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PRINTING TELEGRAPH APPARATUS

Filed June 9, 1941

3 Sheets-Sheet 1

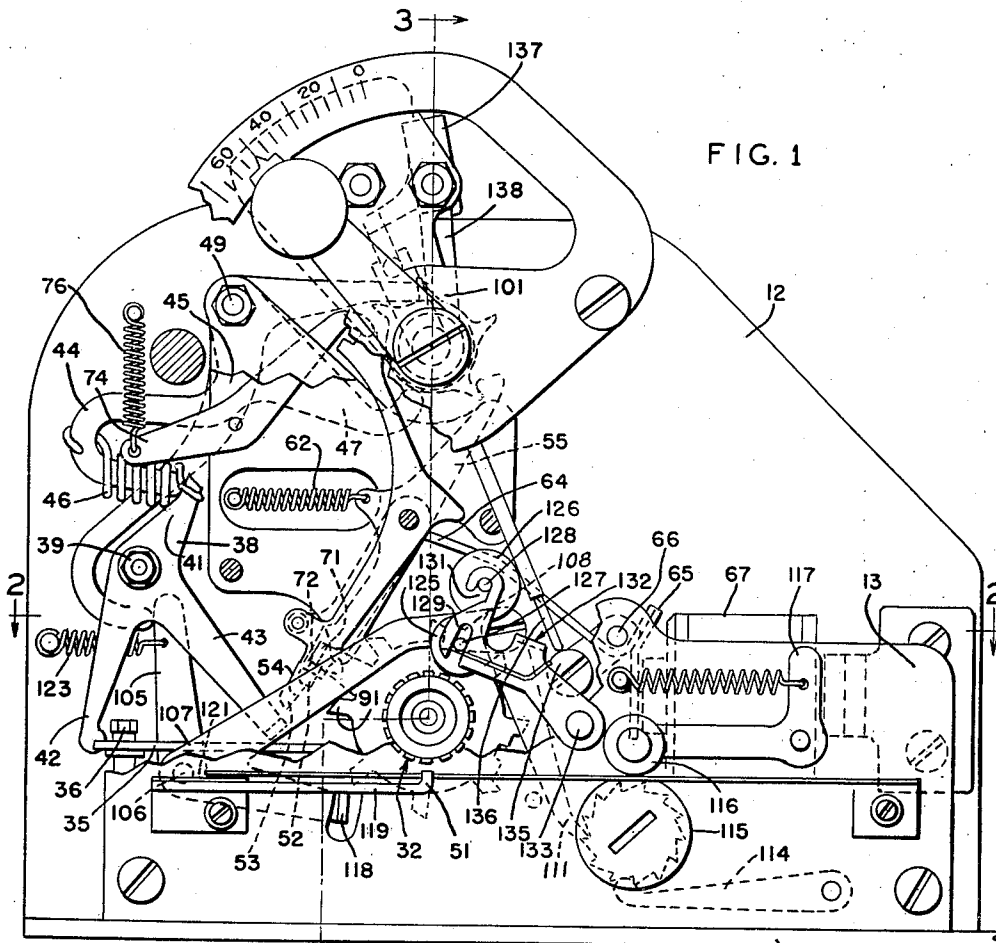


FIG. 1

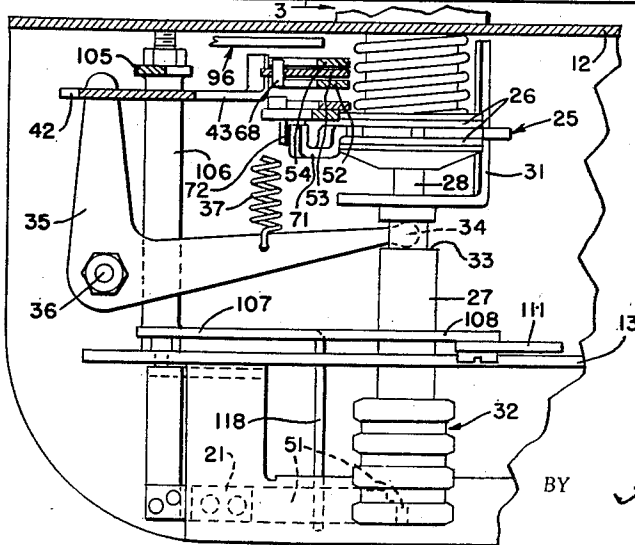


FIG. 2

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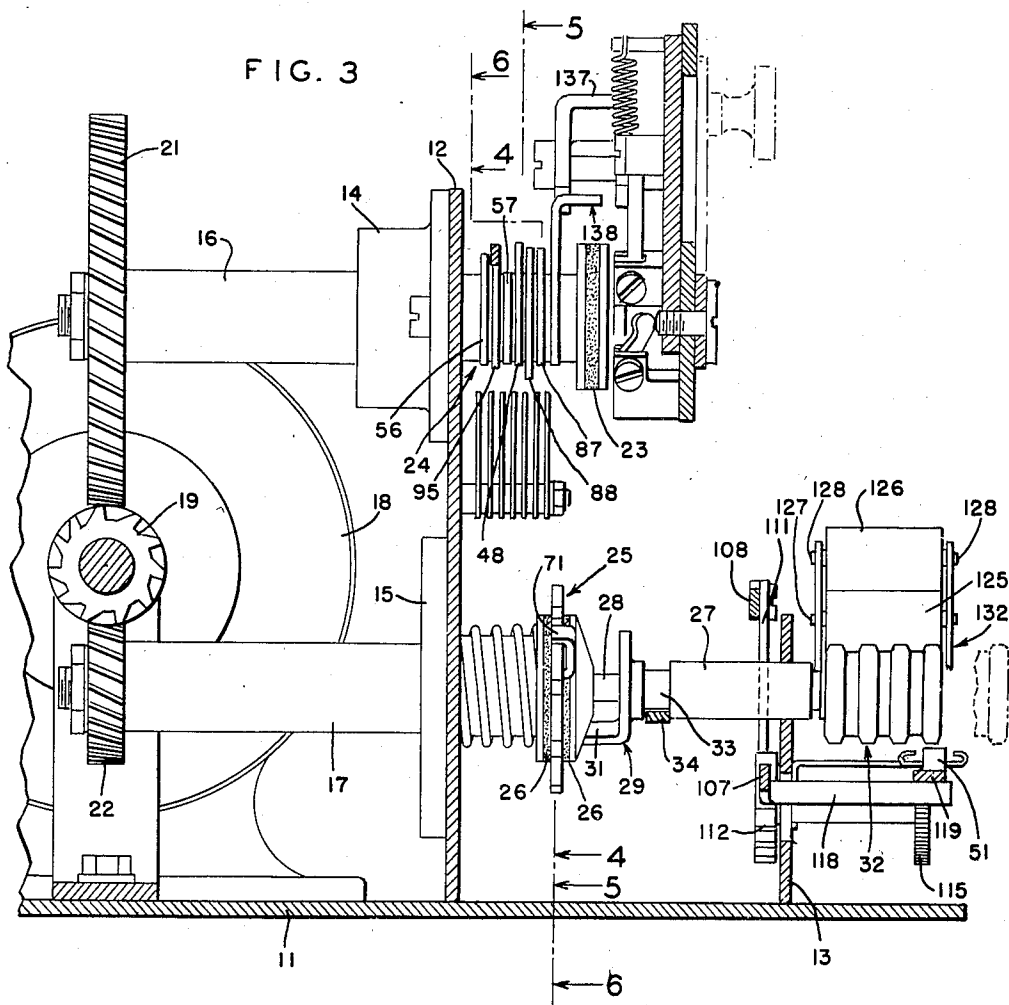
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3 Sheets-Sheet 2

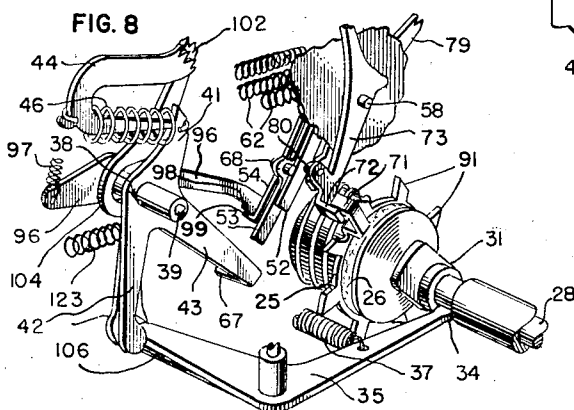
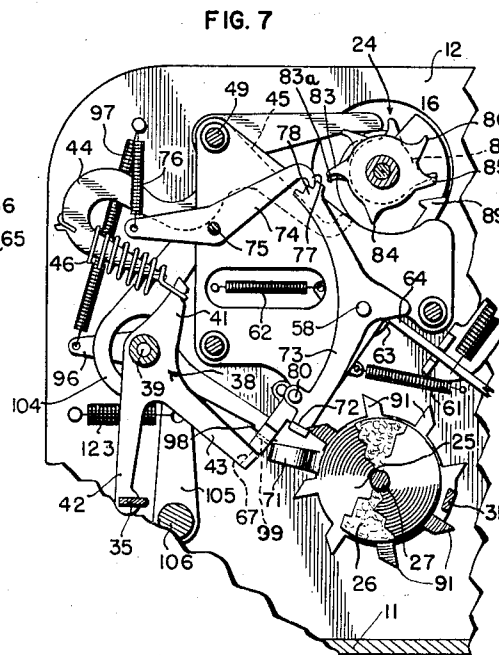


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2,333,318

PRINTING TELEGRAPH APPARATUS

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Application June 9, 1941, Serial No. 397,179

15 Claims. (Cl. 178—34)

This invention relates to printing telegraph apparatus and more particularly to type wheel printers having a plurality of rows of type characters and apparatus for selectively positioning said type wheel rotationally and longitudinally.

A principal object of the present invention is to provide an automatic telegraph printer of simplified construction which may be operated at the speed of standard permutation code printers but which may be manufactured at lower cost, and has a minimum number of operating parts.

Towards this end the preferred embodiment includes two principal operating shafts, one of these shafts carries all of the control or supervisory elements of the printer including a distributor cam and the principal function operation cams, while the other of said shafts carries an escapement wheel which establishes the rotary position of the type wheel in accordance with the received signal impulses. Both of said principal operating shafts are driven by a common motor shaft whose speed is regulated by the conventional synchronizing devices while the operating elements carried by said shafts are frictionally driven through auxiliary driving connections.

The type wheel consists of four cylindrical type sections secured upon a supporting shaft coaxial with said escapement shaft. Through a lever train under the supervision of the cam shaft, the type wheel shaft is moved longitudinally with respect to its coaxially disposed escapement shaft into any one of four positions, in each of which one of the sections of type characters is brought into alignment with a common printing platen. The extent to which the type wheel shifting apparatus is enabled to move the type wheel following each restoration, is determined by an arm associated with one of the levers in said train which may be intercepted in its travel by any of four blocking shoulders. Two selectable elements responsive to two of the five permutation code components of each signal determine which of the four shoulders is interposed in the path of said arm and accordingly, into which of the four positions the type wheel is moved.

A secondary selecting mechanism consisting of a lever which is actuated by a number of cam projections carried upon the cam shaft and a latch lever which is also actuated by a cam carried by the cam shaft but which effects the holding of the first lever in either of its set positions, serves to regulate the angular placement of the

escapement wheel which as has been said, is frictionally driven from the common motor. The escapement wheel has eight projections which individually and/or combinedly may be intercepted by an extremity of said lever that may be withdrawn or presented into the path of the teeth of said wheel at predetermined time intervals during a cycle. Combinations of said interception operations determine the total extent of rotation and accordingly the ultimate position of the type wheel.

The afore-described train of levers which function to move the type wheel longitudinally and the just described selector mechanism which functions to establish the angular rotation of the type wheel, both perform from a zero starting point and serve concurrently to determine one of said four rotary type wheel sections and also one of the longitudinal rows. The two selective positionings are established concurrently and also within the same cycle during which a code combination signal is received for determining the character to be printed, there is exercised the actuating impulse for completing the printing operation. Thus, there is obtained in the instant apparatus a complete selection and operation of a telegraph printing device within the time interval corresponding to its associated character selecting signal.

For a more comprehensive understanding of the present invention reference may be had to the accompanying drawings and to the detailed description following hereinafter wherein identical reference characters designate corresponding parts throughout and wherein:

Fig. 1 is a front elevational view of a printing telegraph apparatus with certain portions broken away and having embodied therein the features of the present invention;

Fig. 2 is a fragmentary plan sectional view of the apparatus revealing the type wheel case shifting lever and operating mechanism taken substantially along the line 2—2 of Fig. 1 in the direction of the arrows;

Fig. 3 is a transverse sectional view taken approximately on line 3—3 of Fig. 1 in the direction indicated by the arrows;

Fig. 4 is a sectional detailed view of a portion of the operating mechanism as featured in Fig. 1 illustrating apparatus approximately on line 4—4 of Fig. 3;

Fig. 5 is a transverse sectional view generally similar to the illustration in Fig. 4 but taken approximately on line 5—5 of Fig. 3;

Fig. 6 is a transverse sectional view taken approximately on line 6—6 of Fig. 3;

Fig. 7 is a detail view of the apparatus as illustrated in Fig. 4 but in a different condition of operation; and

Fig. 8 is a perspective detail view of the longitudinal type wheel shift selecting levers and auxiliary mechanism.

Referring now more particularly to the drawings, the reference character 11 denotes a base plate on which is supported in vertical position a principal wall 12 and an auxiliary supporting wall 13. Attached to the principal supporting wall 12 are a pair of box journals 14 and 15, the former carrying the driving portion of the cam shaft 16 as best indicated in Fig. 3 and the latter carrying the corresponding portion of the escapement shaft 17.

Rotary power is supplied by an electric motor 18 upon whose armature shaft there is the driving worm 19 which meshes with both the driven wheels 21 and 22. From the indicated arrangement it will be understood that the shafts 16 and 17 are driven in relatively opposite direction which, as indicated in Figs. 4 to 7, is clockwise for shaft 16 and counterclockwise for shaft 17. Within the box journal 14 there is contained a friction disc which in cooperation with the friction disc 23, Fig. 3, imparts rotation to the cam assembly carried upon sleeve 24.

Shaft 17 rotates continuously under impetus of driving worm 19 and it in turn imparts rotation to the escape wheel 25 through the medium of the adjacent friction discs 26, one on each side of said wheel 25. In coaxial alignment with shaft 17 is a secondary shaft 27 journaled in an opening of the auxiliary vertical plate 13 and having a reduced section 28 which fits centrally into an opening of the shaft 17 so as to be concentric to and rotatable therewith. Driving engagement between shaft 17 and its coaxial subservient shaft 27 is had through the medium of a coupling 29, which consists of an arm integrally associated with shaft 27 and having a laterally extending portion 31, see also Figs. 4 to 7, which is received within an appropriate slot in the frictionally driven escapement disc 25.

A type wheel 32 having four circular sections of type characters and eight characters on the periphery of each row is integrally associated with the shaft 27 and is displaceable longitudinally therewith after the manner indicated by the dotted outline 32, Fig. 3. In the reduced portion 33 of driven type wheel shaft 27 there is nested a disc formation 34, Fig. 2, of a bell crank lever 35, pivoted at 36. The bell crank 35 is normally urged into its counterclockwise (Fig. 2) position by a spring 37 anchored to a suitable part of the stationary framework. Opposing the effect of spring 37 is a lever 38, Fig. 1, pivoted upon a screw 39 and having three arms designated 41, 42 and 43. Of these, arm 41 extends upwardly and is held against a gooseneck formation 44 of a pivoted follower lever 45 by means of a compression spring 46 which surrounds the underturned portion of the gooseneck formation 44 and is looped around the extremity of arm 41. A sidewardly extending arm 47 of lever 45 is formed with a follower projection which is adapted to ride upon the periphery of cam 48, Fig. 5, so that during the course of a cycle of revolution of cam shaft 16, lever 45 is moved in a clockwise direction about a pivot 49 causing lever 38 to be rotated in a counterclock-

wise direction about its pivot 39 under the yielding pull of compression spring 46.

The foregoing described train of elements from the principal mover, cam 48 of cam shaft 16 and including levers 45, 38 and 35, serve to shift the type wheel shaft 27 longitudinally of its axis withdrawing the reduced portion 28 of shaft 27 from within shaft 17. From the shape of cam 48, Fig. 5, it will be apparent that the movement imparted to the afore-described train of levers is a gradual one in the direction of projecting the type wheel rightwardly as viewed in Fig. 3. In the absence of any interference to this movement, type wheel 32 will continue in this direction until the innermost one of its cylindrical sections is brought into alignment with a print hammer or platen 51, Figs. 1 and 3. A manner of selecting one of the several cylindrical type wheel sections for alignment with the print hammer of platen 51 is provided, through the agency of the arm 43 of the afore-described intermediate one 38 of the series of levers which constitute the train between cam 48 and shaft 27. As may be noted from Figs. 1, 5, and 6, arm 43 in rotating counterclockwise about pivot 39 together with the other elements of its lever 38 described an arc in which path there are normally disposed the extremities of three blocking levers designated generally 52, 53 and 54.

Of the three levers, 52, 53 and 54, two have rearwardly extending portions 55, Figs. 5, 6 and 8, which lie in the path of the cam assembly 24. A cam 56 having a single apex lies in the same plane as does the rearmost or follower extremity 55 of lever 54, and a similarly shaped but radially offset cam 57 lies in the same plane as does the follower extremity 55 of lever 52, Fig. 5. When either one of the lever extremities 55 is engaged by its associated cam apex 56 or 57, that end of the lever is thrust rightwardly as viewed in Figs. 5 or 6, pivoting its said associated lever 52 or 54 upon one or the other of the alternative pivot pins designated 58 and 59 each common to both of said levers.

It is to be noted that levers 52 and 54 are provided with normalizing springs 61 or 62 tending to rotate their respective levers in a counterclockwise direction. In addition there is provided upon each one of the levers 52 and 54 a shoulder projection designated 63 against which there may be disposed the extremity 64 of a line magnet armature 65 pivoted at 66. When the magnet 67 is energized pursuant to a marking line signal condition, its armature 65 is attracted and held in its counterclockwise position with respect to pivot 66 and with extremity 64 interposed into the path of shoulders 63 of levers 52 and 54. When the operating cycle during which apex 56 or 57 engages its associated follower 55 is coincident with the energized condition of magnet 67, extremity 64 prevents said lever from rotating about shaft 59 as a center and causes its rocking instead upon shaft 58 as a center. Accordingly, instead of lever 52 or 54 pivoting about shaft 59 as the center, there will be effected instead a pivotal movement about shaft 58 as the center with the lowermost extremities of either or both said levers 52 or 54 shifting relatively leftward as viewed in Figs. 1, 5, or 6.

As a result of this movement on the part of any one or more of the lever extremities which ordinarily lie in the path of the sidewardly extending projection 67 of probing arm 43, the counterclockwise rotation of lever 38 will ac-

cordingly, be permitted to a greater or lesser degree depending upon which one of said levers 52, 53 or 54 remain to block the progress of said sidewardly extending projection 67. Although but two full length levers 52 and 54 are provided under the direct control of magnet armature 65, a total of four variable conditions may be obtained through the auxiliary effect of intermediate lever 53. The latter member though not controlled directly by any of the cams of cam assembly 24 nor under the direct control of magnet 67, responds, nevertheless, in an indirect manner to the control of cam assembly 24 as will now be described.

As has been said, lever 53 is pivoted upon shaft 58 and is located intermediate the two levers 52 and 54. Furthermore, it is provided with a stud pin 68 which projects a short distance on both sides of said lever 53 so as to be interfered with by either one of its adjacent levers 52 and 54, Fig. 8, when one of them is moved clockwise because of the operation of one of the cams 56 or 57 coincident with the energized or marking condition of armature 65. The extremity of lever 53 extending into the path of projection 67, is longer than either of the other levers 52 or 54. Accordingly, it alone serves to block the movement of arm 43 when none of the levers is removed from blocking position resulting thereby in the placement of type wheel 32 in a first case selection position such as indicated in solid outline in Fig. 3, i. e., with the first section of its four type wheel sections in alignment with the print hammer 51.

When lever 52, Fig. 5, happens alone to be moved by its associated cam projection 57 so that its lowermost extremity is moved leftwardly, it takes lever 53 with it on account of the overlying pin 68, and the blocking extremity of lever 54 is left in the path of projection 67 with the result that there is obtained an extent of movement of type wheel 32 longitudinally, so that its second typing section is brought into alignment with print hammer 51. As a further alternative of operation, when lever 54 is dislodged by its cam projection 56 it, too, moves intermediate lever 53 out of blocking the projection 67 and there remains the extremity of lever 52 in the path of said projection 67, causing to be effected the third alternative condition; namely, with the third section of type wheel 32 brought into alignment with print hammer 51.

The final alternative condition obtainable in accordance with this selecting apparatus, is one where both levers 52 and 54 are removed from blocking engagement with projection 67 taking intermediate lever 53 with them and in this case a shoulder 69, which may be formed integral with any one or all of the levers 52, 53 and 54, serves to block the projection 67 in its ultimate or fourth degree of movement, obtaining thereby a condition when the fourth typing section of wheel 32 is brought into alignment with print hammer 51. Thus, there is obtained a total of four case shift positions under the control of two principal selecting elements; namely, levers 52 and 54 each under the control of one of the impulses of a five-unit permutation code. Thus, there is consumed two of the five impulses of each permutation code in the longitudinal positioning of the type wheel 32 leaving a total of three selective impulses remaining for the purpose of positioning the type wheel radially, which performance will now be described.

The normal or zero position of shaft 27 and

its integrally associated type wheel 32 obtains when the sidewardly extending stop lug 71 rests against the sidewardly extending lug 72, Fig. 4, of the single selector lever 73 which is pivoted solely upon the afore-described shaft 58. The arrestment of escape wheel 25 is thereby effected and this obtains when said lever 73 is in its clockwise extreme position such as that illustrated in Fig. 4 as distinguished from its counterclockwise position shown in Fig. 7, with said lug 72 in the path of the sidewardly extending formation of stop arm 71. During the alternative condition of said lever 73, namely, its counterclockwise position as shown in Fig. 7, the stop lug 72 is moved out of the path of said sidewardly extending portion of stop arm 71, permitting the continued rotation of escape wheel 25 in a counterclockwise direction as urged by the constantly rotating shaft 17 through the friction disc 26 until one of its teeth 91 encounters said lug 72.

A retaining lever 74 pivoted at 75 and urged by a spring 76 in a clockwise direction may present its pointed detenting projection 77 alternatively in one of two V-shaped recesses of the uppermost extremity 78 of said lever 73. When in the position illustrated in Fig. 4, detent projection 77 rests in the leftmost of the two recesses and when said lever 73 is in its alternative condition, namely, with stop lug 72 out of the path of stop arm 71, then the detent projection 77 is adapted to dwell in the other of said two detent recesses.

In cooperation with lever 73 and complementing its performance in releasing the teeth of wheel 25, is a companion lever 79, Fig. 4, resembling in contour generally one of the afore-described two levers 52 and 54. It, too, is provided with a spring 82 for urging it in a manner so as to dispose the clearance of longitudinal slot 81 in the right-hand extremity of pivot shaft 58 just as in the case of levers 52 and 54. An integrally formed shoulder 83 also is similarly affected by the fluctuation of the armature extremity 64 after the manner already described in connection with the two case shift selector levers 52 and 54.

The lowermost extremity of lever 79 is provided with a V notch 82, Figs. 4 and 7, within which there fits the other selector lever pivot shaft 59 so that depending upon the condition of armature 64, lever 79 too may rotate about shaft 58 as a pivot, or about shaft 59 as a pivot; as it is engaged by any one of the four cam projections 83, 84, 85 and 86 of a cam disc 87 carried by the assembly 24. The particular distribution of cam projections 83 to 86 is significant in connection with the timing of shaft 16, and when these are compared with the distribution of four corresponding projections 83a, 84a, 85a and 86a, Fig. 7, on a cam 83 located just behind cam 87 and in the same plane as is located the uppermost extremity 78 of lever 73, it will be seen that while the timing or the recurrence of cam projections on cam discs 87 and those on disc 88 is the same, the phase relationship of the two discs is different. This is because cam disc 87 controls lever 73 by engaging its follower extremity 78 on the left of the shaft 16 (Figs. 4 and 7) while cam disc 88 controls lever 79 through engagement with its follower lobe 89 on the right side of the shaft 16 (Figs. 4 and 7). With respect to the line impulses of each permutation code, projections 83, 84, and 85 coincide with impulses 2, 4, and 5 so that the instant of engagement between such projections and the follower lobe 89 of lever 79 will be understood to corre-

spond with the afore-rected intervals of the code combination signal, the remaining signal intervals, namely, those corresponding to impulses 1 and 2, being coincident with the times during which projection 87 engages the follower lobe of lever 82 and projection 86 engages the follower lobe of lever 84.

In angular arrangement the projections of cam 87, which operate through the follower lobe 89 of lever 79, are so located with respect to shaft 10 that when projection 83 encounters lobe 89 it is followed shortly thereafter by an engagement between a corresponding projection 83a of cam 88 and a follower portion of extremity 78 of lever 73. Thereafter, projection 84 engages lobe 89 and is followed shortly by an engagement between the corresponding projection 84a on cam 88 and section 78 of lever 73. This succession of operations continues until all of the projections of cams 87 and 88 have had the opportunity to engage the contacting portions of their respective levers 79 and 73.

As will be observed from Figs. 4 and 8, the lever 73 is provided with an angularly (frontward as viewed in Figs. 4 and 7) extending projection 72 which may serve to block arm 71 as well as teeth 91 and thereby prevent the counterclockwise rotation of escape wheel 25. When lever 73 is moved in a counterclockwise direction about pivot 58 from the position in which it is shown in Fig. 4 to the position in which it is shown in Fig. 7 blocking projection 72 is withdrawn from the top of the sidewardly extending part of arm 71 and is instead brought into the path of first escapement wheel tooth 91.

When lever 79 restores lever 73 from this position whereat projection 72 was blocking escape tooth 91 to the position wherein said lever is shown in Fig. 4, by means of its lowermost extremity engaging a sidewardly extending pin 80 integrally associated with said lever 73, tooth 91 is freed from blocking engagement by projection 72 and escape wheel 25 is permitted to resume counterclockwise rotation together with its stub shaft 27. This rotation is permitted to continue until a succeeding tooth on cam 86 engages the follower portion 78 of lever 73 rocking the latter member back into the position designated in Fig. 7.

In accordance with the angle between the teeth 83 and 84 of cam 88 a period of time is permitted to elapse which will permit the four teeth 91 of cam 25 to pass the position designated so that thereafter when projection 72 is moved into blocking engagement it will encounter the fifth tooth 91. It is to be noted, however, that the restoration movement to lever 73 which is effected by the action of lever 79, is effective only when armature 64 is in the blocking position of shoulder 63 as designated in Fig. 4. If armature 64 at any particular time when a projection of cam 87 engages lobe 89 happens to be in its alternative position, that is, free from shoulder 63, then instead of lever 79 rotating about point 58 as a center, it rotates about shaft 59 as a center and describes an arcuate movement with respect to shaft 58 as permitted by the elongated hole 81 in lever 79.

Summarizing the operation of cams 87 and 88, it will be understood that shortly after one of the projections on cam 88 acts to rotate lever 73 in a counterclockwise direction about pivot 58, a projection on cam 87 encounters the follower lobe 89 of lever 79 and thereupon may or may not restore said lever 73 to its clockwise extreme

position depending upon whether the armature 64 is in the blocking or clearing position with respect to shoulder 63. It is to be noted, moreover, that the arrangements of projections on cams 86 and 87 although mutually corresponding cam for cam, present a significant spacing with respect to the projection on each cam. This arrangement of cam projections is especially designed so as to permit the escapement of the teeth 91 of escape wheel 25 in certain significant groups. Starting from the zero position of shaft 16 this arrangement of groups is first, four teeth 91, then, two teeth 91, and finally, a single tooth 91 of said escape wheel 25.

The remaining tooth 86 of cam 87 and its corresponding tooth 86a of cam 88 are designed to escape the final one of the teeth of wheel 25 invariably coincident with the stop impulse so as to restore the type wheel and escapement assembly to zero position.

It is to be noted that the distribution of cam projections on cams 87, 88, 86, and 87 is such as to correspond with the occurrence of the five impulses in a permutation code signal. As has already been said the positioning of the type wheel longitudinally is in accordance with first and third impulses of the code combination while the positioning of the type wheel rotationally is in accordance with the second, fourth, and fifth impulses of a code combination. Following the positioning of the longitudinal or case shift levers, namely, 52 and 54, cam 48, Fig. 6, acting through the afore-described linkage 45, 38, and 35 attempts to shift the type wheel longitudinally in accordance with the degree of movement permitted by the interception arm 43 of said lever 38. This arm is capable of four extents of movement in a counterclockwise direction as already explained. In following a setting of lever 54, which is encountered by cam apex 56, arm 43 is expected to engage the extremity of said lever 54 and maintain it in its set position as placed by the projection of cam 56. The mass of the type wheel and the other mechanisms which are brought into motion together with lever 38 may, under higher speeds of operation, delay the response of arm 43 so that cam 56 may override the follower lobe of extension 55 of lever 54 and permit said lever to resume its normal position before probe arm 43, Fig. 8, has had a chance sufficiently to engage said blocking extremity of said lever 54.

For this reason, a temporary latch lever 96, Fig. 8, has been provided which pivots about center 39, and is urged in a clockwise direction by a spring 97. Lever 96 is formed with a latching shoulder 98 that is adapted to slip behind the sidewardly extending projection 99 integrally formed with lever 54. Accordingly, when the latter is positioned by its cam 56 during the marking condition of armature 64 and its remote extremity is moved out of blocking position with respect to projection 67, the integrally formed lug 99 passes beyond the said shoulder 98 permitting latch lever 96 to assume the condition illustrated in Fig. 6. When thereafter probing arm 43 is rotated in a counterclockwise direction, the sidewardly extending lug 67 seeking any one of the levers 52, 53, or 54 as a stop will also encounter the remote extremity of latch lever 96 rocking the latter counterclockwise about its pivot 39 and releasing sidewardly extending lug 99 due to the clearances between the point of engagement of its shoulder and the location of sidewardly extending lug 67; and thereafter upon

the return movement of said arm 43, lever 54 will be free of latch lever 96 and will be permitted to resume its normal position as illustrated in Fig. 1.

As an incident to each cycle of rotation of shaft 16 and operating invariably in response thereto, cam 95 afore-mentioned, rotating in a clockwise direction gradually raises the follower extremity 101 of a bell crank lever 102 pivoted at 49 so as to thrust its curved arm 104 rightwardly to engage the upstanding arm 105 of a rock shaft 106. As a result clockwise movement is imparted to a lever arm 107 having two branch arms designated 108 and 109 and causing the former through its pivoted pawl 111 to rotate the tape advancing sprocket wheel 112 one tooth distance in a counterclockwise direction. In so doing, the rotation of tape feed shaft 113 is effected overcoming the influence of a detent pawl 114, Fig. 1. Shaft 113 carries a friction feed roll 115, Fig. 1, which in cooperation with a follower friction roll 116 carried by a spring loaded bell crank 117 grips the paper between them feeding it to the left in accordance with the progress of wheel 115.

The other branch 109 of said arm 107 is provided with a forwardly extending lug 118 which underlies a flat bar 119 carried by a horizontal spring 121 and integrally associated with the print hammer projection 51. The clockwise movement of lever 107 is slow and gradual as indicated by the gradual involute curve of the periphery of cam 95; however, when follower projection 101 reaches the dropoff 122 the counterclockwise movement induced upon arm 107 by the spring 123 which is tied to arm 105 causes said projection 118 to strike sharply against the plate 119 and impart an instantaneous blow by the print hammer 51.

Printing ink is supplied to the type wheel 32 by means of an intermediate ink transfer roll 125, Figs. 1 and 3, which in turn is supplied throughout its surface with printing ink from a porous supply roll 126 supported parallelly thereto and longitudinally in surface contact therewith. Both rolls 125 and 126 are provided with trunnions 127 and 128 which fit into slotted openings 129 and 131 of a pivoted yoke member 132 under counterclockwise spring tension, Fig. 1, about its pivot shaft 133.

Operation

The motor 18 is a source of rotating power and through its driving worm 19 there is imparted rotation in opposite directions simultaneously to the two driven worm wheels 21 and 22. The former being of larger diameter than the latter, shaft 16, it will be understood, will be driven at a comparatively slower speed than the shaft 17 of the latter worm wheel 22. The tributary mechanisms of both shafts are arrested, however, under normal condition when current is on the line and when no permutation code signals are received. The arrested condition obtains when line relay 67 is continuously energized attracting its armature 65 so that the blocking projection 64 is positioned behind the shoulder 63 of the several selector levers and when concurrently an eccentrically disposed armature screw 135 urges against the push rod 136 which through the conventional orientation unit, such as shown and described more fully in U. S. Patent No. 1,904,164 to S. Morton et al., is disposed so as to maintain stop gates 137

rigid against the influence of cam assembly arm 138.

Upon the receipt of the start impulse of any code combination signal, which impulse is invariably of spacing nature (no current in contrast to the normal or holding current of the line) armature 65 is released withdrawing said screw 135 from push rod 136 and armature extremity 64 from behind the shoulders 63 of the several selector levers 52, 54, and 79. In consequence of the unlocking of stop gate 137 which action is explained in the foregoing patent, cam assembly arm 138 is permitted to overcome the effect of a mild holding spring of said stop gate 137 releasing the entire cam assembly 24 for clockwise rotation as viewed in Figs. 1 and 4 to 7. When the cam assembly 24 has rotated in the clockwise direction sufficiently for projection 83 of cam 87 (Fig. 4) to dislodge or rock counterclockwise the lever 73, the latter member's extremity 72 will be withdrawn from the path of escapement wheel stop arm 71; and escape wheel 25, which is constantly driven through the friction discs 26, will be permitted to rotate counterclockwise until its first escape tooth 91 encounters said projection 72 whereupon escape wheel will be momentarily arrested.

During the receipt of the succeeding five impulses of the code combination, the responses of the selector mechanism will depend upon the particular nature of each impulse. Accordingly, with various code combination signals there will result a varying degree of rotation on the part of escapement wheel 25 and through its integral association by means of bar 31 with the type wheel 32, the latter member will accordingly be variably positioned together with shaft 27 while at the same time longitudinally shifting bell crank 35 will, through its articulation of levers, project the type wheel 32 longitudinally of its axis a characteristic amount depending upon the degree of counterclockwise rotation permitted to the probing arm 43 by the selector levers 52, 53, and 54 as afore-described.

Within the same cycle of operation that the afore-described functions are executed, cams 48 and 95 will engage a series of motion transfer levers and will respectively execute the shift function and trip the print hammer. It is to be noted that the print hammer actuating lever including arm 107 also carries the tape feed pawl 111 which during the loading motion of the lever train causes the counterclockwise rotation of tape feed wheel 115.

The selection is performed by four principal selector levers, two of which designated 52 and 54 control between them a third designated 53 to yield a total of four case shift positions for the longitudinal shifting of the type wheel. Two other selector elements designated 73 and 79 operate in a complementary manner to regulate the extent of escapement on the part of wheel 25 and, accordingly, the rotational positionment of the type wheel 32.

While there has been described above a specific embodiment of the invention, it is to be understood, nevertheless, that numerous changes and modifications may be instituted without departing from its essential spirit or scope; accordingly, it is not intended to be limited by the specific disclosure of the accompanying drawings nor by the particular language of the foregoing specification, except as indicated in the hereinafter appended claims.

What is claimed is:

1. In a printing telegraph apparatus, a rotatable type carrier having four annular sections each relating to a case position, means for shifting said type carrier longitudinally to present any one of said sections selectively into printing positions, means for rotating said type wheel so as to present individually any type elements on each section in radial printing position, and a start-stop selector shaft comprising a plurality of cams each associated with a permutation code element and means under the control of said cams for concurrently moving said type wheel longitudinally and rotationally to select an individual type element among said four annular sections for printing.

2. In a printing telegraph apparatus, a type wheel comprised of a plurality of annular sections of type characters with characters in each section aligned longitudinally, a selector mechanism for regulating the angular positioning of said type wheel comprising an escapement wheel, a pair of levers for regulating the movement of said escapement wheel, means responsive to certain impulses of a permutation code for operating said pair of levers correspondingly, a selector mechanism for regulating the longitudinal positioning of said type wheel comprising a pair of further levers each responsive to an impulse of a code, a lever common to said pair, and a type wheel shift train including yieldable means operated in accordance with the positioning of said further levers.

3. A permutation code printing apparatus comprising a frictionally driven rotary type wheel, an escapement wheel having a plurality of peripheral teeth and integrally associated with said type wheel, cam actuated means for moving a stop into the path of the teeth of said type wheel, and a selectable lever for withdrawing said stop from said teeth in accordance with signals received over a line.

4. In combination, a frictionally driven rotatable member, an escapement wheel integrally associated with said member, a pair of levers associated with said escapement wheel comprising a first lever periodically movable into blocking position with respect to said escapement wheel and a second lever periodically movable to withdraw said first lever from blocking said escapement wheel in accordance with the component impulses of a permutation code.

5. In a permutation code selector mechanism, a frictionally driven escapement wheel, a pair of complementary-action levers for regulating said escapement wheel, cam means for interposing one of said levers to arrest said wheel a plurality of times during each cycle of rotation of said wheel, and magnetically controlled means for regulating the other of said levers to withdraw said one of said levers selectively in accordance with line signals.

6. In a telegraph printing apparatus, a selector mechanism for positioning a rotary type wheel concurrently in rotary and longitudinal movements including a type wheel case shifting apparatus comprising a pair of signal impulse controlled levers, a common lever under control of said signal impulse controlled levers, a probe associated with said apparatus and arrestable in any of four case positions under the supervision of said impulse and common levers, a frictionally driven escape wheel having cyclic rotation, a first cam actuated lever for interposition in the path of said escape wheel to arrest said escape wheel

in any of a plurality of radial positions, a second cam actuated lever for withdrawing said first cam actuated lever selectively a number of times during each cycle, and magnetically controlled means interposed in the path of said second cam actuated lever for varying its pivotal operation in accordance with incoming line signals.

7. In a telegraph selector mechanism, a frictionally driven wheel, a pair of levers for controlling the rotation of said wheel, cam means for interposing one of said levers to arrest said wheel a certain number of times during each cycle, and magnetically controlled means for regulating the other of said levers to withdraw said one of said levers a variable number of times in accordance with line signal impulses.

8. In a telegraph printing apparatus, a selector mechanism for positioning a type wheel longitudinally and rotationally, comprising a type wheel shifting apparatus, a probe associated with said apparatus and arrestable in any of four positions, a frictionally driven escape wheel integrally associated with said type wheel, a first cam actuated lever for interposition in the path of said escape wheel to arrest it in any of a plurality of radial positions, a second cam actuated lever for withdrawing said first cam actuated lever, and magnetically controlled means interposed into the path of said second cam actuated lever for varying its pivotal operation in accordance with incoming line signals.

9. In a permutation code selector mechanism, the combination comprising a first shaft having a plurality of cyclically rotatable cams, a second shaft having a type wheel and an escapement wheel with characters on said type wheel peripherally disposed to coincide with teeth on said escapement wheel, and escapement means comprising a lever actuated by said cams a number of times for variably escaping the teeth on said escapement wheel in accordance with permutation code signals for correspondingly permitting the rotation of said type wheel.

10. In a permutation code selector mechanism, the combination comprising a first shaft having a plurality of cyclically rotatable cams peripherally disposed on said shaft to coincide with the intervals of occurrence of permutation code impulses of a signal, a second shaft having a type wheel and an escapement wheel with characters on said type wheel peripherally disposed to coincide with teeth on said escapement wheel, and an escapement control means reciprocated by said cams on said cam shaft for variably passing the teeth of said escapement wheel in accordance with permutation code line signal impulses for correspondingly positioning said type wheel.

11. In combination, a frictionally driven escapement wheel having a plurality of peripherally disposed escape teeth, a frictionally driven cam assembly having a plurality of peripherally disposed cam projections corresponding one for one to the impulses of a permutation code, a magnet and armature responsive to the fluctuations of line signals, and means moved to and fro by said cam assembly and responsive in accordance with the line signal impulses manifest on said magnet and armature for escaping said teeth of said escape wheel in a manner characteristic of the line signals induced on said magnet.

12. In a selector mechanism, a plurality of stop members each having a characteristic stop abutment and arranged in transverse alignment, a probing extension yieldably moved in a path to

encounter said alignment, and telegraphically controlled means to selectively withdraw any of said members from said alignment to accordingly vary the extent of movement of said probing extension.

13. In a selector mechanism for supervising the rotary arrestment of a type wheel, a frictionally driven shaft, a type wheel carried by said shaft, an escape wheel carried by said shaft having a number of escape teeth corresponding to type elements on said type wheel, a pair of escape levers, and means operative during the receipt of component impulses of a telegraph code for presenting one of said levers in arresting position before each of said escape wheel teeth and under the control of other of said levers for withdrawing said one of said levers when a code impulse of a predetermined polarity is received.

14. A selector mechanism for supervising the arrestment of a frictionally driven rotary shaft, 20

comprising an escape wheel having a predetermined number of teeth carried by said shaft, a blocking lever, and means for interposing said lever into blocking engagement with each of the teeth of said wheel and a withdrawing lever for displacing said blocking lever in response to electrical impulses of a predetermined polarity.

15. In a printing telegraph apparatus, a type wheel, a multiple tooth escape wheel integrally associated with said type wheel and having cyclic operation therewith, a pair of supervisory levers, means for interposing one of said levers into blocking engagement with each of the teeth of said escape wheel during its cycle of operation, and means including the other of said pair of levers for selectively withdrawing said one of said levers under the control of predetermined electrical impulses.

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