June 23, 1931. E. E. KLEINSCHMIDT 1,811,134

PRINTING TELEGRAPH

Original Filed July 18, 1924 3 Sheets-Sheet 1

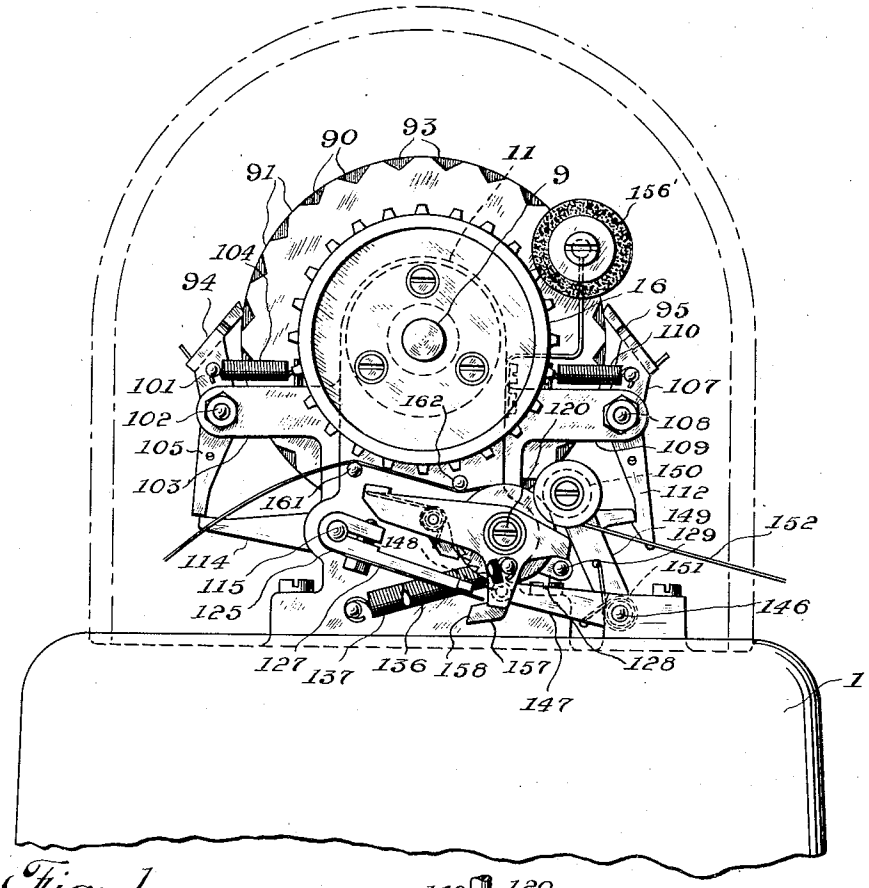

Fig. 1

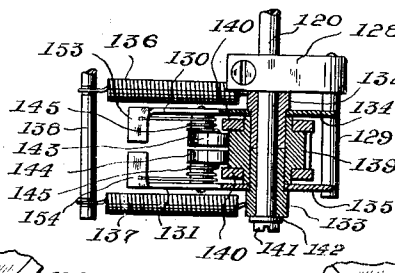

Fig. 11

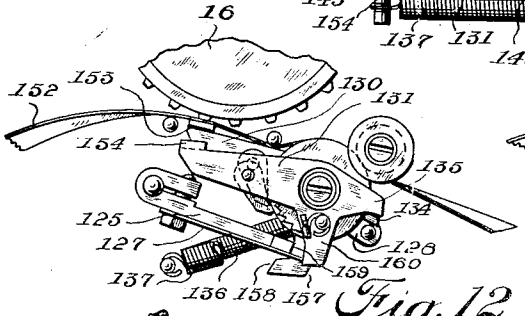

Fig. 12

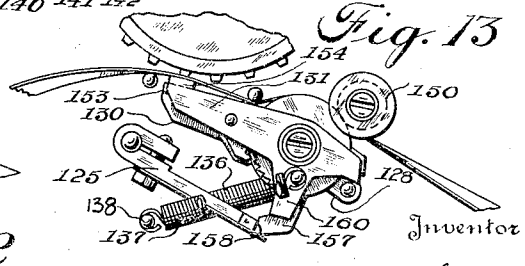

Fig. 13

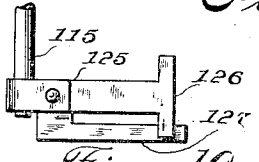

Fig. 10

Inventor

Edward E. Kleinschmidt

By William A. Strauch

Attorney

June 23, 1931. E. E. KLEINSCHMIDT 1,811,134

PRINTING TELEGRAPH

Original Filed July 18, 1924 3 Sheets-Sheet 2

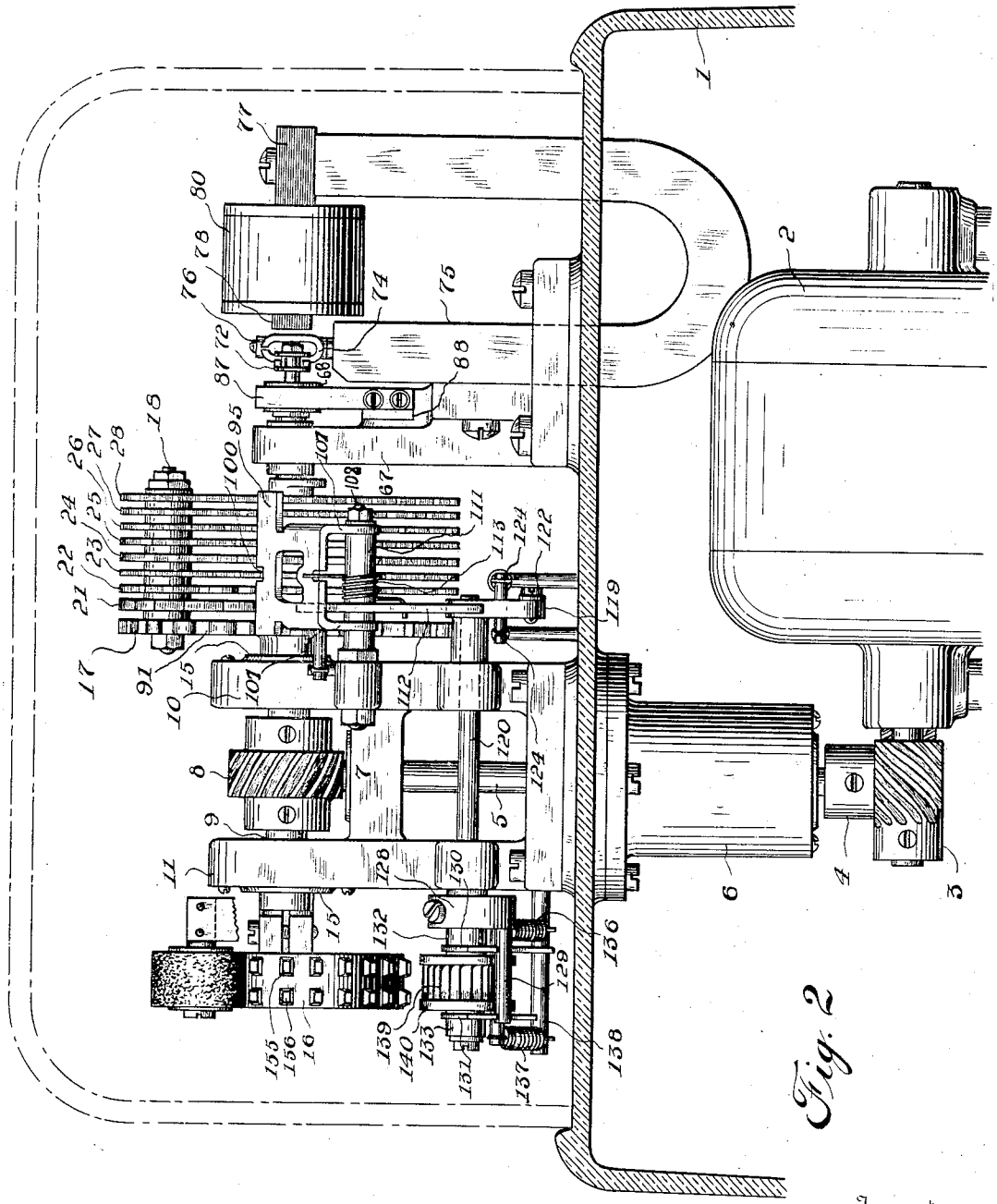

Fig. 2

Inventor
Edward E. Kleinschmidt

By William A. Strauch
Attorney

June 23, 1931. E. E. KLEINSCHMIDT 1,811,134

PRINTING TELEGRAPH

Original Filed July 18, 1924 3 Sheets-Sheet 3

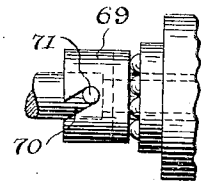

Fig. 6

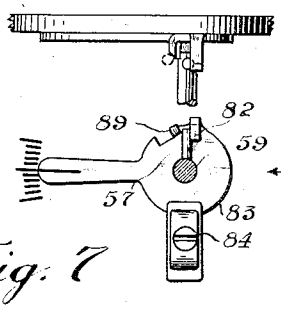

Fig. 7

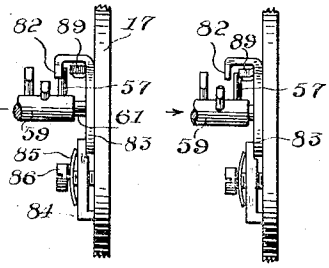

Fig. 8

Fig. 9

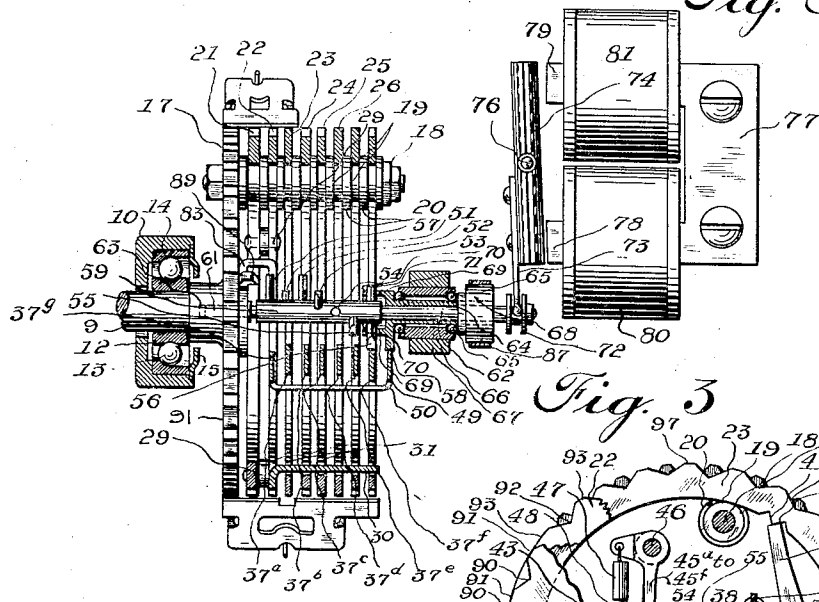

Fig. 3

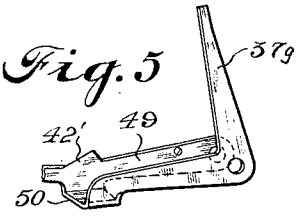

Fig. 5

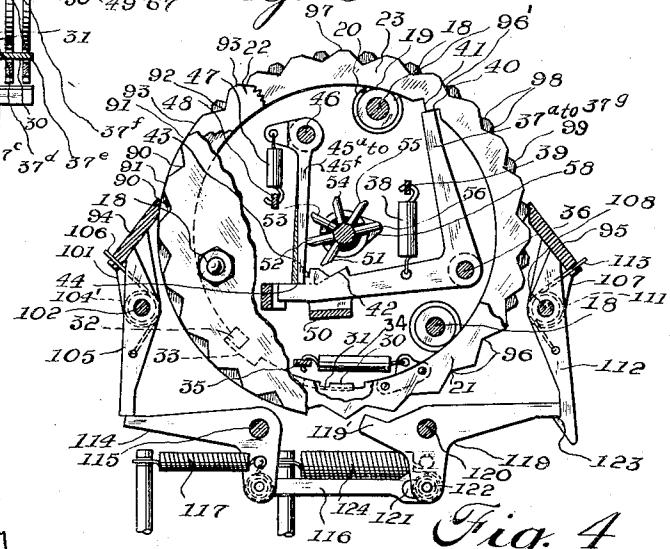

Fig. 4

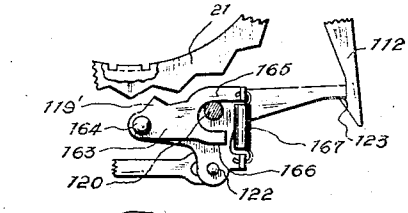

Fig. 14

Inventor

Edward E. Kleinschmidt

By William A. Strauch

Attorney

Patented June 23, 1931 1,811,134

UNITED STATES PATENT OFFICE

EDWARD E. KLEINSCHMIDT, OF CHICAGO, ILLINOIS, ASSIGNOR TO TELETYPE CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

PRINTING TELEGRAPH

Reíle of abandoned application Serial No. 726,839, filed July 18, 1924. This application filed November 30, 1928. Serial No. 322,946.

The present invention, disclosed in this application which is a duplicate of application 726,839, filed July 18, 1924 and which was accidentally abandoned, relates to printing telegraph systems, and machines.

More particularly, the present invention relates to new and improved forms of synchronization, selective systems, and apparatus for type printing telegraphs.

Heretofore certain types of printing telegraph systems have utilized synchronously rotating elements at different stations, and have maintained definite time relations by operating the receivers at slightly greater speeds than the transmitter speeds, starting the receiver element into rotation at the beginning of each signal interval by a start-impulse, and arresting the receiver at the end of each rotation by establishing a stop condition. In these prior systems the transmitter element may rotate continuously under solely local control or may be started and stopped under solely local control between the start and stop intervals.

In the prior systems of the type described, the rotary receiver member is started into operation at the beginning of each signal interval, and arrested at the end of each signal interval, and the angle of rotation for each complete cycle is 360° or less. Such systems are especially adapted for use with printing mechanisms of the type-bar form, as in the case with the improvement above mentioned. A wide use for printers of the type-wheel form exists in the stock ticker and other fields. In the stock tickers now in use, speed is sacrificed for simplicity and permutation codes are not used. The capacity of the present tickers is therefore limited, and as a result the present systems are incapable of handling the growing volume of business in this line. These systems are also, in general, two wire systems requiring two line wires for their operation, with resultant loss of economy and decreased efficiency in the utilization of line wire. By reversing the operation of the usual start-stop rotary members of the permutation selector systems, and stopping the operation of a selector member at the beginning of each signal interval or cycle, and starting it at the end thereof, I have evolved an entirely new type of selective system which permits the application of permutation codes to type-wheel printers by simple, reliable, efficient and rugged mechanism, which permit much higher speeds of operation than heretofore attainable in type-wheel machines.

An object of the invention is the provision of a new stop-start system of the character described.

In printers of the stock ticker type, the letters are printed in one position, and the figures are printed in another position. This necessitates the frequent shifting from the letter case to the figure case. In usual permutation code printers, the shift operation from one case to another requires a full cycle for each case movement. Because of the frequency of the shift operations in stock tickers, if the usual shift is utilized, the operation of the printer is slowed considerably. To avoid this difficulty, a novel type of shift is provided by the addition of a special interval to the signal cycle, during which interval the selection of the figure or letter case is determined. By utilizing this new method of case selection, a high speed of operation is attainable. A further feature of eliminating special case selecting signals is that reliable printers suitable for use in emergency signalling, such as in police and fire telegraph printing systems is provided. In such systems, when special signal combinations are used to shift from letters to figures, it is found that operators may forget to send the shift signal or the restoring signal when transmitting information that is urgently needed, with the result that serious relays occur at times when speed is most essential. By utilizing the novel case selecting methods hereinafter set forth, these difficulties are eliminated.

A further object of the invention is the provision of new types of selectors in which the case selection is determined by an impulse interval in each signal, instead of by special signal combinations.

In operating systems of the character described, using type-bar or type-wheel printers, it is necessary to establish substantially uni-

form speed conditions at the various stations. Heretofore, motors with special speed governors have been provided, at all points. The governors add complications, require considerable maintenance, and are subject to failure. By experimentation, I have found that it is possible to eliminate at points where alternating current is available, motor governors thru utilization of over-size induction motors to drive the apparatus. If the driving motor is made sufficiently large so that only a small percentage of its rated capacity is utilized, the motors will operate with substantially no slip variation under the varying printing loads, and the speed will be maintained in substantial synchronism, the fluctuations in speed being well within the margin of operation of the apparatus.

Another object of the invention is therefore, the provision of simplified and more reliable motor driving arrangements.

In type-wheel systems utilizing extra impulses to initiate and arrest the selective operation of the receiver, as in the well known start-stop systems, the type-wheel is arrested to effect printing or to effect the start-stop synchronism, and a blank space must be allowed on the type-wheel. Arresting the heavy type-wheel throws heavy strains on the apparatus which decreases the life and reliability of the printers.

Another object of the invention is to provide a system in which the type-wheel is not arrested at any time during the operation of the printer and in which no blank spaces on the type-wheel are required.

Still other objects of the invention are the provision of new and improved high speed selectors, new and improved printing actions, and such other objects as will appear in the following disclosures of preferred embodiments of which—

Fig. 1 is a front elevation showing a type-wheel printer.

Fig. 2 is a side elevation partially in section.

Fig 3 is a fragmental sectional view to show the selector details.

Fig. 4 is a sectional view to show the selector rings and the selecting mechanism.

Fig. 5 is a detail view of the shutter ring trip finger.

Fig. 6 is an enlarged view showing details of the cam shaft stop connection.

Figures 7, 8 and 9 are detail views showing the stop or drive members and orienting plate.

Figures 10 to 13 inclusive are fragmental views showing the printing hammer and tape feed parts.

Figure 14 is a fragmental view showing an improved trip restoring mechanism.

Referring to Figures 1 and 2, a suitable base 1 is provided from which all the parts may be supported in a manner to form a compact self-contained unit. An oversize induction motor 2 is provided and in operation it drives continuously a helical gear 3, which in turn drives a helical gear 4, rigidly secured to a shaft 5. Shaft 5 is suitably supported in a bearing member 6, and in a bearing 7 supported from base 1. On the upper end of shaft 5, a drive pinion is mounted (not shown) which drives a helical gear 8. Gear 8 in turn is secured to and drives continuously a main shaft 9, which is mounted in ball or antifriction bearings 10 and 11. Bearings 10 and 11 are similar in structure but preferably reversed in direction, as indicated in Fig. 2. The bearings comprise hardened rings 12, (Fig. 3) rigidly secured to shaft 9 and bearing against balls 13 which in turn are supported and confined against hardened races 14 secured in housings 10 and 11. End covers 15 are provided to hold the bearings in assembled relation.

Rigidly mounted on shaft 9 and rotatable therewith is a type-wheel 16 and a flange or disc 17. Upon bolts or supports 18, fastened to flange 17 are mounted sets of rollers 19 (Fig. 3) spaced apart by spacing member 20. Mounted on rollers 19 in a manner to have a slight relative rotary motion with respect to the flange 17, is a cam ring 21, a shutter ring 22, a shift ring 23, and five selector rings 24, 25, 26, 27 and 28. Cam ring 21 and shutter ring 22 are fastened so that they will move together by means of rivet connections 29. Formed integrally with shutter ring 22 is a stop member 30. Member 30 extends across slots 31 (Figs. 3 and 4) in rings 23 to 28 and limits the relative rotary motion thereof with respect to the shutter ring and cam ring. Secured integrally or fastened to flange 17 is a stop member 32 (Fig. 4) which extends across slots 33 in rings 21 to 28 and limits the relative movements of these rings with respect to the flange.

A plurality of springs 34 individual to shutter ring 22 and to each of rings 23 to 28 (Fig. 4) fastened to the respective rings at one end thereof, and to a member 35 projecting from flange 17 at the other end thereof tend to urge the respective rings clockwise in Fig. 4 against stops 30 and 32. Pivoted to a member 36 projecting from flange 17 are a plurality of selector fingers 37*a* to 37*f*, and a shutter trip finger 37*g* (Figs. 3, 4 and 5). Finger 37*g* is individual to ring 22 and selector fingers 37*a* to 37*f* are individual to the rings 23 to 28 respectively. The shutter and selector fingers are normally held to the right in Fig. 4 by means of springs 38 individual thereto, one end of each spring 38 being secured to its individual finger and the other end thereof being secured to a member 39 projecting from flange 17. Shoulders 40 and 41 are cut into each of the rings 22 to 28, and springs 34 normally hold shoulders 40 against the ends of fingers 37*a* to 37*g*

in which position shutter ring 22 and shift ring 23 are in unactuated position, and selector rings 24 to 28 are held in unselected or unactuated position.

Each of the fingers 37*a* to 37*f* has formed thereon a cam projection 42, and latch shoulders 43 and 44. A plurality of latch members 45*a* to 45*f* individual to the fingers 37*a* to 37*f* respectively are pivotally mounted on a spindle 46 supported from flange 17. Secured to each of the latches 45*a* to 45*f* are the ends of springs 47, individual thereto, the other ends of which are fastened to member 48 secured to and projecting from flange 17 in a manner to throw latches 45 to the right in Fig. 4. Shutter ring finger 37*g* is rigidly secured to an actuating member 49 (Figs. 3 and 5) by means of a connecting member 50, and has formed thereon an actuating cam projection 42′.

Coacting with fingers 37*a* to 37*f* and latches 45*a* to 45*f* are a set of selecting cams 51 to 56 (Figs. 3 and 4), a start pin 57, and a shutter ring trip cam 58. Cams 51 to 56 are fastened in helical arrangement on a cam shaft 59. Cam shaft 59 has reduced sections 61 and 62. End 61 is rotatably and slidably supported in a bearing recess 63 formed in the end of shaft 9 (Fig. 3) and end 62 is slidably supported in a sleeve 64, (Figs. 3 and 4) with which shutter trip cam 58 is integrally formed. Sleeve 64 is supported through ball bearings 65 on a hardened steel bearing member 66 which in turn is secured in bearing support 67 (Figs. 2 and 3). Fastened securely to sleeve 64 by means of a screw thread or in any other convenient manner to be rotatable therewith, is a friction brake member 68, one end of which abuts against balls 65 and prevents endwise motion of sleeve 64. Extending from the end of sleeve 64 which carries shutter cam 58 is drive sleeve 69 into slots 70 of which a drive pin 71 and cam pin 56 extend to form a drive connection between cam shaft 59 and sleeve 64. Slots 70 (Fig. 6) are preferably cut at a slight angle so that when shaft 59 is driving sleeve 64, there will be a slight tendency for the shaft 59 to move to the left in Fig. 3, but this condition may be altered or reversed if desirable.

End 62 of shaft 59 extends through sleeve 64 and has secured thereto in any suitable manner a shifting grooved member 72 (Figs. 2 and 3). The ends of a forked member 73 extend into the circular groove in member 72 in a manner to permit rotation of shaft 59, and to shift shaft 59 endwise due to movement of member 73. Member 73 is rigidly secured to armature 74 of a selector magnet. The selector magnet preferably comprises a permanent magnet 75 supported from base 1 (Fig. 2) upon one pole of which armature 74 is pivotally mounted at 76. A laminated U-shaped soft iron core 77 is mounted on the other pole thereof and upon legs 78 and 79 of which windings 80 and 81 are applied.

In operation, when the windings 80 and 81 are deenergized, legs 78 and 79 will be in the same magnetic condition, and armature 74 will be held in position with one end thereof against either leg 78 or 79. When, however, a marking condition is received, the magnetism of leg 79 is decreased due to the effect of winding 81, and the magnetism of leg 78 is increased due to the effect of winding 80, and the armature and cam shaft actuated thereby will assume the position shown in Fig. 3. When the current is reversed and a spacing condition is received, the magnetism of leg 78 is weakened and that of leg 79 is strengthened with the result that the cam shaft 59 is moved bodily to the left in Fig. 3.

The relative arrangement of selector fingers 37*a* to 37*f*, latches 45*a* to 45*f* and cams 51 to 56 is similar to that shown for the single magnet selector disclosed in copending application, Serial Number 649,562, filed July 5, 1923, and the same functions are performed thereby. It will therefore be clear that a neutral receiving magnet with a spring returned armature may be substituted for the polarized arrangement above described, as set forth in the said application to shift the cam shaft axially. As shown in Fig. 3, the relative widths of selector fingers 37*a* to 37*f* and member 49 are such that in the position of the cam shaft to the right in Fig. 3, as the cam pins 51 to 58 are engaged by the passing cam surfaces 42 and 42′ of the fingers 37*a* to 37*f*, the fingers will be moved to the left in Fig. 4 to selected position, and latches 45*a* to 45*f* will ride over shoulders 43 of the fingers and lock the set fingers in actuated position. As will more fully hereinafter appear, the fingers, latches and rings are rotated continuously in operation, while the cam shaft is stopped at the beginning of the reception of each code combination and started at the end thereof. This is the reverse of the operation in the said copending case, where the cam shaft is started into operation at the beginning of the reception of each code combination and arrested at the end thereof. As in the said application, when the cam shaft is moved to the left in Fig. 3, by the reception of a spacing condition, cams 51 to 56 are shifted to the left in Fig. 3 in which position they will pass along side the respective fingers 37*a* to 37*f*, and no setting will be made.

The latches 45*b* to 45*f* of the selector fingers 37*b* to 37*f* controlling the selector rings 24 to 28 are sufficiently wide to be actuated and restored in either marking or spacing position of the cam shaft by cams 52 to 56. Latch 45*a* individual to the shift ring selector control finger 37*a* is however offset so that cam 51 while functioning to set selector 37*a*, will not restore latch 45*a*, the restoring of 45*a* being effected by start pin 57. Start pin 57 and cam 52 are aligned as shown in Fig. 3,

so that latches 45*a* and 45*b* are simultaneously restored. The relative position of cams 51 to 58 is such that cam 53 is restoring latch 45*c* while cam 51 is setting finger 37*a*, cam 54 is restoring latch 45*d* while cam 52 is setting 37*b*, cam 55 is restoring 45*e* while cam 53 is setting 37*c*, cam 56 is restoring 45*f* while cam 54 is setting 37*d*, cam 55 then sets 37*e*, and cam 56 follows in setting 37*f*. A selection is then completely set up on fingers 37*a* to 37*f* and when this is completed cam 58 actuates member 49 and trips the shutter ring for purposes which will more fully hereinafter appear.

It will be noted that cam 58 is fixed to sleeve 64 and will not be shifted with the cam shaft 59. Accordingly, the shutter ring is invariably tripped after the position of 37*f* has been determined.

In addition to the function of restoring latch 45*a*, start pin 57 is normally arranged to engage a bevelled edge of a drive projection 82 (Figs. 3, 7 and 8) of an orienting member 83 pivotally mounted on extension 61 of shaft 59 and held against flange 17 by a clamping member 84, a spring 85, and a screw 86. With the parts in the position shown in Fig. 3, shaft 59 is driven by flange 17 through pin 57. The drive projection 82 is preferably, but not necessarily, bevelled as shown to assist the selector magnet in moving the cam shaft to the left in Fig. 3 to initiate a selective operation. A continuous frictional drag tending to resist rotation of cam shaft 59 is applied by means of a brake band 87 (Figs. 2 and 3) which bears against friction brake member 68, and is fastened to suitable support 88 secured to base 1. The friction exerted by band 87 is such that when the cam shaft 59 is moved to the left in Fig. 3 and off the bevelled surface of drive member 82, the cam shaft will come to rest while the remainder of the apparatus is rotated with shaft 9 and flange 17, and at the end of a revolution of member 82, if the cam shaft has been moved to the right in Fig. 3, member 82 will re-engage start pin 57 and will again drive shaft 59.

By adding to the orienting plate 83 a special start or drive member 89 so positioned and bevelled that when the cam shaft is to the left in Fig. 3, during the last selecting interval, pin 57 will engage this member and shaft 59 will be driven thereby until the last interval of a signal is received during which shaft 59 is invariably moved to the right in Fig. 3 when it will again be stopped until engaged by 82 and started at the end of a cycle. Member 82 is positioned to engage pin 57 in such position that pin 56 will have just passed projection 42 of 37*f*. It will be noted that if the last selecting impulse is a marking condition, pin 57 will engage member 82 directly and will start into rotation. By the adding of drive member 89, a wider speed difference between the transmitter and receiver may be used, thereby increasing the operating margins and efficiency of the selector. At the same time signalling intervals of equal length may be used on the line without materially shortening the time for the transfer of the selection from the selector members in the last or stop signal interval. In the usual form of start-stop selector, it has been common to lengthen the last interval of each signal combination to obtain sufficient time for the transfer of selections in the receivers. This lengthening of the last interval is undesirable and is avoided by using drive member 89.

Owing to the fact that a special interval is allotted in each signal to determine the case in which a character is to be printed, each signal is made up of eight intervals or conditions. The first interval controls initiation of a selective operation of the receiver, the second interval controls the case selection, the next five intervals are allotted to the selective combinations, and the last or eighth interval establishes the arresting condition. It will, however, be understood that the case control may be eliminated or controlled by special signal combinations in a well known manner. Besides being useful in machines of the stock ticker type, this new method of selecting the case is highly valuable in emergency signalling systems, such as fire and police systems, where serious delay may be caused at vital times, when an operator using the prior well-known forms of shift control by the transmission of special code combinations, forgets to return the printer to the proper case. This defect is completely eliminated by the present method of case selection.

As above pointed out, the shift ring and the first selector ring control fingers and latches are restored during the first interval of a signal, the finger and latch controlling the second selector ring are restored during the second interval, the third signal interval and so on until the fifth interval the fifth selector is restored and the preceding selection has been completely cleared off. As each of the fingers is actuated in accordance with a received marking impulse, and latched in actuated position, the ends thereof are removed from engagement with shoulders 40 of rings 23 to 28, and the selected ones of these rings will be conditioned for movement. The released ones of these rings will be held against movement by stop 30 until finger 37*g* is actuated, (Fig. 3). Simultaneously with or slightly after the setting of ring 28 is determined by cam 56, cam 58 actuates 37*g* through 49 and 50 and removes the end of 37*g* from engagement with shoulder 40 of shutter ring 22, and ring 22 together with cam ring 21 will shift under the influence of its spring 34 and springs 34 of the released selector

rings, until the edges of the notches 33 engage stop 32 carried by flange 17. The release of the shutter ring and movement of the selected ones of the selector rings initiates a printing operation of the selected character.

As previously explained, the latches 45*a* to 45*f* are reset progressively during the reception of each code combination. However, the tripped fingers 37*a* to 37*f* are only partially reset. The movement of fingers 37*a* to 37*f*, and relative positions of shoulders 43 and 44 is such that in actuated position with ends of latches 45*a* to 45*f* against shoulders 43, fingers 37*a* to 37*f* will be clear of and out of engagement with the shoulders 41 of the shifted rings, so that, as latches 45*a* to 45*f* are kicked off shoulders 43, there will be sufficient movement of the fingers before engaging shoulders 41 to lock the latches 45*a* to 45*f* in restored position. The released or selected rings are restored to latched position as hereinafter described.

As hereinbefore set forth, shaft 9, together with flange 17, and the parts carried thereby are continuously rotated. A plurality of V-shaped notches 90 which correspond in number with the number of combinations which may be set up on the selector rings, or with the number of printing positions of the type wheel 16 are preferably cut at uniformly spaced intervals in the periphery of flange 17 in a manner to form teeth 91 (Figs. 1, 3 and 4). An equal number of similar notches 92 are cut into the periphery of shutter ring 22 to form teeth 93 (Figs. 1 and 4). The relative position of the flange 17 and ring 22 is such that in unactuated position, as shown in Fig. 4, the teeth 93 of the shutter ring are out of alignment with the teeth 91 of the flange ring and form a continuous support for seeker bars 94 and 95. When the shutter ring is released, however, it assumes a position in which notches 92 align with notches 90 and teeth 93 align with teeth 91 so that the seekers 94 and 95 are free to enter these notches as the flange and parts carried thereby are rotated. The shutter ring 22 and the flange 17 are slightly greater in diameter than the rings 21 and 23 to 28, so that when the shutter ring is in unactuated position, the seeker bars will be raised clear of these rings. Bar 94 is the figures control seeker and is merely wide enough to cover flange 17, cam disc 21, shutter ring 22 and shift control ring 23. The bar 95 is the letters control seeker and extends across the flange 17 and all of the rings 21 to 28. Cam ring 21 supplies actuating energy to the printing hammers and has a plurality of V-shaped notches 96 cut in the periphery thereof equal in number to the notches in flange 17 and forming V-shaped teeth. The notches 96 are so arranged that when shutter ring 22 is tripped they will be so positioned that no interference with the movement of seekers 94 and 95 into the aligned notches of the flange and shutter ring will be caused thereby. Shift ring 23 has notches 96′ cut in the periphery thereof in a manner to form teeth 97 which in unactuated position of ring 23 will prevent movement of seeker 94 into the aligned notches of the flange and shutter ring, and in actuated position will permit movement of this seeker into the aligned notches. The selector rings 24 to 28 have cut into the periphery thereof a plurality of V-shaped notches 98 which form teeth 99, the notches 98 being arranged in accordance with the well known notched disc arrangement of the Baudot types of selectors, so that only one set of notches will be aligned for each of the various possible selective combinations of the rings. The position of the selector rings with respect to the flange 17 is such that the set of aligned slots of the selector rings in selected position will align with one set of the aligned shutter ring and flange notches, when the shutter ring is actuated. A notch 100 is cut into seeker 95 so that shift ring 23 will not control this seeker. For each selective combination of received impulses there will accordingly be a different alignment of slots in selector rings 23 to 28 and, until this alignment passes under seeker 95, one or more of the teeth 99 will arrest the inward movement of seeker 95.

Seeker 94 is carried on supporting extensions 101 (Figs. 1 and 4) pivotally supported on a spindle 102 which is carried by a bracket 103. A spring 104, urges the seeker 94 towards the right in Fig. 1. Pivotally supported on spindle 102 is a sleeve 104′ carrying a figure control trip member 105. Sleeve 104′ suitably positions member 105 between members 101. A helical spring 106 wound around sleeve 104 with one end abutting against the lower edge of 94, and the other end thereof fastened to 105 forms a yielding connection which normally forces the upper end of 105 and the under side of 94 into engagement (Fig. 4). In a similar manner, seeker 95 is carried by supporting extensions 107 pivotally mounted on spindle 108, which in turn is secured to bracket 109. Spring 110 secured to 107, and bracket 109, throws 95 to the left in Fig. 1 against the rings. Secured to a sleeve 111 is a letters control trip 112. Sleeve 111 is rotatable on spindle 108 and suitably spaces trip 112 between members 107. A helical spring 113 is wound around sleeve 111 and normally holds the upper end of 112 and the lower surface of 95 yieldingly in engagement.

A bell crank member 114 rigidly secured to a rotatably mounted hammer control spindle 115 has one arm thereof pivotally connected to a link 116, and the other arm thereof is normally held against the lower end of member 105 by spring 117 secured to a suit-

able support 118. A bell crank 119 (Figs. 2 and 4) is rigidly secured to a pivotally mounted hammer actuating and releasing spindle 120 with one arm thereof connected to slot 121 in link 116 by means of pin 122. The end of the other arm of 119 is urged towards a shoulder 123 of member 112 by means of spring 124. Until shoulder 123 is moved out of the path of the end of arm of 119 it acts to prevent more than a slight rocking movement of member 119 as the end 119′ thereof is engaged by the ends of the teeth of cam ring 21. The connection of link 116 is such that bell crank 114 cannot move fully under the influence of spring 117 until bell crank 119 is fully released by movement of seeker 95, but bell crank 119 is free to move fully even though seeker 94 does not release bell crank 114 for complete movement. When bell crank 119 is released, the end 119′ thereof will drop fully into the notches of cam ring 21 and member 119 will be given a full rocking movement.

Spindles 115 and 120 are rotatably supported in bearings in members 10 and 11. Secured to spindle 115 is a platen stop member 125 (Figs. 1 and 10) formed with an anvil end 126 and having fastened thereto a figure hammer stop 127. On spindle 120 and rotatable therewith is secured a hammer releasing or control member 128 (Figs. 1, 2 and 11) which has secured thereto a control and restoring pin 129. A letters printing hammer 130 and a figures printing hammer 131 (Fig. 11) are pivotally mounted on sleeves 132 and 133 carried by spindle 120, and the extensions 134 and 135 of the printing hammers are held against pin 129 by means of springs 136 and 137 secured at one end to the respective hammers and at the other end to pin 138. A tape feed roller rotatably mounted on sleeves 132 and 133 is made up of a central toothed ratchet wheel 139 and end flanges 140 and acts as a spacer between arms 130 and 131. A screw 141 and washer 142 hold the hammers and roller member in assembled relation. Each of the hammers 130 and 131 have secured thereto pins 143 upon which feed pawls 144 are pivotally mounted, and held against ratchet wheel 139 by means of helical springs 145. The connections and mounting of the pawls is such that as either of the hammers is oscillated to effect printing, the pawls will be set back of a new tooth on the printing stroke, and the feed wheel will be advanced on the restoring stroke. Pivotally supported from a spindle 146 (Fig. 1) is a jockey roller arm 147 carrying a jockey roller 148, and an arm 149 carrying a tape tensioning roller 150. A helical spring 151 wound around 146 and fastened to arms 147 and 149 normally forces roller 148 between the teeth of ratchet wheel 139, and forces wheel 150 against flanges 140 to guide and tension tape 152. Platens 153 and 154 carried by hammers 130 and 131 are arranged to force tape 152 upward against the letters type 155 and the figures type 156 of type wheel 16. A suitable inking roller 156′ is provided for the type. It will of course be understood that platens of composition of rubber-like material may be used to avoid battering of the type. Hammer 130 is provided with a stop extension 157 with surfaces 158 and 159, (Figs. 1, 12 and 13) arranged to co-act with anvil 126, and hammer 131 is provided with a stop extension 160 arranged to co-act with anvil 126 and member 127. Guide pins 161 and 162 guide tape 152.

As shown in Fig. 4, in order that the teeth of cam ring 21 will restore the arm of 119 over shoulder 123, it is necessary for 119′ to extend sufficiently upward when in latched position so that the ends of the cam ring teeth engage it, causing a slight rocking movement of 119 as the ring rotates. This slight movement and the continued rubbing of the ends of the cam ring teeth on 119′ may be avoided by utilizing the arrangement shown in Fig. 14. In this form the projection 119′ is formed integrally on a forked member 163 which is pivotally secured to member 119 by means of pin 164. Extensions 165 and 166 of member 163 co-act with spindle 120 upon which 119 is mounted to limit the pivotal movement of member 163. A light spring 167 secured to extensions of 119 and 165 respectively, normally urges 165 into engagement with spindle 120. With bell crank 119 latched up as shown, the end of 119′ is held clear of the cam ring teeth. When seeker 95 trips latch 112, projection 119′ drops into engagement with the cam ring periphery, and as the cam ring rotates and member 119′ moves outward, a force is exerted which tilts member 163 upward about its pivot 164 until extension 166 engages spindle 120, and then further movement of the ring forces the end of bell crank 119 upward until caught by shoulders 123. As soon as the high point of the tooth passes the end of 119′, spring 167 will restore fork 163 to the position shown in Fig. 14 where it will again clear the cam ring 21.

General operation

As hereinbefore in detail described, motor 2 continuously drives shaft 9 upon which type wheel 16 and the flange 17 are carried at a speed above the speed of the transmitter member. The line condition is normally such that cam shaft 59 is held to the right in Fig. 3 by the line magnet, and in this position, the cam shaft is driven with the flange 17 and parts carried thereby, through member 82 and pin 57. The first condition of each code or signal combination is such as to cause the line magnet to shift the cam shaft 59 to the left in Fig. 3 and as soon as this occurs, the pin 57 drops off member 82 and is stopped due to the frictional drag of member 87 on member 68.

The timing of the speed of rotation of shaft 9 is such that surfaces 42 of selector fingers 37*a* to 37*f* are carried past their respective cams 51 to 56 in properly timed relation with respect to the incoming impulses so that the selectors will be set or remain unaffected, in accordance with the reception of a marking or spacing impulse in the proper interval. After the selectors are set in accordance with the received character, cam 58 trips the shutter ring 22 and permits the released shift and selector rings 23 to 28 to assume their actuated or selected positions. If the impulse controlling selector 37*f* is a spacing condition, pin 57 will be engaged by member 89 and shaft 59 will be driven until the last impulse of the signal is received when the cam shaft will again be moved to the right in Fig. 3, and shaft 59 will again come to rest until engaged by member 82. The cams on shaft 59 are so spaced that a relative angular rotation of 48¾° between the cams and the selector fingers is allotted to each of the first seven signal intervals, and an angle of 18¾° is allotted to the last interval, making a total of 360°. The time interval of all seven impulses is uniform, however, so that a definite time of engagement between member 82 and pin 57 will occur at the end of each signal.

Tripping of the shutter ring by cam 58 permits the selector rings to assume actuated position in accordance with the received signal. For each signal a predetermined row of notches in flange 17 and rings 22 and 24 to 28 will be aligned. If a letter is to be printed, shift ring 23 will be aligned to permit inward movement of seeker 94. If a figure or a special mark is to be printed, ring 23 will be tripped and all of the slots in flange 17, and rings 22 and 23 will be aligned. Accordingly, the rings rotate with seekers 94 and 95 engaging their respective controlling rings. If a letter is to be printed, member 105 will prevent movement of arm 114. As the aligned slots in flange 17, and in rings 22 and 24 to 28 pass under seeker 95, this seeker will move inward and move member 112 to trip arm 119. Tripping of arm 119 permits movement of projection 119′ thereof into a notch in cam ring 21 under the influence of spring 124. This movement of 119 moves pin 129 downward through spindle 120, and springs 136 and 137 will cause movement of hammers 130 and 131. As arm 114 was not tripped, members 126 and 127 will be in the position shown in Fig. 12, and extension 160 of hammer 131 will engage member 127, preventing upward movement of the platen 154. Extension 157 of hammer 130 will, however, move upward until surface 159 thereof engages anvil 126, in which position platen 153 will press tape 152 upward to effect printing of the selected letter. If ring 23 is tripped to select a figure, seeker 94 will be oscillated by movement into and out of the aligned slots, but member 114 will not move, due to connecting link 116, until seeker 95 moves into the aligned slots as above set forth, to trip 119. In this case, member 114 will move to rock spindle 115 counterclockwise and position members 126 and 127, as shown in Fig. 13. In this position, surface 158 of extension 157 will engage anvil 126 and a printing movement of platen 153 will be prevented, while hammer 131 moves upward under the influence of spring 137 and causes a printing impact of platen 154 to print the selected figure.

Owing to the fact that the unselected ones of rings 24 to 28 are positioned with the edges of slots 33 thereof engaged by member 32 as shown in Fig. 4, these unselected rings will immediately force seeker 95 outward after it has moved into the aligned notch. The drag exerted by member 119′ against the side of the notch on cam ring 21 and the drag on the released selector rings will momentarily retard or arrest the rotation of these members until member 32 on flange 17 engages the forward edges of slots 33 of the selected rings, when the cam ring, the shutter ring, and the released selector rings will again be positively driven by the flange 17. As soon as 32 engages the edge of the selector, shutter, and cam ring slots 33, fingers 37*a* to 37*g* will lock them in unactuated position and member 119′ will be cammed outward, latching members 114 and 119, as shown in Fig. 4 or Fig. 14, as the case may be. This movement of arm 119 throws pin 129 upward to restore the hammer 130 or 131 as the case may be, and to advance the tape through operation of pawl 143 or 144. The printing parts will then be restored to the position shown in Fig. 1.

It will be observed that in order to effect printing of each character, a minimum average angular rotation of 360° plus the angular drag of the rings, or more must be covered by the flange 17 and shaft 9. In the present embodiment, it will be noted that after each combination is completely set up on the selector fingers an interval equal to the difference between 48¾° and 18¾° or 30° of rotation must elapse before a new signal can be initiated, making an average of at least 390° of angular rotation of the shaft type-wheel and flange for each character if reception is continuous. The minimum possible angular rotation between printing of characters for continuous reception is the angle of drag plus one half the angle between the teeth on the cam ring. The printing of characters is irregular in timing, but will average out so that each character received is printed in a minimum possible time, and without arresting the movements of the type-wheel to print, as has been heretofore common in type-wheel systems in which distributing members are maintained in properly timed relation by utilizing special impulses to initiate and arrest the selective operations at the beginning

and end of signal cycles respectively. No blank spaces on the type-wheel are necessary to effect printing, as in the start-stop Baudot type-wheel printers heretofore in use.

It will be obvious that many modifications all within the spirit of the invention as defined in the appended claims may be made by those skilled in the art.

Having described preferred embodiments only, what is desired to be secured by Letters Patent and claimed as new is:

1. A selecting receiver responsive to received code combinations of electrical conditions comprising a normally moving member stopped in operation at the beginning of each reception of a code combination, and started in operation at the end of each code combination.

2. The combination as set forth in claim 1 together with means for starting said member into operation and arresting the operation thereof during the reception of certain of said code combinations.

3. The combination as set forth in claim 1 in which each of said code combinations is preceded by an operation initiating condition and followed by an operation arresting condition, together with means for starting said member into operation, and arresting the rotation thereof during the reception of only those code combinations in which the last selecting condition differs from the arresting condition.

4. A printing telegraph machine comprising a continuously rotating type-wheel, printing means co-acting with said type wheel to effect printing of selected characters, selecting means responsive to selective combinations of electrical conditions controlling said printing means, and means for initiating and arresting selective operation of said selecting means at the beginning and the end of each selective combination.

5. The combination as set forth in claim 4, in which each selective combination comprises a selective operation initiating condition, a plurality of selecting conditions and a selective operation arresting condition.

6. The combination as set forth in claim 4, in which said selecting means comprises a rotary member stopped in operation at the beginning of each selective operation and started in operation at the end thereof.

7. In a printing telegraph receiver, a continuously rotating type wheel, printing mechanism co-acting with said type wheel to effect printing of selected characters, and selecting means responsive to permutation code combinations of selecting conditions comprising only one electro-magnet and otherwise entirely mechanical controlling said printing means.

8. The combination as set forth in claim 7 in which said electro-magnet comprises an armature operated solely by magnetic effects.

9. In a selective mechanism, an electro-magnet, an armature for said electro-magnet operated to either of its positions solely by magnetic energy, and a plurality of selecting members selectively controlled by said armature through solely mechanical connections.

10. The combination as set forth in claim 9 in which said mechanical connections comprise a cam shaft.

11. The combination as set forth in claim 9, in which said mechanical connections comprise a cam shaft movable axially by said electro-magnet to effect selective setting of said selecting members.

12. A selecting mechanism comprising normally rotating means stopped in rotation at the beginning of each selective operation and started into operation at the end of each selective operation.

13. The combination as set forth in claim 12 together with continuously rotating selecting means coacting with said normally rotating means to effect selective operations.

14. In a selecting mechanism, a plurality of normally rotating relatively movable notched selector rings, and means selectively responsive to combinations of electrical conditions for causing selective alignment of the notches in said rings to effect differing selective operations.

15. The combinations as set forth in claim 14 in which said last mentioned means comprises a selector finger individual to and controlling each of said selecting rings.

16. The combination as set forth in claim 14 in which said last mentioned means comprise selector fingers individual to and controlling each of said selecting rings, and said rotating rings are movable into actuated position by springs and held in unactuated position by the selector fingers individual thereto.

17. The combination as set forth in claim 14 in which said last mentioned means comprise selector fingers individual to and controlling each of said selector rings, and said selector rings are movable into actuated position by springs and held in unactuated position by the selector fingers individual thereto; together with a latch individual to each selector finger.

18. The combination as set forth in claim 14 in which said last mentioned means comprise selector fingers individual to and controlling each of said selector rings, and said selector rings are movable into actuated position by springs and held in unactuated position by the selector fingers individual thereto, together with a latch individual to each selector finger, and means for setting said fingers in accordance with the received signals, and for restoring said fingers; said fingers and latches normally rotatable with said rings.

19. The combination as set forth in claim 14 in which said last mentioned means comprise selector fingers individual to and controlling each of said selector rings, and said selector rings are movable into actuated position by springs and held in unactuated position by the selector fingers individual thereto, together with a latch individual to each selector finger, and a shaft with a cam individual to each selector finger for setting said fingers in accordance with the received signals, and for restoring said latches.

20. The combination as set forth in claim 14 in which said last mentioned means comprise selector fingers individual to and controlling each of said selector rings and said selector rings are movable into actuated position by springs and held in unactuated position by the selector fingers individual thereto; together with a latch individual to each selector finger, means for setting said fingers successively and means for causing simultaneous movement of said rings to said actuated position.

21. The combination as set forth in claim 14, in which said last mentioned means comprises selector fingers individual to and controlling each of said selecting rings, and said fingers are arranged to be reset in accordance with the preceding selection.

22. A selective mechanism comprising a plurality of relatively movable notched rings, means responsive to successively received combinations of conditions for predetermining the position of said rings, and means for causing selected ones of said rings to simultaneously assume actuated position.

23. In a telegraph printer, a type wheel, a plurality of rows of characters on said type wheel, means responsive to predetermined combinations of marking and spacing electrical conditions for determining the printing position of said type wheel, and means responsive to a predetermined condition for selecting the character of those in printing position that is to be printed.

24. The combination as set forth in claim 23 in which said first mentioned means comprises a plurality of notched selector members positioned to align a series of notches in a manner to select the printing position of said type wheel.

25. The combination as set forth in claim 23 in which said first mentioned means comprises a plurality of notched selector members positioned to align a series of notches together with a single seeker coacting with said aligned notches so as to determine the printing position of said type wheel.

26. The combination as set forth in claim 23 in which said last mentioned means comprises a notched member and a seeker coacting.

27. In a telegraph printer, a type wheel with a plurality of rows of characters, an independently movable printing platen individual to each row of characters, and code operated selecting means controlling said platens to effect printing of selected characters.

28. The combination as set forth in claim 27 in which said selecting means comprises means for determining which of said platens is to be actuated and means for determining the position of said type wheel when said predetermined platen is to be actuated.

29. In a telegraph printer, a type wheel, a printing hammer co-acting with said type wheel, a cam ring comprising a cam surface individual to each printing position of said type wheel, and means actuated by said cam ring for controlling said printing hammer.

30. The combination as set forth in claim 29 together with selecting means controlling the operation of said last mentioned means to time the operation of said printing hammer.

31. The combination as set forth in claim 29 together with selecting means controlling the operation of said last mentioned means to time the operation of said printing hammer, and in which said last mentioned means effects restoration of said selecting means after a printing stroke of said hammer.

32. The combination as set forth in claim 29 in which said last mentioned means stores energy in a spring to affect a printing stroke of said hammer.

33. The combination as set forth in claim 29 together with selecting means controlling the operation of said last mentioned means to time the operation of said printing hammer, and in which said last mentioned means stores energy in a printing spring to actuate said hammer on a succeeding printing stroke during the restoration of said selecting means.

34. The combination as set forth in claim 27 together with paper feeding means actuated by the operation of either printing platen.

35. In a telegraph receiver, means responsive to received combinations of electrical conditions comprising a plurality of cam members, and a shaft carrying said cam members, said cam members being responsive to received code combinations of impulses while said shaft is maintained in non-rotative condition.

36. In a telegraph receiver, a plurality of selector members arranged to be rotated, and means for sequentially operating said selector members in accordance with received code combinations of impulses, while said members are held from rotation.

37. In a selecting receiver, a plurality of rotatable selector members; and rotatable means adapted to operate said members in accordance with received code combinations of signalling conditions while said rotatable means is being held from rotation.

38. In a telegraph receiver, a rotary selector arranged to be held from rotation while operating in response to received code combinations of impulses, a continuously rotating type-wheel, and a selector member sequentially operated in accordance with the operation of the rotary selector for selecting a predetermined character on said type-wheel for operation, said selector member being arranged to rotate with said type wheel.

39. In a printing receiver rotatable selector means arranged to operate in response to received code combinations of impulses, selector members arranged to be operated by said rotatable selector means in accordance with the operations thereof by said code combinations of impulses and a type wheel rotatable with said selector members, said selector members selecting one of said type characters on said type wheel for operation.

40. In a telegraph receiver, a rotatable cam shaft, a plurality of cam members arranged about said shaft, rotatable selector members, one for each of said cam members, means for sequentially associating said members with their associated cam members as said members are rotated, means for operating said shaft in accordance with received code combinations of impulses for positioning said members, a type wheel, and means responsive to a predetermined positioning of said members for selecting one of said type characters on said type wheel.

41. In a telegraph receiver, a plurality of rotatable selector members, a rotatable type wheel, said members and said type wheel being arranged to rotate continuously, means for positioning said members in accordance with code combinations of impulses as said members are rotated, and means controlled when said members are positioned for operating one of said type characters on said type wheel.

42. In a telegraph receiver, a plurality of rotatable selectors arranged to be rotated continuously, a plurality of continuously rotatable type characters, means for operating said selectors in accordance with received code combinations of impulses as said selectors rotate and means responsive to a predetermined combination of operation of said selectors for selecting one of said type characters.

43. In a telegraph system, a receiver responsive to received code combinations of impulses comprising a plurality of selectors, and rotatable means for distributing said received code combinations of impulses to said selectors, said distributing means being arranged to be maintained stationary while distributing said impulses.

44. In a telegraph receiver, a plurality of members arranged to operate by received code combinations of impulses, a distributing means for distributing said impulses to said receiving means, said distributing means being arranged to be held stationary during the period of the receipt of the code combinations of impulses.

45. In a telegraph receiver, a plurality of members arranged to be operated by received code combinations of impulses, a distributing means for distributing said impulses to said receiving means, said distributing means being held fixed during the receipt of the combinations of impulses and started into rotation at the end of the code combination of impulses.

46. In a telegraph receiver, a plurality of members arranged to be operated by received code combinations of impulses, a distributing means for distributing said impulses to said receiving means, said distributing means stopped during the period of receipt of a code combination and starting at the end of the code combination.

47. In a telegraph receiver, a continuously rotating type wheel, and continuously rotating selector members responsive to received code combinations of impulses for selecting predetermined characters of said typewheel for operation.

48. In a telegraph receiver, a cam shaft comprising a plurality of cam fingers arranged about said cam shaft, a plurality of selector members one for each of said fingers, means for operating said shaft in accordance with received code combinations of impulses while said shaft is maintained stationary, said selector members being arranged to be operated in accordance with the operation of said shaft, and a continuously rotating type wheel selectively operated in accordance with the operation of said selectors.

49. In a telegraph receiver, a cam shaft comprising a plurality of cam fingers arranged about said shaft, a plurality of rotatable selector members, one for each of said fingers, means for operating said shaft in accordance with received code combinations of impulses while said shaft is maintained stationary, said rotatable selector members being arranged to be operated in accordance with the operation of said shaft, and a continuously rotating type wheel selectively operated in accordance with the operation of said selectors.

50. In a telegraph receiver, a continuously rotating type wheel, a selector shaft arranged to be stopped during the reception of received code combinations of impulses, means for operating said shaft in accordance with said code combinations of impulses, said shaft being arranged to be started into operation at the end of the receipt of the code combination of impulses and means responsive to the operation of said shaft in accordance

with the code combinations of impulses for selectively operating said type wheel.

51. In a printing telegraph receiver, a constantly rotating type wheel and constantly rotating selector mechanism responsive to received code combinations of impulses for selectively causing the printing of one of the characters on said type wheel.

52. In a printing telegraph receiver, a constantly rotating type wheel, constantly rotating selector mechanism and a single electro-magnet responsive to received code combinations of impulses for selectively operating said selector mechanism to select one of said type characters for operation.

53. In a selecting mechanism, a plurality of continuously rotating relatively movable selector rings, a selector finger individual to each of said selector rings responsive to received code combinations of impulses for operating said selector rings, said rings being arranged to be held in actuated position by springs and in non-actuated position by said selector fingers.

54. In a selecting mechanism, a plurality of continuously rotating relatively movable selector rings, a selector finger individual to each of said selector rings responsive to received code combinations of impulses for operating said selector rings, said rings being arranged to be held in actuated position by springs and in non-actuated position by said selector fingers, and a latch device individual to each of said selector fingers for latching the actuated fingers.

55. In a telegraph printer, a typewheel having a plurality of rows of characters, selecting mechanism responsive to code combinations of impulse conditions arranged on said printer for selecting characters on said typewheel in accordance with said code combinations and means responsive to a predetermined impulse condition for selecting one of said selected characters on one of said rows of characters for printing operation.

56. In a telegraph printer, a typewheel, a plurality of rows of characters on said typewheel, selecting mechanism on said printer responsive to combinations of marking and spacing electrical conditions for selecting a character on each of said rows of characters for printing and means responsive to a predetermined impulse condition for selecting a character of those already selected to be printed.

57. In a telegraph printer, a typewheel, a plurality of rows of characters on said typewheel, selector mechanism on said printer responsive to code combinations of marking and spacing impulse conditions for selecting a character on each of said type rows for operation and means responsive to an impulse condition received in addition to said code combination of impulse conditions for selecting one of said selected characters for printing.

58. In a type wheel telegraph printer, a plurality of groups of characters, selector mechanism on said printer responsive to code combinations of marking and spacing impulse conditions for simultaneously selecting a character in each of said groups for operation and means invariably responsive to one of the said impulses of said code combinations for selecting one of the said selected characters for printing.

59. In a telegraph printer, a typewheel, selecting mechanism on said printer invariably responsive to certain impulse conditions of received code combinations of impulse conditions for selecting a plurality of characters for printing, one of said selected characters being arranged in normal position and another being arranged in offset position and means responsive to a predetermined impulse condition of said code combination other than said certain impulse conditions for determining whether said printer will print in normal or offset position.

60. In a telegraph printer, a typewheel arranged to print in normal and offset position, selector mechanism on said printer responsive to code combinations of impulse conditions for variably operating said typewheel to printing position and means responsive to a predetermined impulse condition for selectively operating said typewheel to print the selected character in either normal or offset position.

61. In a telegraph printer, a typewheel having characters arranged to print in normal position and other characters arranged to print in offset position, selector mechanism on said printer responsive to code combinations of impulse conditions for conditioning a character in normal and offset position for printing and means responsive to a predetermined impulse condition selecting one of said conditioned characters for printing.

62. In a telegraph printer, a typewheel having a plurality of rows of characters, one of said rows being arranged to print in normal position and another in offset position with respect to said first row, selecting mechanism on said printer responsive to marking and spacing impulse conditions for selecting a character on each of said rows for printing, means responsive to an impulse condition allotted to said code combination for selecting one of the said selected characters in one of said rows whereby a character either in normal or offset position is printed.

63. In a telegraph printer, a typewheel, a plurality of rows of characters on said typewheel arranged in offset relation with respect to each other, selecting mechanism on said printer responsive to predetermined ones of code combinations of impulse conditions for selecting a character on each of said type

rows and means responsive to a predetermined one of said code combinations of impulse conditions for selecting one of said selected characters of said rows for printing operation whereby characters are printed in offset relation with respect to each other.

64. In a telegraph printer, a typewheel, a plurality of rows of characters on said typewheel arranged in offset relation with respect to each other, selecting mechanism on said printer comprising a plurality of notched selector disks positioned in accordance with received code combinations of impulse conditions to align a series of notches in a manner to select a character on each of said rows and means responsive to a predetermined impulse condition allotted to the code combinations for selecting one of said selected characters for printing.

65. In a telegraph printer, a typewheel, a plurality of rows of characters on said typewheel arranged in offset relation with respect to each other, selector mechanism comprising a plurality of notched selector members positioned in accordance with received code combinations of impulse conditions to align a series of notches, a single seeker co-acting with said aligned notches to determine the selecting position of said typewheel for conditioning a character in each row for printing and means responsive to an impulse condition allotted to each code combination for selecting one of said conditioned characters for printing.

66. In a telegraph printer, a plurality of groups of characters, selecting mechanism on said printer comprising a plurality of notched selector disks, selector fingers individual to and controlling each of said selector disks to unactuated position, spring means for moving said disks to actuated position in accordance with received code combinations of impulse conditions to align a series of notches thereon for conditioning a character on each of said groups and means responsive to an impulse condition allotted to each code combination for printing one of said conditioned characters.

67. In a telegraph printer, a plurality of rows of characters, selecting mechanism on said printer comprising a plurality of notched selector disks, selector fingers individual to and controlling each of said selector disks for normally holding said disks in unactuated position, spring means for moving said selector disks into actuated positions in accordance with received code combinations of impulse conditions, a latch individual to each selector finger, a shaft having a cam individual to each selector finger for setting said finger in accordance with the received code combinations of impulse conditions whereby said springs operate said disks, said cams thereafter restoring said latches, said disks when in actuated position aligning a row of said notches for conditioning a character in each group for printing and means responsive to an impulse condition allotted to each code combination for printing one of said selected characters.

68. In a telegraph printer, a typewheel, a plurality of rows of characters, an independently movable platen individual to each row of characters, selecting mechanism on said printer responsive to predetermined ones of received code combinations of impulse conditions for selecting a character on each of said type rows and means responsive to a predetermined one of said code combinations of impulse conditions for selecting one of said platens to print a selected character in one of said rows whereby characters are printed in offset relation with respect to each other.

69. In a recorder, a plurality of rows of characters, an independently movable printing platen individual to each row of characters, selector mechanism responsive to code combinations of impulse conditions for selecting one of said characters in each row for recording and means responsive to an impulse condition allotted to each code combination for controlling said platens to effect printing of one of said selected characters.

70. In a recorder, a plurality of rows of characters, an independently movable printing platen individual to each row of characters, selector disks responsive to code combinations of impulse conditions for selecting a character in each of said rows for printing and means responsive to an impulse condition allotted to each group for operating one of said platens to effect printing of one of said selected characters.

71. In a telegraph recorder, a plurality of rows of characters, a printing hammer individual to each row of characters, selecting mechanism responsive to code combinations of impulse conditions for selecting a character on each row for printing and means responsive to an impulse condition allotted to each group for operating one of said hammers to effect the printing of a selected character.

72. In combination, a recorder, a plurality of rows of characters, a printing platen individual to each row of characters, permutation means responsive to a uniform code combination of impulse conditions for conditioning a character on each of said rows for printing, a common operating means for all of said platens and means for selecting one of said platens to print the character on the associated row which has been conditioned for printing.

73. In combination, a recorder, a typewheel having a plurality of rows of characters, a plurality of hammers, one corresponding to each row of characters, a common operating means for all hammers, means to select a hammer to be operated and permutation mechanism responsive to a uniform code combina-

tion, said mechanism being associated with said recorder for controlling all of said operations.

74. A telegraphic printer comprising a typewheel and a permutation code selecting mechanism in operative relation with said printer, and operable by line signals in groups of five for selecting the printing position of two characters on said typewheel, said selecting mechanism being controlled by an additional line signal transmitted with the first group of five signals for selecting one of the two characters for printing.

75. In a telegraph recorder, a series of characters to be recorded, said characters being arranged on a typewheel, permutation code mechanism comprising six elements in mechanical relation with said recorder means controlled by five of said elements for simultaneously bringing two characters on said type wheel to printing position and means controlled by the sixth element to determine the character to be printed.

76. In combination a recorder, a typewheel comprising a plurality of rows of characters, an electric motor, means to rotate the type wheel by power derived from said motor to bring a plurality of characters successively to the printing position, one character on each of said rows being simultaneously brought into printing position, permutation mechanism in mechanical relation with said recorder and responsive to uniform code combinations of impulse conditions for selectively controlling the application of power from said motor to said typewheel whereby said character on each of said rows is selected for printing, a platen for each row of characters, operating means common to all of the platens and deriving power from said motor and means to select a platen for printing operation.

77. In combination a recorder, a typewheel having a plurality of rows of characters, an electric motor, means to rotate the typewheel by power derived from said motor to bring a plurality of characters one on each of said rows successively and simultaneously to the printing position, permutation mechanism for variably controlling the application of power from said motor to said typewheel, said permutation mechanism operating in response to uniform code combinations of impulse conditions for selecting a character on each of said rows for printing, a platen for each row of characters, operating means common to all of said platens and deriving power from said motor, means to select a platen to be operated, and means to operate the platen selecting means and subsequently to operate the platen operating means.

78. In a telegraph printer comprising a plurality of rows of typewheel characters and permutation mechanism therefor, responsive to uniform code combinations of impulse conditions for selecting a character on each of said rows for printing, an independently movable platen individual to each row of characters and selecting means for selecting one of said platens to print one of said selected characters in one of said rows.

79. In a telegraph printer comprising a plurality of rows of type characters arranged to print characters in offset relation with respect to each other, selecting mechanism responsive to uniform code combinations of impulse conditions, means controlled by said selecting mechanism in accordance with the operation thereof by received code combinations of impulse conditions for selecting a character on each of said rows for printing, an independently movable platen individual to each row of characters and means for selectively operating one of said platens to print a selected character in one of said rows whereby the characters are printed in offset relation with respect to each other.

80. In a recorder, a plurality of rows of characters, an independently movable printing platen individual to each row of characters, selector mechanism for said recorder responsive to uniform code combinations of impulse conditions for selecting one of said characters in each row for recording and means selectively operated in accordance with the code combination of impulse conditions received for selecting one of said platens to effect the printing of one of said selected characters in one of said rows.

81. In a recorder; a typewheel having a plurality of rows of characters; a plurality of printing hammers each corresponding to a row of characters; a permutation code selecting device; a motor; means to rotate the typewheel by power derived from said motor; means to determine the printing position of said typewheel under the control of said permutation device; means also controlled by said permutation device to select one of said hammers; and means to operate the selected hammer by power derived from said motor for recording a character from one of said rows of characters in accordance with the printing position of the typewheel and hammer selected.

82. In a recorder; a band of record receiving material; a typewheel having a plurality of rows of characters; a plurality of print hammers, one of said hammers being adapted to make a series of impressions from one of said rows of characters adjacent to one edge of said band; another of said hammers being adapted to make a series of impressions from another row of said characters adjacent to the other margin; a permutation code selector; means controlled by said selector to select the character to be recorded and the hammer to be operated; and means for supplying power to operate the selected ham-

mer and to move the selected character to printing position.

83. In a recorder; a typewheel having a plurality of rows of characters; a plurality of printing hammers each corresponding to a row of characters; a permutation code selecting device; a motor; means to rotate the typewheel by power derived from said motor; means controlled by part of said selecting device for determining the printing position of said typewheel; means controlled by another part of said selecting device to select one of said hammers and means to operate the selected hammer by power derived from said motor for recording characters from one of said rows of characters.

84. In a recorder; a band of record receiving material; a typewheel having a plurality of rows of characters; a plurality of print hammers, one of said hammers being adapted to make a series of impressions from one of said rows of characters adjacent to one edge of said band; another of said hammers being adapted to make a series of impressions from another row of said characters adjacent to the other margin; a permutation code selector; means controlled by said selector in accordance with received impulse conditions to select the character to be recorded and in accordance with a further impulse to select the hammer to be operated; and means for supplying the power to operate the selected hammer and to move the selected character to printing position.

85. In a recorder; a typewheel having a plurality of rows of characters; a printing platen for each row of characters; a permutation code selecting device; a motor; means to rotate the typewheel by power derived from said motor; means controlled by said selecting device in accordance with received impulse conditions for selecting a printing position of said wheel; means controlled by said selecting device in accordance with an impulse condition other than the first mentioned impulse conditions for selecting one of said hammers; and means to operate the selected hammer by power derived from said motor for recording characters from one of said rows of characters.

86. In a recorder; a plurality of groups of characters; selector mechanism; a polar magnet responsive to code combinations of signalling conditions for operating said selector mechanism; means controlled by said selector mechanism for selecting a character in each of said groups for operation; and means responsive to a control condition accompanying each code combination for causing printing of one of said selected characters.

87. In a printing recorder; a type wheel; a plurality of rows of characters on said type wheel; selector mechanism; a polar magnet responsive to code combinations of impulses of opposite polarity; said magnet being arranged to operate said selector mechanism in one direction in response to impulses of one polarity and in an opposite direction in response to impulses of opposite polarity; means controlled by said selector mechanism for simultaneously selecting a character in each row for printing; and means responsive to a control condition accompanying each code combination of impulse conditions for effecting printing of only one of said selected characters.

88. In a telegraph printer; a plurality of groups of characters; a tape; means whereby the characters in each group are printed on said tape in offset relation with respect to the characters of another group; a permutation selector mechanism controlling said means; and a polar magnet responsive to code combinations of marking and spacing impulses of opposite polarity for variably operating said selector mechanism.

89. In a telegraph printer; a plurality of groups of characters; a tape; means whereby the characters in each group are printed on said tape in offset relation with respect to characters in the other groups; a polar magnet responsive to code combinations of marking and spacing impulses of opposite polarity; a selector mechanism selectively operated by said magnet; means controlled by said selector mechanism for selecting a character in each group to be printed; and means responsive to an impulse accompanying each code combination for effecting printing of only one of said selected characters.

90. In a telegraphic receiving apparatus, a series of independently movable fingers; finger setter means; means for moving said finger setter means with respect to said fingers; a polar magnet responsive to received code combinations of impulses of opposite polarities; means under the control of said magnet whereby said finger setter means is actuated to set selectively said fingers in accordance with the received combination impulses; and recording means controlled in accordance with the relative setting of the series of said fingers.

91. In a selecting mechanism; a magnet energized in accordance with received code combinations of impulse conditions; and a selector member mechanically connected to said magnet whereby in response to current flowing in one direction in said magnet said selector member is operated in one direction, and in response to current flowing in the opposite direction in said magnet said selector member is operated in the opposite direction.

92. In a recorder, a plurality of groups of characters; a magnet energized in accordance with received code combinations of impulses of opposite polarity; a selector member mechanically connected to said magnet whereby in response to current flowing in one direction in said magnet said member is operated

in one direction and in response to current flowing in the opposite direction in said magnet said selector member is operated in the opposite direction; a plurality of permutation members selectively set by said member to select said characters; and means controlled by said selector member to determine the group from which a selected character is to be printed.

93. In a printing telegraph receiver, a selector, a rotating device, a magnet energized in accordance with received code combinations of impulses of reversed polarity for selectively operating said rotating device; one direction of current flowing through said magnet acting to operate the rotating device in one direction, and the opposite direction of current flowing through said magnet acting to operate the rotating device in the opposite direction.

94. In a telegraph receiver; a type wheel structure provided with a plurality of groups of characters; a first set of selectors responsive to received code combinations of impulse conditions; a second set of selectors operated by said first selectors for selecting a character in each of said groups for printing; printing mechanism for said type wheel structure; and means for selectively operating said printing mechanism to effect printing of a selected character from one of said groups.

95. In a telegraph receiver; a type wheel structure comprising a plurality of groups of characters; a first set of selectors responsive to received code combinations of signalling conditions; a second set of selectors operated by said first set of selectors for selecting a character in each of said groups; printing mechanism; a record tape; and means for operating said printing mechanism to effect printing of selected characters from said groups in offset relation with respect to each other.

96. In a telegraph receiver; a type wheel structure comprising a plurality of groups of characters; printing mechanism; spring actuating means for said printing mechanism; a first set of selectors responsive to a received code combination of signalling conditions; a second set of selectors successively controlled by said first selectors for selecting a character in each of said groups; means for tensioning said spring actuating means; and means for selectively causing said spring actuating means to operate said printing mechanism to record a selected character from only one of said groups.

97. In a telegraph receiver; a type wheel structure comprising a plurality of groups of characters; a plurality of printing hammers for said type wheel structure; spring actuating means for said printing hammers; a first set of selectors responsive to received code combinations of signalling conditions; a second set of selectors successively controlled by said first selectors for simultaneously selecting a character in each group; means whereby said spring actuating means is tensioned for operating said printing hammers; and means for selectively permitting said spring actuating means to operate said printing hammers to print a character from one or the other of said groups.

98. In a telegraph receiver; a plurality of groups of characters; printing means; a first set of selectors responsive to a received code combination of signalling conditions; a second set of selectors successively controlled by said first selectors for selecting a character in each of said groups; spring actuating means for said printing means; means whereby said spring actuating means are tensioned for operating said printing means; and means responsive to a condition accompanying each code combination of signalling conditions operative to cause said spring actuating means to selectively print the characters from said groups in offset relation with respect to each other.

99. In a telegraph printer, a constantly rotating typewheel; a member rotating in constant phase relationship with said typewheel; means to mechanically operate said member at different angular positions in its travel; and means to record under control of said member a character corresponding to the angular position at which said member is operated.

100. In a printing telegraph recorder, a signal receiving selector operable in cycles; a rotatable typewheel; and means to record from said typewheel under the control of said signals independently of the phase relationship between said typewheel and the cyclic operation of said selector.

101. In a printing telegraph receiver, a constantly rotating typewheel; and means to selectively receive and record characters from said typewheel corresponding to code signals, independently of the position of the typewheel at the beginning of the receipt of the code signals.

102. In a printing telegraph receiver, a constantly rotating typewheel; recording means cooperating with said typewheel; selector mechanism controlling said recording means in response to received groups of signalling condition and started into selective operation by the first condition of each group; said recording mechanism being operative to effect recording of selected characters regardless of the phase position of the selected character on said typewheel when the start condition of the corresponding group is received.

103. In a telegraph receiver, a rotary selecting device variably responsive to received groups of signalling conditions, each group comprising a start condition followed by a plurality of selecting conditions; and means

to start said device into selective action upon receipt of each start condition at any phase position of said device.

104. In a telegraph printer, a typewheel; means to rotate said typewheel continuously; means operating at random intervals to select a character to be recorded, and means to record the corresponding character from said wheel.

105. In a printing telegraph receiver, a single magnet, selecting mechanism responsive to received groups of signalling conditions rendered operative for selective purposes by the first condition of each group and rendered inoperative for selective purposes at the end of each group; a continuously rotating typewheel; and means under the control of said selecting mechanism to record characters from said typewheel in accordance with the groups of conditions received.

106. In a telegraph printer, a selecting device started into selective operation at the beginning of each signal and operated variably thereafter according to the signal received and automatically stopped in selective operation at the end of each signal; a constantly rotating character wheel; and means controlled by said selecting device to record from said wheel characters corresponding to the signals received.

107. In a telegraph printer, a series of elements, a single magnet, solely mechanical means interposed between said magnet and said elements controlled by said magnet adapted to set said elements in varying permutations; a constantly rotating typewheel; and means to record from said typewheel the character corresponding to the setting of said elements.

108. In a telegraph printer, a series of selective elements; a single distributing control device adapted to mechanically control the setting of said elements in varying permutations in accordance with received signals; and constantly rotating typewheel; and means to record characters from said typewheel in accordance with the permutation settings of said elements.

109. In a telegraph receiver selectively responsive to received code signals; a receiving selector started into selective operation preceding the receipt of each code signal, and arrested in operation after reception of each code signal; a constantly rotating typewheel; and means to record from said typewheel under the control of said selector.

110. In a printing recorder; character carrying means; signal controlled selecting means; character selecting means operated by said signal controlled selecting means; and means controlled by said character selecting means and cooperating with said character carrying means to effect printing of selected characters; all of said means being mounted for operation upon a common axis.

111. In a printing device; character carrying means; signal controlled selecting means; character selecting means controlled by said second mentioned means; a printing mechanism controlled by said third mentioned means and coacting with said first mentioned means to effect recording of selected characters; and power driven function operating shafts for said means operating about a common axis.

112. In a telegraph printer, a typewheel, a series of code discs rotatable with said typewheel, means to produce rotative motion between each of said discs and said typewheel and means to record from said typewheel a character selected according to the rotative position of said discs with respect to said typewheel.

113. In a telegraph printer, a typewheel, a series of code discs rotatable with said typewheel, means to produce rotative motion between said discs and means to record from said typewheel a character selected according to the rotative position of said discs with respect to each other.

In testimony whereof I affix my signature.

EDWARD E. KLEINSCHMIDT.