring 134 and this spring holds the lower end of the arm 130 in engagement with an adjusting screw 135 on the arm 133. The latter arm is fixed to the shaft 132 and

a crank 136 also fixed to the shaft is provided with a pin which engages the notched upper end of a lever 137. The latter is pivoted on the main frame between its ends and is connected at its lower end to the actuating bar 40^b. When this bar is selected, it is shifted by the striking or actuating bail 48 to effect the line space feed.

To effect the printing of letters and figures, the type bar segment 36 is guided to shift in its own plane and its lower end is connected by links 138 to a rock shaft 139. An arm 140 (see Fig. 5^b) on the shaft is provided with two adjustable screws 140^a and 141. An arm 142 loosely mounted on the rock shaft 139 is arranged to engage the screw 141 and is connected to the rear end of the actuating bar 40^a. A pivoted locking dog 143 is arranged to engage the head of the screw 140^a when the type bar segment is lifted to its fig. shift position and so lock the segment in such position. This locking dog is connected to the rear end of an actuating bar 40^c. If the segment is in its normal or lower position and bar 40^e is selected and then shifted by the striker bail, the segment will be raised to its fig. shift position and locked in such position by the dog 143. The type bar segment can be restored by similarly selecting and actuating the bar 40^c.

The bar 40^d is provided at its rear end with a spring supported bell tapper 144 and, when this bar is selected and rises into the notches of the permutation bars, the tapper strikes a bell 145. It should be noted that the bar 40^d is not moved by the striker bail but effects the ringing of the bell as soon as it is lifted by its spring 41.

Preferably, the signal bar 40^d and type actuating bar 40^f are arranged on opposite sides of the carriage feed shift bar 40^e and the permutation bars are so notched that the bars 40^d and 40^f are both selected by the same combination. But means are provided to prevent the operation of one of these bars when both are thus selected. For this purpose, the fig. shift bar is provided with a lug 146 (see Fig. 3) which cooperates with lugs 147 and 148 fixed respectively to the bars 40^d and 40^f. Normally the lug 146 is above the lug 147 on the signal bar 40^d. But, in the fig. shift position of the bar 40^e, this lug will be above the lug 148 on the bar 40^f. The latter is connected to a type bar which has but one character and will ordinarily be operated when the signal is received for selecting both this bar and the bell actuating bar 40^d. But if the fig. shift combination is received in advance of the special combination that selects bars 40^f and 40^d, the latter will be actuated to sound the signal.

To prevent the disengagement of the shoulders on the function actuating bars 130

40^b, 40^c and 40^e, these shoulders, as shown in Figs. 5^b and 6, are considerably higher than the shoulders on the actuating bars that are connected to the type bars and the stop bar 67 is cut away above the function bars as shown in dotted lines in Fig. 5, so that these bars, when selected, can rise higher than the type actuating bars. The movement of the bail which effects the operation of these special function bars is effected not only by its spring 63 but also by the cam 61 which, as previously described, positively completes the movement of the bail.

15 In one setting of the permutation bars none of the actuating bars are selected but the main shaft is operated to effect the letter space movement of the carriage and, in this way, the spaces between the words may be formed. When any of the special function bars are selected, the operation of the letter spacing mechanism is prevented by means of a lever 159 pivotally mounted upon the rear face of the comb bar 67 and having one end arranged above the special or function actuating bars. When any one of these bars is selected it shifts the bar 159 against the tension of its spring 160 and moves its opposite end into the path of an extension 161 on the letter spacing rocker 100. Then when the main shaft 56 rotates, the rocker and plunger 102 can not be depressed far enough to engage the feeding dog 107 with the next tooth of the ratchet 108. At the end of the operation the selected function bar is restored and the spring 160 restores the spacing lock-out lever 159 to its normal position with one end in engagement with an adjustable eccentric stop 162.

Obviously, changes may be made in the details set forth without departure from the essentials of the invention as defined in the claims.

45 I claim as my invention:

1. In combination in a telegraph printer, a set of type bars, actuating bars connected thereto, a common operating member, a set of permutation bars spring held in normal position for selecting said actuating bars, a set of selectors responsive to received code combination and provided with yielding spring means for effecting the selecting movements of said permutation bars, means for controlling said selectors, an intermittent operating cam shaft and means operated thereby for successively restoring said selectors and actuating said common operating member, substantially as described.

60 2. In combination in a telegraph printer, a set of type bars, actuating bars connected thereto, a common operating member, a set of longitudinally shiftable, notched permutation bars for selecting said actuating bars, a set of selectors for shifting said permuta-

tion bars, yielding spring means for effecting the bar shifting movements of said selectors, an intermittently operated shaft, and cams on said shaft for successively locking said permutation bars, restoring said selectors, actuating said operating member and unlocking said permutation bars, substantially as described.

3. In combination in a telegraph printer, a series of type bars, actuating bars connected thereto, a common striker bar, a set of longitudinally shiftable, notched permutation bars for selectively controlling the engagement of said actuating bars with said striker bar, a corresponding set of selectors adapted to be conditioned for operation in response to received signals, yielding spring means for effecting the operating movements of said selectors to thereby shift said permutation bars, an intermittently operated shaft and means actuated thereby for engaging and disengaging said actuating bars and permutation bars and for operating said striker bar, substantially as described.

4. In combination in a telegraph printer, a set of type bars, individual actuating bars connected thereto, a common operating bar, a set of notched permutation bars spring-held in normal position and selectively controlling the engagement of said actuating bars and said operating bar, a set of selectors spring-actuated to position said permutation bars, an intermittently operated shaft, and cams on said shaft for successively locking said permutation bars, restoring said selectors, engaging said actuated bars therewith, actuating said operating bar, disengaging said actuating bars from said permutation bars and unlocking said permutation bars, substantially as described.

5. In combination in a telegraph printer, a set of type bars, individual actuating bars connected thereto, a common striking bail, a set of notched permutation bars spring-held in normal position for selecting the actuating bars, a locking bail for said permutation bars, a set of selectors spring-actuated to move said permutation bars, a restoring bail for said selectors, an intermittently operated shaft for successively operating said locking, restoring and striking bails in the order named, and individual magnets for controlling said selectors and said shaft, substantially as described.

6. In combination in a telegraph printer, a set of type bars, individual actuating bars connected thereto, a common striking bail, a set of notched permutation bars spring-held in normal position for selecting the actuating bars, a locking bail for said permutation bars, a set of selectors spring-actuated to move said permutation bars, a restoring bail for said selectors, springs for effecting the operating movements of said bails, an intermittently operated shaft, cams on

said shaft for permitting the operation of said locking, restoring and striking bails in the order named and for restoring the same, latches for holding said selectors and said shaft in inoperative condition and individual magnets for tripping said latches, substantially as described.

7. In a telegraph printer, the combination of a set of type bars, actuating bars connected thereto, additional function bars, a set of permutation bars for selecting said actuating and function bars, springs for effecting the selecting movements of said actuating and function bars, a striking bail for effecting the operating movements thereof, and a carriage return controlling member operated by the selecting movement of one of said function bars, substantially as described.

8. In a telegraph printer, the combination of a set of type bars, actuating bars connected thereto, additional function bars, a set of permutation bars for selecting said actuating and function bars, springs for effecting the selecting movements of said actuating and function bars, a striking bail for effecting the operating movement thereof, a carriage return device controlled by the selecting movement of one of said function bars, a latch for holding said device in operative position, and letter space feeding means for releasing said latch, substantially as described.

9. In a telegraph printer, the combination of a set of type bars, actuating bars connected thereto, additional function bars, a set of permutation bars for selecting said actuating and function bars, springs for effecting the selecting movements of said actuating and function bars, a striking bail for effecting the operating movement thereof, and a signalling device operated by the selecting movement of one of said function bars, substantially as described.

10. In combination in a telegraph printer, a set of type bars, individual actuating bars connected thereto, a common striking bail, a set of notched permutation bars spring-held in normal position for selecting the actuating bars, a locking bail for said permutation bars, a set of selectors spring-actuated to move said permutation bars, a restoring bail for said selectors, a letter space feed mechanism, an intermittently operating shaft, cams on said shaft for successively operating said locking, restoring and striking bails and said letter space feed, a removable top plate and a paper platen mounted thereon, said letter space feed mechanism comprising separable parts mounted respectively on said top plate and the main frame of the printer.

11. In a telegraph printer, the combination of a set of type bars, actuating bars connected thereto, additional function bars,

a set of permutation bars for selecting said actuating and function bars, springs for effecting the selecting movements of said actuating and function bars, a striking bail for effecting the operating movements thereof, a removable top plate, a paper platen mounted thereon, and letter space, line space and carriage return mechanisms operated by said function bars, and each comprising separable parts in one way engagement and mounted respectively on said top plate and on the main frame of the machine.

12. In combination in a telegraph printer, a set of type bars, individual actuating bars connected thereto, a set of notched permutation bars longitudinally movable to align the notches thereof and select any one of said actuating bars, a corresponding set of selectors adapted to be conditioned in different combinations in response to received signals, a common actuating member for effecting the engagement and disengagement of the actuating bars with the permutation bars and for operating the selected actuating bar, and individual springs associated with said selectors for effecting the longitudinal movements of said permutation bars and permitting the conditioning of said selectors in response to the succeeding signal in advance of the complete operation of said actuating member.

13. In combination in a telegraph printer, a set of type bars, a set of longitudinally movable notched permutation bars individually spring-held in normal position, a plurality of actuating bars individually selectable by lateral movement into the aligned notches of said permutation bars and longitudinally movable to effect the operation of a corresponding type bar, a set of selectors each individually spring-actuated to shift one of said permutation bars from normal, latches for holding said selectors in retracted position, a common actuating member for effecting the lateral and longitudinal movements of said actuating bars, a device operated by said actuating member for restoring said selectors for further operation in advance of the complete operation of the actuating member, individual magnets for tripping said latches in different combinations in response to received signals and a magnet controlling the operation of said actuating member.

14. In combination in a telegraph printer, a series of type bars, actuating bars connected thereto, a common striker bar, a set of longitudinally movable notched permutation bars for selectively controlling the engagement of any one of said actuating bars with said striker bar, and an adjustable bar common to said actuating bars for limiting the extent of engagement thereof with said striker bar.

15. In a telegraph printer, the combina-

tion of a series of type bars, actuating bars
 connected thereto, additional function bars,
 a set of permutation bars for selecting said
 actuating and function bars, springs for
 5 effecting the selecting movements of said
 actuating and function bars, a striker bar
 for effecting the operating movements there-
 of, a spring-actuated carriage-return, con-

trolling member, a latch tripped by the
 selecting movement of one of said function
 bars for holding said carriage-return in re- 10
 tracted position with its spring under ten-
 sion, said striker bar having means for re-
 storing said member in engagement with said
 latch, substantially as described.

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