April 5, 1927. 1,623,810

H. PFANNENSTIEHL

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Fig. 2

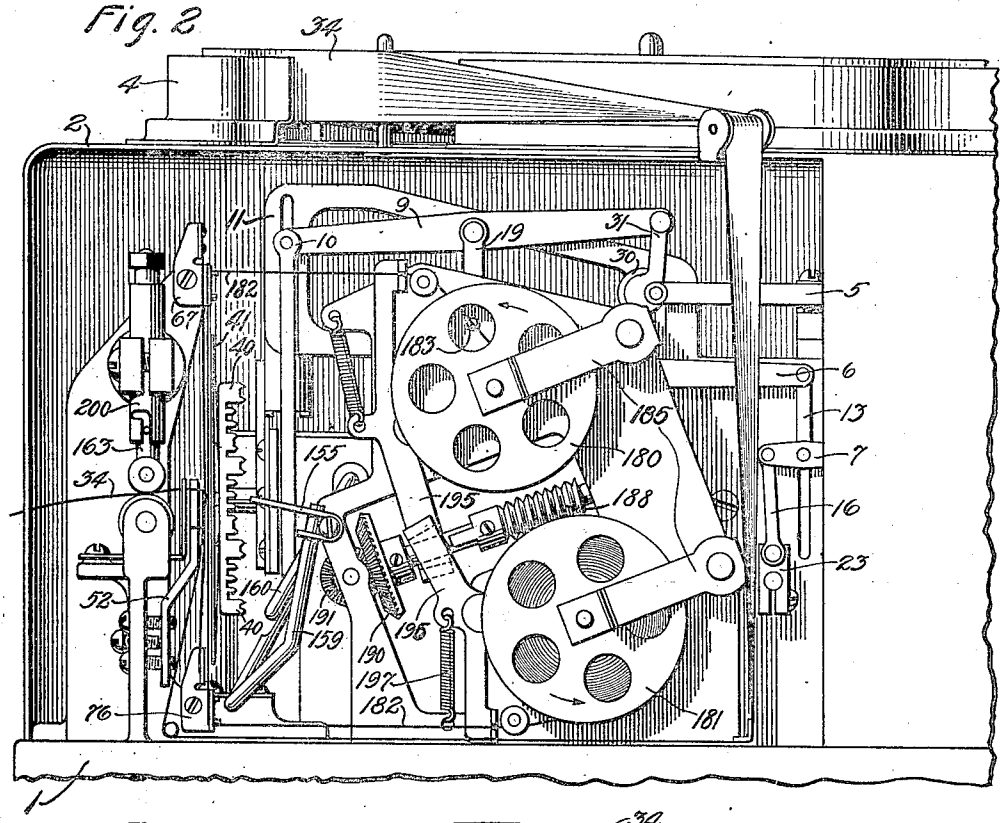
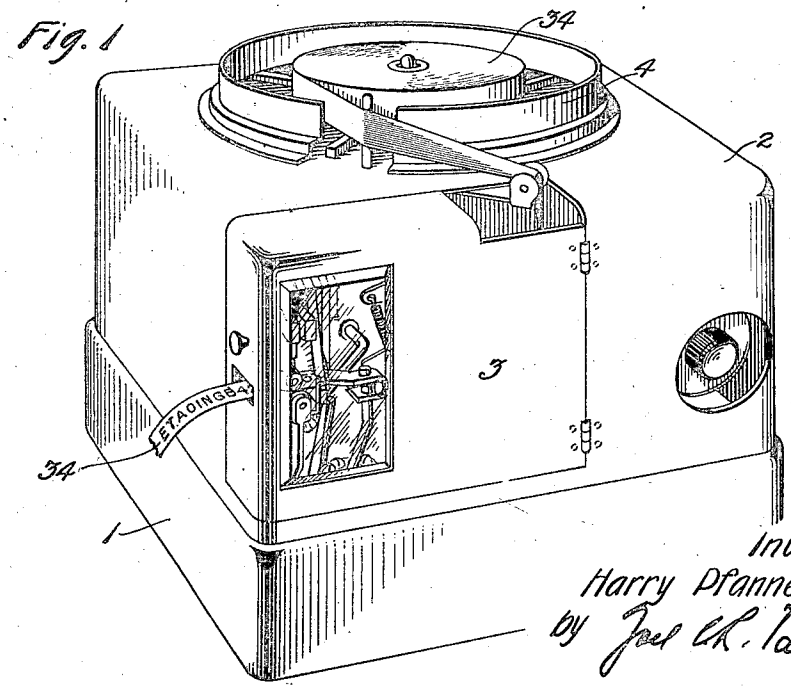


Fig. 1



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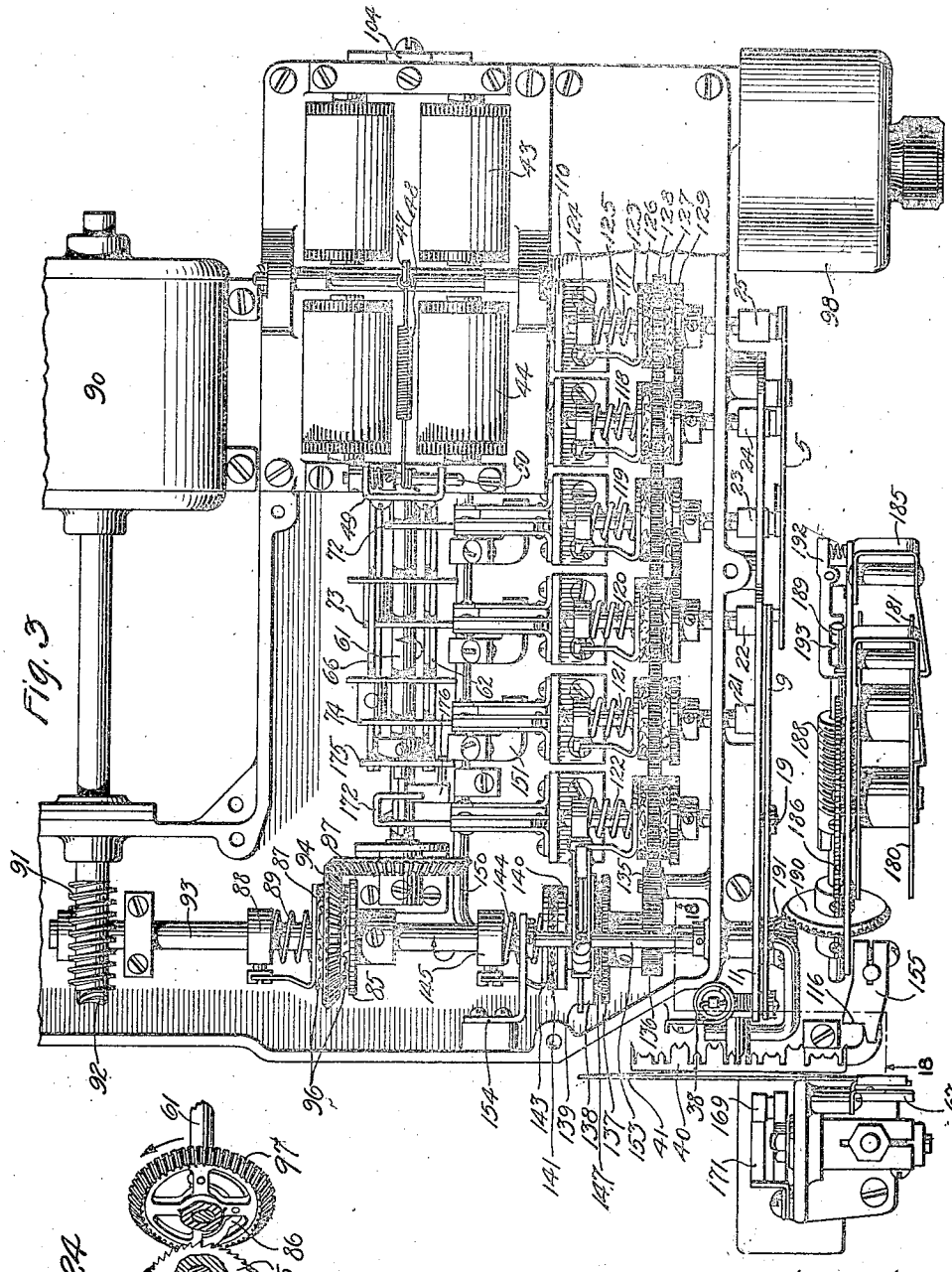


Fig. 3

Fig. 24

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1,623,810

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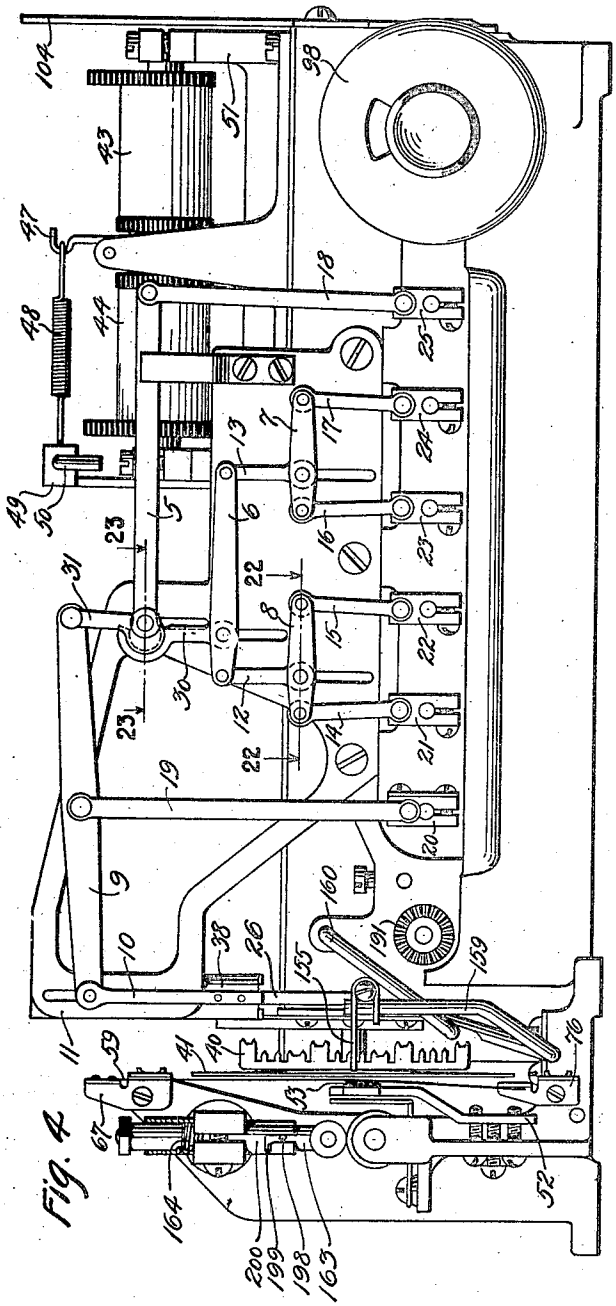


Fig. 4

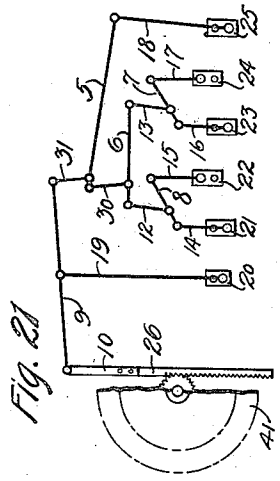


Fig. 21

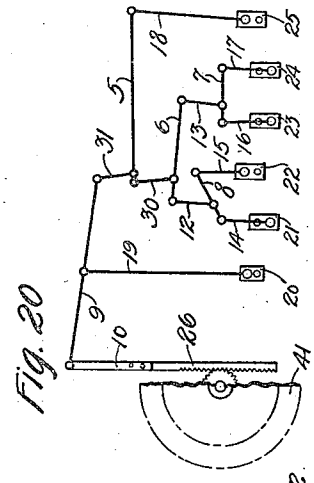


Fig. 20

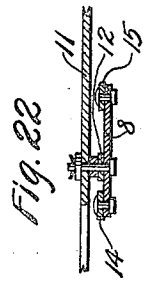


Fig. 22

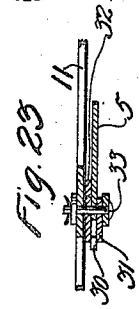


Fig. 23

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Fig. 5

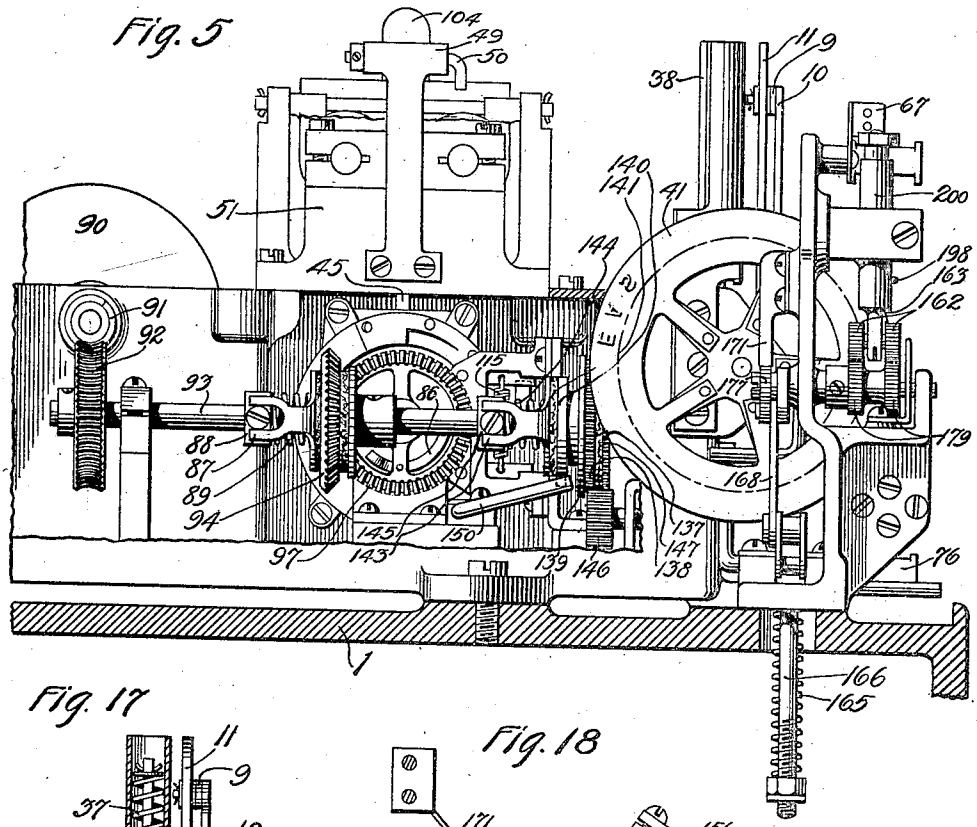


Fig. 17

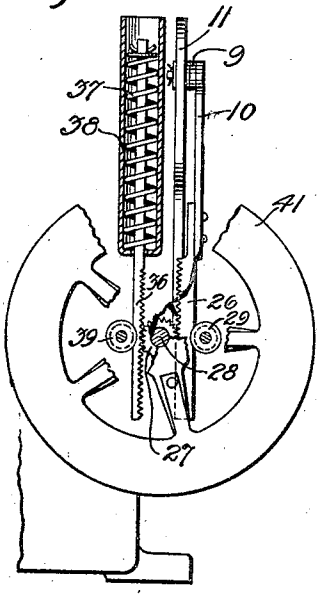


Fig. 18

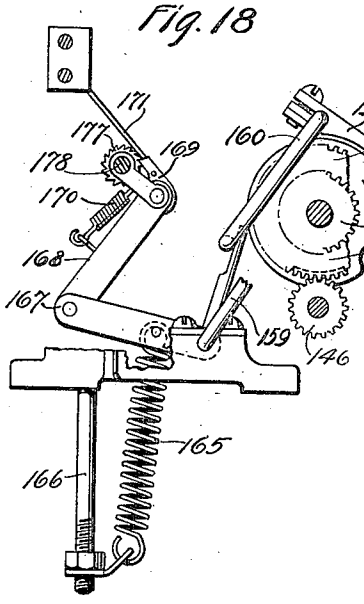
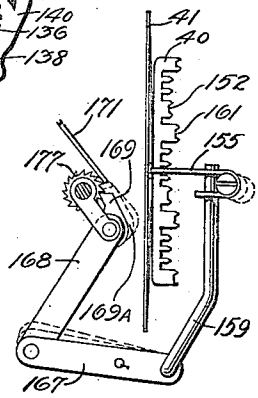


Fig. 19



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Fig. 6

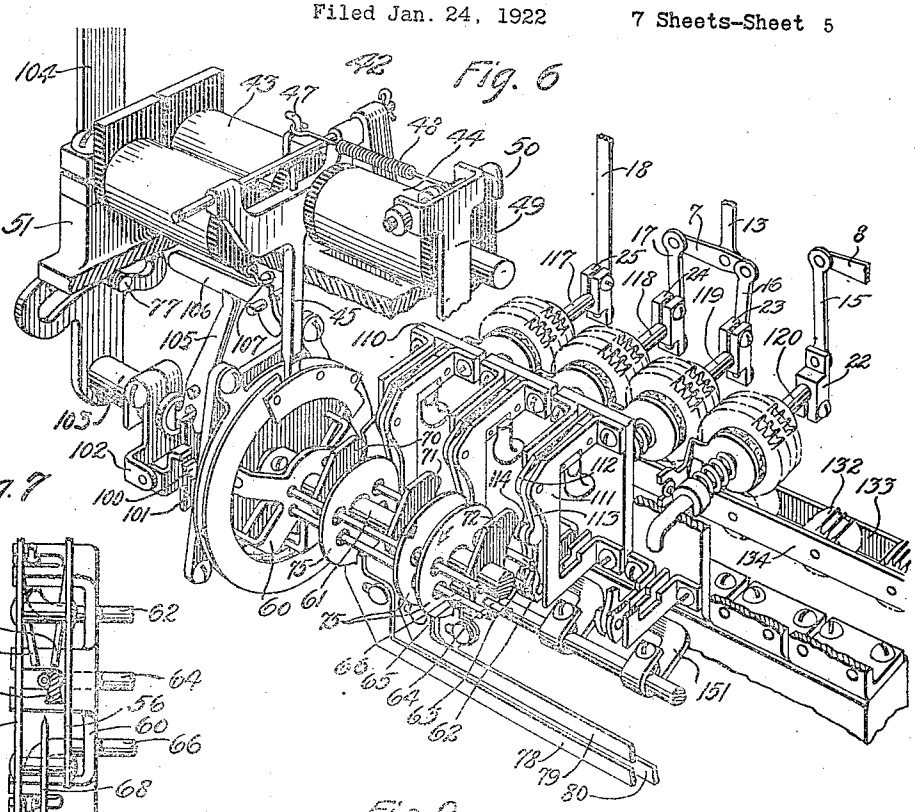


Fig. 7

Fig. 9

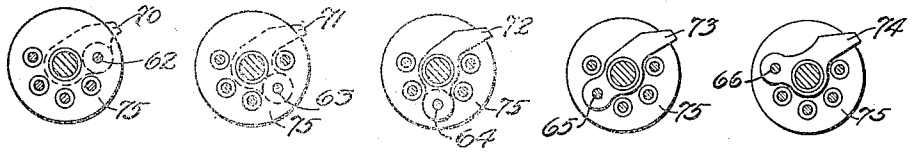


Fig. 8

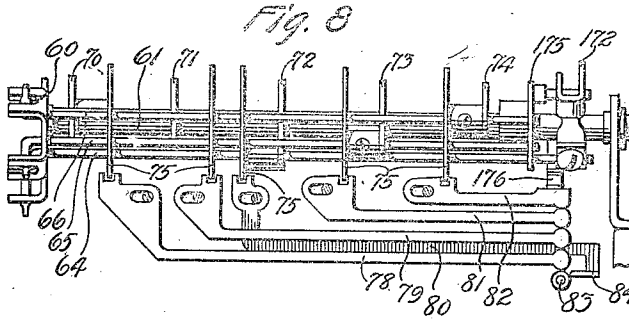
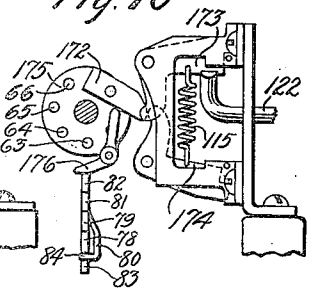


Fig. 10



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April 5, 1927. H. PFANNENSTIEHL. 1,623,810

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Fig. 11

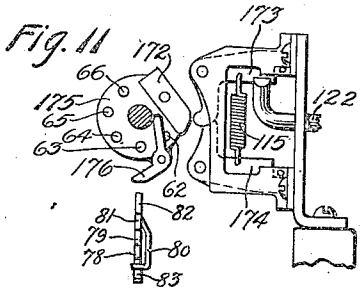


Fig. 12

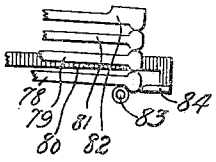


Fig. 13

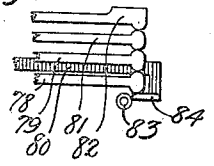


Fig. 14

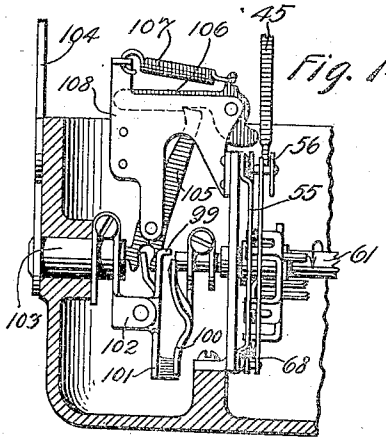


Fig. 15

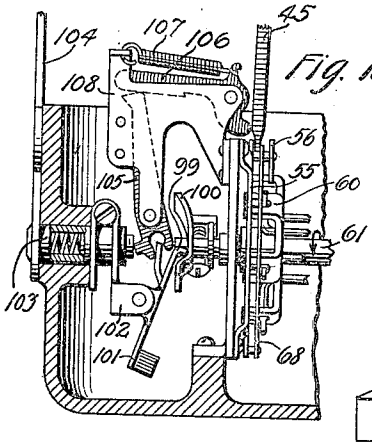


Fig. 25

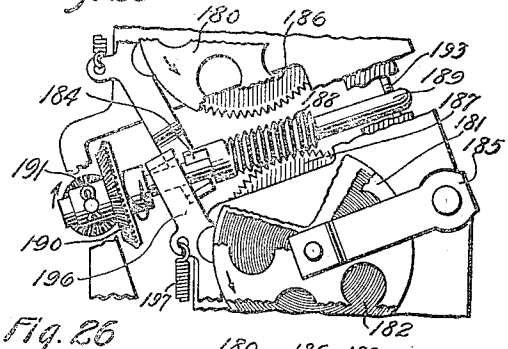


Fig. 26

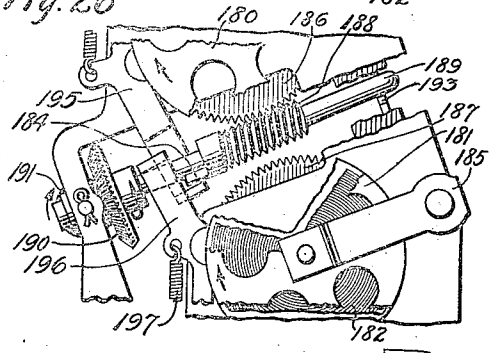


Fig. 16

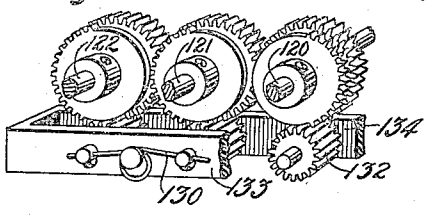
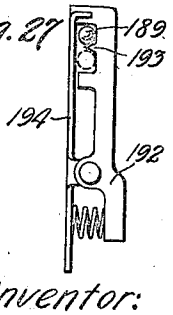


Fig. 27



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PRINTING TELEGRAPHY

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Fig. 28

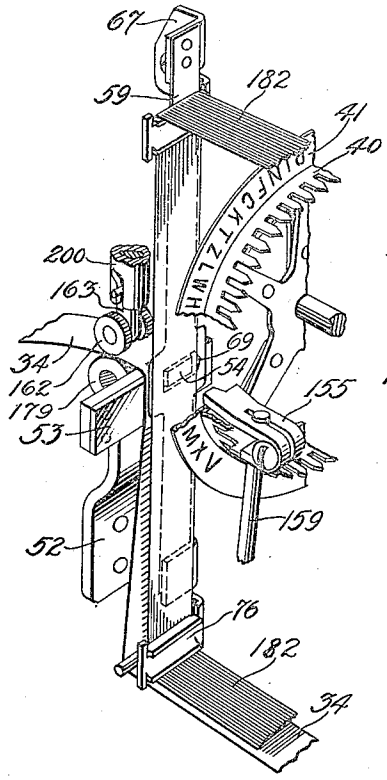


Fig. 29

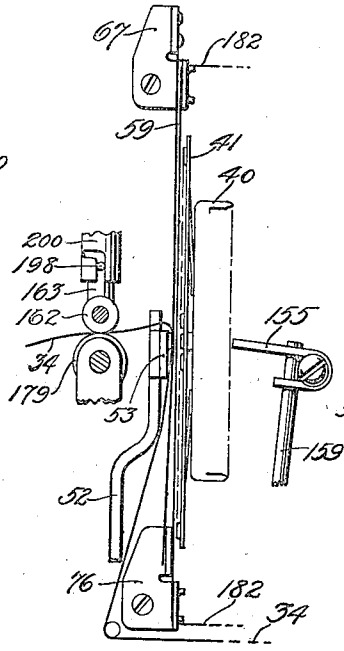


Fig. 30

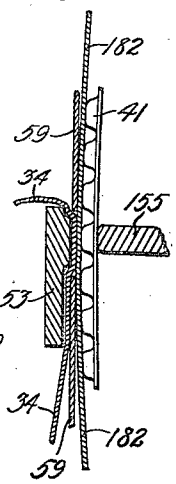


Fig. 31

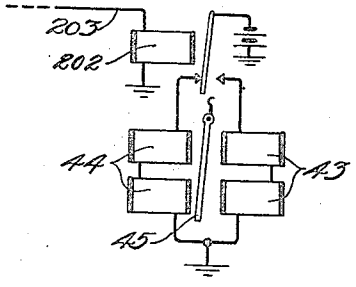
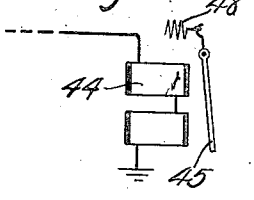


Fig. 32



Inventor
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Patented Apr. 5, 1927. 1,623,810

UNITED STATES PATENT OFFICE.

HARRY PFANNENSTIEHL, OF MAPLEWOOD, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PRINTING TELEGRAPHY.

Application filed January 24, 1922. Serial No. 531,337.

This invention relates to printing telegraph apparatus and particularly to apparatus for receiving and translating impulses into printed characters.

An object of the invention is to provide a receiving instrument in which the various selecting and printing operations, so far as possible, are mechanically controlled and positive in action.

Another object is the provision of means whereby a positive drive connection is established between the driving and driven members of the printing mechanism following a selection.

Another object is to provide a shielding member in conjunction with the type wheel for preventing the impression of characters adjacent to the one to be printed.

Another object is the provision of means whereby the type wheel may be shifted from the portion carrying the numerals and other special characters to that portion upon which the letters of the alphabet are arranged and vice versa and the advancement of the printing medium simultaneously.

The invention, according to one of its embodiments, provides an electro-responsive device responsive to selecting units or impulses, a translating device controlled thereby for translating the effects of such units or impulses into mechanical movements, and recording mechanism operated by such translated effects for causing the printing of the letters of the alphabet, numerals and other special characters on a printing medium.

The electro-responsive device comprises a single electromagnet having its coils connected either directly to the line or controlled by an intermediate or line relay. This electromagnet responds to all impulses and upon its initial energization permits the operation of the translating mechanism.

The translating mechanism is made up of a series of rotatable and horizontally movable selecting rods which are successively brought under the control of the single electromagnet, there being a tripping finger individual to each of the rods. They are moved by the horizontal movement of the rods, into a tripping and non-tripping position with respect to a series of latches depending upon the energization of the electromagnet which is energized in accordance with the character of the impulses received. The selecting rods are, during the period of their selection, rotatable by power communicated to a shaft common to the selecting rods through a friction clutch, but subsequent to the release thereof and just prior to the engagement of the tripping fingers with the series of latches, a positive drive connection is established between the driving and driven shafts.

The recording mechanism comprises, among other parts, a flexible metal ring or wheel, on one side of which the type representing the letters of the alphabet, numerals, punctuation marks and other special characters which are necessary for the printing of a message, are embossed. The wheel or ring is rotatable in either direction, and through the shortest arc between respective characters so as to bring the desired type in alignment with the printing hammer which, when operated, forces the ring with the type against the paper tape, the printing of adjacent characters being prevented by a flexible shield. The type wheel is rotated by means of a rack and pinion normally under tension by a helical spring and driven through a series of pivoted levers which are moved by crank levers under the control of a series of rotatable shafts for imparting to the type wheel a definite and predetermined degree of rotation. The series of shafts is controlled by the latches operated by the tripping fingers.

This invention may be considered as an improvement upon the invention described and claimed in my copending application, Serial No. 432,953, filed December 24, 1920.

Referring to the drawings:

Fig. 1 is a perspective view of the mechanism as assembled;

Fig. 2 is a vertical sectional view with a portion of the casing removed;

Fig. 3 is a plan view with the top removed;

Fig. 4 is a vertical sectional view with the ribbon feeding mechanism removed;

Fig. 5 shows the printer as viewed from the left-hand side;

Fig. 6 is a perspective view of a portion of the selecting mechanism;

Fig. 7 illustrates the method of positioning the selecting rods;

Fig. 8 is a plan view of a portion of the auxiliary selecting mechanism;

Fig. 9 is a detail view showing the shape

of the releasing cams and their position with respect to the selecting rods;

Fig. 10 is an end view of the structure shown in Fig. 8;

Fig. 11 shows the mechanism of Fig. 10 in its inoperative position;

Figs. 12 and 13 illustrate two positions of the auxiliary selecting mechanism;

Figs. 14 and 15 are sectional views showing the manner of release and stopping of the shaft with which the selecting elements rotate;

Fig. 16 is a perspective of a portion of the driving gears;

Fig. 17 is a detail view of the type wheel;

Fig. 18 is a view taken along the broken line 18—18 of Fig. 2;

Fig. 19 shows the various positions of the stepping pawl for advancing the paper tape;

Figs. 20 and 21 show two positions of the lever arrangement for positioning the type wheel so that the characters P and 6, respectively will be in a printing position;

Fig. 22 is a sectional view taken along the broken line 22—22 of Fig. 4;

Fig. 23 is a sectional view taken along the broken line 23—23 of Fig. 4;

Fig. 24 is a detail view of the positive clutch;

Fig. 25 is a plan view of the ribbon advancing mechanism in one of its operative positions;

Fig. 26 is a plan view of the ribbon advancing mechanism in another of its operative positions;

Fig. 27 is a detail view of the ribbon advancing mechanism looking from the right in Fig. 26;

Fig. 28 is a perspective view of a portion of the type ring or wheel showing the arrangement of the flexible shield;

Fig. 29 is a front view of the parts shown in Fig. 28;

Fig. 30 illustrates the parts of Fig. 29 on an enlarged scale showing the manner of printing and shielding of the adjacent characters;

Fig. 31 is a diagrammatic showing of the circuit connections with a line relay;

Fig. 32 illustrates an alternative arrangement of Fig. 31.

In Fig. 1 there is shown a perspective view of the printer mechanism having a metal base 1, upon which rests a casing or housing 2, which has a portion 3 thereof hinged for the purpose of permitting easy access to the printing mechanism. On the top of the casing 2 there is positioned a container 4, in which the tape 34 upon which the characters are to be printed, is positioned.

Referring to Figs. 2 and 4, preferably the latter, a front view of the printer illustrating the arrangement of a plurality of pivoted levers 5, 6, 7, 8 and 9, is shown. Each of these levers is pivoted so that the distance through which they may be moved is different, that is, upon the movement of the lever 5 in either a downward or upward direction, a member 10 will be moved through a given distance. Likewise, if the lever 6 is caused to move in either a downward or upward direction, due to the movement of the connecting links 12 or 13, the member 10 will be moved through a distance greater than that caused by the movement of the lever 5. By arranging these levers in this manner, the various combinations of steps necessary for shifting or moving the type wheel from one position to another so that the different characters carried by the type wheel may be brought into a printing position, are attained. It is thus seen that one of the bars is designed to move the type wheel through a distance of sixteen steps corresponding to a like number of characters, a second one through eight steps, a third through four steps, a fourth through two steps, and a fifth through one step. It is thus possible to position the type wheel in alignment with the tape or printing medium and the printing mechanism for the printing of any desired letter of the alphabet, numeral or other special character, such as punctuation marks. Each of the bars or connecting links 12, 13 and 30 is arranged with respect to the plate 11, which has slots cut therein corresponding to each of these bars so that an easy movement thereof with the least possible amount of friction results.

As shown in Fig. 22, which is a cross-section taken along the line 22—22 of Fig. 4, the bars or connecting links are secured to the pivoted levers so that for each movement of the bars 14, 15, 16, 17 and 18, a resultant movement of the link 12 will be brought about corresponding to the distance through which the associated bar is moved. The manner of connecting the links 30 and 31 with the pivot to which the pivoted lever 5 is connected, differs somewhat from that just described, and which is illustrated in Fig. 23. Between the plate 11 and a surface of the lever 5, there is a washer 32 which holds this lever out of engagement with the member 11. The bar 30 has one end formed in the shape of a hook which fits over the end of the pivoted lever 5, while it is held in position by the enlarged portion of the link 31, the whole combination being held in position by means of a pin or other fastening means 33.

Rigidly secured to the member 10, as shown in Fig. 17, which operates in a vertical plane, is a rack 26, which has cut on one edge thereof a series of teeth designed to engage the teeth of a pinion 27 rigidly secured to a shaft 28. The meshing of the teeth on the rack 26 with those of the pinion 27 is maintained by means of a roller

29. Disposed oppositely to the rack 26 is a second rack 36, which likewise has teeth on one edge thereof, which engage the teeth in the pinion 27. Similarly this rack 36 is held in contact with the teeth on the pinion 27 by means of a roller 39. One end of the rack 36 extends into a hollow member 38 which has fitted therein a helical spring 37 so that the action of the helical spring in combination with the rack 36 places a tension on the pinion 27 so that during a portion of the operation, the rack 26 will have to work against the force exerted by the spring 37, thereby providing a more positive action and permitting of the more accurate positioning of the type wheel in alignment with the printing mechanism.

Secured to the shaft 28 is a metallic wheel 40, shown in Fig. 19, provided with a rim, having cut therein a plurality of teeth of various depths, there being a tooth on the opposite side of each of the types. The teeth in the rim of the wheel 40 individual to each of the characters, are all of the same width and depth. The other teeth are provided for permitting various auxiliary operations, such as spacing without printing, etc. These teeth are provided for the purpose of enabling the centering of the type with respect to the printing mechanism and the tape or printing medium prior to the actual engagement of the printing hammer with the type wheel. Since it is sometimes desired to cause the advancement of the tape without causing the printing of a character, the depth of the teeth are not the same. Thus, as will be more clearly described hereinafter, the printing mechanism, owing to the shape of some of the teeth in the rim of the wheel 40, is not permitted to go to its fullest extent for printing the character on the tape, but the mechanism is so arranged that the tape will be caused to advance one step.

Attached to the spokes of the wheel 40 is a type ring or wheel 41, on one side of which the various characters are embossed. The manner of mounting the type ring which is provided with inwardly extending portions, is such that upon engagement by the printing mechanism, a portion of the ring will be moved forward, and upon its release, will quickly restore to its normal position. For preventing the printing or smudging by the characters adjacent to the one being printed, a flexible steel ribbon 59, Figs. 28, 29 and 30, having an aperture 69 cut therein, which is in alignment with a printing anvil 54 attached to a plate 53, which in turn is secured to the upright 52, is provided. The steel ribbon 59 is attached at its two ends to brackets 67 and 76 and lies between the inking ribbon 182 and the paper tape 34. Upon the engagement of the printing mechanism with a portion of the type ring, the paper tape 34, as shown in Fig. 30, will be bent down over the edges of the anvil 54, while the inking ribbon 182 will be caused to pass through the apertures 69, one edge of which is cut in the shape of a V to prevent cutting of the inking ribbon and paper tape.

The selecting mechanism shown in Fig. 6 comprises a single selecting magnet 42 having a pair of oppositely disposed coils 43 and 44, which are supported on the frame 51. The coils 43 and 44 are arranged when energized to effect a movement of a pivoted armature 45 to which there is secured at one end thereof a beveled extension 46. Since it is oftentimes desirable to connect the magnet directly in circuit with the line, an extension pin 47 is secured to the armature 45, serving as a fastening means for a spring 48, which extends between the extension pin 47 and the upright 49 secured to the base 1. One end of the spring 48 is fastened to a rotatable member 50 attached to the upright 49, thereby permitting of the adjustment of tension exerted on the armature 45.

Normally when the selecting magnet is used without the biasing spring 48, the armature 45 lies in a central position to the coils 43 and 44, so that the beveled extension 46 is in a position central to a pair of deflecting fingers 57 and 58. These deflecting fingers 57 and 58 serve to guide the end of the selecting rods 62, 63, 64, 65 and 66 upon their rotation in the path of the beveled extension or projection 46. Selecting rods 62 to 66, as shown in Fig. 6, extend horizontally across the back of the machine and have the extreme right end thereof bent at an angle of approximately 90 degrees. The movement of the selecting bars into their two operative positions is brought about upon their rotation, as will be more clearly understood from the following description, by the positioning of the beveled projection 46 on the armature 45 in the path of their movement, or, in other words, to one side or the other of the central position with respect to the deflected fingers 57 and 58. In order that the selecting rods will be retained in the position set until a subsequent selection which requires the same to be placed in the other of their operative positions, a semicircular disc or locking vane 68 is mounted in a manner so that one end thereof, which like the extension 46 is beveled, lies in the central portion of the aperture between the deflected fingers 57 and 58. Thus, if it is desired to position any one of the selecting rods, either to the right or left of this disc, and in which position they will be in an operative position with respect to the other mechanism of the printer, the armature 45 must be moved so that the beveled extension 46 lies within the path of the projection on the selecting rod next to engage this part to either the left or the right of the

semicircular disc 68, depending upon which of the coils 43 or 44 is energized. Consequently the selecting rod will be moved a distance equal to the thickness of the semicircular disc 68, which distance is sufficient to permit of the satisfactory operation of the mechanism.

Individual to each of the selecting rods 62 to 66 and rigidly secured thereto, are operating cams or tripping fingers 70, 71, 72, 73, and 74, which are of a shape as shown in Fig. 9, and although the rods to which they are secured are operated successively, they will function simultaneously. Fixed to each of the tripping fingers 70 to 74, is a circular plate 75, and beneath which and movable therewith are a plurality of auxiliary selecting bars 78, 79, 80, 81 and 82, the free ends of which normally rest on a rivet or roller 83. The selecting bar 80 is provided with a horizontally extending portion 84 so that for certain positions of the other selecting bars, the free ends thereof rather than resting on the roller 83, will rest on the extension 84, thereby setting up a condition identical to that if they were resting or piled up on the roller 83, as shown in Fig. 8.

In order that the selecting rods may be revolved for successively positioning the various cams or tripping fingers in accordance with the energization of the selecting magnet 42 for the desired character to be printed or other selecting purposes, all five rods are rotatable and freely movable in a horizontal direction in the bifurcated portion of a spoke-shaped member 60, which is rigidly secured to a driven shaft 61. The shaft 61 has power communicated thereto from a continuously running motor 90, through a worm gear 91 secured to the shaft of the motor and a pinion 92. For closing the power circuit of the motor, a snap switch 98 is mounted on the front of the machine. The pinion 92 is secured at one extremity of an operating shaft 93, which has secured at a point intermediate its ends a beveled gear 94, normally tending to rotate due to the frictional engagement thereof with the friction discs 96 disposed on each side thereof. The beveled gear 94 engages a similar gear 97 secured to the end of the shaft 61, at the opposite end of which the member 60 is secured. In order to vary the normal pressure between the friction discs 96 and the beveled gear 94, plate 87 with a horizontal projecting portion having the free end thereof bifurcated, and a helical spring 89 disposed intermediate the plate 87, and a distance nut 88, are provided. Thus, by varying the pressure on the spring 89, a corresponding variation in the pressure existing between the various parts with which it is associated, is produced.

During a portion of the revolution of the beveled gear 97, especially during the period that the selecting rods 62 to 66 are being positioned to one side or the other of the semicircular disc 68, depending upon the energization of the selecting magnet 42, the load on the driving shaft 93 and consequently on the beveled gear 94 is considerably lighter than that following such positioning of the selecting rods. It is necessary, owing to an increase in load, to provide a positive driving connection between the shaft 93 and the shaft 61, during the period that the tripping fingers 70 to 74, inclusive, function. For providing this positive drive connection between these parts, a toothed wheel 85 is rigidly secured to the shaft 93, and adapted to be engaged by a flexible spring 86 secured to the beveled gear 97, as shown in Fig. 24. The spring 86 is arranged with respect to the wheel 85 so that the engagement of these two parts is brought about following the setting of the selecting rods and continues until the tripping fingers have functioned, as will be more clearly described hereinafter.

Also secured to the shaft 61 is an irregular shaped stop arm 100, best shown in Figs. 14 and 15, which during the non-operation of the printer, engages an extension on the member 101 pivoted to the member 102. One end of the member 101 engages the bifurcated portion of a bar 105 pivotally secured to plate 108, to which there is also pivotally secured a latch 106. This latch 106 is normally held in position by a spring 107 secured to a portion thereof and the plate 108. The under surface of the latch 106 has a notch cut therein which is adapted to receive one end of the bar 105, thereby retaining the extension on the member 101 in the path of the stop arm 100. By this arrangement the shaft 61 will be normally held against rotation and will be started upon the initial energization of the selecting magnet 42. The armature 45 is moved to the left and strikes against the latch 106 thereby raising one end thereof and causing the bar 105 to disengage the notch on the lower surface of this latch for removing the extension on the member 101 out of the path of the stop arm 100. Thus, since power is constantly applied to the shaft 61, as previously described, this shaft will continue to revolve until it is again stopped by the extension on the member 101. Just prior to the completion of the cycle of rotation of the shaft 61 and due to the engagement of the portion 99 of the member 101 with the irregular surface of the member 100, the member 101 together with the bar 105 and the latch 106 will be restored to their normal position, thereby placing the extension on the member 101 in the path of the stop arm 100. By this arrangement the shaft 61 will be started into operation at the beginning of each signal period and will be automatically stopped following the positioning of the selecting rods necessary for the positioning

of a character on the type wheel in alignment with the printing medium and the printing mechanism for effecting the printing of the desired character.

It is often desirous to permit the orientation of the stop member with respect to the driven shaft so that the period intervening between the time that the initial impulse is received and the setting of the first selecting rod may be varied in order that the receiving mechanism will be in synchronism with the transmitting apparatus. This, in the present machine, is accomplished by providing a vertical member 104, pivoted to the rod 103 to which the member 102 is secured. By loosening the screw 77, the member 104 may be moved either to the right or left a distance determined by a circular slot formed in a portion of this member. Thus, since the member 101 is pivotally secured to the member 102, the time intervening between the release of the stop arm 100 and the engagement of the first selecting rod with the beveled extension 46 on the armature 45, may be varied while the printer is in operation.

Referring again to Fig. 6, mounted on the plate 110 and just in front of the cams or tripping fingers 70 to 74, inclusive, is a series of U-shaped members 111 and 112, which have pivoted thereto release latches 113 and 114. These latches are pivoted to the U-shaped members 111 and 112 in a manner so that they are positioned side by side, one being pivoted to the upper part of these members while the other is pivoted to the lower part thereof, and are thus operated independent of the other. They are held in their normal positions by a coiled spring 115. These latches, during the period that the printer mechanism is at rest serve to retain a shaft individual thereto against rotation. The latches 113 and 114 are arranged to be moved out of the path of the projection on the shaft individual thereto by the cams or tripping fingers 70 to 74, depending upon the position of the corresponding selecting rod, and are arranged as will be more clearly described hereinafter to permit of the rotation of the corresponding shaft through a half cycle or an angle of 180°.

Corresponding to each set of release latches and extending horizontally from the back of the machine to the front thereof are operating shafts 117, 118, 119, 120, 121 and 122. Each of these shafts, as previously described, have one extremity thereof bent so as to engage one or the other of the release latches 113 or 114. At the extremity of these shafts there are connected the rectangular shaped pieces 20, 21, 22, 23, 24 and 25 to which the respective connecting links 14, 15, 16, 17, 18 and 19 are connected. At a point intermediate the ends of each of these shafts there is positioned a gear wheel 128, the teeth of which engage the teeth in the corresponding gear wheel secured to the adjacent shaft. Disposed on each side of these gear wheels is a disc of friction material 126 and 127, the former of which is secured by means of a plate 123 having a horizontally extending portion, the free end of which is bifurcated and is secured in place by a locking nut 124. In order that the pressure between the disc 126 and the gear wheel 128 may be varied for different load conditions, a helical spring 125 is placed intermediate the plate 123 and the locking nut 124. Thus, by varying the position of the locking nut 124 on the associated shaft, the tension of the spring 125 may be varied. Disposed on the opposite side of the friction disc 127 is a gear wheel 129, which is rigidly secured to the respective shafts. This gear wheel has teeth arranged thereon for but a small portion of its circumference for the purpose, as will be more clearly described hereinafter, of forming a positive drive connection between the driving means and the shaft with which it is associated.

Beneath each of the gears 128, as is more clearly shown in Fig. 16, an idler 132 fixed to the horizontal extending members 133 and 134 and engaging the teeth in the gears 129, is provided for taking care of an increase in load. The idlers are held firmly in engagement with the teeth in the respective gears by a spring 130 secured at a point intermediate its ends in a manner to exert an upward pull on the shafts to which the idlers are secured. Power is communicated to the gears 128 and the idlers 132 and their associated parts, as shown in Fig. 3, through a gear 136 rigidly secured to the shaft 93, which drives the gears 128 through an intermediate gear 135, which serves to reverse the direction of rotation of these gears with respect to the main driving gear 136. It is thus seen that since power is continuously applied to the shaft 93 from the constantly running motor 90, these gears will likewise be continuously revolved, but owing to the engagement of the projection on one end of the respective shafts with either the latch 113 or 114, these shafts are prevented from rotating but will, however, rotate the instant they are released due to the frictional association of these gears with the friction discs 126 and 127.

Also secured to the shaft 93 is a gear wheel 137, which like the gear wheel 128, drives an idler 146, shown in Figs. 5 and 18. Disposed on one face of the gear wheel 137 is a disc of friction material 147 which also engages a second gear wheel 138, and which has teeth formed thereon for only a small portion of its circumference for providing a positive drive connection between the idler 146 and the teeth thereon. To the opposite face of the gear 138 there is rigidly secured a circular plate 139, in turn secured to a cam

140 which is normally retained against rotation due to the engagement of a projection of the rod 150, which extends across the back of the machine. Arranged beneath each of the release latches 114 and rigidly secured to the rod 150 is an arm 151, which is operated upon the release of any one of the release latches 114 for causing the rotation of the rod 150 through an angle sufficient to move the extension of the rod 150 out of the path of the cam 140. The cam 140 is fixed to a circular disc of friction material 141, which like the friction discs 126, is held firmly in engagement by means of the plate 143 in combination with the spring 144 and the locking nut 145.

When the extension on the rod 150 is moved out of the path of the cam 140, this cam together with the gear 137 is free to rotate, and since power is communicated to the friction clutches 141 and 147 from the continuously running motor 90, the gear wheel 137 will be rotated until the extension on the rod 150 again engages the cam 140. Following the release of the gear 137 and the cam 140, as is more clearly shown in Fig. 18, and following the positioning of the operating levers 5, 6, 7, 8 and 9, depending upon the particular selection chosen, the cam 140 allows the arm 156, together with the roller 157 secured to one extremity thereof to move in a downward direction, thereby causing a similar movement of the pivoted rod 160, which in turn causes the rotation of the irregular shaped rod 159. At one extremity of the rod 159 there is secured the printing mechanism or hammer 155, a portion of which engages the teeth cut in the rim 40 for correctly aligning the type wheel 41 with respect to the extreme end of this mechanism. As previously described, the rim of the whel 40 is provided with variously shaped teeth. Those individual to the characters are, however, of the same shape so that upon the engagement of the member 155 with the walls of any of these teeth, any slight displacement of the type wheel 41 will be corrected.

Referring to Figs. 4 and 11, controlled by the selecting rod 64 which carries the cam or tripping finger 72, is an operating cam 172, which is arranged to be rendered effective by the engagement of a pivoted bell crank lever 176, upon the positioning of the auxiliary selecting bars 78, 79, 80, 81 and 82 in either the position shown in Figs. 8 or 13 for causing the operation of the release latches 173 and 174, which like the release latches 113 and 114 are normally held by a coiled spring 115. Similarly, these latches control the rotation of the shaft 122, which extends to the front of the machine and controls the movement of the operating block 20 to which the link 19 is secured. When the members 78, 79, 81 and 82 are moved to the extreme right hand position due to the positioning of the discs 75, with which they are associated, to such a position, the bell crank lever 176 will be fulcrumed on the free end of the member 82 so that upon the rotation of the selecting rod 64, together with the cam 172 controlled thereby, this cam will engage the opposite end of the bell crank lever 176, thereby causing the operation of either the release latch 173 or 174, depending upon whether the selecting rod 64 is positioned to the right or left of the semi-circular disc 68. Upon the operation of either of these release latches, the shaft 122 is permitted to revolve through an angle of 180°, thereby imparting to the block 20 a similar degree of rotation, and consequently causing the movement of the link 19 and the operating lever 9 to a position whereby the type wheel will be shifted from the portion carrying the letters to the portion upon which the figures and punctuation marks are formed, or vice versa, depending upon which one of the latches is released. In cases where it is desired to shift the type wheel from one portion thereof to another and effect the advancement of the tape one step without causing the impression of a character, and in one distinct operation the auxiliary member 80 with its extension 84 is arranged so that when the members 78, 79, 81 and 82 are in the position shown in Fig. 12, it is not necessary to effect the movement of all of these members, but only requires the movement of the member 80 by its corresponding disc 75. When the members are positioned as shown in Fig. 13 on the extension 84 rather than the roller 83, a condition similar to that just described will exist upon the rotation of the selecting rod 64, together with the operating cam 172. From the above description it is apparent that by means of such an arrangement the type wheel may be shifted through a relatively large angle.

It is also possible with the present arrangement to shift the type wheel from one set of characters to another and prevent the operation of the tape advancing mechanism on the same operation. With the auxiliary selecting elements 78 and 82 in the position shown in Fig. 8, the operating cam 172 will be operated for releasing the shaft 122 which causes the type wheel to be rotated through a relatively large angle. Also with the set of tripping fingers secured to each of the selecting rods 62 to 66, the type wheel will be rotated so that one of the shallower cut teeth lies in the path of the printing hammer. When the printing hammer is actuated, it is prevented from traveling its fullest extent, due to its engagement with the bottom of the aligned tooth, thereby preventing the operation of the tape advancing mechanism. It is thus seen that the invention provides an arrangement whereby the

type wheel may be shifted from one set of characters to another without effecting the operation of the tape advancing mechanism.

The mechanism for causing the advancement of the tape 34 from a printed area to an unprinted area, as shown in Fig. 18, comprises among other parts a ratchet wheel 177 fixed to a shaft 178 and a stepping pawl 169, the latter of which is secured to one extremity of an operating lever 168, which is pivotally secured to the member 167. The stepping pawl 169 is normally under the tension of a coiled spring 170, having one end thereof secured to the stepping pawl 169, while the other end is secured to the member 168. The member 167 is rigidly secured to the operating rod 159 and normally tends to move in a downward direction due to the action of the spring 165 secured to this member and the bolt 166, but owing to the normal position of the operating rod 159, this member is prevented from moving. However, upon the movement of the operating rod 159, as previously described, the members 167 and 168, together with the stepping pawl 169 will be caused to move in a downward direction, the former under the action of the spring 165, while the latter is pulled down due to the spring 170. The stepping pawl 169 as shown by the solid lines in Fig. 19, is moved into engagement with the next succeeding tooth on the ratchet wheel 177. Following the printing operation and the restoration of the operating rod 159 to normal, the members 167 and 168 and the stepping pawl 169 are likewise restored to normal, and due to the engagement of the stepping pawl with the next succeeding tooth, the ratchet wheel 177 will be caused to advance one tooth. Also secured to the shaft 178 is a pair of finely toothed wheels 179. Just above these wheels is a similar set of wheels 162 secured to a rod 163, which may under the action of spring 164 be moved in an upward direction for causing the disengagement of the teeth in the wheels 162 with those in the wheels 179. A pin 198, Fig. 4, is secured to the rod 163 and may, by giving a slight turn to the rod 163 after this rod has been raised a short distance be caused to engage a bayonet slot 199, cut in the casing 200 which incloses the rod 163. Between the wheels 162 and 179, the tape 34 is designed to pass so that upon the advancement of the ratchet wheel 177 one tooth, a corresponding movement of the shaft 178 will be produced, thereby causing the advancement of the tape 34. A positive stop 171 is arranged so that the free end thereof lies in the path of the upward movement of the stepping pawl 169, thereby preventing the advancement of the ratchet wheel 177 a distance equal to more than that of one tooth.

It is often desired to cause the advancement of the tape without effecting the printing of a character. In the present invention this feature is accomplished by advancing the type wheel through the setting of the selecting rods in a predetermined order, whereby the type ring will be positioned so that one of the shallower cut teeth is in alignment with the printing hammer 155 upon the movement of the printing hammer as in the case previously described. When it is desired to advance the tape without printing a character, the shoulder 116 engages the outer edge of the tooth 152, shown in Fig. 19. In this case the members 167 and 168 will be moved through a distance sufficient to permit the stepping pawl 169 to engage the next succeeding tooth on the ratchet wheel 177. But owing to the engagement of the shoulder 116 with the outer edge of the tooth 152, the extreme extension of the printing hammer 155 will not be permitted to move far enough to engage the type wheel for the printing of a character. Thus, upon the withdrawal of the printing hammer in a manner previously described, the stepping pawl 169 will be restored to its normal position against the positive stop 171, thereby rotating the ratchet wheel 177 through a distance equal to one tooth. Consequently the tape 34 will be advanced a similar distance. Should the type wheel be in a position whereby the shoulder 116 on the printing hammer 155 engages the outer edge of the tooth 161, neither printing nor advancing of the tape will be effected since the stepping pawl 169 is not moved far enough to permit its engagement with the next succeeding tooth, in the ratchet wheel 177, as is more clearly shown in Fig. 19 represented by the dotted lines 169A.

The mechanism for advancing the ink ribbon continuously, as illustrated in Figs. 25, 26, and 27, comprises a pair of ribbon spools 180 and 181, upon which the inking ribbon 182 is wound, and which are arranged one above the other and revolvably supported by the arms 185 individual thereto. Individual to each of the spools 180 and 181 are gear wheels 186 and 187, respectively, which serve upon the engagement thereof with the teeth in a worm gear 188 secured to a shaft 189 for causing the advancement of the ribbon. Secured to one end of the shaft 189 is a beveled gear 190, the teeth of which mesh with those of a corresponding beveled gear 191, which is secured to the shaft 93 driven from the continuously running motor 90. As shown in Fig. 27, the shaft 189 is mechanically locked in a position whereby the teeth of the worm gear 188 mesh either with the gear wheels 186 or 187 depending upon the position of the end of this shaft with respect to the extending portion 193 of the vertically supported member 192. For preventing the

accidental movement of this shaft from its two operative positions, a spring pressed member 194 pivoted to the vertical member 192 is provided, but which may be readily moved so as to permit the positioning of the shaft 189 in either of its operative positions. Attached to one end of the worm gear 188 is a projection or shoulder 184, which under normal conditions is unrestrained against rotation. Pivotally mounted to the plate to which the member 185 is secured, are members 195 and 196, each of which has a slot cut in one end thereof, and through which the inking ribbon is designed to pass. However, upon the movement of either of the pivoted members 195 or 196, which are held in their normal position by a spring 197, due to the engagement by a ball 183 secured at a point near each end of the ink ribbon, the engaged member will be rotated through an angle sufficient to cause the opposite end thereof to lie in the path of the shoulder 184. Thus, upon the continued rotation of the worm 188 and due to the cam action caused by the movement of the end of the member opposite to the one in engagement with the ball 183 into the path of the shoulder 184, the shaft 189 will be moved from engagement with the teeth on one of the gear wheels 186 or 187 to that of the other, depending upon which gear wheel the worm gear was previously in engagement with.

As shown in Fig. 2, the ball 183 secured to the ribbon 182 is about to engage one extremity of the member 195, and upon the engagement of this ball with this member and due to the fact that the slot through which the ink ribbon passes is not large enough to permit the passage of the ball 183, the member 195 will be rotated a distance sufficient to cause the lower extremity of this member to engage the shoulder 184, thereby causing the worm gear 185 to disengage the teeth in the gear wheel 187 and engage those in the gear wheel 186 for reversing the direction of travel of the ink ribbon. Immediately following the disengagement of the ball 183 with the member 195, this member will be restored to its normal condition under the action of spring 197.

The receiving printer hereinbefore described is operated preferably by various combinations of five selecting current units with an additional impulse preceding the selecting units for conditioning what may be termed the distributing mechanism for operation. Impulses may arrive over the line and pass through a line relay 202 having both front and back contacts, as clearly shown in Fig. 31. To the front and back contacts the windings of the coils 43 and 44 are connected. In some cases it may be advisable to eliminate the line relay and use but one set of coils of the selecting magnet 42, as is more clearly shown in Fig. 32, and normally bias the armature of the selecting magnet by the use of the coiled spring 48.

The operation of the printer mechanism, hereinbefore described, relative to a particular type selection and the operations incident thereto are as follows: For the sake of clearness, let it be assumed that it is desired to select and print the character P. Further assume that the character P comprises the following selecting current units: no current, current, current, no current, and current. Also assume that the type ring 41 is in a position for printing the characters of the alphabet.

Preceding the above selecting units it is necessary to transmit a starting unit, which in the present case amounts to opening the line whereby the line relay 202 is deenergized, thereby causing the energization of the coils 43 of the single selecting magnet 42. The energization of the coils 43 of the selecting magnet 42 causes the reversal of the position of the armature 45, whereby the release latch 106 is rotated about its pivot, thereby effecting the disengagement of the bar 105 with the notch on the under surface of this release latch. The release of the bar 105 causes the member 101 to be rotated about its pivot a distance sufficient to move the extension on this member out of the path of the stop arm 100 secured to the shaft 61. The instant the member 101 is moved in this manner, the shaft 61, together with the stop arm 100 is free to rotate, since, as previously described, power is communicated to this shaft from a continuously running motor 90 through friction clutches associated with the beveled gear 94.

The first selecting unit of the combination being no current, the line relay 202 remains deenergized, thereby maintaining the coils 43 of the selecting magnet 42 energized until the position of the armature of relay 202 is again reversed. The shaft 61 together with the selecting rods 62, 63, 64, 65, and 66 now being rotated, causes the projections on these rods to successively engage the beveled extension 46 on the armature 45. Inasmuch as the coils 43 are, for the particular section chosen, energized, the armature 45 will be in a position whereby the projection on the selecting rod 62 will be moved to the right of the semi-circular disc or locking vane 68, thereby causing a similar displacement of the cam or tripping finger 70 with respect to the release latches 113 and 114, or in other words, being in a position upon its continued rotation to operate the release latch 113. Upon the transmission of the second selecting unit, which consists in applying to the line 203 a source of current, the line relay 202 would be energized, whereby the coils 43 will be deenergized and the coils 44 of the selecting magnet 42 energized for reversing the position of the armature 45.

Thus, the beveled extension 46 will be moved to the right so that upon the engagement of the projection on the selecting rod 63 with this beveled extension, it will be deflected to the left of the semi-circular disc or locking vane 68, and consequently moving the selecting rod 63 and the cam or tripping finger 71 a distance equal to the width of this disc or locking vane. The next selecting unit being current, the line relay 202 will remain energized, thereby retaining the armature 45 in its extreme right position, and consequently the projection on the selecting rod 64 like that of 63 will be moved to the left of the semi-circular disc or locking vane 68. For the next selecting unit the line relay 202 will be deenergized for causing the energization of the coils 43 of the selecting magnet 42 and the reversal of the position of the armature 45 together with the beveled extension 46, so that upon the engagement of the projection of the selecting rod 65 with this beveled extension, the selecting rod 65 together with the cam or tripping finger 73 will be moved to the right a distance equal to the thickness of the semi-circular disc or locking vane 68. The last selecting unit consists in applying current to the line, thus causing the energization of coils 44 and the reversal of the position of the armature 45. Upon the engagement of the projection on the selecting rod 66 with the beveled extension 46, the rod 66 will be moved to the right and retained in such position until a succeeding selecting unit is transmitted which reverses its position with respect to the semi-circular disc for locking the vane 68.

Following the positioning of the selecting rods in the manner just described, the cams or tripping fingers 70, 71, 72, 73, and 74 will be in a position just about to operate the corresponding release latch at which time the flexible spring 86, as shown in Fig. 24, will be approaching the teeth in the gear wheel 85. During the operation of the release latches 113 and 114, it is necessary to provide a positive drive connection between the shaft 61 and the shaft 93, as at this time the greatest load is exerted on the motor 90. Assume also that the projections on the shafts 118, 119, and 121 are in engagement with the upper or release latch 113, while the extension on the shafts 117 and 120 is in engagement with the release latch 114. Then, since but one of the latches 113 and 114 is designed to be released only by the operating cams or tripping fingers 70 to 74, when the corresponding selecting rod is moved either to the right or left with respect to the semi-circular disc or locking vane 68, the shafts 117 to 121 will be released for rotation simultaneously upon the engagement of the tripping fingers 70 to 74 with the release latch restraining the respective shaft against rotation. In this case these shafts will be rotated through an angle of 180 degrees due to the frictional engagement of the friction discs 126 and 127 with the continuously running gear 128, thereby moving the operating levers 5, 6, 7, and 8 to the position shown in Fig. 20.

For the first few degrees of rotation of the shafts 117 to 122, inclusive, no appreciable load is applied to the friction clutches, but is only noticeable for approximately the first and last 15 degrees of rotation during which period considerable slippage takes place between the several gears and the friction discs, owing to the increase in load. To obviate this condition, a positive drive is effected between the respective parts by the use, as previously described, of gear wheels 129, which have teeth formed on the periphery thereof for only a portion of the circumference. Thus, during the period of increase in load, the teeth in the gear wheel 129 engage those in the idlers 132, thereby establishing a positive drive connection for lessening the load on the friction clutches individual to the respective gears 128. The movement of the operating levers 5, 6, 7, and 8, and consequently the lever 9, will cause the rack 26 to be moved together with the pinion 27 and the shaft 28 a distance to properly position the portion of the type ring carrying the character P in alignment with the printing medium and the printing hammer 155. Upon the operation of any one of the release latches 114, the member 151 pivoted to the shaft 150, is operated, thereby rotating its associated shaft through an angle sufficient to cause the removal of the extension thereon from engagement with the cam 140 which is then free to revolve through the frictional engagement of the gear 137 with the friction discs 141 and 147. The roller 157, together with the arm 156, upon the continued rotation of the cam 140, falls into the depressed area, more clearly shown in Fig. 18, for causing the rotation of the rod 153. However, just prior or about the time when the roller 157 is engaging the depressed area on the cam 140, the teeth on the wheel 138, which, as previously described, has teeth thereon for but a small portion of its periphery, engage the idler 146 and provide what may be termed a positive drive connection for rotating the cam whereby a more positive action is produced on the rod 153. As the rod 153 continues to rotate, the operating rod 159 is rotated about its pivot so that the printing hammer 155 presses the portion carrying the character P, as shown in Fig. 30, against the paper tape and thus effects the printing of this character.

Before the character is printed, however, the type ring will be aligned with the extreme end of the printing hammer due to

the engagement thereof with the side of the teeth cut in the rim of the wheel 40, as was previously described.

At the time that the printing hammer 155 is printing the character P on the tape 34, the stepping pawl 169 has engaged the next succeeding tooth of the ratchet wheel 177, so that upon the withdrawal of the printing hammer 155 from engagement with the type ring, the members 167 and 168 will be restored to their normal positions, thereby causing the advancement of the ratchet wheel 177 through the action of the stepping pawl 169 one tooth. Consequently the paper tape 34 will be advanced to position an unprinted area before the type wheel 41.

As the stop arm 100 together with the shaft 61 continues its rotation, and just prior to the completion of the cycle thereof, the portion 99 of the member 101 engages the irregular surface on the stop arm 100, thereby causing the restoration of the release latch 106, the operating bar 105 and the member 101 to their normal positions, or the position shown in Fig. 14. Thus, before the stop arm 100 has completed its cycle of rotation, the projection on the member 101 will lie in the path of this arm, thereby arresting the rotation of the shaft 61 after it has completed its cycle of rotation.

Assuming that it is desired to shift the type ring from the portion carrying the letters of the alphabet to the portion on which the figures or other special characters are mounted, it is necessary to transmit a definite series of selecting units. Such a series of selecting units is as follows: current, current, no current, current, and current. The selecting magnet 42 in responding to such units, causes all of the selecting rods with the exception of the one carrying the cam or tripping finger 72, to be positioned to the left with respect to the semi-circular disc or locking vane 68. With such a setting of the selecting rods, the auxiliary selecting members 78, 79, 81, and 82 will be in a position so that the free ends thereof will be arranged as shown in Fig. 8. It is, of course, understood that the stop arm 100 has been released for rotation, as was described in connection with the positioning of the type ring 41 for the printing of the character P. As the shaft 61 continues to rotate following the setting of the selecting rods in the manner just described, the lower end of the bell crank lever 176 engages a surface of the member 82, which has been positioned in this manner by the setting of the selecting rods 62, 63, 65, and 66 to the left with respect to the semi-circular disc or locking vane 68. Due to the engagement of the lower portion of the bell crank lever 176 in this manner, the cam 172 controlled by the selecting rod 64 is caused to be rotated about its pivot, and since the selecting rod 64 is in its extreme right position, the latch 173 will be operated upon the engagement of the cam 172 therewith, so that the shaft 122 will be free to rotate until arrested the engagement of the extension thereon with the release latch 174 positioned at an angle of 180 degrees from the release latch 173. The shaft 122 will thus be revolved in a manner similar to that described in connection with the other shafts. Due to the accumulated effect produced by the positioning of the operating blocks 20, 21, 22, 23, 24, and 25, the rack 26 will be moved a distance sufficient to impart a rotary motion to the pinion 27 such that the type wheel 41 will be rotated through an angle to position the portion of the type wheel carrying figures and other special characters in alignment with the printing mechanism.

Following the positioning of the type ring 41 in the manner just described, assume that it is desired to print the numeral 6, the following set of selecting units would be transmitted: no current, current, no current, current, and no current. The electromagnet 42, in responding to these impulses, positions the selecting rods upon their rotation in a manner whereby the respective cams or tripping fingers 70 to 74 are in a position with respect to the semi-circular disc 68, so that upon the operation of the corresponding release latch, the shafts 117, 118, 119, 120, and 121 will be rotated so that the rectangular block secured at one end thereof will assume the position shown in Fig. 21. With the operating levers 5, 6, 7, 8, and 9 in the position shown in this figure, the numeral 6 will be in alignment with the projection on the printing hammer 155. The printing of the numeral 6 is effected in a manner similar to that described in connection with the printing of the character P. A further description of the operation of the system in this respect is, therefore, considered unnecessary.

If it is desired to unshift the type ring, as for example, from the portion on which the numerals or other special characters are mounted to the portion carrying the letters of the alphabet, the following series of selecting units must be transmitted: current, current, current, current, and current. As before, the selecting rods 62, 64, 65, and 66 will be positioned to the left with respect to the semi-circular disc 68. Likewise the selecting rod 64 will be positioned to the left with respect to the semi-circular disc 68. The selecting rod 64 being thus moved to the left, the cam 172 upon the engagement thereof with the bell crank lever 176, and due to the arrangement of the auxiliary selecting members 78, 79, 81, and 82 in the position shown in Fig. 8, the release latch 174 will be operated upon the continued rotation of the selecting rods. Consequently the shaft 122,

the projection of which is now in engagement with the release latch 174, will be revolved until arrested by the release latch 173 or to the position shown in Fig. 11. Due to the setting of the selecting rods in the position just described and the rotation of the shafts 117, 118, 119, 120, 121, and 122 to a position whereby the rectangular blocks 22, 23, 24, and 25 are in the position shown in Fig. 4, the type ring 41 will be in a position for the printing of the characters of the alphabet.

It often becomes necessary to shift the type wheel from the area thereof carrying figures or other special characters to the area carrying the letters of the alphabet and also advance the tape 34. To accomplish this, it is only necessary to transmit a series of impulses or selecting units whereby the selecting rods will be positioned so that the auxiliary selecting rods 78, 79, 80, 81, and 82 assume a position similar to that of Fig. 13. Thus, as the selecting rods are revolved, and due to the engagement of the bell crank lever 176 with the end of the auxiliary member 82, which is now raised as shown in Fig. 13, the cam 172 will be caused to engage the release latch 174. Consequently the shaft 122 will be free to rotate through an angle of 180 degrees upon the operation of the release latch 174. In this manner, the type wheel 41 will be rotated through a relatively large angle, that is, the portion of the type wheel, carrying the letters of the alphabet will be positioned in alignment with the printing mechanism. Likewise, the rod 153 will be rotated, as previously described, for causing the stepping pawl 169 to engage the next succeeding tooth in the ratchet wheel 177 for imparting to the shaft 178 a degree of rotation sufficient, upon the restoration of the stepping pawl to normal, to advance the tape 34. No character is printed as the type wheel is in a position such that the shoulder 116 of the printing hammer 155 engages the tooth 152.

Although the present invention has been disclosed and described in connection with a receiving printer wherein the characters are printed in a continuous line or on a paper tape, it is, of course, obvious that several of the embodiments of the invention may be incorporated in receiving printers of the type commonly referred to as page printers without departing from the spirit and scope of the invention.

The invention claimed is:

1. In combination, a type wheel having a solid rim with characters arranged on one side thereof, a plurality of rotatable selecting members arranged to occupy either of two positions, means for retaining said members in their actuated position, means responsive to selecting units to permit said members to be positioned in predetermined combinations with respect to said retaining means, a source of power normally disconnected from said type wheel, and means controlled by said selecting members for connecting said source of power to the type wheel to position said type wheel in a printing position.

2. In combination, a type wheel having a solid rim with the characters arranged on one side thereof, a plurality of rotatable and horizontally movable selecting members arranged to occupy either of two positions, a locking vane for retaining said members in their actuated position, an electromagnet having an armature with a beveled extension for causing said selecting members to be deflected to one side or the other of said locking vane depending upon the energization of said electromagnet, and mechanical means controlled by the positioning of said members for rotating said type wheel to a printing position.

3. In combination, a type wheel having a continuous periphery with the characters arranged on one side thereof, a plurality of rotatable and horizontally movable selecting elements arranged to occupy either of two selectable positions, means tending normally to rotate said elements, electromagnetic means operative for permitting the rotation of said elements and the subsequent positioning thereof in predetermined combinations, and mechanical means controlled by the positioning of said elements to effect the positioning of said type wheel in a printing position depending upon the energization of said electromagnetic means.

4. In combination, a type wheel having a solid rim with the characters arranged on one side thereof, a plurality of selecting elements rotatable in a complete circular path and arranged to occupy either of two positions, members carried by each of said elements, means tending normally to rotate said elements, a single electromagnet operative for causing the release of said elements and the subsequent positioning thereof whereby said members are set in predetermined combinations, and mechanical means controlled by the setting of said elements in predetermined combinations for causing the positioning of said type wheel in accordance with the energization of said electromagnet.

5. In combination, a plurality of rotatable elements arranged to occupy either of two selecting positions, means tending normally to rotate said elements, electromagnetic means for controlling the release of said elements and the subsequent positioning thereof in predetermined combinations, a type wheel, mechanical means controlled by the setting of said elements for positioning said type wheel, printing mechanism, and a flexible shield associated with said type wheel for preventing the printing of adjacent charac-

ters on the operation of the printing mechanism.

6. In combination, a type wheel having the characters arranged on one side thereof in a single row, a printing medium, an inking ribbon, a flexible shield having an aperture cut therein in a position central to the ends thereof and interposed between said inking ribbon and said printing medium, and a printing mechanism arranged when operated to cause the impression of a character carried by said type wheel on said printing medium without causing the impression of the adjacent characters.

7. In a printing telegraph receiver, a type wheel having the characters arranged on one side thereof in a single row, a printing medium, an inking ribbon, a flexible metal shield having an aperture cut therein, and interposed between said printing medium and said inking ribbon, a printing anvil mounted in alignment with said aperture, and printing mechanism arranged to cause the impression of a character carried by said type wheel on said printing medium without the impression of the characters adjacent to the desired character to be printed.

8. In combination, a type wheel having a solid rim with the characters arranged on one side thereof in a single row, a member movable through varying distances for causing the rotation of said type wheel, actuating means therefor comprising a set of rotatable shafts each arranged by a half revolution thereof to produce a definite and characteristic degree of motion, connecting levers movable in accordance with the rotation of said shafts, and a pivoted lever linked with the connecting levers for transmitting the cumulative effects of said shafts to produce a desired cumulative rotation of said type wheel.

9. In a printing telegraph receiver selecting mechanism responsive to line current impulses, a type wheel having a continuous periphery with the characters arranged on one side thereof in a single row, a toothed wheel secured to said type wheel, means controlled by the selecting mechanism to simultaneously rotate said toothed wheel and said type wheel to a predetermined point, a printing medium, a striker bar, and means mounted on said striker bar and arranged to engage a tooth in said wheel for correctly aligning the type wheel with respect to the striker bar and printing medium.

10. A printing telegraph receiver comprising a selecting magnet, a plurality of movable selecting rods positioned in accordance with the energization of said magnet, a type wheel having a continuous periphery with two sets of characters arranged thereon in a single row, a printing medium, means for advancing said printing medium, and mechanical means controlled by said rods for simultaneously shifting said type wheel from one set of characters to the other and causing the operation of said advancing means.

11. In a printing telegraph receiver, a type wheel having a continuous periphery with the characters arranged on one side thereof in a single row, means for positioning said type wheel comprising a set of interconnected levers of different lengths, a crank for operating each of said levers, a rotatable shaft for operating each of said cranks, a pair of stops for each of said shafts arranged to stop the rotation of said shaft in either of its two diametrically opposite positions, and means for selectively tripping one or the other of said stops of each selected set to permit a half rotation of the associated shafts, and means linked with said system of levers for imparting a rotary movement to said type wheel.

12. A printing telegraph receiver comprising a plurality of selecting rods, an intermittently revolving shaft associated with said rods, means for normally holding the said shaft together with said rods against rotation, a selecting magnet, means controlled by said selecting magnet for permitting the rotation of said shaft, said selecting magnet being responsive to selecting current impulses for positioning said selecting rods in predetermined combinations in accordance with the desired character, tripping members secured to each of said rods, a type wheel having a continuous periphery with the characters arranged on one side thereof in a single row, and mechanical means brought into operation by said tripping members to impart to said type wheel a motion sufficient to position the desired character in a printing position.

13. A printing telegraph receiver comprising a printing medium, means for advancing said printing medium, a selecting magnet, a plurality of movable selecting rods positioned in accordance with the energization of said magnet, a type wheel having two sets of characters thereon, and mechanical means controlled by one of said rods when the remaining ones thereof are in a predetermined position for simultaneously shifting said type wheel and operating said advancing means.

14. In a printing telegraph receiver, a paper tape, means for advancing said tape intermittently, selecting mechanism comprising a plurality of elements, electromagnetic means for controlling the position of said elements in accordance with the reception of selecting units, a type wheel arranged with two sets of characters, and means controlled by one of said elements when the remaining elements are in a predetermined position for simultaneously shifting said

type wheel and operating said tape advancing means.

15. In a printing telegraph receiver, a paper tape, means for advancing said tape intermittently, selecting mechanism comprising a plurality of elements, a single magnet for controlling the position of said elements in accordance with the selecting units received, a type wheel arranged with two sets of characters thereon in a single row, and means controlled by one of said elements when the remaining elements are in a predetermined position for simultaneously shifting said type wheel and operating said tape advancing means.

16. In combination, a driving shaft, continuously operated power means for driving said shaft, a driven shaft normally driven from said driving shaft through a friction clutch, means tending normally to prevent the rotation of said driven shaft, a gear wheel on said driving shaft, and a resilient member secured to said driven shaft and arranged to engage said gear wheel to communicate power from the driving shaft through said resilient member to the driven shaft.

17. In a printing telegraph receiver, a type wheel positioning mechanism comprising a driving shaft, continuously operated power means for driving said shaft, a driven shaft normally tending to rotate, said shaft being normally driven through a friction clutch, a set of rotatable shafts each arranged by a half revolution thereof to impart a definite and characteristic degree of rotation to said type wheel, selectively operable means rotatable with said driven shaft to permit a half revolution of selected ones of said set of rotatable shafts to produce a desired cumulative rotation of said type wheel, and a mechanical coupling established between said driven and driving shafts preceding the release of said set of shafts.

18. In combination, a type wheel positioning mechanism comprising a set of rotatable shafts each arranged by a half revolution thereof to impart a definite and characteristic degree of rotation to said type wheel, a continuously operated power means normally tending to rotate said shafts by power communicated thereto through a friction clutch, means selectively operable to permit a half revolution of selected ones of said shafts to produce a desired cumulative rotation of said type wheel, and a positive connection established between said shafts and said power operative means prior to their completion of a half revolution.

19. In combination, a driving and a plurality of driven shafts, a train of gears continuously driven from said driving shaft, a gear individual to each of said driven shafts which normally tends to rotate said shaft through a friction clutch, an idler gear corresponding to each of the gears of said train and rotatable therewith, and means rigidly secured to said driven shafts for engaging said idler gears for a portion of the rotation thereof whereby a positive drive connection is established between the respective parts.

20. In combination, a shaft normally tending to rotate, a stop member, a stop arm normally engaging said member secured to said shaft and having a curved surface, electromagnetic means, a release latch forming a mechanical lock for said member operated upon the initial energization of said electromagnetic means for moving said stop member out of the path of said stop arm, and a projection of said stop member engaging the curved surface of said stop arm upon the rotation of said shaft for automatically restoring said release latch and stop member to normal.

21. In combination, a shaft normally tending to rotate, a stop member, a stop arm normally engaging said member and secured to said shaft, a single selecting magnet, and a release latch operated upon the initial energization of said selecting magnet for moving said stop member out of the path of said stop arm, said stop arm arranged to produce a cam action upon its rotation for automatically restoring said member and said release latch to normal.

In witness whereof, I hereunto subscribe my name this 18th day of January, A. D., 1922.

HARRY PFANNENSTIEHL.