

Feb. 5, 1935.

H. L. KRUM

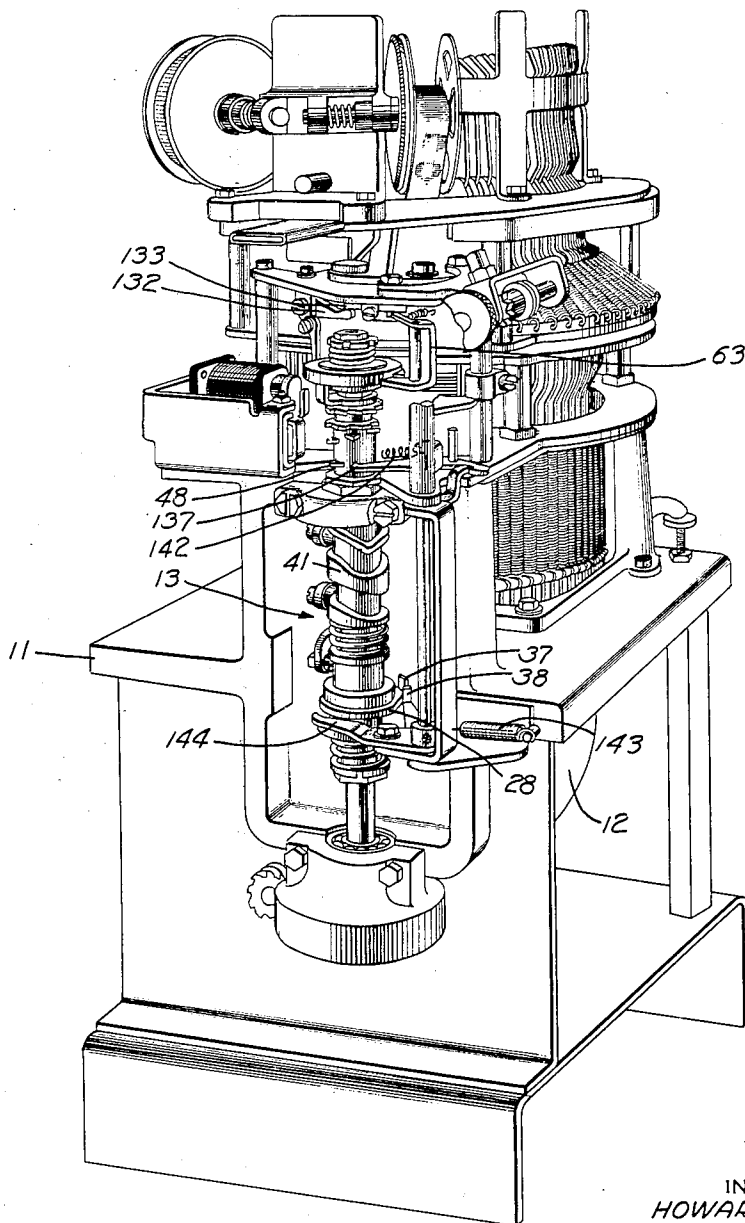
1,989,698

SELECTING MECHANISM

Filed Sept. 9, 1933

3 Sheets-Sheet 1

FIG. 1



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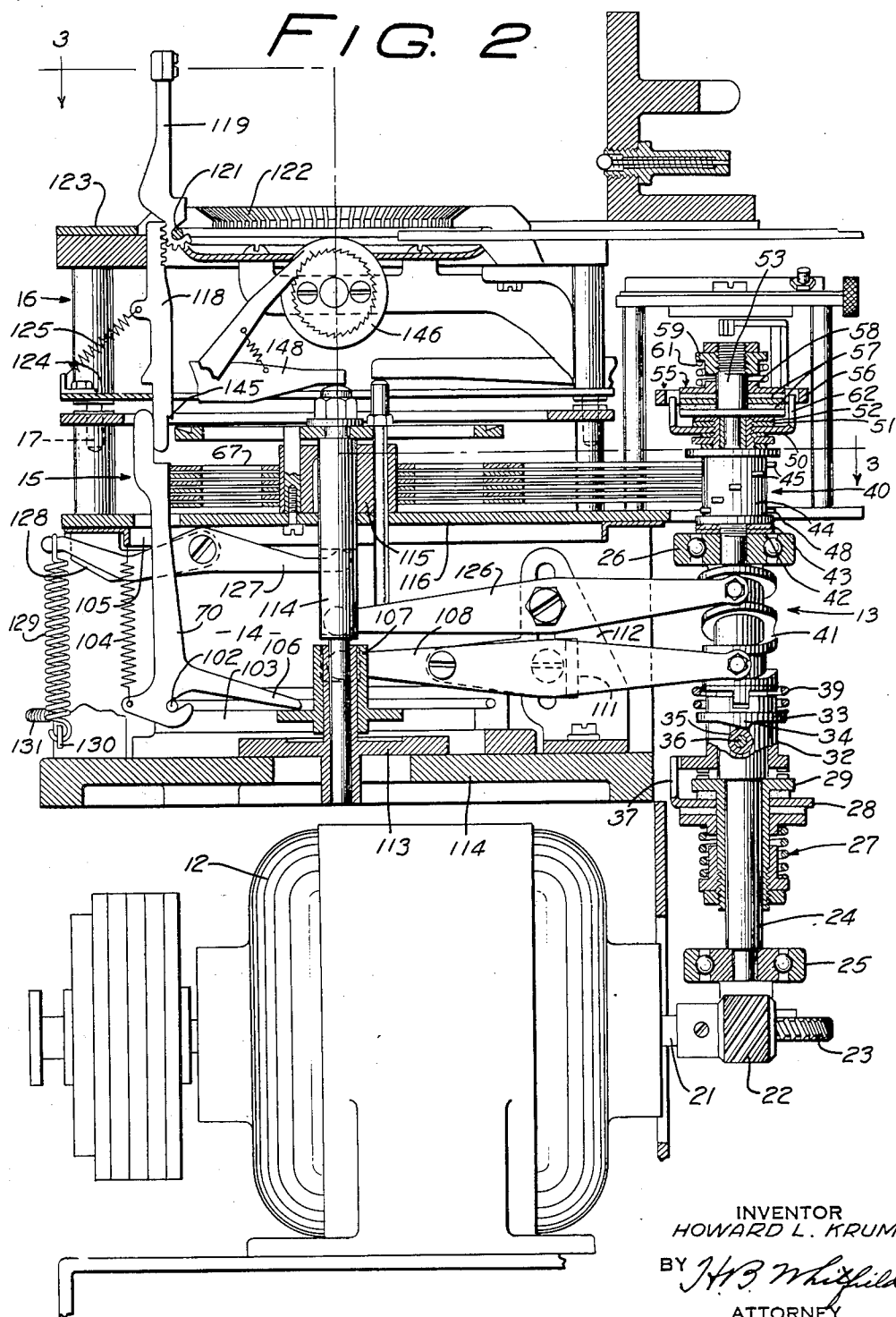
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SELECTING MECHANISM

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FIG. 3

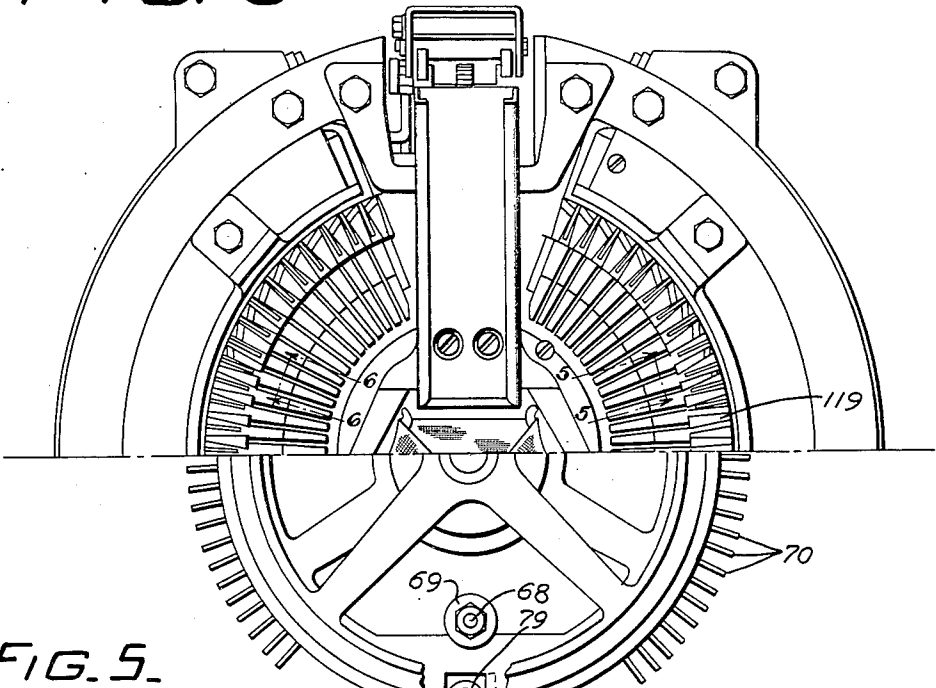


FIG. 5.

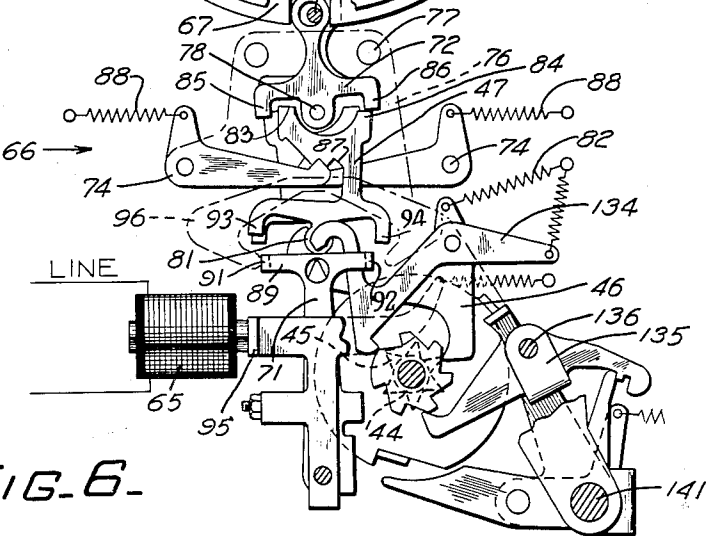
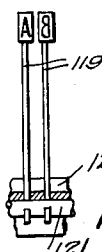
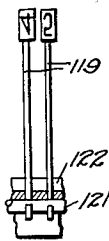


FIG. 6.

ATT	AAC	UN	X
4.108 $\frac{7}{8}$	3. $\frac{3}{4}$	2.74 $\frac{7}{8}$	4.24 $\frac{1}{2}$

FIG. 4

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1,989,698

SELECTING MECHANISM

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Application September 9, 1933, Serial No. 688,711

21 Claims. (Cl. 178—33)

The present invention pertains to printing telegraph apparatus and more particularly to improvements in selecting mechanisms therefor.

The principal object of this invention is to provide, in a selecting mechanism for telegraph printers, means for minimizing the relative movements of the selecting elements to render the selecting mechanism conducive to high speed operation.

To achieve the foregoing and other objects, this invention contemplates the provision in a selecting mechanism of a plurality of groups of settable elements comprising respective series of marking and spacing abutments, the selecting mechanism including means responsive to signalling conditions of marking and spacing nature, and a cyclically operable means cooperating with the signal responsive means to set, through the instrumentality of the respective series of abutments, a group of permutation members in variant combinations.

In the embodiment herein described, there is disclosed a printing telegraph receiver comprising a selector mechanism, which is similar to that disclosed in S. Morton et al. Patent 1,745,633, dated February 4, 1930, operatively associated with a code disc selector mechanism of the latch type, in which the code discs are arranged in superposed horizontal planes. The code discs are permutably set by the selector mechanism which is operatively positioned to one side of the code discs and embodies a single selector electromagnet responsive to line current impulses. Directly above the code discs and concentrically disposed therewith are the actuating bars, striker disc, and type bars. Arranged around the periphery of the code discs and operatively associated with the actuating bars are a series of selectable elements or drop bars. Printing or recording by the type bars is effected upon a tape through the use of an inking ribbon which extends transversely of the tape at the printing point, the printing zone being located centrally of the circularly arranged type bars. The type on each type bar is positioned so as to print on either the near or the far side of the tape to effect offset printing characteristic of stock quotation operation. However, single line printing can be produced, if desired, by properly positioning the type faces on the type bars. There is arranged below the aforementioned mechanism the motor, and juxtapositioned to the motor and the printing apparatus and operatively connected thereto is the main operating shaft assembly which is disposed vertically.

Many features included in the disclosure of the present application are also disclosed in one of the following copending applications; namely, Serial No. 651,664 filed January 14, 1933 by A. H. Reiber et al., or Serial Nos. 688,726, 688,713, and 688,730 filed by C. W. Swan, W. J. Zenner, and E. W. F. Hanke et al., respectively, on September 9, 1933.

A better understanding of the invention may be had from the following description, taken in conjunction with the accompanying drawings, wherein,

Fig. 1 is a perspective view of the printing telegraph apparatus embodying improvements according to the present invention;

Fig. 2 is a vertical cross-sectional view of the apparatus shown in Fig. 1;

Fig. 3 is a combination plan and sectional view taken on line 3—3 of Fig. 2,

Fig. 4 is a representation of a portion of tape printed with the apparatus according to the present invention, and

Figs. 5 and 6 are sectional views taken on lines 5—5 and 6—6 respectively of Fig. 3.

Referring to the drawings wherein like reference characters indicate the same part through the several views and more particularly to Figs. 1 and 2, there is shown a main supporting frame generally indicated by the numeral 11, which carries in its lower compartment a motor 12 which is separated from the other parts of the apparatus superposed thereabove by a solid partition. Frame 11 also carries the parts or units; namely, main shaft assembly, the operating mechanism, the selector mechanism, and the typing unit, generally indicated by the numerals 13, 14, 15, and 16, respectively, all of which are arranged vertically so as to produce a compact, self-contained apparatus. The typing unit 16, which carries the ribbon feed and reverse mechanisms and also the tape feed mechanism is, by means of dowels 17 which fit into drilled holes in the main frame 11, detachably mountable on frame 11.

For a detailed description of the specific apparatus herein shown, reference may be had to copending application Serial No. 651,664, filed January 14, 1933 by A. H. Reiber et al. Accordingly, only so much of the apparatus will be described as will be conducive to a ready understanding of the present invention. To shaft 21 of motor 12 is secured a worm pinion 22, which is adapted to mesh with worm gear 23 affixed to the lower extremity of a vertically disposed main operating shaft 24, which is carried by anti-friction bearings 25 and 26 which, in turn, are mount-

ed in suitable brackets secured to frame 11. Carried on shaft 24 immediately above bearing 26 is a combination friction and grab clutch 27, the friction clutch portion of which comprises a driving disc 28 interposed between discs of friction material. The flange 29 of the friction clutch portion of the combination friction and grab clutch 27 is provided on its upper surface with a series of teeth and forms a part of the toothed or grab clutch portion, the companion teeth of this clutch portion being formed on the lower surface of the flange of a sleeve member 32. Sleeve member 32 is also provided with a flange 33 integral to which is a cam portion 34 which coacts with a cam follower roller 35 mounted on a stud shaft 36, secured to the frame 11 of the apparatus. Drive disc 28 is operatively connected to sleeve member 32 through laterally disposed arm 37. Disc 28 constantly tends to rotate due to the action of the constantly rotating friction clutch portion thereon, but is prevented from rotating by means of a stop lever 38 (Fig. 1). The teeth on sleeve member 32 are maintained out of engagement with the teeth on flange 29 by means of the camming-out action between cam 34 and follower 35. When the stop arm 38 is moved out of engagement with lug 37 on stop disc 28 as will presently appear, power is communicated by the clutch 27 to rotate sleeve 32 until the cam portion 34 passes out of contact relation with the follower 35, whereupon sleeve 32 will be urged downwardly due to the distending action of helical spring 39 to effect the meshing of the teeth in the grab clutch portion of the clutch 27. Thereafter a positive driving action is imparted by power communicated through the grab clutch to a multi-cam member 41 disposed above sleeve 32 and rotatively connected through tongue and groove means to sleeve 32. Near the end of the cyclic rotation of the clutch 27, the cam 34 and follower 35 again cooperate to cam out the sleeve member 32 and consequently disengage the toothed portions of the grab clutch. The further rotation during the final period of the cycle is effected solely through the friction clutch portion of clutch 27. Incidentally, cam member 41 is provided with cam grooves to control the printing, tape feed, ribbon feed, and selector bar restoration functions of the apparatus.

Shaft 24 extends above the bearing 25 and is secured to the inner ring of the anti-friction bearing 25 by means of a nut 42 and lock nut 43. A selector cam assembly 40 is loosely mounted on shaft 24 and comprises a selector cam member 44 which is provided with a series of cam projections or portion 45 which are helically arranged so as to effect, upon rotation of the selector cam member 44, through a series of selector levers 46 (Fig. 3), the operation of a corresponding series of interponents 47 successively. Attention is directed at this point to the fact that according to the present invention the cam projections 45 may be very materially reduced in size from that heretofore achievable, due to the particular construction of the elements analogous to interponents 47 in the prior structures. Cam member 44 also includes a release cam portion 48. The selector cam assembly includes, in addition to cam member 44, a locking cam disc 49, and a driving disc 50. All of these cam discs are held in a predetermined cooperative relation with the selector cam assembly by means of a nut 51 and a lock nut 52. Threaded into the upper end of shaft 24 and rotatable therewith is a member

53 which is provided with a flange 54 which forms part of a friction clutch 55 comprising drive disc 56, discs of friction material 57 and a disc 58 which is operatively connected by means of tongue and groove connections to a capstan nut 59 threaded and locked on the upper end of member 53. Compressed between flange 53 and the flange on nut 59 is a helical compression spring 61 which renders the friction clutch effective. Disc 50 and disc 56 are operatively connected to each other by means of a pair of diametrically opposed lugs 62.

Shaft 24 rotates continuously and carries with it, as previously described, the friction clutch portion of clutch 27. Also constantly rotating with shaft 24 is the member 53 and its associated parts, except disc member 56 which is held from rotation by a stop gate 63 (Fig. 1). Thus, it is seen that the selector cam assembly is driven by the shaft 24 through the medium of friction clutch 55 which, as already noted, is rendered effective by the pressure of spring 61.

Having reference now to Fig. 3, the details of the selector mechanism actuated by the aforementioned selector cam assembly 40 will be described. The locally driven selector cam assembly 40 is rotated at a speed substantially equivalent or synchronous to the speed of code impulsing, and operating in conjunction therewith is a selector magnet 65 which may be connected either directly or indirectly to the signal line.

Referring to Fig. 2, the selector cam assembly 40 is shown as cooperating with a group of selector elements 66 and a series of code discs 67, detailed illustration of which is shown in Fig. 3. As previously described, the code discs 67 are arranged in superposed horizontal planes and are mounted for limited rotation on studs 68, and are held in spaced relation by washers 69 mounted on said studs. In the specific embodiment herein described, the code discs are provided with spokes, but may obviously be formed from solid discs if desired.

The transfer mechanism between the six code discs 67 and the selector arm 71, associated with the selector magnet 65, comprises six sets 66 of selector elements, each set comprising a T-lever 72 (Fig. 4), a selector member or interponent 47, detents 74, and bell crank levers 46, each set being composed of flat material and arranged in superposed relation between thin guide plates 76 which are mounted on studs 77 and spaced by washers (not shown).

As is commonly known, the peripheries of the code discs are notched so that each permutation of the six discs will result in an alignment of notches to permit the entrance of a selector or drop bar 70 therein. The T-levers 72 are mounted on a common pivot 78, and each one is provided at the extremity of its stem portion with a substantially circular head to fit snugly into a notch in its associated code disc 67 so that the oscillation of a T-lever 72 will effect a corresponding reciprocation of its code disc. Each T-lever 72 is provided in its head portion with a hole substantially larger than a common guide rod or stop post 79 so that the limited movement of the T-lever and code discs may be predetermined. The interponents 47 are provided with circular portions 81, adapted to engage corresponding sockets in their associated bell crank levers 46. Individual springs 82 normally hold the bell crank levers 46 and interponents 47 in the position shown in Fig. 3 with one or the other of the abutments 83 and 84 in contact with their cooperating abut-

ments 85 and 86 in T-lever 72. Springs 82 are also effective to hold their corresponding bell crank levers 46 in contact with the selector cam member 44.

As previously mentioned, the selector cam member 44 is provided with a helically arranged series of cams 45, one for each of the bell crank levers 46, which rotate the bell crank levers 46 (six in the present instance) in succession and thus reciprocate the interponents 47 as the selector cam member 44 is rotated. In addition to the reciprocal movement, the interponents 47 have a lateral swinging movement between detent notches 87 which cooperate with detents 74 which are actuated by their individual springs 88.

The setting of the interponent 47 to its right-hand or left-hand position is determined by the position of selector arm or lever 71, which in turn is determined by the nature of the signal impulses, whether marking or spacing, received, by the selector magnet 65. Selector lever 71 terminates in a U-shaped portion 89, having downwardly extending arms 91 and 92 which constitute abutments which cooperate with abutments 93 and 94 of the interponent 47 and function to position the interponent 47 in either its right-hand or left-hand position, or marking and spacing positions, respectively, as will presently appear. As previously mentioned, each spring 82 associated with a bell crank lever 46 holds the associated interponent 47 in its forward position and in engagement with its associated T-lever 72, and each code disc 67 thus is held in either one or the other of its two selecting positions, namely, marking or spacing, according to the position of the associated interponent 47.

As the signal impulses are received, the selector magnet 65, which, in the present embodiment is shown connected directly in the line circuit, responds to only one of the two different electrical conditions comprising the signals and attracts its armature 95 when a marking impulse is received and releases it again when a spacing impulse is received, while the interponents 47 are reciprocated successively in synchronism with the received signals by the action of selector cams 45 of the cam member 44 upon the bell crank levers 46. The abutments 93 or 94 are thereby brought into cooperative relation with their companion abutments or arms 91 or 92 at the corresponding signal intervals, thereupon setting the interponents 47 in variant combinations. Then, when the interponents 47 are returned or reciprocated to their upward position (as viewed in Fig. 3) by the tendency of their associated springs 82, the abutments 83 or 84 will coact with their mateable or companion abutments 85 or 86, as the case may be, depending upon whether a marking or spacing condition has been established by the received signal. Thus, respective series of marking and spacing abutments are provided; for example, the series of marking abutments comprises abutments 84, 86, 91, and 93, and the series of spacing abutments comprises abutments 83, 85, 92, and 94. In this manner, the functional movements of the various selecting elements are minimized, thereby conducing to mechanical refinements of parts and consequently high speed performance. In order to insure the alignment of abutments 91 and 92 in their respective cooperative positions, a limiting stop 96 is provided.

Having reference to Fig. 2, it will be noted that cooperating with the peripheries of code discs 67 are a series of selector or drop bars 70, only one of which is shown in Fig. 2. These bars are

circularly arranged about the code discs 67 and are pivotally mounted upon a circular rod 102. The rod 102 is mounted in and the bars 70 are guided by a circular comb member 103. Each of the bars 70 is provided adjacent their pivotal points with a heel portion to which is secured one end of an individual spring 104, the other end of which is secured to a ring 105 attached to the frame of the apparatus. The springs 104 normally tend to rotate their respective bars 70 in a clockwise direction (as viewed in Fig. 2) into engagement with the code discs 67. Each of the bars 70 is provided with an arm 106 which co-operates with a selector bar restoring member 107. The member 107 is held normally in its upward position, and thus through arms 106 maintain the bars 70 out of engagement with the code bars 67. Member 107 is connected to a lever 108, pivoted at 109 to an adjustable member 111 which is slidably mounted on a bracket 112. The opposite end of lever 108 is provided with a follower roller adapted to coact with one of the cam grooves in cam member 41. Thus, upon the cyclic operation of cam member 41, positive reciprocal movement in a vertical direction is imparted to member 107. Member 107 is slidably mounted on a turret member 113 mounted on a base 114 and concentrically positioned with relation to the code discs 67.

Also slidably operable in the turret member 113 is the reduced lower end of a plunger 114, the upper end of which is guided in a block 115 mounted on a plate 116 and is disposed in coaxial alignment with turret member 113. Carried by the upper end of plunger 114 is a circular striker member 117 which is provided on its upper surface and along its circumference with a continuous V-shaped notch or groove, and interposed between striker member 117 and an upward extension on bars 70 is an actuating or push bar 118, there being one push bar 118 individual to each selector bar 70. The upper end of push bar 118 is provided with a rack meshed with a segmental gear portion of a type bar 119 associated therewith. Type bars 119 are pivotally mounted on a circular rod 121 carried in a circular comb member 122. Bars 118 are guided by comb members 123 and 124 and are each provided with a spring 125 adapted to simultaneously impart thereto a downward and leftward movement (as viewed in Fig. 2). Each push bar 118 is provided with a notched portion adapted to engage with the V-shaped notch along the peripheral edge of the striker disc 117 when urged thereto by its associated selector bar 70.

Downward movement is imparted to plunger 114 by a lever 126, pivotally mounted on bracket 112, one end of which operates in a groove in plunger 114, the other end of the lever 126 being provided with a follower roller which operates in a cam groove in the cam member 41. Upward movement is imparted to plunger 114 by a spring actuated lever 127 which is pivoted to a bracket 128 secured to plate 116. One end of lever 127 is adapted to operate on a shoulder in plunger 114 and the other end cooperates with a printing spring 129. The lower end of spring 129 is attached to one end of an adjusting lever 130, the other end of the lever 131 cooperating with an adjusting screw 131 (Figs. 1 and 2), which makes possible the variation of the printing blow.

Referring to Figs. 1 to 3, a description of the mechanism so far described will now be given. As previously mentioned, the normal stop condition of the line is marking, and hence the se-

lector magnet 65 is normally energized due to which condition the selector arm 71 is held in its counterclockwise or attracted position, as viewed in Fig. 3. During the first line impulse or start interval which is of spacing nature, the selector magnet 65 is deenergized and the movement of the selector lever 71 will effect, through bell crank 132 (Fig. 1), the disengagement of latch 133 from stop gate 63 to permit a single cyclic operation of the selector cam assembly, in a manner clearly set forth in the aforementioned Patent 1,745,633. As described in said patent, the parts are so constructed that the selector cam assembly is stopped positively by the gate 63 at the end of each cycle, and is readily released in response to a start impulse by the movement of the selector lever 71. In this manner the apparatus of the present invention is adapted to operate on the start-stop principle.

Assuming that the first impulse after the starting impulse is of marking nature, the armature 95 and associated selector lever 71 will be held in their counterclockwise positions (shown in Fig. 3). While the selector lever 71 is in this position, a knife-edge locking lever 134 operates to lock it in such position, as clearly set forth in U. S. Patent No. 1,783,382, issued December 2, 1930 to H. L. Krum, until the first cam of the helical series of cams 45 on the selector cam member 44 has actuated its associated bell crank lever 46 in a counterclockwise direction to move the first interponent 47 to its marking position. This movement of interponent 47 to its marking position, shown in Fig. 3, is effected when interponent 47 is caused to rotate about its ball portion 81 due to the coaction of abutments 91 and 93 and the downward pull exerted on ball portion 81 by the bell crank 46. Interponent 47, when subsequently actuated in a reverse direction by spring 82 through bell crank 46, rocks, through the co-operation of abutments 84 and 86, the associated T-lever 72 to its counterclockwise position, to urge in turn its associated code disc 67 to its corresponding clockwise position.

Had the first impulse condition after starting been of spacing nature, the armature 95 and selector lever 71 would not have been held or attracted by the selector magnet 65, but instead, the lever 71 would have assumed its clockwise position, in which event the opposite abutments to those previously mentioned would have cooperated to move the associated code disc 67 to its counterclockwise position.

The operation of the selector mechanism pursuant to the reception of each of the succeeding impulses, including the stop impulse condition of marking nature, is similar to that just described. At the conclusion of each of the complete cylindrical operations of each selector cam member 44, an alignment of notches occurs in the code discs to permit the selection of one of the drop bars 70 to actuate thereby one of the push bars 118 into cooperative relation with striker disc 117, which, when operated, imparts an upward movement to bar 118 to cause its associated type bar 119 to be rotated about rod 121 to effect printing.

In operation the cam 41 being initiated into operation substantially at the termination of the selecting cycle so that the printing of a previous selected character may be effected while a succeeding character is being selected. To effect this overlap, the mechanisms indicated generally by 13 and 18 in Fig. 1 are employed. The selector cam assembly is also provided with a release

cam 48 (Fig. 1) which coacts with a release lever 135 pivotally mounted on a pivot stud 136 carried in the frame of the machine. Lever 135 is provided at one extremity thereof with a cam follower 137 adapted to coact with cam 48. The other arm is provided with a shoulder which cooperates with arm 138 of a release bail 139 freely carried on a vertically disposed shaft 141 suitably mounted in the frame of the apparatus. Lever 135 is held in cooperative engagement with arm 138 by a spring 142. When cam 48 coacts with follower 137, lever 135 is thereby disengaged from arm 138, permitting the release lever 139 to be rotated slightly in a clockwise direction by its spring 143 to effect the disengagement of arm 38 from stop disc 28. Thus, at a predetermined point in the cycle of operation of the selector cam member 44, the rotation of the cam member 41 is initiated. The rotation of the cam 41 is positively restricted to a single cycle or revolution by the action of stop lug 37 on disc 28 upon lever arm 144 of release lever 139; the effect of lug 37 on arm 144 being to impart a counterclockwise rotation to release lever 139 to effect the reengagement of arm 138 with lever 135, and consequently the return of arm 38 into the path of lug 37.

Thus it is seen that substantially a complete overlap between the selecting operation and the printing and functional operations is provided. The cam 41 and the levers 108 and 126 (Fig. 3) cooperate to effect these operations, as cam 41, after the initiations of its rotation, effects first the counterclockwise movement of lever 108 (as viewed in Fig. 2) to impart to member 107 downward movement whereupon all of the selector bars 101 are free to respond to the action of their individual springs 104 to be rotated about the pivot rod 102 into engagement with the code discs 67. As already disclosed, the operation of the selector mechanism has effected an alignment of notches in the code discs 67, thus permitting one of the selector bars 70 to enter therein, and in consequence thereof the selected bar 79 is permitted to rotate about rod 102 somewhat farther than its companion bars 70, the effect of which is to move its associated push bar 118 into cooperative relation with the striker member 117. An undercut notch 145 is provided on bar 118 for interlocking engagement thereof with striker 117. At the proper time in the cycle of operations, the lever 126 is rotated in a clockwise direction to permit plunger 114 to respond to the action of printing springs 129 through the instrumentality of lever 127. Plunger 114 and its associated striker disc 117 thus have a sharp upward movement imparted thereto, which movement is imparted through selectively operated push bar 118 to the associated type bar 119, which is rotated sharply to its printing position against a platen 146 (Fig. 3) through the rack and pinion connection between said push bar and said type bar. In this connection the interlocking relation between notch 145 and the peripheral V-shaped groove on the striker member 117 affords a positive locking connection between the push bar and the striker member so that immediately upon their interengagement for effecting the printing operation, the drop bars 70 are free to take part in a succeeding selection. Thus, a further overlap is provided between the selecting and printing operations.

Immediately following the release of the plunger 114 to perform the printing operation, the drop bars 70 therefore may be restored to their re-

leased or unactuated position out of engagement with code discs 67. This restoration is effected by imparting a clockwise movement to lever 108 to raise, in turn, the restoration member 107 to its upward position, which member coacts with arms 106 of selector bars or drop bars 70 to rotate said bars 70 against the action of their springs 104. Since the cam 41 is required to overcome the pull of approximately 64 springs 104, the fulcrum 109 of lever 108 is so selected as to produce a mechanical advantage of about three to one. Adjustment 111 is provided to control the clearance between bars 70 and code discs 67. Immediately following the retraction of bars 70 from the code discs 67, the re-selection of code discs 67 in accordance with ensuing code combinations may be effected. The plunger is finally returned to its lowermost position by the cam 41 by imparting counterclockwise rotation to lever 126, whereupon clockwise rotation is imparted to lever 127 to store up energy in the printing spring 129 for a subsequent printing operation.

The reciprocation of plunger 114 also functions to operate the tape feed mechanism through a lever 148, but since this feature is not a part of the present invention and inasmuch as there are many well-known methods for accomplishing this result, no specific method will be herein described.

It is manifest from the foregoing disclosure that owing to the novel form of interponents 47, considerable operating time is conserved, thereby enabling the selective operations to proceed with enhanced speed. Moreover, the shocks resultant upon long and rapid or sharp throws of the operating elements attendant upon high speed operation are eliminated by reason of the greatly reduced size of cam projections 45 required. The ultimate effect, therefore, of the device according to the present invention is to render the selecting apparatus conducive to higher speed of operation, while simultaneously reducing the strains and stresses upon the elements to a minimum.

In Fig. 4 is illustrated a portion of so-called ticker tape printed with the apparatus according to the present invention. As is commonly known, the printing or recording is done in offset lines to facilitate the reading of the stock quotations, the stock or item comprising the "letters" characters being recorded in the upper line and the price or quotation comprising the "figures" characters being recorded in the lower line. In the present apparatus the offset printing is effected entirely without the use of a shift mechanism, the position of the typeface on the typebar being the sole means of determining the line in which printing is to take place. To effect printing in the upright position, as indicated in Fig. 4, the type faces are arranged on the type bar 169 in the manner shown in Figs. 5 and 6. That is, the type characters carried by the type bars located in the right arcuate support (as viewed in Fig. 3) are arranged to have their top edges nearest the pivot as shown in Fig. 5, while the type characters carried by the type bars located in the left arcuate support are arranged to have their bottom edges nearest the pivot as indicated in Fig. 6.

Although the present invention has been disclosed and described with reference to certain specific apparatus, it will be understood that many modifications and variations other than that specifically disclosed may be made without departing from the spirit or scope thereof.

What is claimed is:

1. In combination in a selecting mechanism responsive to code combinations of electrical impulses, a set of selectable members, a series of interponents provided with a plurality of abutments, diagonally opposite ones of which are cooperable to effect selective operations, a corresponding series of actuators for said interponents, an electromagnet, an armature lever therefor, and a cyclically operable cam member cooperating with said armature lever and said actuators to set through the instrumentality of said electromagnet and said interponents said selectable members in different combinations.

2. In a selecting mechanism, a set of permutation members, each operable either to a marking or a spacing position, a plurality of groups of settable elements comprising respective series of marking and spacing abutments, carrying means for said elements, means responsive to signalling conditions of marking and spacing nature, and a cyclically operable means cooperating with both said means to set through the instrumentality of said abutments said members either in their marking or spacing positions.

3. In combination in a selecting mechanism, a set of selectable members, a series of elements provided with a plurality of abutments, diagonally opposite ones of which are cooperable to effect selective operations, carrying means for said elements, means responsive to code combinations of electrical impulses, and a cyclically operable means cooperating with both said means to set through the instrumentality of said elements said selectable members in different combinations.

4. In a selecting mechanism, a set of permutation members, a corresponding set of selecting elements pivoted to swing to either one of two operative positions, each of said elements provided with a pair of abutments individual to each of said positions, a common vibratory member for controlling the pivotal movement of said elements in response to received signals, and means for bodily reciprocating said elements to and from said permutation members to move through the instrumentality of the abutments each of the permutation members from either one of two positions to the other.

5. In a selective mechanism, a set of permutation members, each operable to either one of two selective positions, a corresponding set of T-levers operably articulated thereto and provided with an abutment individual to each position, a set of elements corresponding serially to said T-levers and provided with abutments matable to said first recited abutments, carrying means for said elements, means responsive to signalling conditions, and a cyclically operable member cooperating with both said means to set through the instrumentality of said abutments said permutation members either in one or the other of its two selective positions.

6. In a selector mechanism, means responsive to received code combinations of electrical impulses, a set of selectable members, a corresponding set of T-levers operably articulated to said members, said T-levers each provided with a pair of abutments, a selector electromagnet, an armature lever therefor, said armature provided with a pair of abutments, a series of interponents provided with a plurality of abutments, diagonally opposite ones of which are cooperable respectively with diagonally related abutments on said armature lever and said T-levers, and a

cyclically operable cam member cooperating with said armature lever to set under the control of said electromagnet and through the instrumentality of said interponents and said T-levers, said selectable members in different combinations.

7. In a selecting mechanism, a set of permutation members, each operable to either a marking or a spacing position, a plurality of groups of settable elements comprising respective series of marking and spacing abutments, an electromagnet, a vibratory member controlled thereby having a marking and a spacing abutment, and means for rendering one of said groups of settable elements coactive sequentially with said vibratory member to set, under the control of said electromagnet and through the instrumentality of the other of said groups, said permutation members in different combinations.

8. In combination in a selecting mechanism, a set of selectable members, a series of elements provided with a plurality of abutments, diagonally opposite ones of which are cooperable to effect selective operations, an electromagnet, a vibratory member controlled thereby having a pair of abutments, and means for rendering said series of elements coactive sequentially with said vibratory member to set, under the control of said electromagnet, said permutation members in different combinations.

9. In combination in a selecting mechanism responsive to code combinations of electrical impulses, a set of selectable members, a series of interponents provided with a plurality of abutments, diagonally opposite ones of which are cooperable to effect selective operations, an electromagnet, an armature lever therefor provided with a pair of abutments, and means for rendering said interponents cooperable with said armature lever to set, under the control of said electromagnet, said selectable members in different combinations.

10. In a selecting mechanism, a set of selectors adapted to be conditioned in different combinations, a series of interponents provided with a plurality of pairs of abutments, diagonally opposite ones of which are cooperable to effect selecting operations, a member common to all of said selectors provided with a pair of abutments and electromagnetically vibrated in response to received signals to control through said interponents the setting of said selectors, and intermittently acting locking means for holding said member against vibratory movement at definitely spaced intervals during the setting cycle.

11. In a selecting mechanism, a set of selectors adapted to be conditioned in different combinations, a series of interponents provided with a plurality of pairs of abutments, diagonally opposite ones of which are cooperable to effect selecting operations, and a member common to all of said selectors provided with a pair of abutments and electromagnetically vibrated in response to received signals to control through said interponents the setting of said selectors.

12. In a selecting mechanism, a set of selectors each adapted to be placed in either of two conditions, a corresponding set of interponents provided with a plurality of pairs of abutments, diagonally opposite ones of which are cooperable to effect selective operations, a magnet responsive to received code combinations of electrical conditions comprising an armature having a pair of abutments, a locally driven rotary member, and a helically arranged series of cams actuated by said rotary member for associating said interponents sequentially with said armature to me-

chanically and selectively change the setting of said selectors.

13. In a selecting mechanism, a set of selectors each adapted to be placed in either of two conditions, a corresponding set of interponents provided with a plurality of pairs of abutments, diagonally opposite ones of which are cooperable to effect selective operations, a magnet responsive to received code combinations of electrical conditions comprising an armature having a pair of abutments, a locally driven rotary member, a helically arranged series of cams actuated by said rotary member for associating said interponents sequentially with said armature to mechanically and selectively change the setting of said selectors, and a knife-edge locking device vibrated by said circular series of cams for holding the armature of said magnet against vibration as each of the selectors is associated therewith.

14. In a selecting mechanism, a set of selectors adapted to be placed in either of two positions, a corresponding set of interponents provided with a plurality of pairs of spaced abutments, diagonally opposite ones of which are cooperable to effect selective operations, a series of levers to which said interponents are pivoted, a magnet responsive to received signals, an armature lever operated thereby and having a pair of spaced abutments in its free end movable alternately into and out of the paths of movement of each one of said pairs of abutments of said interponents, and a distributor cam for cooperating with said levers to successively reciprocate said interponents to selectively swing the same to either of two positions to effect upon reciprocation and through diagonally opposite ones of said other pair of abutments on said interponents the selective positioning of said set of selectors.

15. In a recorder, a plurality of recording members arranged in two arcuate opposed supports, each of said members being provided with a single recording element, means to direct a record tape diametrically between the two arcuate supports and substantially in the same plane as the pivots of said members, and means to operate said members to make a record on the tape in off-set lines.

16. In a recorder, a plurality of recording members arranged in two arcuate opposed supports, each of said members being provided with a single recording element, means to carry a record medium between the two arcuate supports, and a selector mechanism responsive to received code combinations of impulses to select a recording member for operation, for recording in offset lines.

17. In a recorder, a plurality of recording members arranged in two arcuate opposed supports, each of said members being provided with a single recording element, means to direct a record medium diametrically between the two arcuate supports, and means to operate said elements through a quadrantal arc to make a record on said medium in off-set lines.

18. In a recorder, a plurality of recording members arranged in two arcuate opposed supports, each of said members being provided with a single recording element, means to carry a record medium between the two arcuate supports, and means to operate said elements through a quadrantal arc to make a record on said medium, the arcuate paths of opposed elements adapted to overlap to produce a record in offset lines.

19. In a telegraph printer, a plurality of pivoted type-bars arranged in two arcuate supports,

each of said type-bars provided with a single type-face, means to carry a tape between said supports, and a selector mechanism responsive to received code combinations of impulses to select a type-bar for printing on the tape, the relative position of said type and tape being determinative of printing in offset lines.

20. In a printing telegraph receiver, a plurality of selecting members arranged in different horizontal planes, a plurality of type-bars arranged in a circle, positioned above said members, and operable invariably in their own individual immovable planes, means for moving said members in their respective horizontal planes to

select a type-bar, and means responsive following the selection for operating the selected type-bar to record the character carried thereby.

21. In a recorder, a plurality of recording members arranged in two arcuate opposed supports and operable invariably in their respective planes toward a common locus, each of said members being provided with a single recording element, means to carry a record medium between said supports, and means to operate said members to make a record on said medium, the relative position of said type and record medium being determinative of printing in off-set lines.

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