June 23, 1959 R. E. ARKO ET AL 2,892,031

TYPING REPERFORATOR

Filed Dec. 16, 1954 4 Sheets-Sheet 1

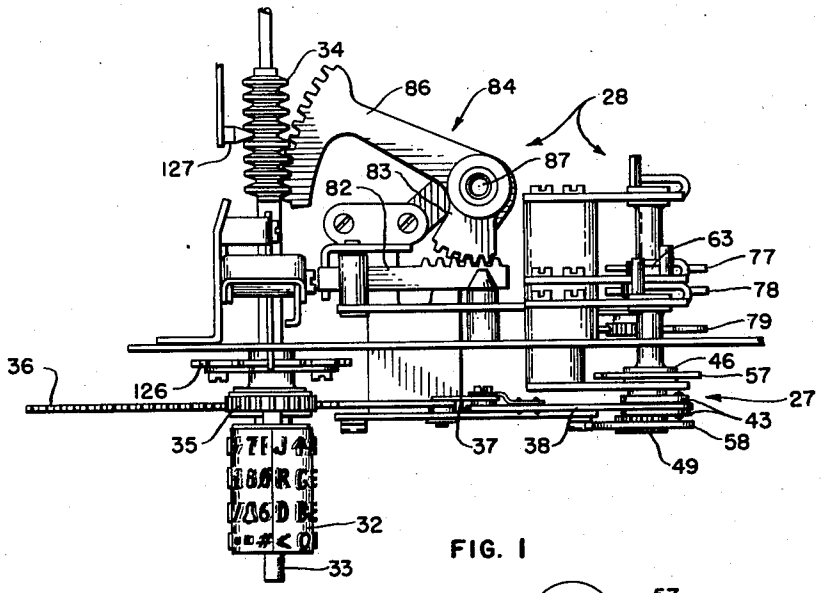


FIG. 1

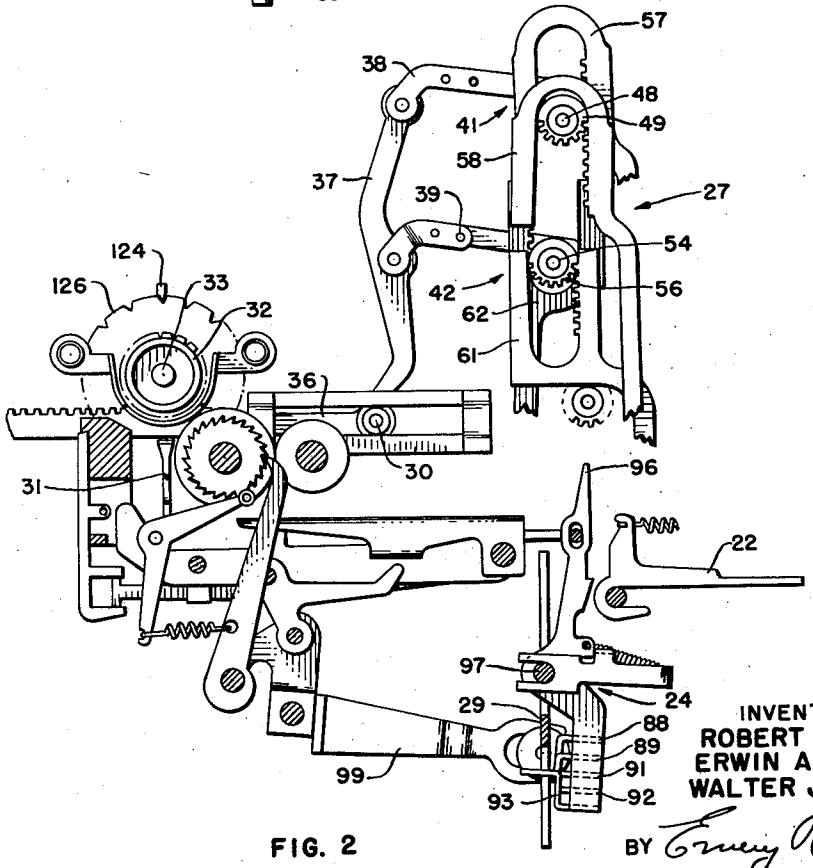


FIG. 2

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TYPING REPERFORATOR

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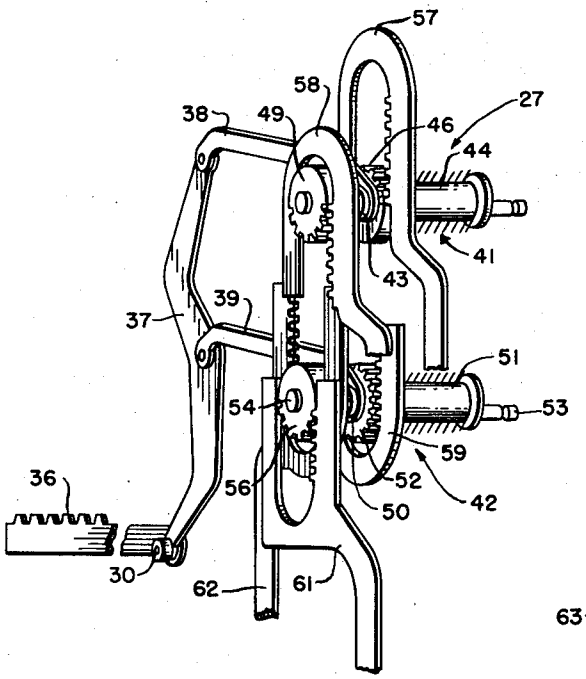


FIG. 3

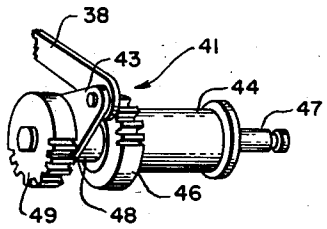


FIG. 4

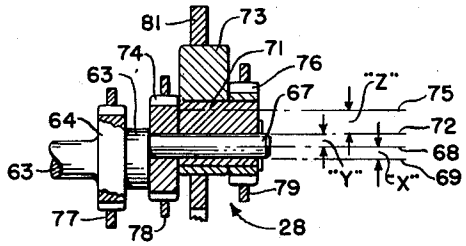


FIG. 6

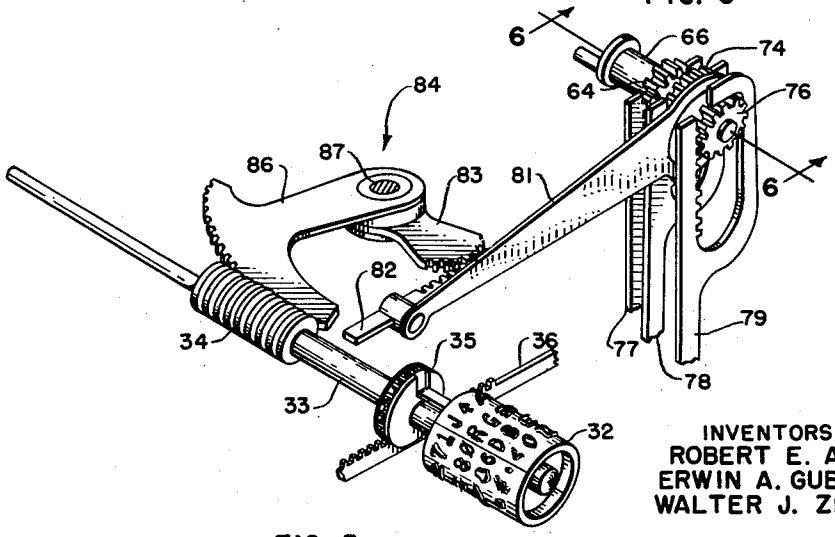


FIG. 5

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TYPING REPERFORATOR

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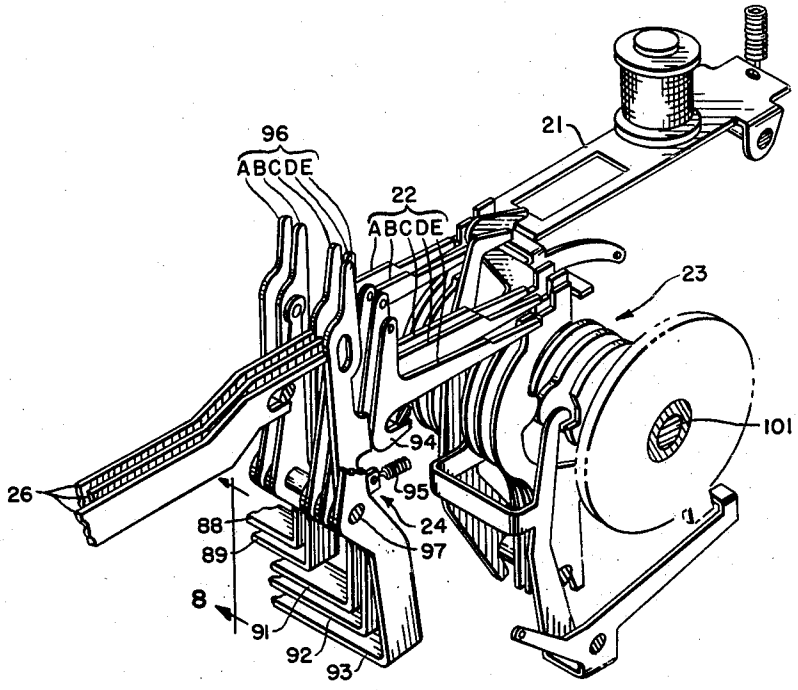


FIG. 7

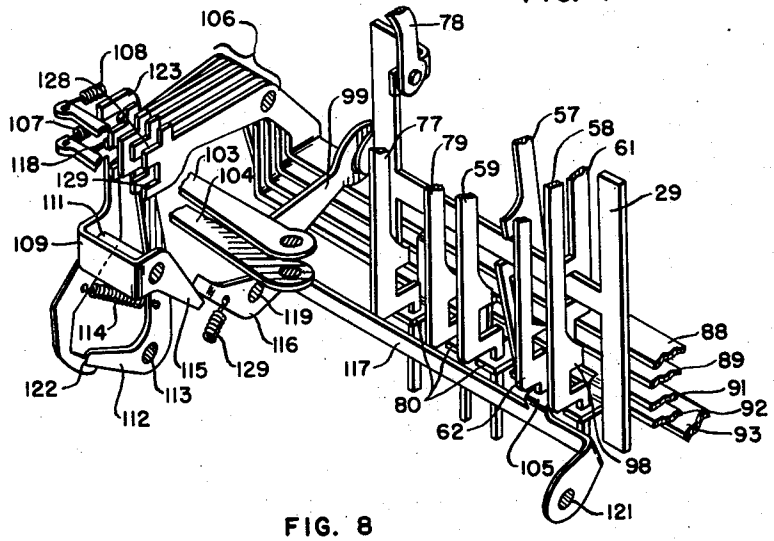


FIG. 8

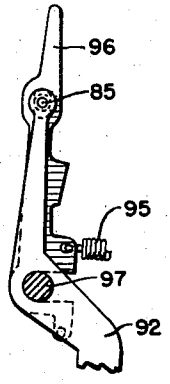


FIG. 11

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TYPING REPERFORATOR

Filed Dec. 16, 1954 4 Sheets-Sheet 4

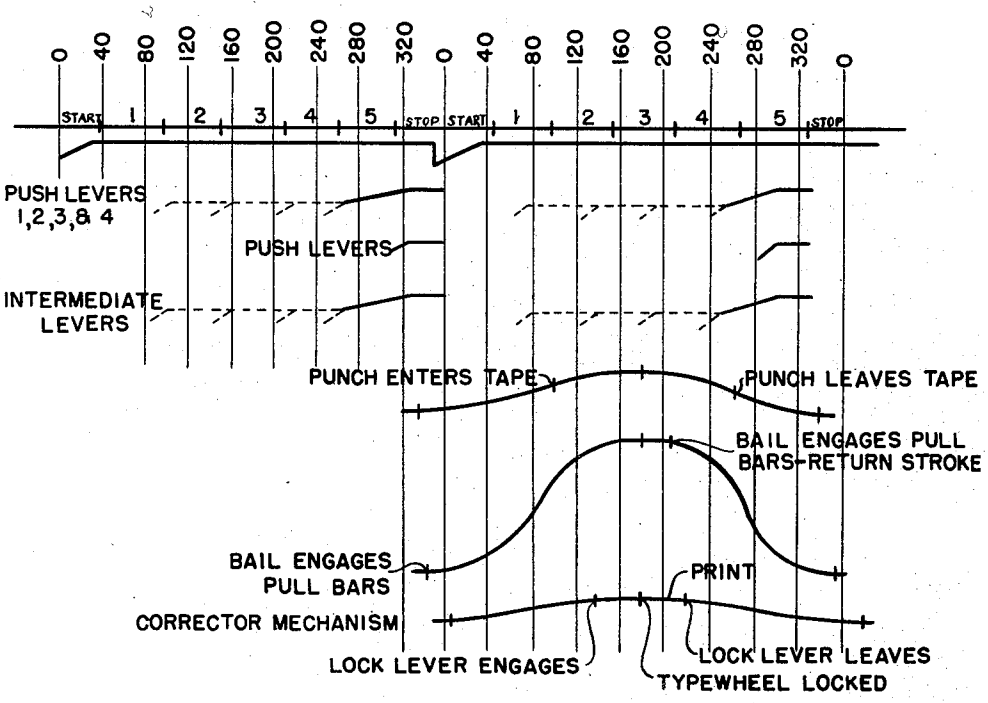


FIG. 9

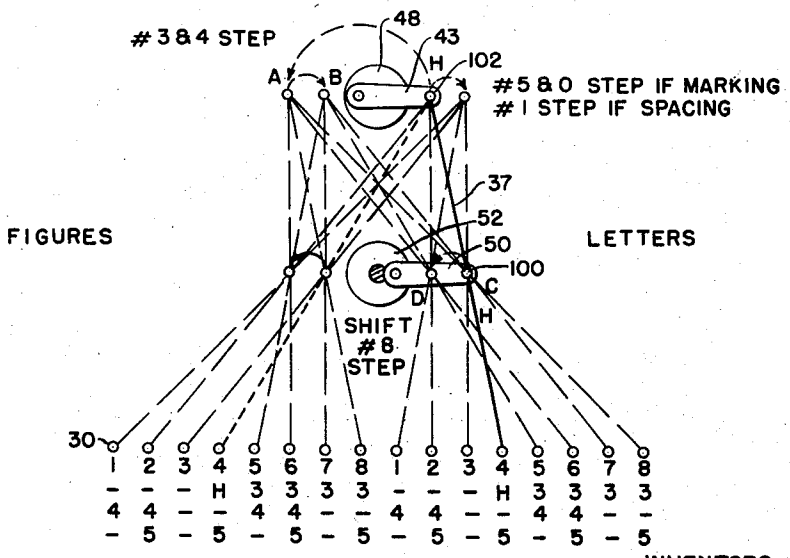


FIG. 10

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United States Patent Office

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2,892,031

TYPING REPERFORATOR

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Application December 16, 1954, Serial No. 475,628

12 Claims. (Cl. 178—34)

The present invention pertains to printing telegraph apparatus and particularly to a high speed typing reperforator actuated in accordance with electrical impulses for simultaneously printing and perforating a telegraphic tape.

In the past, telegraphic printing apparatus has been limited in its speed by the mechanical movements that are required to translate the electrical impulses to type positioning movements. This invention has solved many of these problems and has produced a tape printer which has been successfully operated at very high speeds. By producing a light weight type cylinder or wheel, and by devising a series of positively driven and detented eccentrics to position the type wheel, the obstacles have been overcome.

In order to perforate and print simultaneously, a novel system of motion translation has been devised to transmit the effect of the signal impulses simultaneously to the punch mechanism and to the type positioning mechanism.

An object of this invention is to provide high speed tape printing apparatus with last letter visibility.

Another object is to provide a unique and positive means for translating an electrical impulse into selective mechanical movement.

A further object is to provide a typewheel printer with an aggregate motion positioning device which can operate at high speeds.

Another object is to provide a typing reperforator approaching a simple harmonic movement of the positioning mechanism.

A still further object is to provide a typewheel position positioning mechanism which will be positive in two directions.

Yet another object is to provide an aggregate motion mechanism in which the aggregation of force will approach a straight line force thereby eliminating the deleterious effect of twisting or bending.

Another object is to provide a typing reperforator with a unique intermediate transfer mechanism which transfers signal intelligence to the printing mechanism and to the perforating mechanism simultaneously, but which operates with no decrease in efficiency if either of the units is not used.

Other objects and advantages not specifically recited above will be apparent, and the invention will be better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings wherein like figures refer to like elements, and:

Fig. 1 is a top plan view showing the principal elements of the invention;

Fig. 2 is a front elevational view of the principal elements of the invention;

Fig. 3 is a fragmentary perspective view of the rotational typewheel positioning assembly;

Fig. 4 is a detail perspective view of the two stage eccentric assembly;

Fig. 5 is a detail perspective view of the typewheel axial positioning mechanism;

Fig. 6 is a sectional view of the three stage eccentric assembly;

Fig. 7 is a perspective view of the selector and intermediate signal transfer mechanism;

Fig. 8 is a fragmentary perspective view of the pull bars and the shift selecting mechanism;

Fig. 9 is a timing diagram;

Fig. 10 is a diagrammatic representation of the rotational positioning of the typewheel; and

Fig. 11 is an enlarged view of the selector bail and intermediate lever.

In accomplishing the above objects, a signal selector such as is defined in Zenner Patent No. 2,595,745 is used. As the marking signal is received at the armature, a push bar is moved and comes in contact with a bail extension and a punch selecting member. The perforator is defined in Zenner Patent No. 2,490,608 and De Boo Patents Nos. 2,648,385 and 2,545,198. As the bail extension is pivoted to the left by the push bar, the bail moves to the right and carries with it its corresponding pull bar rack. The pull bar rack is thereby placed in the path of a power bail which moves the selected pull bar rack upwardly. The pull bar rack has a pinion engaged with it which is fixed to an eccentric. Movement of the pull bar rack causes rotation of its pinion and rotation of the eccentric thereby. The last three impulses control the rotational alignment through the afore-mentioned eccentrics which form a part of a double two stage eccentric assembly, while the first two impulses control the axial positioning through a three stage eccentric assembly. Attached so as to move with every stroke of the power bail, is a pull bar rack which is associated with an axial positioning assembly so as to retract the type cylinder after each cycle and return it to its home position during the subsequent cycle. As the type cylinder is brought to its proper position, a corrector mechanism, operating from an eccentric cam on the power shaft, performs the final positioning and a print hammer is triggered to print the selected character on the tape. The power is, of course, supplied in the usual manner from a motor or other suitable source.

Referring now to Figs. 1, 2 and 7, the general operation of the high speed typing reperforator will be described. The signal is received by a selector magnet (Fig. 7) causing its armature assembly **21** to vibrate, in the usual manner. The push bars **22** are selectively operated through any suitable selecting means **23** such as the selector defined in Zenner Patent No. 2,595,745. The selected push bars **22** are moved against cooperating elements of the intermediate system designated generally as **24**. The perforating mechanism is of the type generally shown in Zenner Patent No. 2,490,608 or the De Boo Patents Nos. 2,545,198 and 2,648,385. The intermediate system **24** positions the punch components through the punch interponents **26** and at the same time moves the selected pull bar racks of the typewheel rotational positioning assembly **27** (Fig. 2) and the typewheel axial positioning assembly **28** (Fig. 1) into the path of the power bail **29** (Fig. 2) so as to enable the positioning assemblies to position the selected character on the typewheel **32** over the printing hammer **31**. At the top of the positioning stroke of the power bail **29**, printing takes place; and the power bail **29**, on its downward stroke, returns the pull bar racks to their unselected position and thereby the typewheel to its home position.

The typewheel assembly comprises a shaft **33** with a cylindrical rack **34** rigidly mounted thereon. The typewheel **32** has sixty-four characters arranged in four rows of sixteen characters each. As is indicated in Fig. 5, the surface of the typewheel **32** is divided into two semi-

cylindrical portions with one such portion having the "figures" characters thereon and the other having the "letters" characters thereon. The "figures-letters" shift is accomplished through the rotational positioning assembly 27 and will be described in detail hereinafter.

The type positioning assembly functions as two cooperating units with the rotational positioning being accomplished by the two-stage eccentric assembly shown in Fig. 3, and the axial positioning being accomplished by the triple eccentric assembly shown in Fig. 5, the former positioning function being controlled by the last three impulses of a five unit code and the latter being controlled by the first two. While the positioning mechanism is illustrated in conjunction with a typewheel, it is obvious that it is adaptable to other types of movement such as linear or rectilinear positioning. The specific linkage and number of eccentrics is intended as a preferred embodiment and should not limit the scope of the invention.

Referring now to Figs. 3, 4 and 5, the rotational positioning assembly comprises a slidably mounted rack 36 which is engaged with the typewheel pinion 35 so that movement of the rack 36 will cause rotation of the pinion 35, and thereby rotation of the typewheel 32. Pivotally attached to end 30 of the rack 36 is an interponent 37 (Fig. 2) having an output lever 38 pivotally attached to the end remote from the rack 36 and a second output lever 39 pivotally attached midway between the rack connection and the remote output lever connection. The two-stage eccentrics 41 and 42 are identical and are suitably mounted to bring two levers 43 and 50 (Figs. 3 and 4) into position to be pivotally connected with the output levers 38 and 39. The two-stage eccentric 41 (most easily seen in Fig. 4) has a shaft 44 suitably journaled in the frame of the machine so as to be rotatable by its associated pinion 46, through 180° about its own axis. A cylinder 48 is rotatably mounted on the end of shaft 44 with its axis of rotation parallel to that of the shaft 44 and offset therefrom. The cylinder 48 is so mounted as to be rotatable through 180°, by its associated pinion 49, about its own axis of rotation. The lever 43 is rigidly fixed to the cylinder 48 for rotation with it and is pivotally connected to the output lever 38. The relative distances between the axis of rotation of the shaft 44, the cylinder 48, and the connection point of lever 38 are proportional so as to impart horizontal movement to lever 43 in three increments, thus enabling lever 43 to position the lever 38 and, through lever 38, the upper end of the interponent 37 in any one of four different positions. It is, of course, understood that by varying the distances and the amounts of rotation, an infinite number of positions could be obtained. The eccentric assembly 42 is essentially the same as the described eccentric assembly 41 wherein elements 50, 51, 52, 53, 54 and 56 correspond to the elements 43, 44, 46, 47, 48 and 49, respectively. The pinions 46, 49 and 52 are engaged by pull bar racks 57, 58, and 59, respectively, while the pinion 56 is engaged by the shift pull bars 61 and 62. The rotation of the pinions and thereby the associated portion of the eccentric assembly is accomplished by the selective movement of the pull bar racks, the selection and movement of which will be taken up in detail later.

Referring now to Figs. 5 and 6, the axial positioning assembly 28 will be described. A shaft 63 having a pinion 64 keyed thereto is mounted so as to be rotatable through 180°, and has a cylinder 67 rigidly mounted thereon with its axial center line 68 a given distance "X" from the axis of rotation 69 of the shaft 63 and parallel thereto. A second cylinder 71 is eccentrically mounted on the first cylinder 67 with its axial center line 72 a given distance "Y" from the axial center line 68 of the first cylinder 67 or a distance "X" plus "Y" from the axis of rotation 69 of the shaft 63, and parallel thereto. The second cylinder 71 is mounted for rotation through 180° about the axial center line 68 of the first cylinder 67. A third cylinder 73 is eccentrically mounted on the second cylinder 71 with its axial center line 75 a given distance "Z" from the axial center line 72 of the second cylinder 71 or a distance "X" plus "Y" plus "Z" from the axis of rotation 69 of the shaft 63, and parallel thereto. The third cylinder 73 is so mounted as to rotate through 180° about the axial center line 72 of the second cylinder 71. A pinion 74 is rigidly affixed to the second cylinder 71 and concentrically mounted with respect to the axial center line 68 of the first cylinder 67, so that rotation of the pinion 74 will cause rotation of the second cylinder 71 about the axial center line 68, of the first cylinder 67. A second pinion 76 is rigidly attached to the third cylinder 73 and concentrically mounted with respect to the axial center line 72 of the second cylinder 71 so that rotation of the pinion 76 will cause rotation of the third cylinder 73 about the axial center line 72 of the second cylinder 71. Pull bar racks 77, 78 and 79 are engaged with the pinions 64, 74, and 76, respectively. An output lever 81 (Fig. 5) has at one end a circular aperture dimensioned to correspond to the peripheral surface of the third cylinder 73, upon which lever 81 is supported by means of its aperture. It can be seen that rotation through 180° of any of the pinions will cause a rotational displacement of the third cylinder 73, and thereby a linear displacement of the output lever 81, a determinable amount. The output lever 81 is connected to a slidably mounted rack 82 which is engaged with an arcuate segment 83 of a segmented pinion 84. The segmented pinion 84 has a second arcuate segment 86, which is engaged with the cylindrical rack 34 on the typewheel shaft. The segmented pinion 84 is pivotally mounted at the pivot point 87 so that movement of the axial positioning rack is transmitted through the pivoting of the segmented pinion 84, to the cylindrical rack 34 and thence through the typewheel shaft to the typewheel 32.

In this embodiment, five axial positions for the typewheel are provided. There is a retracted position for last letter visibility which is the state when none of the cylinders is rotated from its position as described above. This condition exists at the end of each cycle. The second cylinder 71 is rotated in each cycle. When the second cylinder 71 is rotated 180° about the axial center line 68 of the first cylinder 67, it is apparent that any point on the third cylinder 73 and thereby the output lever 81 will move a linear distance of 2Y. In the same manner, when the pinion 74 is also rotated through selection of its associated pull bar 78, the output lever 81 will move a linear distance of 2Y plus 2X. The fourth and fifth typewheel positions are similarly attained through the selective rotation of the pinion 76 along with the pinion 74 or the rotation of all three pinions.

The selective rotation of the pinions which are an integral part of the positioning device as outlined in the preceding paragraphs is accomplished through their associated pull bar racks. The engagement of the pull bar racks provides a positive action for rotating the pinion and its associated eccentric when selected, and for preventing rotation when not selected. Referring now to Figs. 7 and 8, the pull bar racks 57, 58, 59, 61, 62, 77, and 79 are each articulated by a loop 80 or other suitable means to a pull bar rack bail 88, 89, 91, 92, or 93. For purposes of clarity the operation of one such bail 92 will be described. When the selector mechanism, for example, receives a marking impulse in the fourth code interval, one of the push bars 22 is selected and moved to the left in Fig. 7 in the usual manner as described in the Zenner Patent No. 2,595,745. A cam portion 94 of the push bar 22 is moved against a cam portion of the intermediate interponent 96 causing the interponent 96 to pivot about the pivot point 97, and move the punch selector interponent 26 to the left thereby selecting the number 4 punch lever in a manner such as is defined in the aforementioned De Boo patents. The pull bar bail

92 is yieldably related to the intermediate interponent 96 so that a simultaneous result of the afore-mentioned movement is to pivot the bail 92 about the pivot point 97 and move its bottom portion and loop 80 to the right. The pull bar rack 58 being engaged by the loop 80 is pivoted on its pinion 49 in such a manner as to engage the cross bar of the power bail 29, which is in its lowermost position at the selection stage of the cycle, beneath the shoulder 98 of the pull bar rack 58. The power bail 29 is then moved upward by the oscillation of the lever 99 which in turn is driven from the power shaft by means of an eccentric cam and link (not shown). The upward movement of the pull bar rack 58 rotates the pinion 49 and its associated lever 43.

Referring to Fig. 11 the association of the intermediate interponents 96 and the bails 88 to 93 will be explained. The intermediate interponents 96 are each associated with their respective bail 88—93 through the cooperation of a pin 85, carried on the upstanding arm of each bail, and a vertical slot in the intermediate interponent. Interponents 96 are pivoted about the common pivot bar 97. Under normal operating conditions, each intermediate lever 96 and its associated bail moves as a unit about their common pivot point 97 except that the pivot hole of the intermediate lever 96 is in the form of an open-ended slot, and each lever 96 is biased against the pivot shaft 97 by a yield spring 95. If for some reason a selector bail 88 to 93 is prevented from being pivoted, the force of the push bar 22 will be absorbed by pivoting the intermediate lever 96 in a clockwise direction about the bail pin 85 and sliding the lower portion out of normal pivot position, stretching the yield spring 95. This novel yield mechanism thereby eliminates the danger of broken or damaged parts which may be caused by some timing error or any other reason which would present a positive force to an unyielding mechanism.

The pull bar racks 77, 79, 58 and 59 are operated in the manner just described. One of the rotation controlling pull bar racks 57 is positioned to the right of the power bail (Fig. 8) with its bail engaging shoulder toward the power bail 29. The pull bar rack 57 is controlled by the fifth impulse of the code and is engaged by the power bail 29 at all times except when the fifth impulse is marking. When the fifth impulse in the code is marking the pull bar rack bail 93 and the pull bar 57 are pivoted as described above with the exception that the pull bar rack 57 is moved out of the path of the power bail 29 rather than into it, for a purpose to be hereinafter described.

Fig. 10 shows diagrammatically the sixteen horizontal positions of the end 30 of the typewheel rack 36 as positioned by the interponent 37 in response to the selective operation of the pull bar racks 57, 58, 59, 61 and 62. In the interest of clarity the output arms 38 and 39 are not shown, in which event the interponent 37 is positioned directly by the levers 43 and 50. The pinion and pull bar racks are of course not shown. As stated above, the last three units of a standard five unit code control the rotational positioning of the typewheel. The third unit controls the rotation of the lever 43 while the fifth unit controls the rotation of the shaft 44 (Fig. 3) and thereby said third and fifth units control the horizontal linear position of the lever 43 and the cylinder 48 about the center of which it pivots. The fourth unit controls the rotation of the shaft 51 (Fig. 3) and thereby the horizontal linear position of the lever 50. The neutral or home position, as indicated by H in Fig. 10 occurs when none of the pull bar racks 57, 58, or 59 (Fig. 3) has been selected. It should be noted that this occurs when the fifth code unit is a marking pulse. To move the typewheel to position letters 5 of Fig. 10, pull bar 58 (Fig. 3 or 8) is selected by a third code unit marking pulse so as to rotate the output portion 102 of lever 43 to point A, and pull bar 59 is selected by the fourth code unit marking pulse to rotate shaft 51, and move the output portion 100 of lever 50 horizontally from point C to point D. Pull bar 57 is selected by a fifth code unit spacing pulse to rotate the shaft 44 and move the output portion 102 of lever 43 horizontally to point B. The interponent 37 is similarly positioned from the home position to the positions shown in Fig. 10 with the code combinations associated therewith.

The shift and unshift function is accomplished by rotating the typewheel 32 from the "letters" home position 4 to the "figures" home position 4. This involves rotation of the typewheel through 180° or eight angular typewheel units or spaces. In order to conform to the established code, shift and unshift functions must take place on 1–2–4–5 code combinations and 1–2–3–4–5 code combinations respectively. The selection and operation of the shift function is most easily seen by referring to Figs. 3 and 8. The shift selection assembly consists of two sensing arms 103 and 104 pivotally pinned at one end and urged toward the selection bail extensions 106 by associated springs 107 and 108. A lever 109 is pivotally mounted on the pin 111. A second lever 112 is pivotally mounted at 113, and the two levers 109 and 112 are urged toward each other about their respective pivots by a spring 114. A cam extension 115 of the lever 109 is in camming relationship with a cam extension 116 of the shift bail 117. Two shift pull bar racks 61 and 62 are positioned on either side of the power bail 29, and the lower extensions of the pull bar racks 61 and 62 are held by a loop 105 on the shift bail 117 while the rack portions are engaged with opposite sides of the shift pinion 56 (Fig. 3). The bail engaging shoulders of the pull bar racks are so constructed as to engage the bottom of the power bail 29 on its downward stroke. Four of the selector bail extensions 106 are formed having a shoulder 128 and a groove 129. The extension of the selector bail 91 has no groove. The sensing arm 103 is so positioned as to be unblocked when all of the selector bails are pivoted, and the sensing arm 104 is so positioned as to be unblocked when selector bails 88, 89, 92 and 93 are pivoted and move under the extension of selector bail 91 and into the grooves 129 of the others, selector bail 91 being controlled by the third code unit. Thus when the "figures" shift signal, 1–2–4–5, is received, the selector bails 88, 89, 92 and 93 are rotated to move pull bar racks 77, 79 and 58 into the path of the power bail 29 and pull bar rack 57 out of the path. At the same time, the selector bail extensions 106 are moved down to unblock the sensing arm 104 and allow it to strike the hammer 118 of lever 109 to pivot said lever 109 clockwise (Fig. 8) about its pin 111. The pivoting of lever 109 in a clockwise direction (Fig. 8) moves the cam extension 115 of the lever 109 away from the extension 116 of the shift selector bail 117 thereby allowing the selector bail 117 to be rotated in a counterclockwise direction about its pivots 119 and 121 (Fig. 8) by its spring 124. Counterclockwise rotation of the selector bail 117 causes the loop 105 to move to the left (Fig. 8) thereby moving the bottom of the two shift pull bars 61 and 62 so as to move the bail engaging shoulder of the figures shift pull bar 61 into the path of the descending bail and the letters shift pull bar 62 out of said path. As the power bail 29 moves down, it imparts downward movement to the figures pull bar rack 61. The pull bar rack 61 rotates the shift pinion 52 (Fig. 3) which rotates the lever 50 through 180° about its pin 54, and at the same time raises the letters pull bar rack 62 through cooperation of the shift pinion and the rack. The shift selector assembly is locked in the described position by the lever 112 pivoting about its pivot point 113 and engaging a shoulder on the latching extension 122 of the selector lever 109. The sensing arms 103 and 104 are moved away from the selector bail extensions by any suitably timed means. The letters shift code combination unblocks the sensing arm 103 and allows it to strike the hammer extension 123 of the selector lever 112, thus pivoting the lever 112 about its pivot

point 113 and unlatching the selector arm 109 so as to cause the lever 109 to be rotated in a counterclockwise direction by the spring 114 causing the cam extension 115 of the lever 109 to cause the extension 116 of the selector bail 117 to be rotated in a clockwise direction thereby causing the loop 105 to be moved to the right (Fig. 8) which moves the letters shift pull bar 62 into the path of the bail and the figures pull bar rack 61 out of said path.

Referring again to Fig. 10 it will be noted that the action of the eccentrics is so arranged that when the figures shift code 1–2–4–5 is selected, the typewheel will be rotated through 45° or two angular typewheel units or spaces toward the figures home position 4 on the upward stroke of the power bail 29. The figures shift mechanism is also selected as outlined above and begins to position the typewheel on the down stroke of the power bail. Since the typewheel has already been rotated through two typewheel units when the shift mechanism begins to operate, a further rotation of six typewheel units is all that is required. By cutting down the throw of the typewheel, a smoother, faster operation is achieved. The same is true of the letters shift. The use of the standard code signal and the advantageous typewheel position at the beginning of the downstroke of the power bail is made possible by engaging the pull bar rack 57 controlled by the fifth code unit on a spacing signal rather than a marking signal.

The typewheel corrective mechanism may be operated from a power shaft through an eccentric assembly (not shown) or any other suitable means to move a lever 124 into one of the positioning grooves of a corrector disc 126 which is slidably keyed to the typewheel shaft 33, and a second lever 127 (Fig. 1) into the cylindrical rack 34. The foregoing operation is, of course, accomplished just prior to the printing operation as indicated on the timing diagram in Fig. 9.

All component parts such as ribbon feed or ribbon reverse mechanisms, and tape feed mechanisms are not described since they are well known in the art of printing telegraph apparatus.

The operation of this invention may be more clearly understood by following its functions in printing a character. Assume that the shift is in the letters position, and that the armature 21 is responding to the letter "C" code signal, wherein the second, third, and fourth impulses will be marking, while the first and fifth impulses are spacing. The selector mechanism 23 selects the push bars 22B, 22C, and 22D and moves them to the left to contact the intermediate interponents 96B, 96C, and 96D. The intermediate levers 96 and bail extensions are thereby rotated about the pivot point 97 to move the associated punch interponents 26 to the left to position the second, third, and fourth punch levers, and at the same time move selected bails 89, 91 and 92 and their associated pull bar racks 79, 59 and 58 to the right to position the pull bar racks in the path of the power bail 29. Reference to the timing diagram of Fig. 9 indicates that the power bail 29 is in its lowermost position while this selection takes place. While the selector bails are so rotated, the shift sensing arms 103 and 104 are allowed to move toward the extensions 106. They are, however, blocked from actuating the shift mechanism by the extensions of selector bails 93, and 88, which are not selected. The power bail 29 moves up carrying the pull bar racks 78, 79, 59, 57, and 58 with it. Pull bar rack 57 being controlled by the fifth code unit, is in engagement with the power bail on a spacing signal, and pull bar 78 is attached to the power bail to move on every cycle. Movement of the pull bar rack 57 rotates the pinion 46 and thereby shaft 44 to move the pivot point of lever 43 to the right, Figure 10; pull bar rack 58 rotates the pinion 49 and thereby the lever 43 to point B in Fig. 10; and, pull bar rack 59 rotates the pinion 52 and thereby moves the lever 50 one unit to the left from point C to point D in Fig. 10, thus positioning the rack 36 one unit or space to the right and rotating the typewheel 32, through its pinion 35 one unit or space from its home position. The pull bar rack 79 rotates the pinion 74 and thereby the cylinder 71 to move the output member 81 one unit and the pull bar rack 79 rotates the pinion 76 to rotate the cylinder 73 about cylinder 71 through 180° and move the output member 81 two additional units. Movement of the output arm is transmitted through the rack 82 and the pinion 84 to the cylindrical rack 34 to position the selected character over the printing hammer 31. The levers of the corrective mechanism 124 and 127 are seated in corrector disc 126 and rack 34 to finally position the typewheel, and the hammer is released causing the selected character to be printed. The power bail 29 is moved downward and moves the pull bar racks downwardly to reverse the foregoing movement and return the typewheel to its home position with the wheel positioned one row behind printing position to permit visible printing. The punching operation occurs during the positioning of the typewheel and the printing.

While this invention has been described in one embodiment, it is apparent that it is adaptable to many modifications and the elements can be utilized with mechanisms other than those shown herein. Various modifications and changes can be made without departing from the scope of this invention.

What is claimed is:

1. In a printing telegraph machine, a type carrier, a series of cylindrically shaped members comprising a first cylindrically shaped member and at least one succeeding cylindrically shaped member, each succeeding cylindrically shaped member being eccentrically mounted on a preceding cylindrically shaped member and rotatable bodily about the axial center line of said preceding cylindrically shaped member, means including an output member operatively connecting the last of said cylindrically shaped members with the type carrier, and a signal controlled means for selectively rotating permutations of said cylindrically shaped members to impart predetermined displacements to said type carrier.

2. In a telegraph printing apparatus, a typewheel positioning means comprising a two stage eccentric assemblage, a three stage eccentric assemblage, each stage of said assemblages having a driving pinion connected thereto, rack means for selectively driving said pinions to position either eccentric assemblage in a permutation of positions, signal receiving means responsive to marking and spacing signals, power means, and means for selectively engaging said power means with said rack means in accordance with permutations of marking or spacing signals received by the signal receiving means.

3. A positioning mechanism for a typewheel printing device comprising a typewheel assembly, a rotatably mounted shaft, a cylindrical member rigidly and eccentrically mounted on one end of said shaft, a second cylindrical member eccentrically mounted on the first cylindrical member to rotate bodily about the axial center line of said first cylindrical member, a third cylindrical member eccentrically mounted on the second cylindrical member to rotate bodily about the axial center line of said second cylindrical member, selectively operable means for rotating any of the group of elements consisting of the shaft and the second and third cylindrical members to cause displacement of the third cylindrical member, and means for transmitting said displacement of the third cylindrical member to the typewheel assembly.

4. In a printing telegraph device having a type carrying mechanism which is positioned relative to a stationary printing assembly, a type carrier positioning device comprising: a positioning arm; a type carrying means mounted to be moved by the positioning arm; a plurality of output arms pivotally attached to said positioning arm at spaced intervals along its length, a plurality of eccentric assemblages, each of said assemblages comprising a rotatable

shaft, a cylinder rotatably mounted eccentrically on said shaft and with its axis of rotation parallel to that of the shaft, a lever rigidly fixed to the cylinder at one extremity of the lever and pivotally attached to one of said output arms at the other extremity of the lever; and means for selectively rotating any of the shafts or cylinders to position the output arms and thereby the type carrying mechanism.

5. In printing telegraph apparatus, a type carrier, a slidably mounted member for actuating said type carrier, an interponent pivotally attached to said slidable member, a first input member pivotally attached to said interponent at a point remote from the slidable member, a second input member pivotally attached midway between the first input member and the slidable member, and two two-stage eccentric assemblages each comprising a rotatably mounted shaft, a cylindrical member rotatably mounted on said shaft with its axial center line offset from and parallel to that of said shaft for bodily movement of said member upon rotation of said shaft, driving means to selectively rotate said cylindrical member 180°, driving means to selectively rotate said shaft, and a lever fixed on said cylindrical member and pivotally attached to one of said input levers whereby the midpoint and the remote end of the interponent are positioned in any of four positions and the type carrier is positioned in any of sixteen positions.

6. In a printing telegraph machine, a permutation code selector, a plurality of selectively controlled push bars selectively controlled by said selector, a positioning device having a series of cylindrically shaped members comprising a first cylindrically shaped member and at least one succeeding cylindrically shaped member, each succeeding cylindrically shaped member being eccentrically mounted on a preceding cylindrically shaped member and rotatable bodily about the axial center line of said preceding member, a plurality of pinions each one of which is attached to one of said cylindrically shaped members to rotate said cylindrically shaped members, a plurality of racks each one of which is engaged with one of said pinions, a power means, and a plurality of bails each positioned as to be rotatable by a predetermined push bar and attached to one of said racks to move it into engagement with the power means in response to a predetermined signal.

7. In a typewheel printer, a letters-figures shifting means comprising a type cylinder having letters on one semi-cylindrical portion of its surface and figures on the other, a typewheel rotating means, a pinion to control said rotating means, a pair of racks engaged on opposite sides of said pinion, a pivotally mounted bail for actuating said pair of racks selectively, power means for driving said bail, and means to selectively pivot said bail in either direction to engage it with either one of said racks to rotate said type wheel through 180°.

8. In a typewheel printer, a letters-figures shifting means comprising a cylindrical typewheel having letters on one semi-cylindrical portion of its surface and figures on the other, a pinion, a pair of racks engaged with said pinion on opposite sides thereof, a power means, a selector means for selectively engaging either of said racks with said power means, and a typewheel rotating means driven by the selected one of said racks to rotate said type wheel through 180° in either direction upon the engagement of the rack with the power means.

9. In a positioning device, a series of cylindrically shaped members comprising a first cylindrically shaped member and at least one succeeding cylindrically shaped member each succeeding cylindrically shaped member being eccentrically mounted on a preceding cylindrically shaped member and rotatable bodily about the axial center line of said preceding cylindrically shaped member, and means for selectively rotating permutations of said members to impart a predetermined displacement to the last of said cylindrically shaped members.

10. In a positioning device, a series of cylindrically shaped members comprising a first cylindrically shaped member and at least one succeeding cylindrically shaped member, each succeeding cylindrically shaped member being eccentrically mounted on a preceding cylindrically shaped member and rotatable about the axial center line of said preceding cylindrically shaped member, a plurality of pinions each attached to one of said cylindrically shaped members for imparting rotation to it, a plurality of racks each engaged with one of said pinions, a power means, and means for engaging permutations of said racks with said power means to rotate said cylindrically shaped members to impart a predetermined displacement to any of said cylindrically shaped members.

11. In a positioning mechanism, a slidably mounted positioning member, an interponent pivotally attached thereto, and having a first input member pivotally attached at a point remote from the positioning member and a second input member pivotally attached midway between said first input member and the positioning member, and two two-stage eccentric assemblies each comprising a shaft, a driving means to selectively rotate said shaft 180°, a pin rotatably mounted on the shaft and having its axis of rotation parallel to the axis of rotation of said shaft, driving means to selectively rotate said pin 180° and a lever fixed on the pin and pivotally attached to one of the input levers whereby the midpoint and the remote end of the interponent are positioned in any of four positions and the positioning member is positioned in any of sixteen lateral positions.

12. A printing telegraph apparatus having means for positioning type characters relative to a stationary printing mechanism comprising a means for receiving code signals, a type carrying mechanism, an eccentric assemblage for moving the type carrying mechanism to any of a plurality of predetermined rotary positions and having individually rotatable portions with driving pinions fixed to them, a rack individual to each pinion, means activated by the receiving means for actuating said racks to rotate the portions of said eccentric assemblages to position the type carrying mechanism in a predetermined one of said rotary positions, a second eccentric assemblage for moving the type carrying mechanism along its axis of rotation to any of a plurality of predetermined axial positions and having individually rotatable portions with driving pinions fixed to them, a rack individual to each of said last-mentioned pinions, means activated by the receiving means for actuating said last-mentioned racks to rotate portions of said second eccentric assemblage to position the type carrying mechanism in a predetermined one of said axial positions, a printing hammer pivotally mounted in the stationary printing mechanism, and means for moving said printing hammer toward the positioned type carrying mechanism.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,892,031 June 23, 1959

Robert E. Arko et al.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 45, after "typewheel" strike out -- position --; column 2, line 34, for "an" read -- the --; column 3, line 30, after "The" insert -- two --; column 8, line 4, for "79" read -- 78 --.

Signed and sealed this 26th day of January 1960.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

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