

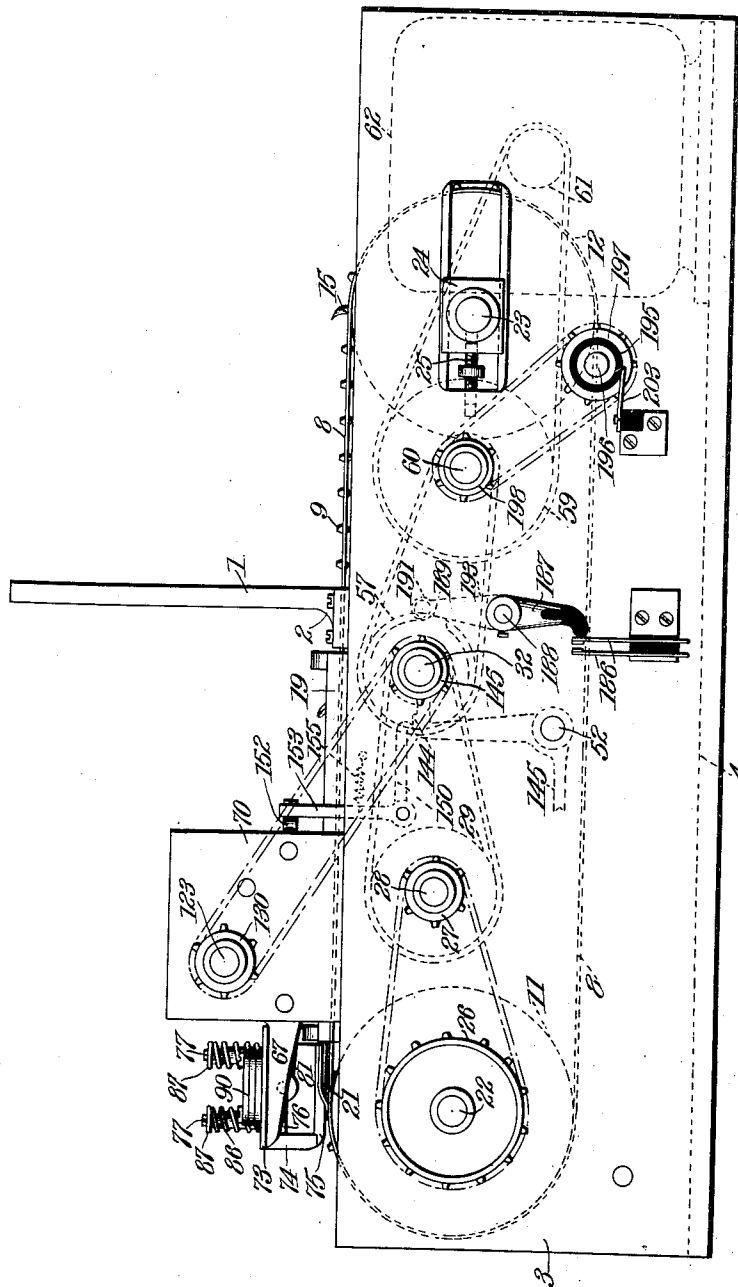
L. M. POTTS.
 AUTOMATIC TELEGRAPH TRANSMITTER.
 APPLICATION FILED JUNE 2, 1910.

1,060,939.

Patented May 6, 1913.

9 SHEETS—SHEET 2.

Fig. 3.



Witnesses
McE. Jones
E. G. Marshall

Inventor
L. M. Potts
 By *John N. Kalk*
 Attorney

L. M. POTTS.
 .AUTOMATIC TELEGRAPH TRANSMITTER.
 APPLICATION FILED JUNE 2, 1910.

1,060,939.

Patented May 6, 1913.

9 SHEETS—SHEET 3.

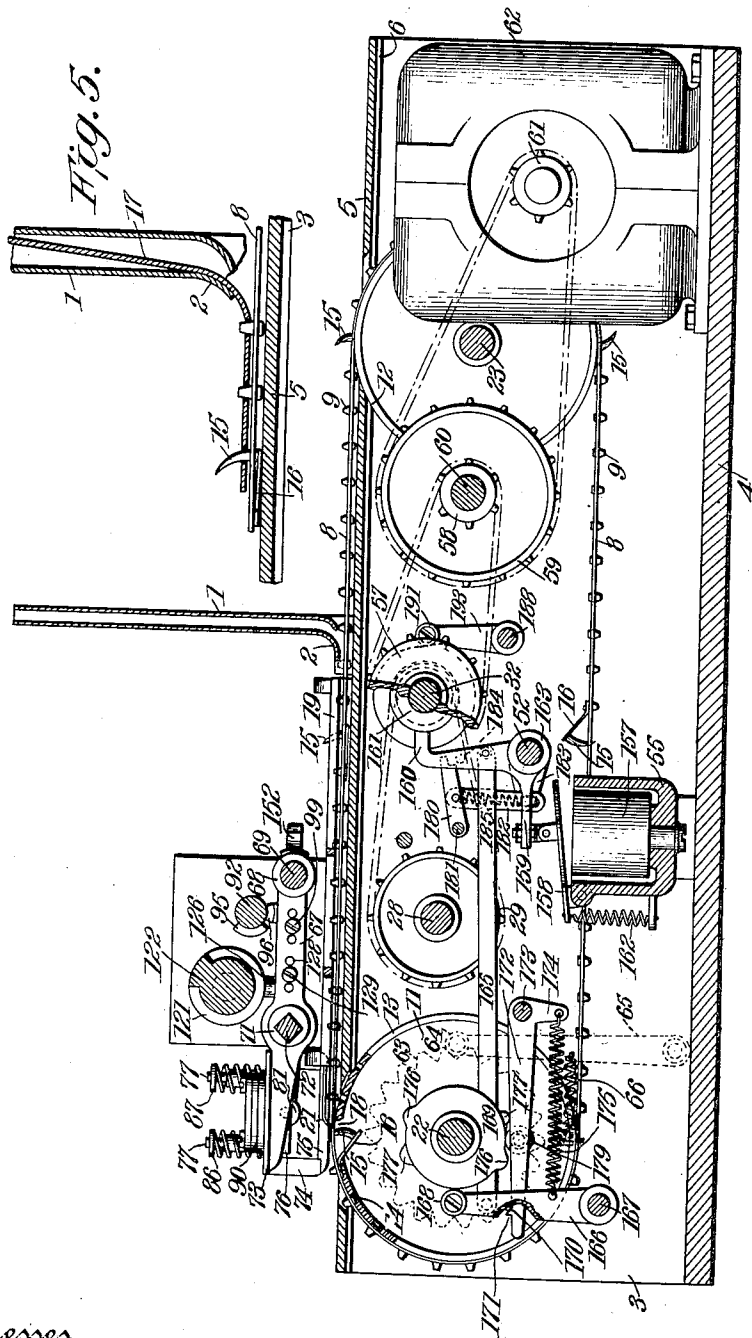


Fig. 5.

Fig. 4.

Witnesses
W. M. Jones
E. J. Marshall

Inventor
L. M. Potts
 By *John H. Kalk*
 his Attorney

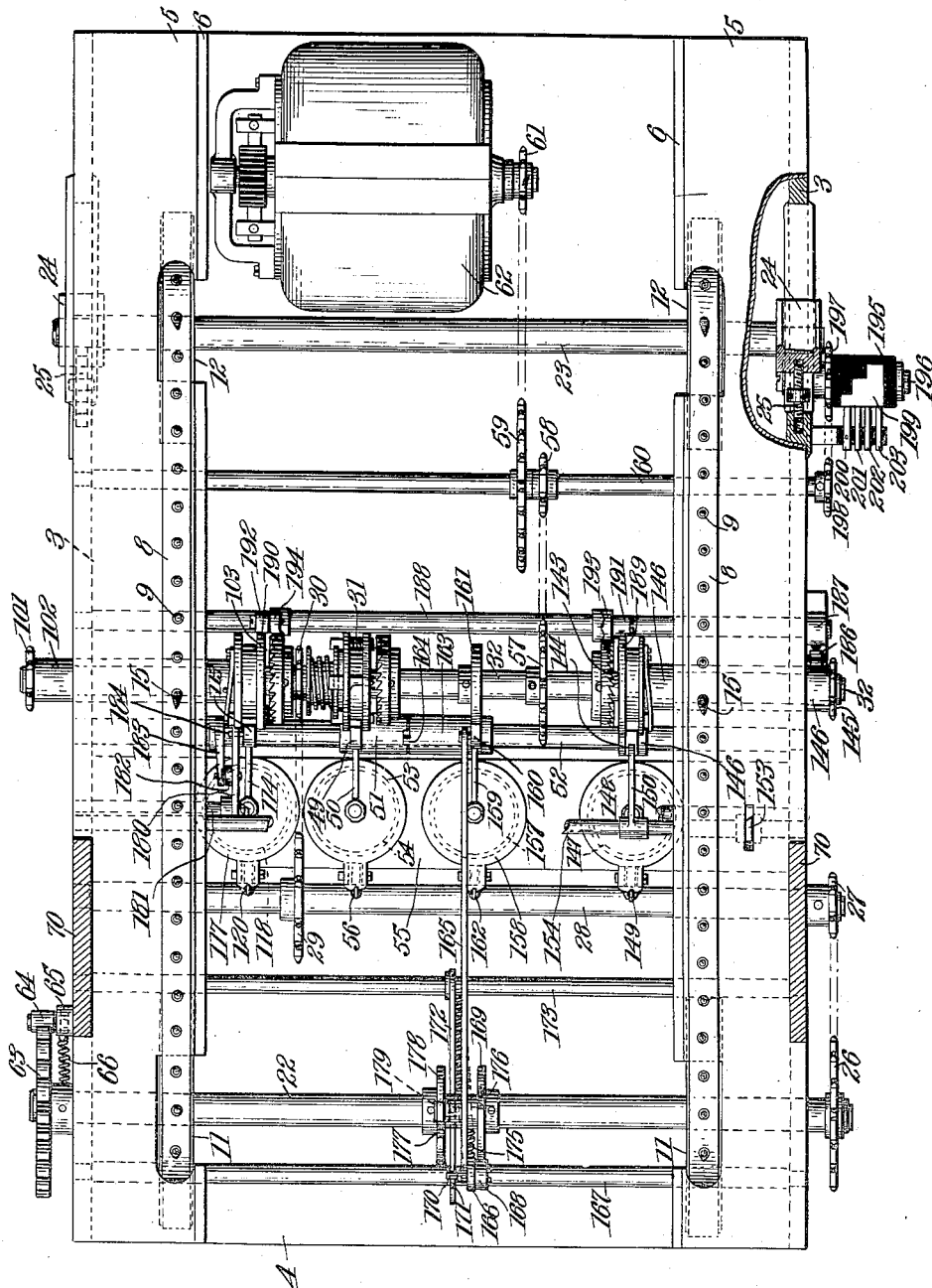
L. M. POTTS.
 AUTOMATIC TELEGRAPH TRANSMITTER.
 APPLICATION FILED JUNE 2, 1910.

1,060,939.

Patented May 6, 1913.

9 SHEETS—SHEET 4.

Fig. 6.



Witnesses
 E. Marshall
 Francis S. McGuire

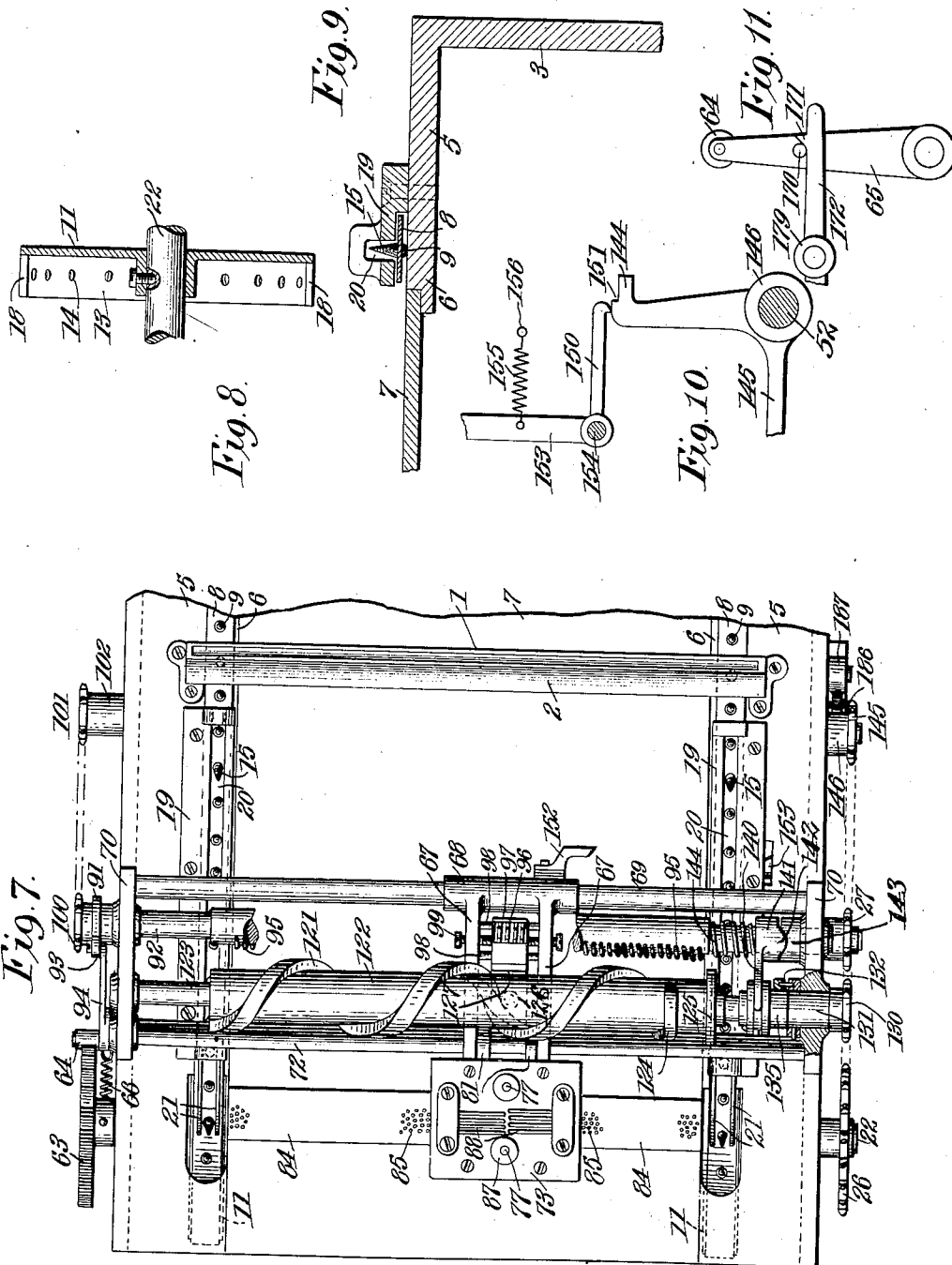
Inventor
 L. M. Potts
 By John H. Kelly
 Attorney

L. M. POTTS.
AUTOMATIC TELEGRAPH TRANSMITTER.
APPLICATION FILED JUNE 2, 1910.

1,060,939.

Patented May 6, 1913.

9 SHEETS—SHEET 5.



Witnesses
E. J. Marshall.
Francis S. Magnus.

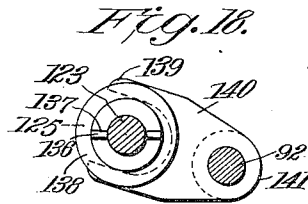
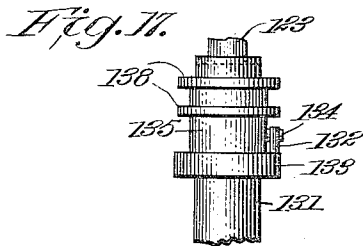
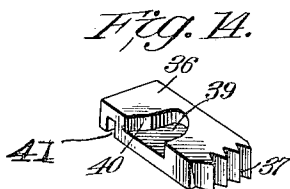
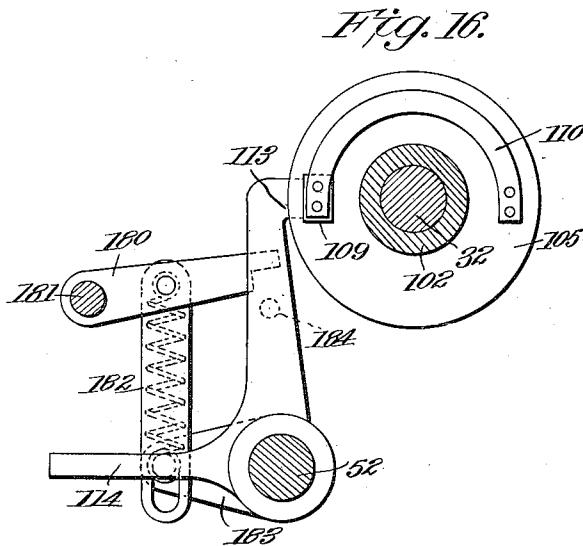
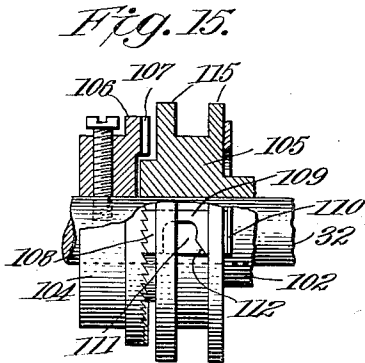
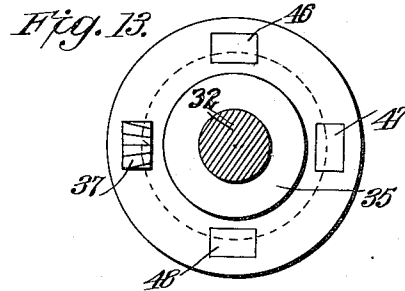
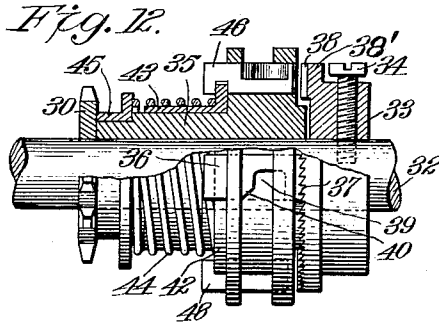
Inventor
L. M. Potts
By John H. Voss
Attorney

L. M. POTTS.
 AUTOMATIC TELEGRAPH TRANSMITTER.
 APPLICATION FILED JUNE 2, 1910.

1,060,939.

Patented May 6, 1913.

9 SHEETS—SHEET 6.



Witnesses
McDonnell
E. J. Marshall

Inventor
L. M. Potts
 By *John H. Kelly*
 his Attorney

L. M. POTTS.
AUTOMATIC TELEGRAPH TRANSMITTER.
APPLICATION FILED JUNE 2, 1910.

1,060,939.

Patented May 6, 1913.

9 SHEETS—SHEET 7.

Fig. 21.

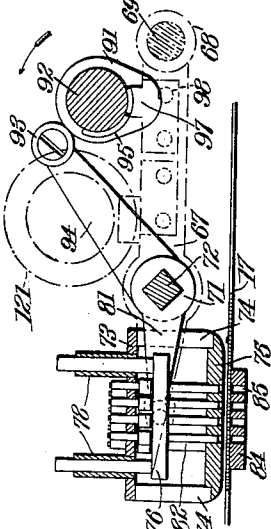


Fig. 20.

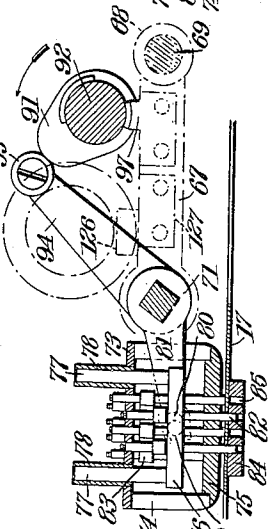
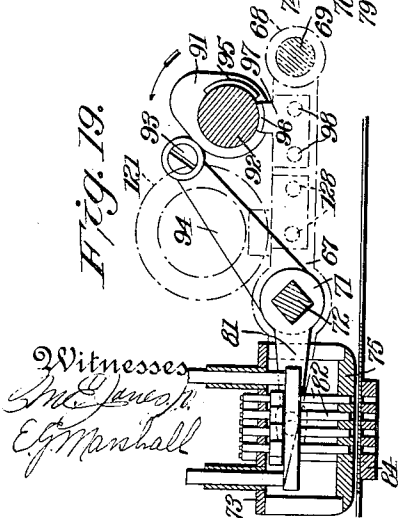


Fig. 19.

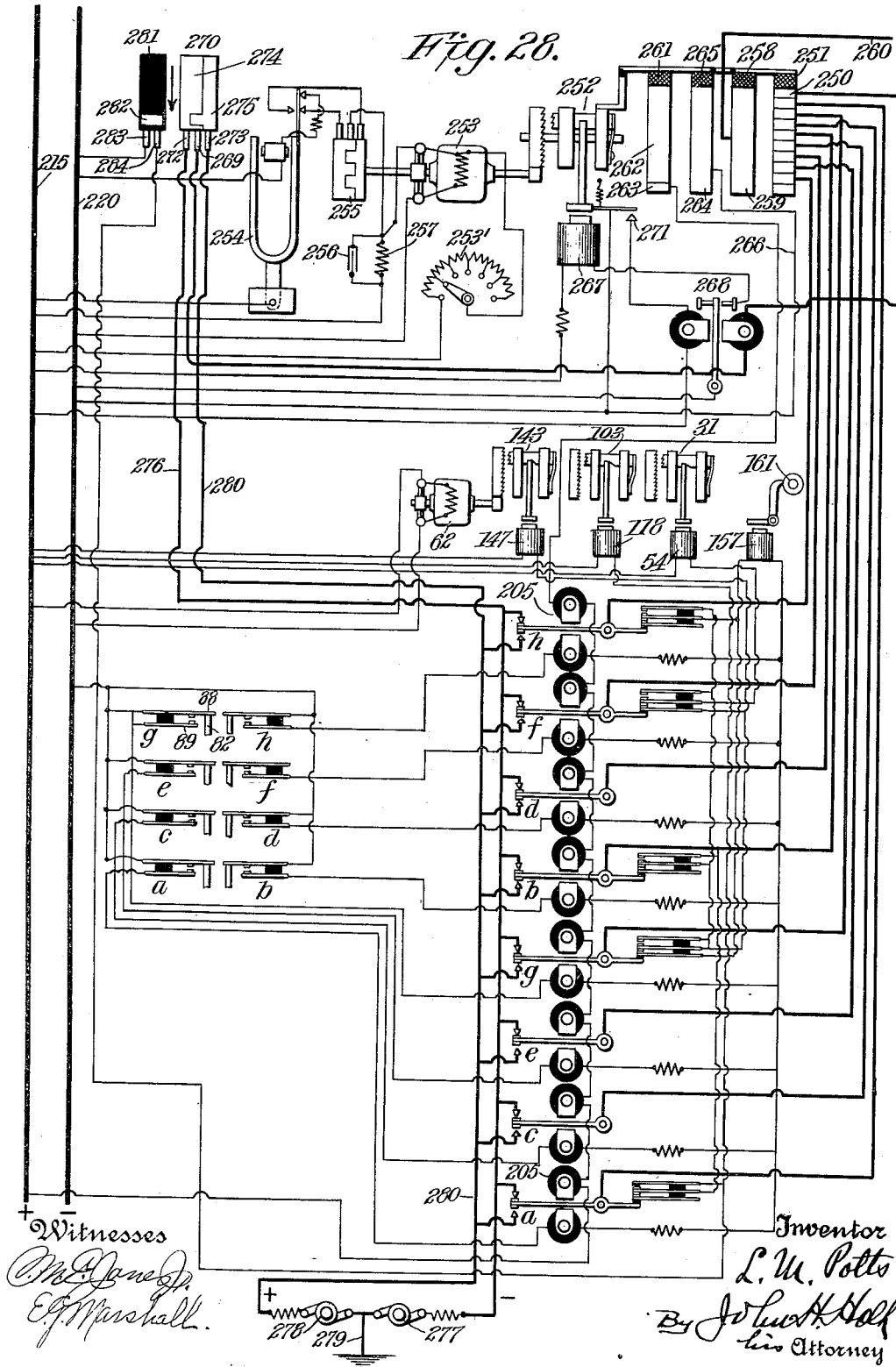


L. M. POTTS.
 AUTOMATIC TELEGRAPH TRANSMITTER.
 APPLICATION FILED JUNE 2, 1910.

1,060,939.

Patented May 6, 1913.

9 SHEETS—SHEET 9.



UNITED STATES PATENT OFFICE.

LOUIS MAXWELL POTTS, OF BALTIMORE, MARYLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AUSTIN McLANAHAN, OF BALTIMORE, MARYLAND.

AUTOMATIC TELEGRAPH-TRANSMITTER.

1,060,939.

Specification of Letters Patent.

Patented May 6, 1913.

Original application filed June 17, 1908, Serial No. 502,785. Divided and this application filed June 2, 1910. Serial No. 564,587.

To all whom it may concern:

Be it known that I, LOUIS MAXWELL POTTS, a citizen of the United States, residing at city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Automatic Telegraph-Transmitters, of which the following is a specification.

This invention relates to that class of automatic telegraph transmitters in which the control is effected by a sending blank on which the information appears in lines of code perforations, embossments or the like, and is characterized especially in that the sending blank itself controls the selective movement necessary to bring about the operation of these perforations or the like.

The said invention is characterized further in that the same perforations or the like which act to effect such selective movement also act to transmit signals corresponding thereto for the purpose of effecting similar operations in other mechanism.

The said transmitter further embodies certain novel blank feeding and lining mechanism, contact mechanism, spacing and carriage return mechanisms, all of which, together with other features, will be hereinafter more fully described and particularly pointed out in the claims.

The present invention was originally embodied in an application for Letters Patent of the United States for telegraphy, filed by me June 17, 1909, Serial No. 502,785, of which the present application is a division.

Referring to the accompanying drawings which illustrate a specific embodiment of my present invention, Figure 1, represents one of the prepared controlling blanks in front elevation; Fig. 2, a diagram illustrating my improved system of code combinations on which the code characters of said blank are based; Fig. 3, a side elevation of a form of my improved transmitter; Fig. 4, a longitudinal vertical section partly in elevation of said transmitter; Fig. 5, an enlarged fragmentary detail sectional view showing the transmitting blank passing on to the conveyer belts of said machine; Fig. 6, a top plan view of said transmitter with the lining and backing screws, together with their supports, and the top plate of the machine removed, to more clearly show the parts within the main body thereof; Fig. 7,

a top plan view of the forward half of said machine; Fig. 8, a detail vertical section of one of the forward belt-carrying drums; Fig. 9, an enlarged detail fragmentary section of a corner of the machine frame, showing one of the retaining plates for holding the blank down on the transmitter belt, also shown in section; Fig. 10, a fragmentary detail side elevation of the locking arrangement for the lever of the backing clutch; Fig. 11, a fragmentary detail view of the locking device for the blanking mechanism; Fig. 12, a detail side elevation partly in section of the lining clutch; Fig. 13, an end elevation of the normally stationary member of the lining clutch, showing its shaft in section; Fig. 14, an enlarged detail perspective view of the coupling pin of the lining clutch; Fig. 15, a detail side elevation, partly in section of the spacing clutch; Fig. 16, an end elevation of said clutch and side elevation of its releasing and locking mechanism; Fig. 17, a fragmentary detail side elevation of a part of the power transmission mechanism of the backing screw; Fig. 18, an end elevation partly in section of said mechanism; Figs. 19 to 25, inclusive, semi-diagrammatic views illustrating steps in the operation of the contact controlling pins; Fig. 26, an enlarged fragmentary top plan view of the plate which lies beneath the sending blank and receives the contact controlling pins; Fig. 27, a diagram of an arrangement of electrical connections when the automatic transmitter is directly connected to a receiver, and, Fig. 28, a diagram of the transmitter connections in a case where it operates to line through a current distributor or sunflower device.

The perforations on the controlling blank shown are arranged in accordance with a code based on a system of combinations which I shall now describe and which is illustrated by the diagram Fig. 2. Referring to this diagram, let the line of characters and other signals extending horizontally across the top of the diagram represent the various transmittible characters and other signals. For all of these characters and the other signals indicated, there are eight code positions, indicated on the left in the diagram (Fig. 2) by the vertical zigzag row of eight round dots. These po-

sitions passing from the top to the bottom of the vertical row referred to, shall be called the *a*, *b*, *c*, *d*, *e*, *f*, *g*, and *h* positions, respectively. Each of such code positions is determined by the vertical distance from each end of the row and by the horizontal position on either side of an imaginary line indicated by the dotted line *x-y*, passing vertically through said zigzag row. Each code character or signal is formed by one or more perforations occupying a different one or combination of such positions. For example, for the letter "A" the perforations occupy the *a* and *d* positions; for the letter "B", the *b* and *f* positions; for "C", the *b* and *g* positions, and so on through the alphabet. The numerals, "back", "line", "blank" and four other miscellaneous signals are, in the case shown, formed each by the combination of three positions. For example, the code numeral 1 is formed by perforations in the *b*, *e* and *h* positions; the "back" signal, which will be more readily understood later, is formed by perforations in *a*, *b*, and *g* positions, and the dollar mark by the *d*, *e* and *f* positions. The punctuation marks and "space" signal occupy but one code position each. Such a system of combinations possesses a decided advantage over a system where each signal is represented by one position only, or two positions only, or three positions only, in that the signals to be transmitted are not so long; and the perforations when arranged in the code positions may be compressed into a smaller vertical space, the latter being an important consideration when the code perforations come between lines of printed characters. Such a system has an advantage also over a system which uses all combinations in a promiscuous way, as the employing of the same number of positions or combinations for the numerals as for the characters, in that it provides for readily detecting errors. This will be clear from a consideration of the following facts: Errors which may be caused by the line and the machine (not by the operator) are almost certain to result in a dropped line impulse or an added line impulse, and not an added and dropped impulse simultaneously. Therefore, if one letter were represented by a certain combination of two code positions, and another letter by one code position only, and a third letter by three code positions, the dropping of a line impulse would result in the substitution of one letter for another, and, similarly, the adding of an impulse would result in the substitution of a three-position letter for a two-position letter, or a two-position letter for a one-position letter. When one letter is substituted by mistake for another, or one numeral for another or one punctuation mark for another, serious results may be

occasioned. If, however, the error in transmission results merely in the substitution of a numeral for a letter in a word, or a letter or some other signal for a numeral, which would be the case according to the system herein described, the mistake is self evident. These blanks may be prepared either manually or automatically by any desired means, and since I do not herein claim such means, the same need not be described. It will be understood, however, that embossments or other forms of impression may be used in the place of said perforations, but perforations are preferred, and throughout the following description the code impressions will be referred to as "perforations."

Referring now to the mechanism controlled by these blanks, this comprises, in the machine shown, electrical contacts controlled by the perforations in said blank, a contact carrying carriage adapted to travel back and forth across the message blank over said perforations, conveying mechanism whereby the message blanks are fed up to the proper point to bring the rows of perforations into operative relation with said contacts, suitable carriage returning mechanism, and other parts, all of which I shall now describe in greater detail. The prepared blanks are fed to the transmitter preferably by passing them top edge down through a vertical chute 1, the lower end of which is curved as at 2 so as to direct the lower edge of the blank forward. This chute is made fast in any desired way to the top of the machine frame, which frame may consist simply of two elongated plates 3 secured in any suitable way to a base 4. The sides 3 of the machine shown are provided each with an elongated flange 5 which is in turn provided with a narrow flange 6, the latter acting to support a removable plate 7. Passing under said chute and over the flanges 5 are two conveyer belts 8, consisting each of a strip of flexible metal, or other suitable material. Made fast to each of these belts is a row of lugs or knobs 9, spaced apart equally, the distance from the center of one knob to the center of the next in a row, corresponding exactly to the distance between the centers of the successive perforations in the rows of perforations 10 extending along the side margins of the message blank. These knobs extend through the belts and form extensions on both the outside and inside thereof. The belts 8 are carried each upon two drums 11 and 12 consisting each in the case shown, of a disk provided with an annular flange 13. (See Fig. 8). Each of these flanges is provided with a series of holes 14 which are spaced apart equally to register exactly with the knobs 9 on the belts, so that there shall be absolutely no relative displacement or slipping of said belts on the drums.

Also secured to said belts, at suitable intervals, are a series of hooks 15, each of which is adapted to extend through an opening in said belts. Each of said hooks is carried by a spring 16 consisting of a small strip of metal secured at its end opposite said hook to the belt. Each of these springs is so bent that the normal tendency of the spring is to occupy a position at an angle to the belt as shown most clearly in Fig. 4, in which position the hook secured to the spring is drawn back to the inside of the belt with very little, if any, of its length extending through the opening in the belt.

The belts 8 in their travel bring the springs 16 into engagement with the upper side of the flange plates 5, and when this occurs the said springs are forced by said plates into a position substantially parallel to the belt, when the hooks 15 on said springs, will extend substantially their full length through the belts. These hooks pass in this position under the chute 1 and engage the first two marginal perforations in the message blank in said chute and thereby cause the said blank to travel along with the belts. In doing so, the other marginal perforations of the blank engage the upwardly extending ends of the knobs 9 which keep the blank securely in the right position on the belts. (See Fig. 5 where 17 represents the message blank). In this way the message blanks are fed forward to the operating position. The chute 1 is cut away slightly at its under side above the respective belts, to allow the hooks 15 to pass.

In the flange of each forward drum are two openings 18 (see Figs. 4 and 8) spaced apart diametrically opposite each other so as to register with each hook spring as it passes over the drum. As the successive hook springs reach these openings there is no longer anything to force the spring toward the belt, so that the springs jump back to their normal positions, thereby releasing the hooks from the paper or blank which then passes from the forward end of the machine.

In order to more securely hold the paper down on the belts, there may be provided retaining plates 19 which may consist each of a metal plate or bar made fast to the top of the machine and provided with a slot 20 to receive the knobs 9 and hooks 15. The lower face of these plates is near enough to the belts to keep the paper from flying up.

To keep the end of the paper or blank from passing upward as it emerges from the retaining plates, which may cause it to become disengaged from its hooks too soon, there may be secured to the forward end of each of the retaining plates a pair of spring fingers 21. (See Figs. 3 and 7).

These fingers are adapted to rest upon the top of the blank and press it down against the belts.

The forward and rear drums are mounted respectively on two shafts 22 and 23, the former being journaled in fixed bearings in the sides of the machine frame, while the latter is preferably journaled in two adjustable bearings 24, adjustable laterally by means of screws 25 to effect the proper adjustment of the conveyer belts.

The forward shaft 22 carries the sprocket 26 fast on one end thereof, and this sprocket is geared to a sprocket 27 fast on the end of a counter shaft 28 (see Fig. 6) extending across the machine and journaled in the side frames thereof. Also mounted on the countershaft 28 and fast thereon, is a larger sprocket 29 which is geared to a sprocket 30 fast on the normally loose member of a clutch 31, mounted on shaft 32. This clutch comprises, among other parts, a normally rotating member 33 made fast to shaft 32 as by set screw 34 (see Fig. 12), and a normally stationary member comprising a stepped sleeve 35 loose on shaft 32. The coupling of these members is effected through a pin 36 mounted to slide transversely in the head of sleeve 35 and provided at one end with teeth 37 adapted to engage teeth 38 on the face of an annular flange 38' on member 33. This pin 36 is provided with a recess 39, one of the walls of which has a cam surface 40. The bottom face of the pin near one end is recessed as at 41 to receive flange 42 of a sleeve 43 slidable on sleeve 35 and normally forced to the right (Fig. 12) under the tension of coil spring 44 which engages said flange 42 and a flanged collar 45 fast on sleeve 35. In addition to pin 36, this clutch has three other pins 46, 47 and 48 similar in all respects to pin 36 except that they have no teeth. All, however, engage flange 42 in exactly the same way as does pin 36. Therefore, if any of these pins is moved laterally this moves pin 36. The reason for this will fully appear later. Said pins are preferably spaced equally apart so that the clutch rotates about a quarter of a revolution in each lining operation. This clutch is normally in the uncoupled condition; that is, the pins are forced back against tension of spring 44 so that teeth of pin 36 do not engage the normally rotating member 33. This is effected by the nose 49 on the upper end of a bell crank lever 50, engaging cam surface 40 of any one of the clutch pins, thus forcing it against spring 44. The arms of this lever 50 are formed on a sleeve 51 loose on a counter shaft 52, and one of said arms is flexibly connected to a pivoted armature 53 of a magnet 54 mounted in a cavity in a frame 55 which extends across the machine. This frame may be supported at its ends in

any desired way. The armature 53 is normally held in the up position by spring 56 so as to force nose 49 into the path of pins 36, 46, 47 and 48. This magnet, lever and spring are not shown in side elevation, since they are identically the same as the magnet 157, lever 159 and spring 162 shown in side elevation in Fig. 4. The clutch shaft 32 is constantly driven by sprocket 57 made fast thereon and geared through sprockets 58 and 59 on a countershaft 60, to a sprocket 61 on the armature shaft of a small electric motor 62 or other suitable source of power.

It is very important that the shaft 22 be caused to stop the message blank exactly in the right place in feeding it up to the operating position, and that during the transmission, this message blank be not moved in the slightest degree. To meet these requirements there is made fast to the shaft 22 a star wheel 63 against the teeth of which is pressed a small roller 64, carried on the upper end of a pivoted arm 65 pulled toward the star wheel by spring 66. The teeth of this star wheel are so spaced that when roller 64 passes from one tooth to the next, the blank is fed up one line.

The traveling contact carriage comprises, among other parts, a bracket consisting of two arms 67 extending from an integral sleeve 68, which is mounted to slide on a rod 69 mounted in upright supports 70 on each side of the machine. This rod is stationary and merely acts as a support for the contact carriage. Mounted in each of said arms forward of the rod 69 is a bushing 71 rotatable in said arms, and passing through the bushings 71 is a square shaft 72 which extends across the machine and is journaled in the supports 70. Mounted fast on top of the arms 67, forward of shaft 72, is a plate 73 having secured to it, by means of depending arms 74, a plate 75, the whole forming a rigid frame carried by and adapted to travel with arms 67 transversely of the machine. Mounted between the plates 73 and 75, for vertical movement, is a plate 76 (see Figs. 19 to 21), provided with two upwardly extending guide pins 77 made fast thereto and slidable in two vertical collars 78 on plate 73.

The plate 76 is supported at its sides by trunnions 79 resting in slots 80 (see Figs. 19 to 21) in the forward ends of two lever arms 81 mounted on the square shaft 72 and adapted to turn therewith. Mounted in the plate 76 for vertical movement therein, is a series of eight pins 82 arranged in two rows of four pins each. (See Figs. 19 to 26). These pins pass, at their upper ends, through openings in the plate 73 which they fit loosely and at their lower ends through similar openings in plate 75, which they also fit loosely, that is, loose enough to slide in. Between the plates 73 and 75 each of

these pins is provided with an enlarged portion 83 adapted to be engaged by the plate 76. Directly beneath the line of travel of the pins 82 across the machine is a plate 84 perforated throughout the length of the travel of said pins, by openings 85 which are arranged to register exactly with the pins in each position of rest of the contact carriage. In the top plan view, Fig. 7, a comparatively few of the openings 85 are shown, it being understood that these openings extend throughout the path of the pins 82. Plate 76 is normally held up in that position shown in Fig. 19 by means of springs 86 (see Figs. 3 and 4) carried on the collars 78 and held between plate 73 and stop-nuts 87 on the tops of the guide pins 77. The upper ends of pins 82 lie respectively beneath eight contact springs 88 which in turn are located just above a corresponding number of contact springs 89. These contact springs are supported by being clamped between blocks of insulation 90 made fast to plate 73. In this way each spring contact is insulated from the other, and the contacts 88 are normally held up out of engagement with contacts 89 by the pins 82.

At proper times, as hereinafter described, vertical reciprocating motion is imparted to plate 76 through a cam 91 fast on shaft 92 of the spacing screw, said cam engaging a roller 93 on one end of a lever 94 made fast to one end of the square shaft 72. This spacing screw, shown most clearly in Figs. 4 and 7 is cut with a triple thread 95, which is removed for something more than two-thirds of its circumference, and these threads are adapted to engage corresponding triple threads 96 on a nut 97 mounted on two pins 98 fast in arms 67 of the contact carriage frame, the said nut being adjustable on said pins by means of adjusting screws 99. When the spacing screw is rotated, its threads engage those of nut 97 and thereby cause said carriage to be advanced across the machine the distance of one letter space for each revolution of said screw. The spacing screw is rotated by means of a sprocket 100 fast on the shaft of said screw and geared to a sprocket 101 fast on a long sleeve 102 (see Fig. 7) mounted loosely on the clutch shaft 32. This sleeve is made fast at its end opposite the sprocket 101, to the normally stationary member of the spacing clutch 103. (See Fig. 6). This clutch is shown most clearly in the detail views Figs. 15 and 16, and comprises, among other parts, a normally rotating member 104 fast on shaft 32, and a normally stationary member 105 integral with or made fast in any suitable way to sleeve 102. The member 104 has an annular flange 106 provided with radial teeth 107 which are adapted to be engaged by the teeth 108 of a coupling pin 109 mounted in member 105 for movement

transversely thereof and forced in the direction of member 104 under tension of a spring 110 made fast to said pin and to member 105. The coupling pin 109 is provided with recess 111 and cam surface 112, and is in every way a duplicate of pin 36 of the lining clutch except that it is not recessed as at 41.

The coupling pin 109 is operated to uncouple the fast and loose members of this clutch by means of nose 113 of bell crank lever 114 which is adapted at times to project into the channel formed by flanges 115 and to engage cam 112 and thus force said pin away from the teeth 107. This bell-crank lever 114 is loosely fulcrumed on shaft 52 and one of its arms is flexibly connected to the pivoted armature 117 of a magnet 118 mounted in a cavity of the magnet supporting frame 55, the said armature being normally forced upward under tension of spring 120 which forces the nose 113 of said lever toward the clutch. (See Fig. 6).

For the purpose of returning the contact carriage to the commencement of its travel, I provide among other parts a backing screw which consists in the case shown of a raised spiral 121 on a cylinder 122, extending transversely of the machine and mounted fast on a shaft 123 journaled in the sides of the frame of the machine as shown. This spiral has a constant pitch except for one revolution near one end where the pitch decreases as at 124 to zero in less than one revolution, and at this end the screw is provided with a flange 125 which acts as a stop for the carriage. The spiral 121 of this backing screw is adapted to engage a small roller 126 rotatably mounted on a stud or pin made fast to a block 127 mounted on pins 128 carried by arms 67 and adjustable by screws 129 similarly to block 97. It will therefore be seen that if the backing screw is rotated in one direction travel will be imparted to the contact carriage through roller 126.

The backing screw is driven by power applied to sprocket 130. This sprocket, however, is not itself connected directly to the backing screw, but is fast on a sleeve 131 loosely mounted on the backing screw shaft 123. This sleeve carries a lateral pin 132 made fast to a collar 133 fast on sleeve 131. This pin 132 is adapted at times to engage a radial pin 134 made fast to a sleeve 135, slidable longitudinally on shaft 123, but held against rotation thereon by pin 136, engaging slot 137 in said sleeve. The sleeve 135 is provided with two annular flanges 138 between which extend the fingers 139 of an arm 140 forming an extension on a sleeve 141 mounted loosely on the spacing screw shaft. (See Figs. 7, 17 and 18). This sleeve 141 is provided with a cam projection 142, which fits normally into a correspondingly shaped

recess in a sleeve 143, made fast on the shaft of the spacing screw. The sleeve 135 is forced in the direction of sleeve 131 under tension of coil spring 144. From this construction it will be seen that when rotation clockwise is imparted to the spacing screw shaft the cam projection 142 will ride upon the cam surface or sleeve 143, the sleeve 141 being caused thereby to be shifted laterally against the spring. This shifts sleeve 135 also in the same direction, thus removing pin 134 from the path of pin 132. This disengages the backing screw shaft from its driving sprocket 130, and leaves it free to be rotated by the roller 126 on the carriage, in the forward travel thereof. If the backing screw remained all the time geared to its power clutch, the roller 126 striking the spiral 121 on the forward movement of the carriage would not only stop the carriage, but the backing screw would try to rotate the backing clutch loose member backward, hence it is essential that the backing screw be absolutely free while the carriage is passing forward. Directly after each spacing operation, however, the backing screw becomes coupled up to its power sprocket 130 by the returning of the sleeve 135, under tension of spring 144, to its normal position.

Sprocket 130 of the backing screw is geared to a sprocket 145 fast on an elongated sleeve 146 (see Figs. 6, 7) mounted loosely on the clutch shaft 32 and fast to the normally stationary member of the backing clutch 143. This clutch is substantially a duplicate of the spacing clutch above described and therefore need not be described in detail. The actuating nose 144 of this clutch is carried on the upper end of a bell-crank lever 145 carried by a collar 146 mounted loosely on shaft 52 (Fig. 10). This bell-crank lever is operated by magnet 147, having a pivoted armature 148 flexibly connected to the horizontal arm of said lever 145. This armature is normally forced upward under tension of spring 149. This magnet, its armature and connection to lever 145 are the same in construction and arrangement as the magnet 157, its armature and connection to its bell-crank shown in Fig. 4.

When magnet 147 operates its armature, thereby withdrawing nose 144 from the backing clutch and starting the carriage backing mechanism, a latch 150 engages a shoulder 151 (see Fig. 10) on the top of the backing clutch lever and holds said nose out of engagement with said clutch until released by a cam 152, on the contact carriage, engaging the upper end of a lever 153 mounted fast on the same shaft 154 with latch 150 and extending up through the top of the machine. The latch 150 is raised by cam 152 against tension of spring 155, secured to said lever 153 and to a pin 156 se-

cured to the side of the machine. By this means the backing mechanism is automatically stopped as soon as the contact carriage reaches the end of its back travel.

5 The message blank is fed up to the proper point so that the first line of perforations will be in position to receive the contact actuating pins, by mechanism which acts to put the lining mechanism into operation and
10 continue it in operation until the blank has reached the proper point. This operation will hereinafter be referred to as "blanking."

In the transmitter, this mechanism consists among other parts, of a magnet 157 (see Fig. 4) provided with a pivoted armature 158 similar to the other magnets of the transmitter, said armature being pivotally connected to an arm 159 of a bell-crank lever, the other arm of which extends upward
20 and is provided with a nose 160, all corresponding exactly to the bell-crank actuating levers of the clutches. The nose 160, however, does not engage a clutch, but is normally held against a disk 161 on shaft 32 under tension of armature spring 162. The
25 disk 161 simply acts as a stop to limit the movement of the bell-crank lever in one direction. This lever is fast on a sleeve 163 which is loose on shaft 52 and is provided at
30 one end with a lug 164 adapted to extend into an elongated recess in the end of sleeve 51 which carries the actuating lever of the lining clutch. Therefore, every time sleeve
35 sleeve 51 with it, thereby causing the fast and loose members of the lining clutch to become coupled and setting the lining mechanism in operation. The opening in which lug 164 works, however, is long enough to
40 allow a certain amount of lost motion between said lug and the sleeve 51, so that when said sleeve is rotated in the regular lining operation, the sleeve 163 of the blanking device is not necessarily rotated. The
45 necessary rotation is imparted to sleeve 163 to accomplish the above result when the magnet becomes energized and pulls down on its armature, causing its bell-crank lever to rotate said sleeve. For the purpose of
50 holding this bell-crank lever in position long enough to bring the controlling blank to the proper place, the upright arm of said bell-crank is connected by means of arm 165, to a lever 166 fulcrumed at its lower end on a
55 shaft 167 and carrying at its upper end a roller 168 adapted to be held against the periphery of a cam 169 fast on the shaft 22.

When arm 159 is pulled down by magnet 157, this forces arm 165 to the left (Fig. 4),
60 and when this happens, a pin 170 fast on lever 166 engages the front of a shoulder 171 (Figs. 4 and 11) on the upper edge of the long arm 172 of a bell-crank lever fulcrumed on a shaft 173, and having its short arm 174
65 connected by spring 175 to the lever 166 by

which the said arm is normally forced upward against said pin. The shoulder 171 then holds the lever 166 back so that its roller 168 will not be engaged by either of the
70 lugs 176 on the cam 169. The lever 166 acting through arm 165 will thus hold the bell-crank connected to armature 158 back. The lining shaft will, therefore, continue
75 rotating until one of the lugs 177, on a cam 178 fast on shaft 22 engages a roller 179 journaled on arm 172, thereby forcing said arm down and allowing lever 166 to be
80 pulled back to the right by spring 175, since shoulder 171 is then below pin 170. This sends the backing bell-crank lever forward, and rotates sleeve 163 in such a direction that
85 its lug 164 will allow sleeve 51 (see Fig. 6) to rotate and send the nose of the lining clutch lever into that clutch and thereby disconnect the loose from the fast member, stopping the lining mechanism from "blanking."

Whenever the contact carriage is sent back to the commencement of its travel it automatically feeds the controlling blank up a
90 line, and when the machine performs the "blanking" operation herein described it automatically sends the carriage back to the beginning of its travel as well as feeds the
95 paper up. These operations are combined in the present machine by the circuit connections of the lining, backing and blanking magnets, as will be fully described later on.

It is important during the operations of "lining" and "backing" that the spacing
100 mechanism shall not operate. This is effected by a locking device located near one side of the machine and consisting, among other parts, of a latch 180 mounted on a
105 shaft 181 as a pivot, and connected through a link 182 to a lever 183 fast on shaft 52. The end of the latch 180 opposite its pivot is provided with a shoulder which, when the
110 arm 183 is rotated downward, is brought into the path of a pin 184 fast on the upright arm of the spacing clutch lever 114. Therefore, whenever levers 50 or 145 operate to start their respective mechanisms, they rotate
115 shaft 52 and this rotates arm 183 downward, thus pulling latch 180 into the path of pin 184, and thereby locking the spacing clutch against operation. To prevent jamming, the arm 183 is connected to link 182
120 by the pin and slot connection as indicated, the said slot being held downward against the pin by means of a spring 185. Therefore, if the bell-crank lever of the spacing clutch
125 tries to release its nose 113 from said clutch while the latch 180 is down, the rotation downward of lever 183 at such time would merely result in extending spring 185.

The lugs 176 on cam disk 177 are so disposed that should the operation of lining normally cause the next succeeding blank to stop with its printed heading under the con-
130

tact carriage, one of these lugs will engage roller 168, thus forcing lever 166 to the left, and thereby putting into operation the blanking device and causing said blank to be fed up to the proper position.

Insulated contacts 186 on the side of the machine (see Fig. 3) operated by arm 187 carried on a shaft 188 which is rotatable by means of similar lugs 189 and 190 on the periphery of the loose members of the backing and spacing clutches, respectively, acting upon rollers 191 and 192 carried by upright arms 193 and 194, respectively, made fast to shaft 188, constitute a clearing out mechanism, the function of which will appear more fully in connection with the description of the general operation of the machine.

The commutator 195 (see Fig. 6) mounted for rotation on a stud shaft 196 on the side of the transmitter and driven by sprocket 197 geared to a sprocket 198 fast on the counter shaft 60, is employed when the transmitter is connected direct to a receiver as when automatically transcribing messages. This commutator has a stepped segment 199 and four brushes 200 to 203 inclusive, the connections of which will be described later.

Passing next to the more purely electrical features of this machine reference will now be had to Fig. 27, which shows diagrammatically the electrical connections and apparatus in the special case where the transmitter is directly connected through a plurality of wires to a receiver, which in practice would be the case, for example, where the receiver acts to automatically print or transcribe the code message of the blank for delivery or for other purposes, as for example, for producing multiple copies, or in any case when it is practicable to use a number of wires to connect the transmitter and receiver. In this diagram the group of contacts on the left indicates the group of eight pairs of contact springs 88 and 89 of the transmitter, operated by pins 82 controlled as described by the perforated blank.

The slanting row of magnets 204 on the right represent eight operating magnets of a type printing machine which forms no part of my present invention. This machine is fully set forth and claimed in the application of which this one is a division. These magnets are shown merely for the purpose of illustration, and it must be understood that the transmitter as herein claimed is not limited to use with them or any other specific receiving device. At the top of the diagram are indicated the "backing," "spacing" and "lining" magnets and their respective clutches, and the "blanking" device of the transmitter. In this case the eight sets of transmitter contacts 88, 89 operate to control the lining, backing and blanking mechanisms of the transmitter and to send signals corresponding to these operations, as for example,

to the magnets 204 in this special case, through the medium of eight relays 205, each of which relays is provided with two independently excited magnets 206, 207. The eight pairs of contact springs 88, 89 form the terminals across a break in eight branch circuits which include respectively the exciting or forward coil 206 of one magnet of each of said relays. The other magnet coils of said relays are all connected in series with the cam operated contacts 186, the function of the magnets excited by these coils being to return the relay armatures to their back stop contacts after each signal, the arm 187 acting at such times to complete the circuit through these coils by bringing the contacts 186 into engagement with each other.

The tongues of the relays 205 and their forward tongue contacts form the terminals of a normal break in eight other branch circuits which include respectively the coils of the eight printer magnets 204. The tongues of certain of these relays also operate groups of spring contacts which, acting through circuits which will be traced later, control the lining, backing and blanking magnets of the transmitter. The commutator 195 acts to complete at intervals certain circuits herein-after traced. When any of the magnets 204 is energized, this operates to bring a movable contact 208 into engagement with a contact 209 and this in turn partially completes a circuit which includes the coils of a magnet 210 which operates a clutch 211 similar to the spacing clutch of the transmitter. The function of this clutch 211 is to connect printer mechanism driven by the loose member of said clutch, to a constantly rotating shaft 212 driven by a motor 213.

Let it be assumed that the power circuits of both motors 62 (the transmitter motor) and 213 (the printer motor) are closed and these motors continuously rotating. One of the prepared controlling blanks, which we shall assume is the one illustrated in Fig. 1, is placed top edge down in the chute 1. Contact 214 is then closed, which may be effected by pressing a push button or operating any suitable key or switch for making instantaneous contact. The closing of this contact completes a circuit through the blanking, lining and backing magnets, 157, 54, and 147, respectively, which may be traced as follows: For the magnet 157 the circuit is from the positive supply main 215 through conductor 216, magnet 157, conductor 217, contact 214, wire joint 218, brushes 202 and 200 of the commutator 195 whose segment 199 will have short circuited said brushes, thence by conductor 219 to the negative supply main 220. Current passing through this circuit energizes magnet 157 which, operating its armature, rotates sleeve 163 (see Fig. 6), thus imparting through lug 164 rotation to sleeve 51 to

a limited extent. This causes the nose 49 of the lining clutch to be withdrawn from said clutch. This allows pin 36 of that clutch to be sent by spring 42 into engagement with the rotating clutch member 33, starting that clutch into operation to effect the blanking, that is, to bring the prepared blank up to the operating position. When sleeve 163 was rotated by the energization of magnet 157, the said sleeve was locked in its operated position through arm 165 acting in connection with the lever 166, pin 170 and lug 171 as described, allowing the transmitter belts to travel forward under power transmitted through the lining clutch until one of the lugs 177 engaging roller 179 releases arm 165 by lowering the lug 171. When this releasing takes place the disengaging nose of the lining clutch will be allowed to fly back to engage one of the pins of that clutch and thereby uncouple the normally loose member from the fast member thereof. This stops the controlling blank in the operating position where the perforations corresponding to the first line of printed matter (W2795 14PD.) lie in the path of the travel of the contact controlling pins 82. This first line of matter simply identifies the message according to the usage of American commercial telegraphs and further than this forms no part of the invention.

When contact was closed at 214 the lining magnet 54 received current over the following circuit: conductor 216, wire joint 221, magnet 54, conductor 222, contact springs 223 and 224, contact springs 225 and 226, thence through contact 214 back to negative main as traced above for magnet 157. At the same time a circuit was completed through backing magnet 147 as follows: conductor 216, wire joint 227, magnet 147, contact springs 225 and 226 and thence back to negative return as traced above for magnet 54. This returns the contact carriage to the commencement of its travel in case it was not already there when the blank was placed in the machine.

Commutator 195, it will be understood, is rotated constantly, at a speed somewhat slower than shaft 32, and at the moment that the first line of printed characters on the controlling blank come into the operating position, assume that brushes of said commutator will occupy about the position indicated by the dotted line *w—x*, Fig. 27. Then, as this commutator continues rotating it brings its segment into contact first with brushes 200 and 201 alone. This completes the circuit of the transmitter spacing clutch magnet 118 and thereby causes the shaft of the spacing screw to rotate. The circuit which thus energizes said spacing magnet may be traced as follows: from positive supply main 215 through conductor

216, magnet 118, conductor 228, brushes 201 and 200, through return conductor 219 to the negative supply main. The first thing that happens after the transmitter spacing shaft commences to rotate is that the lug 190 on the spacing clutch (indicated diagrammatically in Figs. 22 to 24) engages roller 192 carried by lever 194, rocking arm 187 in a direction to bring together contacts 186. This sends a "clearing" impulse through the tongue-returning or back coils 206 of all the relays 205. This circuit may be traced as follows: from positive supply terminal 215 through conductor 229, thence through the back coil 206 of each of the relays 205, through contacts 186, thence by conductor 230 to the negative supply main. This sends the tongues of all the relays 205 to their back stop contacts, if any of the said tongues were at the time away from said contacts.

Immediately after the operation of cam lug 190 to close contacts 186 (see Figs. 22, 23 and 24) the cam 91 on the spacing screw shaft operating on lever 94 causes plate 76 of the contact carriage of the transmitter to be lowered. This allows the pins 82 corresponding to the *f* and *g* code positions, (the letter W) to drop through the perforations in the message blank with which they register. In Fig. 20 the pins shown thus operated are not the *f* and *g* pins but, as shown, they illustrate the idea. By these pins passing through their perforations they cause the two spring contacts 88 and 89 above them to be brought into engagement respectively, with each other (see Fig. 25). By closing contacts at these points circuits are closed through the forward coils of the *f* and *g* relays, Fig. 27. This sends the tongues of said *f* and *g* relays to their forward contacts partially completing circuits to the *f* and *g* printer magnets 204. Referring to Fig. 27, the circuits through the forward coils of said relays may be traced as follows: from the positive supply main 215, conductor 231, wire joints 232, 234 and 234', thence through forward coils of the *f* and *g* relays, the *f* and *g* transmitter pin controlled contacts thence through return conductor 235 to the negative supply main. The circuits through the *f* and *g* printer magnets may be traced as follows: from positive supply main 215, through conductor 236, thence through the coils of the *f* and *g* printer magnets, the tongues and forward contacts of the *f* and *g* relays, conductor 237, commutator brush 202, segment 199, brush 200, back to the negative supply main. The printer magnets thus energized act to close contacts 208 and 209. The commutator 195 in its rotation next short circuits brushes 200 and 203. When this happens in connection with the closing of contacts 208 and 209, a circuit is completed through the printer spacing magnet

210, which may be traced as follows: from positive supply main 215, through conductor 238, printer clutch magnet 210, contacts 209 and 208, conductor 239, commutator brush 203, segment 199, brush 200, conductor 219, back to the negative supply main. The printer then operates to print the character. The continued rotation of cam 91 (see Fig. 21), after lowering plate 76 causes said plate to rise, carrying with it those pins which had dropped through the blank, thus freeing said pins from contact with said blank. Then, as the spacing screw continues its rotation, its threaded portion will engage nut 97 on the contact carriage of the transmitter and cause the said carriage to be spaced up to the next position which will bring the contact controlling pins into the next transmitting position. After a short interval, the spacing magnet will receive another impulse, causing the spacing screw shaft to rotate, and then those pins which are in line with the *c*, *g* and *h* code perforations, corresponding to the numeral 2, (the next character in the line) will drop through these perforations. The printer will then print the numeral 2, the operations being substantially as described with the printing of the letter "W", except that in the case of the numeral 2, the *c*, *g* and *h* transmitter contacts, the *c*, *g* and *h* relays and the *c*, *g* and *h* printer magnets operate. The printer is thus caused to print the characters W2795.

It will be seen from Fig. 1 that immediately following the numeral 5 in the first row of characters which we are now assuming to be those which are being printed, there is a word space. Immediately under this space is a perforation occupying the code position to transmit the spacing signal. When this spacing signal perforation comes beneath the transmitter pin registering with it, the said pin will drop through said perforation, allow the *d* contacts 88 and 89 of the transmitter to engage each other and these will act in conjunction with the *d* relay and the *d* printer magnet to complete the circuit of the printer spacing magnet, which will cause the printer carriage to space up as described. The printing of the characters 14PD. is then carried on as described with regard to the other characters of the line. When all the characters in this line have been printed, the transmitter contact carriage automatically starts back to the commencement of its travel, and the controlling blank is fed up a distance of one line, bringing the perforations of the second line of characters into the path of the contact pins. These operations are controlled by the combination of code perforations occupying, on the transmitting blank, the *a*, *b* and *g* positions. These perforations will be seen in Fig. 1 immediately at the right hand end of the perforations corresponding to

the first line "W2795 14PD." on the controlling blank. When the contact controlling pins of the transmitter register with these perforations they will operate the *a*, *b* and *g* transmitter contacts, and *a*, *b* and *g* printer magnets 204. The effect of this will be to close the circuits through the lining and backing magnets 54 and 147 of the transmitter and through the *a*, *b* and *g* printer magnets 204. The circuit through the lining and backing magnets 54 and 147 thus completed may be traced as follows: from the positive supply main 215, through conductor 216, wire joint 221, magnet 54, conductor 222, contacts 223 and 224, contacts 225 and 240 of the *g* (operated) relay, thence through conductor 241, contacts 242 243 of the *b* (operated) relay, contacts 244—245 of the *a* (operated) relay, conductor 246, brush 202 of commutator 195, brush 200 of said commutator, conductor 219, back to the negative supply main. The circuit of the backing clutch magnet 147, may be traced as follows: from wire joint 227, magnet 147, conductor 247, contact spring 225, and thence back to the negative supply main over the same circuit as traced for the lining magnet 54, the connections being so arranged that each time the backing magnet is energized the lining magnet is energized, thus causing the transmitter to automatically line each time that it backs. The circuits of the magnets 204, thus completed, pass through the tongue and forward contacts of the *a*, *b* and *g* relays back to the negative supply main, just as in the case of the printing of a letter, hence these circuits need not be traced over again. At the end of some lines, as for example, the third line of the transmitting blank Fig. 1, it is not necessary to go back to the commencement of the carriage travel to commence a new line. In such a case the combination of perforations occurring right after "John Doe," and representing the "line" combination operate the *a*, *b* and *f* transmitter contacts and these in turn operate the *a*, *b* and *f* relays which in turn operate their forward contacts to send current to the *a*, *b* and *f* printer magnets. These relays also operate to close contact through springs 244, 245, 242, 243 and 223—223' sending current to the coils of the transmitter lining magnet 54 which operates its clutch and through this sets in operation the lining mechanism of the transmitter.

At the end of the last line of the telegram Fig. 1, will be seen a combination of perforations occupying the *a*, *b* and *h* positions. This is the code arrangement for the signal which will cause the used blank to be fed out of the machines (both transmitter and receiver) and a fresh blank brought up into position. This operation is effected as follows: When the transmitter pins reach

the blanking perforations referred to, the *a*, *b* and *h* transmitter contacts are operated, and these in turn operate the *a*, *b* and *h* relays. The tongues of these relays operate to close contact through springs 244—245, 242—243 and 248—249, energizing the blanking magnet 157, and causing it to set in operation the blanking mechanism of the transmitter by which the new controlling blank is brought into the operating position, an operation which has hereinbefore been fully described in the detail.

The foregoing case of the transmitter connected direct to a receiver is, as pointed out, only one of the many ways of using the transmitter.

In Fig. 28, I have shown one of the ways of using the transmitter to send over a single line wire, wherein the signals are transmitted to line through a current distributor which, in the specific case illustrated, is a rotary sunflower device. In the case illustrated in Fig. 28, the eight conductors from the separate tongues of the eight combination relays 205, pass to corresponding segments in commutator 250 which is provided with a brush 251, driven in any suitable way by a clutch 252, which may be a duplicate of the spacing clutch hereinbefore described. The normally rotary member of this clutch 252 is geared to a small motor 253, which drives the said clutch member at a constant speed. This motor is provided with a hand regulating rheostat 253', and, in addition to this, may be, provided with any suitable means for maintaining the speed of motor 253 in synchronism with moving mechanism at some other point. In the drawing the tuning fork 254, commutator 255, condenser 256 and resistance 257 constitute a synchronizing arrangement which I have found very satisfactory, but since this constitutes no part of my present invention, the same need not here be described in detail. Brush 251 of the line commutator is permanently electrically connected to a brush 258 which is driven by clutch 252 over a collector ring 259, permanently connected to line 260. Brush 261, also driven by a clutch 252, travels on a conductor ring 262, which is provided with a single insulated segment 263, which is connected to a circuit which traverses the back coil of each of the relays 205. The ring 262 has associated with it a collector ring 264, having a brush 265 permanently electrically connected to brush 261, and driven by the same means as the latter brush. This collector ring is connected to a negative return 266. The clutch 252 is operated by a magnet 267, the coils of which are connected in a local circuit which includes the tongue and forward contact of a relay 268. The magnets of this relay are independently excited. The forward coil of said relay is connected in circuit between a

segment of commutator 250 and a brush 269 on a rotary contact device or commutator 270. The back coil of this relay 268 is connected in a circuit having a contact 271 adapted to be completed each time the magnet 267 is energized, thus returning the tongue of relay 268 to normal on each operation of magnet 267. Brush 269 is intermediate of two brushes 272 and 273, the former resting on conducting segment 274 of the commutator 270, and the latter brush on the conducting segment 275 of said commutator. Brush 272 is permanently connected to a conductor 276 which is connected to a negative terminal of dynamo 277. The positive terminal of this dynamo is connected to a negative terminal of dynamo 278, and an intermediate connection 279 between said dynamos is connected to earth. Positive terminal of dynamo 278 is connected through conductor 280 to brush 273. The back contacts of all the combination relays 205 are tapped on to the negative conductor 276, while the forward contacts of all of said relays are tapped on to the positive conductor 280. Preferably mounted on the same shaft with commutator 270 is a disk of insulation 281 carrying a contact segment 282 which is adapted, once in each revolution of said disk, to short circuit brushes 283 and 284, which sends a current impulse from local supply main 215 through the spacing clutch magnet 118. This operation corresponds to the operation of short circuiting brushes 200 and 201, Fig. 27, once in each revolution of commutator 195.

When no signals are being sent, the tongues of relays 205 are all against their forward stops, and, assuming the brush 251 to be rotating, negative impulses will be transmitted to line from dynamo 277 through tongues of relays 205, segments of commutator 250 connected to these tongues, brushes 251, 258 and ring 259. The operation of the relays 205 by the perforated controlling blank is exactly the same in this case as in the case described with reference to Fig. 27. In the case illustrated in Fig. 28, however, the signals are formed by positive impulses sent to line in various combinations according to the combination in which the tongues of relays 205 engage contacts connected to the positive pole of dynamo 278. Brushes 251, 258, 261 and 265 make one revolution for each signal, and pause between revolutions. The revolving of these brushes in this manner is brought about in the following way: The commutator 270 is driven at a constant speed by the motor 253, but at a speed somewhat slower than the shaft of clutch 252, and once in each revolution of said commutator the conductor 275 short circuits brushes 273 and 269, thus sending to line a positive impulse through the forward coil of relay 268. This causes

said relay to close its forward contact, thus completing a circuit through the coils of magnet 267, which being thus energized releases the pin of clutch 252 thereby coupling the loose member of said clutch to the motor 253. This causes the brushes 251, 258, 261 and 265 to rotate. When magnet 267 pulls down on its armature, a circuit is completed at contact 271 through the back coil of relay 268, thus restoring said relay to normal. Once in each revolution clutch 252 automatically uncouples the driving motor 253 from the brushes 261—251. This is effected by mechanical means substantially the same as that employed in the clutches of the automatic transmitter described, and therefore need not be further described. Should brush 251 arrive on contact 250 while brushes 269 and 272 are in engagement with conductor 274, the forward coil of relay 268 would receive negative current from dynamo 277, but this relay is so wound that current in that direction through its forward coil does not operate its tongue so as to send it against its forward contact. The intermittent operation of clutch 252 and sunflower mechanism controlled thereby is in no way limited to automatic transmission; that is to say, this mechanism may be used as well with manual as automatic transmission, and no claim is herein made for this feature, since it forms the subject of claims in said application of which this one is a division. At the end of each signal, brush 261 engaging segment 263 completes a restoring circuit, above referred to, which returns the tongue of the operated relays 205 to normal.

While I have herein shown and described a specific embodiment of my said invention, it will be understood that I do not limit myself to this specific construction, since many modifications thereof may be made without departing from the true spirit of my invention.

What I claim is:—

1. An automatic transmitter comprising, in combination transmitting mechanism and a prepared form for controlling the same, and mechanism controlled by said form itself to effect relative movement between the said form and transmitting mechanism.

2. An automatic telegraph transmitter comprising, in combination, a prepared sending form, transmitting mechanism comprising a plurality of electrical contacts arranged for operation in combinations, and mechanism to effect relative movement between said form and said transmitting mechanism, both said movement imparting mechanism and said transmitting contacts being controlled by the said form itself.

3. An automatic telegraph transmitter comprising, in combination, a perforated sending form, transmitting mechanism comprising a plurality of electrical contacts ar-

anged for operation in combination, and mechanism to effect relative movement between said form and said transmitting mechanism, both said movement imparting mechanism and said transmitting contacts being controlled by the same perforations in said form itself.

4. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form, and mechanism controlled by said form itself to effect selective movement of said form in said transmitter.

5. An automatic telegraph transmitter comprising, in combination, transmitting contacts, a prepared sending form for controlling said contacts, mechanism to move said form in said transmitter, power mechanism, and means controlled by said form itself to couple the form moving mechanism to the said power mechanism.

6. An automatic telegraph transmitter comprising, in combination, transmitting contacts, a prepared sending form for controlling said contacts, mechanism to move said form in said transmitter, power mechanism, and a clutch controlled by said form itself to couple the form moving mechanism to the said power mechanism.

7. An automatic transmitter comprising in combination, a prepared sending form on which the signals appear in the form of successive lines of code perforations, and mechanism controlled by certain of said code perforations to control the movement of said form in said transmitter.

8. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, mechanism arranged to effect relative movement between said form and said transmitting mechanism and controlled by certain of said code perforations in said form, these same perforations also controlling the transmitting apparatus to send signals corresponding to the said movement.

9. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, lining mechanism for effecting relative movement between said form and the transmitting mechanism for line-to-line transmission, the said lining mechanism being controlled automatically by perforations in said form itself.

10. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, lining mechanism for effecting relative movement between said form and the transmitting mechanism for line-to-line transmission, the said lining

mechanism being controlled automatically by perforations in said form itself appearing at the end of a line.

11. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, lining mechanism for effecting relative movement between said form and the transmitting mechanism for line-to-line transmission, the said lining mechanism being controlled automatically by perforations in said form itself, the said transmitting mechanism comprising means also operated by the lining perforations of the said form to transmit a signal corresponding thereto.

12. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, spacing mechanism for effecting relative movement between said form and the transmitting mechanism transversely of the form, the said spacing mechanism being controlled automatically by perforations in said form itself.

13. An automatic transmitter comprising in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, spacing mechanism for effecting relative movement between said form and the transmitting mechanism transversely of said form, the said spacing mechanism being controlled automatically by perforations in said form itself, the said transmitting mechanism comprising means also controlled by the said spacing perforations of the form to transmit a signal corresponding to said operation.

14. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, blanking mechanism for effecting relative movement, the distance of a plurality of line spaces, between said form and the transmitting mechanism, the said blanking mechanism being controlled automatically by perforations in said form itself.

15. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, blanking mechanism for effecting relative movement, the distance of a plurality of line spaces, between said form and the transmitting mechanism, the said blanking mechanism being controlled automatically by perforations in said form itself, the said transmitting mechanism comprising means controlled by the said blanking perforations of the said form to transmit a signal corresponding thereto.

16. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, spacing mechanism for effecting relative movement between said form and the transmitting mechanism transversely of the form, mechanism to return the said parts to the commencement of a new line of said perforations, the said return mechanism being controlled by perforations in the said form itself.

17. An automatic transmitter comprising, in combination, transmitting mechanism, a prepared sending form on which the signals appear in the form of code perforations in transverse lines, spacing mechanism for effecting relative movement between said form and the transmitting mechanism transversely of the form, mechanism to return the said parts to the commencement of a new line of said perforations, the said return mechanism being controlled by perforations in the said form itself, the said transmitting mechanism comprising means operated by the said return mechanism controlling perforations to transmit a signal corresponding thereto.

18. An automatic telegraph transmitter comprising a plurality of transmitting contacts adapted to be operated in combinations, a sending form or blank on which the information appears in successive transverse lines, a plurality of movable pins adapted to engage said perforations in said form and thereby control said contacts, and means also controlled by perforations in said form and certain of said pins, to effect relative movement between said form and pins to bring the said pins and the successive perforations in a line and successive lines of perforations into alinement with said pins.

19. The combination with an automatic transmitter comprising transmitting mechanism normally at rest and power mechanism constantly operating, means to effect mechanical connection between said transmitting mechanism and the power mechanism, and a controlling form relatively movable with respect to said transmitting mechanism and acting to control said connection.

20. An automatic telegraph transmitter comprising a controlling sheet on which the information to be transmitted occurs in a succession of lines of code perforations reading from line to line as in page printing, a series of fingers adapted to engage corresponding perforations in said sheet, means to move the fingers across the sheet to engage successive perforations in said lines, and means to move the sheet lengthwise from one line of perforations to a succeeding line thereof, the said movements being controlled by perforations in the said sheet itself.

21. The combination with a telegraph line, of automatic transmitting apparatus, comprising a segmented current distributor, a series of contacts, each contact connected to a separate segment of said distributor, fingers controlling said contacts, a prepared blank or form adapted to control said fingers, means to effect intermittent relative motion between said fingers and the controlling form, said distributor transmitting to line successive impulses corresponding in character to the state of each of said contacts.

22. An automatic telegraph transmitter, comprising a prepared controlling form, a traveling contact carrying carriage, conveying means for feeding the controlling form into operative relation with the contacts on said carriage, means to impart travel to said carriage, the travel of said carriage and the operation of said conveying means being controlled by the said form.

23. An automatic telegraph transmitter comprising a prepared controlling form, a traveling contact carrying carriage, means to impart travel to said carriage, conveying means for feeding the controlling form into operative relation with said contacts and through the transmitter, a continuously rotating power shaft, and means controlled by said form to connect the contact travel operating means and the form feeding mechanism to said shaft.

24. An automatic telegraphic transmitter comprising, in combination, a plurality of movable fingers, a sending form having perforations adapted to control the operation of said fingers, a series of electrical contacts controlled by said fingers, electric circuits in which the respective contacts are connected, a series of relays operated by current in said circuits, and mechanism controlled by said relays to effect relative movement between said form and fingers.

25. An automatic telegraph transmitter comprising, in combination, a perforated controlling form, conveying mechanism comprising endless belts provided with lugs adapted to engage perforations in said form for feeding the same in the transmitter, a series of hooks also adapted to engage perforations in said form, and means to automatically release said hooks from said form.

26. An automatic transmitter comprising, in combination, a prepared controlling form containing the message in the form of perforations or the like, a plurality of electrical contacts controlled by said perforations, step-by-step mechanism for effecting selective relative movement between said form and contacts, an electromagnet controlling said mechanism, and an electric circuit in which said magnet is connected for operation, the said circuit being controlled by certain of said perforations in said form.

27. The combination with a source of current, a telegraph line, electrical contacts controlling the transmission of said current to line and adapted to be operated in combinations, the character of the current transmitted to line depending upon the state of said contacts, a plurality of movable pins arranged to control said contacts, and a sending form on which the information appears in perforations, the said perforations controlling the operation of said pins.

28. An automatic telegraphic transmitter, comprising a controlling blank or web on which the intelligence to be transmitted is impressed in code arranged perforations reading transversely of said web from line to line as in page printing, a series of pins of lesser number than the number of characters to be transmitted arranged in a row extending transversely of said lines and movable transversely of the plane of said blank to engage said perforations, and a series of transmitter contacts, the operation of which is controlled by said pins, and which operate in combinations corresponding to the combinations of pins selected for operation by said perforations.

29. An automatic telegraph transmitter comprising a controlling blank or web on which the intelligence to be transmitted is impressed in code arranged perforations, a series of pins of lesser number than the number of characters to be transmitted movable transversely of the plane of said blank to engage said perforations, and a series of transmitter contacts the operation of which is controlled by said pins and which operate in combinations corresponding to the combinations of pins selected for operation by said perforations, a power shaft, mechanism to impart movement to all said pins toward said blank simultaneously, and means to couple said pin-operating mechanism to said power shaft intermittently.

30. An automatic telegraph transmitter, comprising a controlling web or blank, a carriage movable transversely of said blank, means carried by said carriage adapted to cooperate with said web to control the transmission, means including a rotatable shaft having an interrupted thread thereon adapted to advance said carriage step-by-step across said web on the rotation of said shaft, a power shaft, driving connection between said shafts, said connection including a clutch, and means controlled by the web itself to operate said clutch.

31. An automatic telegraph transmitter comprising a controlling web or blank, a carriage movable transversely of said blank, means carried by said carriage adapted to cooperate with said web to control the transmission, means to advance said carriage step-by-step in a forward direction, and means including a rotatable shaft having

a thread thereon adapted to return said carriage to the commencement of its travel on the rotation of said shaft in one direction, a power shaft, driving connection between said shafts, said connection including a clutch, and means controlled by the web itself to operate said clutch.

32. An automatic telegraph transmitter comprising in combination with a prepared blank or web for controlling the transmitting mechanism, a series of contact controlling pins movable transversely of the plane of said blank and controlled thereby, a traveling carriage on which said pins are mounted, mechanism to move said carriage and pins transversely of said blank, and mechanism to move said blank longitudinally with respect to said pins, a power shaft, a clutch for coupling said carriage operating mechanism to said power shaft, means to operate said clutch at regularly recurring intervals, a clutch for connecting the blank feed mechanism to said power shaft, means controlled by certain perforations in said blank to operate said last named clutch, and means power operated from said shaft at regularly recurring intervals to move said pins toward said blank.

33. An automatic telegraph transmitter comprising in combination, a blank or web for controlling the transmitting mechanism and consisting of a sheet upon which the intelligence to be transmitted is impressed in the form of code perforations, the said intelligence reading in successive lines transversely of the sheet as in ordinary page printing, a series of contact controlling pins less in number than the transmittable signals and movable transversely of the plane of said blank to engage said perforations, a traveling carriage on which said pins are mounted, mechanism to move said carriage and pins step-by-step transversely of said blank, mechanism to move said carriage and pins transversely across said blank by a

continuous motion to return the same to the commencement of the carriage travel, mechanism to move said blank longitudinally with respect to said pins, a power shaft, an individual clutch for each of said mechanisms for coupling the same to said power shaft, a magnet for controlling the clutch of the step-by-step carriage operating mechanism, means to energize said magnet and thereby operate said clutch at regularly recurring intervals, means controlled by certain perforations in said blank to operate the clutches of the carriage return and blank feed mechanisms, and means operating at regularly recurring intervals to move said pins in the direction of said blank.

34. An automatic telegraph transmitter, comprising a prepared controlling form, a carriage provided with transmitting contact controlling mechanism, conveying means for feeding the controlling form into operative relation with said contact controlling mechanism of said carriage, and means to impart travel to said carriage, the travel of said carriage and the operation of said conveying means being controlled by the said form.

35. An automatic telegraph transmitter comprising a perforated controlling form, a carriage provided with transmitting contact controlling mechanism, means to impart travel to said carriage, conveying means for feeding the controlling form into operative relation with the contact controlling mechanism carried by said carriage and through the transmitter, a continuously rotating power shaft, and means controlled by perforations in said form to connect the carriage travel operating means and the form feeding mechanism to said shaft.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS MAXWELL POTTS.

Witnesses:

J. W. TUMBRIDGE,

W. A. HOUGHTALING.