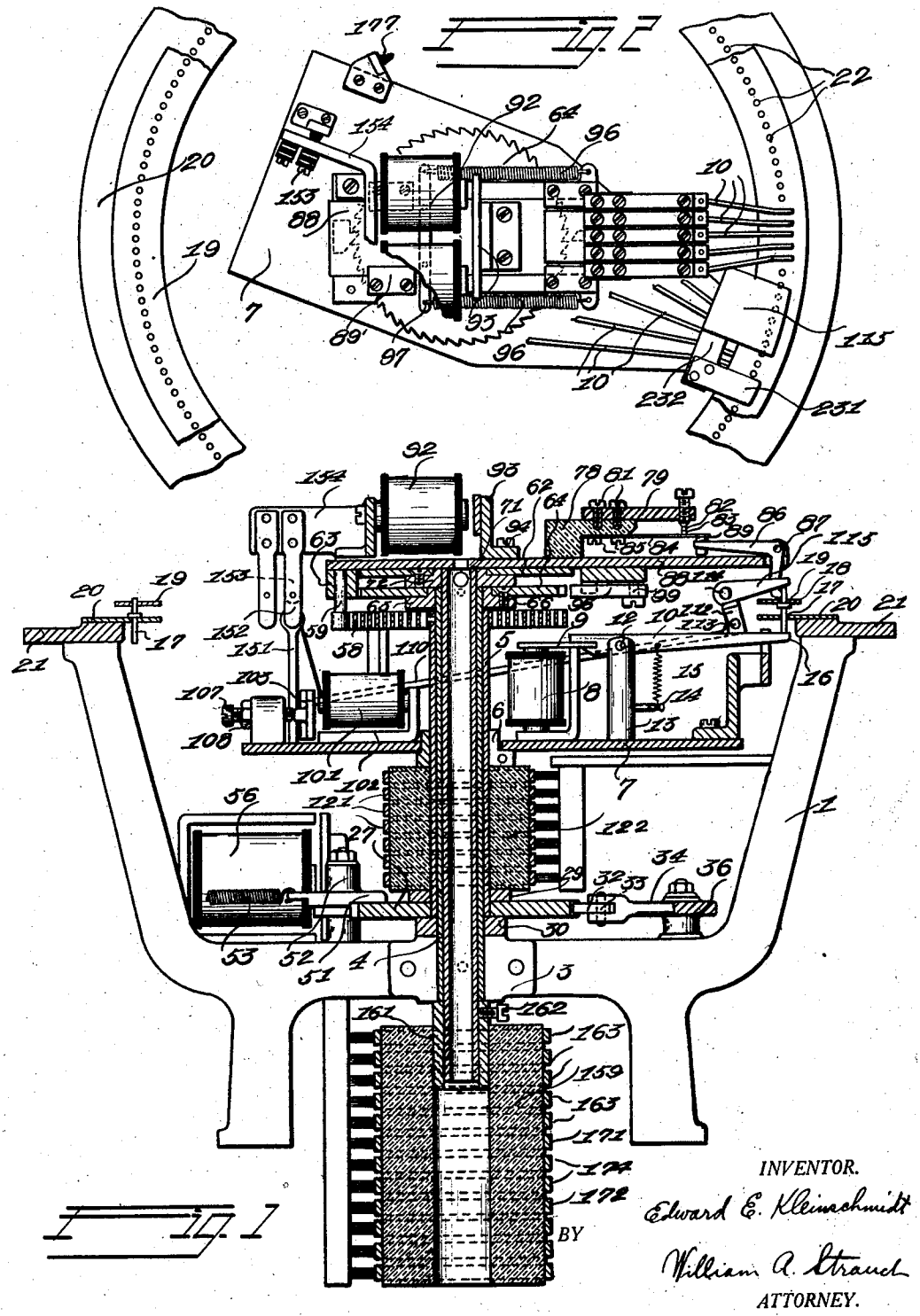
June 16, 1931. E. E. KLEINSCHMIDT 1,810,107

STORAGE TRANSMITTER

Filed Jan. 5, 1929 3 Sheets-Sheet 1



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STORAGE TRANSMITTER

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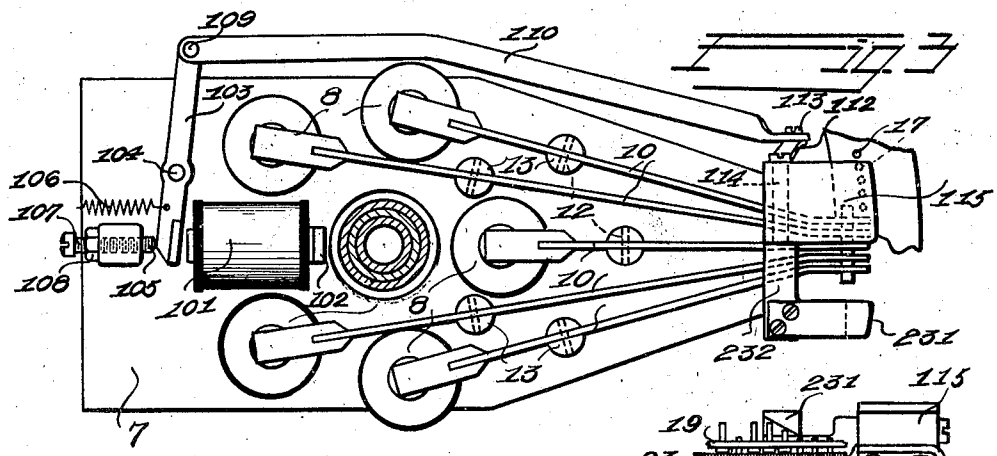

Fig. 3

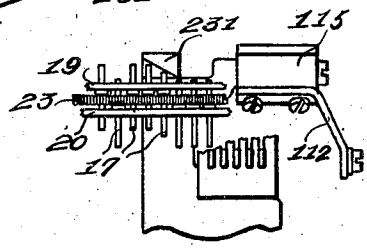

Fig. 4

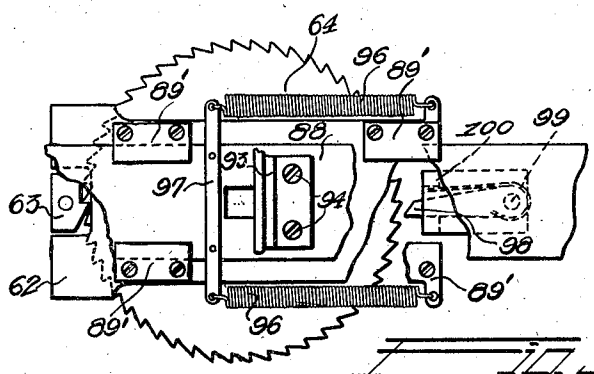

Fig. 5

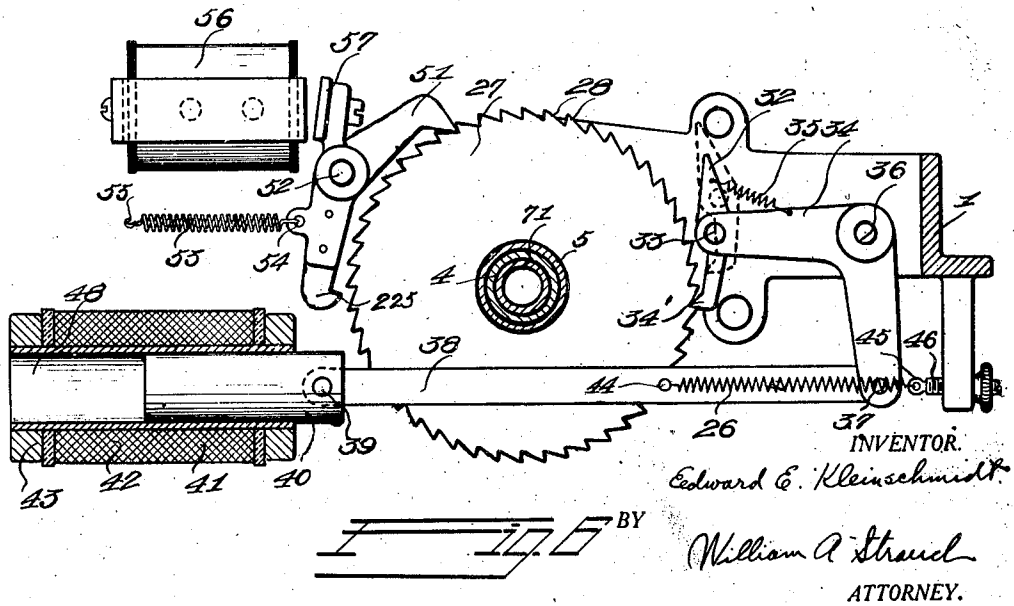

Fig. 6

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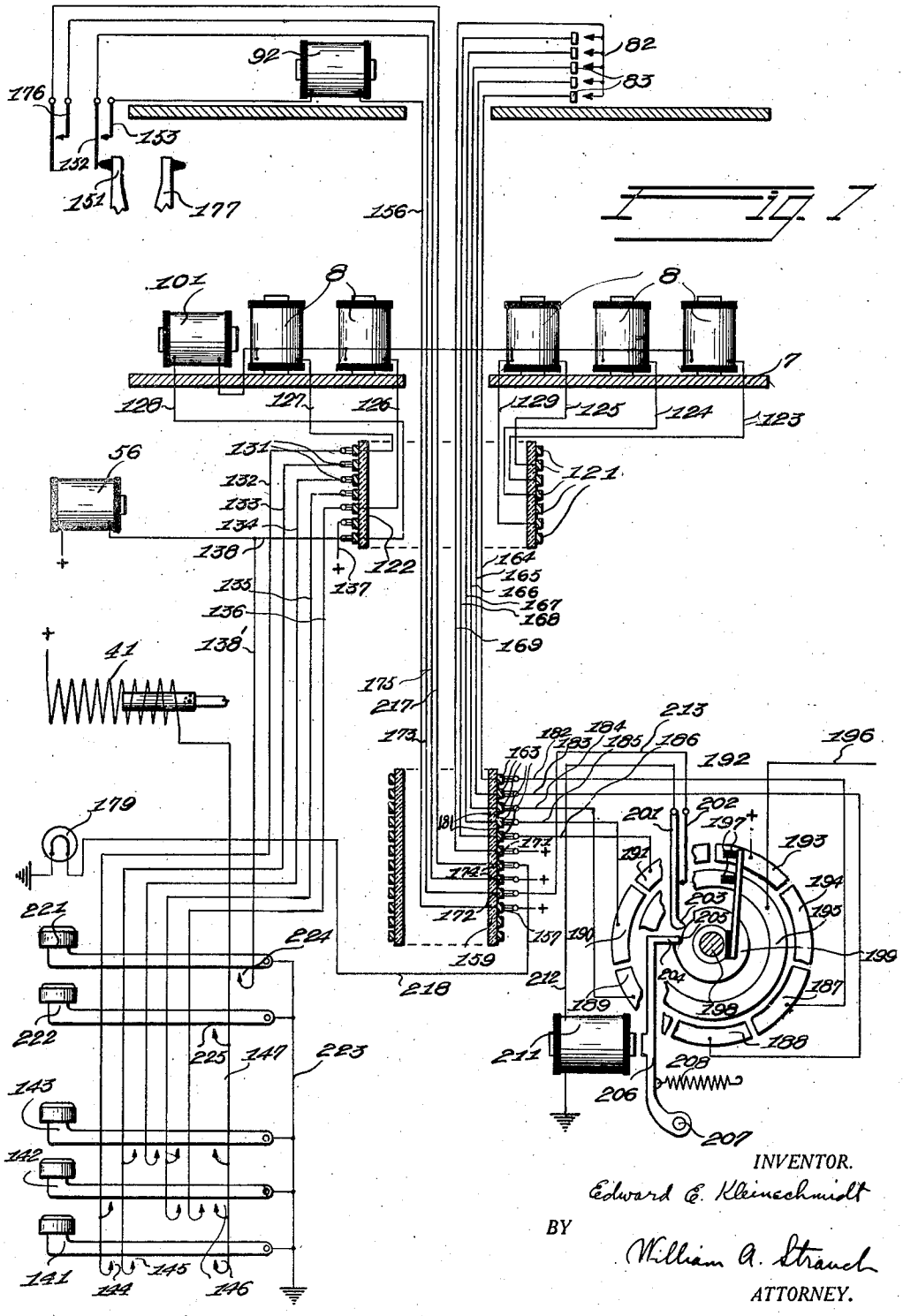

FIG. 1

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STORAGE TRANSMITTER

Application filed January 5, 1929. Serial No. 330,540.

My invention relates to transmitting apparatus for use in automatic telegraph signalling systems and particularly to the code storage mechanism employed therewith.

In order to obtain a uniform rate of signal transmission, it is the practise to provide some form of code storing means interposed between the code bars or key levers on the keyboard and the automatic sender which impresses the stored code on the signalling circuit. The code perforated on a tape is used in one of the well known types of storing devices. In this type the tape is first perforated under control of a keyboard mechanism in accordance with the code combinations to be later transmitted and is then passed through a tape controlled transmitter.

The tape transmitter has been found to have some disadvantages which have prompted the development of what is known in the art as the mechanical storage transmitter comprising groups of mechanical members operated in various combinations by key levers and later controlling a transmitter before being restored in preparation for a reoperation by a key lever. While many of the disadvantages of the tape transmitter have been eliminated by the mechanical storage transmitter, many of those heretofore proposed have been found to be slow in operation due to the inertia of the large moving parts.

Accordingly it is an object of my invention to provide a mechanical storage transmitter which has light moving parts and can transmit signals at a high speed.

A further difficulty which has been experienced with storage transmitters resides in the lack of means for preventing the transmission of a code combination of impulses which has once been set up with mechanical storage mechanism. As will be clear to those skilled in the art, the operator often wishes to wipe out and prevent the transmission of a code after it has been stored. This may for example, be due to an incorrect code combination, accidentally stored. There has accordingly existed a long felt want for a simple efficacious and cheap arrangement which would enable the operator to wipe out any stored up code combination before it has been impressed on the signalling line.

Accordingly a further object of my invention is to provide means for arbitrarily obliterating or wiping out any record which has been set up on the storage transmitter at any time prior to the transmission thereof.

There are other objects of my invention which together with the foregoing will appear in the specification which follows; and from the terms of the appended claims.

My storage transmitter comprises generally three independent units: (1) A storing device comprising a plurality of groups of storage pins mounted in a stationary member and selectively controlled by key levers on a keyboard through selective magnet controlled operating members mounted on a rotatable table and rotatable with respect to the storage pins. These members, one for each pin in a group, are successively brought into operative position with successive groups of pins for operating them in accordance with the key levers operated. (2) A transmitter which comprises a set of feeler cranks, one for each pin in a group are rotatably mounted with respect to the code storing pins and as they are brought into operative relation with a group of pins are operated, thereby to in turn control transmitter contacts and (3) A distributor electrically connected to the transmitter contacts for transmitting the code in a predetermined order.

Associated with the first of the above units is the storage wipe out device which like the pin operating device is movable with respect to the pins for wiping out any group of stored pins by restoring the pins in the group to normal or operated position. The operation of these sections will be better understood from the detailed description of each in the order set forth above.

In the drawings, Figure 1 shows a vertical cross section of a preferred embodiment of my invention.

Figure 2 shows a plan view of Figure 1 with parts omitted.

Figure 3 is a plan view of the code storing mechanism.

Figure 4 is a side view of the stored pins and wipe out.

Figure 5 is a view of the mechanism for rotating the transmitter mechanism.

Figure 6 is a view partly in section of the mechanism for rotating the storage device, and

Figure 7 is a diagrammatic view of the operating circuits employed in carrying out my invention.

As shown in Figure 1, the support for the apparatus comprises a frame 1, mounted upon a base (not shown) and fixedly secured by means of the brackets 3 to a fixed tube 4. Supported by and, rotatably mounted with respect to the fixed tube 4 is an outer tube 5. Secured to the outer tube 5 is a collar 6 which supports a shelf 7. Mounted on shelf 7 are a group of magnets 8, which are connected in circuits selectively energized under control of a keyboard mechanism to be described in detail in connection with Figure 7.

Each of the magnets 8 is provided with an armature 9 having an extension arm 10 secured thereto and pivoted at 12 to the upright member 13 carried by the shelf 7.

Secured at one end to a pin 14 extending horizontally from the upright 13 is a spring 15, the other end of which is secured to the armature extension or lever arm 10. Spring 15 normally holds the armature in a non-operating position away from the pole of the magnet 8 when the latter is deenergized. The pin operating end 16 of the lever arm 10 is positioned beneath storage pin 17, there being five pins in a group, each associated with one of the levers 10 as shown in Figure 3. When a magnet is energized, its armature 9 is drawn towards the pole piece of the magnet, against the tension of spring 15 and in turn rocks the armature lever arm 10 in a counter clockwise direction about its pivot 12. The end 16 moves the storage pin 17 with which it is at the time associated from its lower position to its upper or operative position as shown in Figure 1.

Each of the storage pins 17 is provided with a shoulder 18 which limits its movements between upper and lower annular members 19 and 20 properly secured to the ring 21 on frame 1 and provided with openings 22 through which pins 17 project. Pins 17 are arranged in groups of five in a circle on the annular members 19 and 20. It will be understood, however, that the number in each group may be varied, depending upon the code to be sent, five being used in the present illustration for a baudot code system. An annular coil spring 23, Figure 4, carried between the annular members 19 and 20 maintains the storage pins 17 in either operative or non-operative position. When a storage pin 17 is forced upwardly, its shoulder 18 moves upwardly against and past the outer edge of the coil spring 23 contracting the spring. When the shoulder 18 has passed by, the spring 23 expands and engages the shoulder 18 of the storage pin 17 locking it in its elevated position. In this manner the pins are locked in either operative or non-operative positions.

As shown in Figure 3, five magnets 8 are provided each controlling an individual extension 10 for operation of an associated storage pin 17. Combinations of these magnets are energized by each key operation and accordingly selectively control five of the pins 17 simultaneously. It will be clear that following the operation of each group of storage pins 17, it is necessary to associate the lever arms 10 with a succeeding group of pins. Heretofore this has been accomplished by rotating the members equivalent to the annular members 19 and 20 carrying the pins so as to bring a new group of pins into operative relation with the lever arms 10. As will be clear, the members 19 and 20 and associated parts are heavy and have considerable inertia so that they operate slowly. I provide an arrangement in which, instead of moving the annular members and the associated pins, the tube 5 and with its shelf 7 carrying the magnets 8 and lever arms 10 is rotated with respect to the pins 17 and the latter are held stationary so that following each operation of a group of pins a new set thereof are brought into operative relation with the lever arm 10.

The necessary power for providing this rotation of the tube 5 is obtained from the spring 26, Figure 6, operating through the movable ratchet 27 provided with teeth 28, Figures 1 and 6. Ratchet 27 is secured to and rotatable with the outer tube 5 between the guide plates 29 and 30, Figure 1, on the main frame. A pawl 32 pivoted at 33 on the bell crank 34 is normally urged into engagement with one of the teeth at the tooth engaging end 34′ by the spring 35, one end of which is secured to the pawl 32 and the other to the bell crank 34. Bell crank 34 is pivotally mounted on the main frame at 36 as shown in Figures 1 and 6 and is pivotally secured at 37 to the connecting link 38. Connecting link 38 is pivotally secured at its other end 39 to the plunger 40 of the solenoid 41 of any well known type and comprising a coil 42 and core 43.

Power spring 26 is secured at one end to a pin 44 carried by the arm 38 and at its opposite end to eye 45 of an adjustable screw 46 mounted on the main frame and normally holds the arm 38 and plungers 40 in the position shown. When however the solenoid 41 is energized as will be described hereinafter, the plunger 40 is drawn inwardly between the coils 42 of the solenoid in the opening 48. The movement of arm 38 rocks the bell crank 34 about its pivot 36 in a clockwise direction and the tooth engaging end 34′ of the pawl 32 slides over one tooth into engagement with

the next succeeding tooth on the ratchet 27, preparing the latter for rotation through a distance equal to the pitch of the teeth 28. Upon deenergization of the magnet 41 the tensioned spring 26 pulls the plunger 40 and rod 38 outwardly rocking the bell crank 34 in a counter clockwise direction about its pivot 36 and the tooth engaging end 34 rotates the movable ratchet 27, the pitch distance of one tooth in a clockwise direction.

The outer tube 5 is rotated with the movable ratchet 27 to in turn rotate the shelf 7 carrying the magnets 8 and extension arms 10. The angular rotation is such that the five arms 10 which were formerly positioned beneath and in operative relation with the preceding group of five storage pins are moved to operative relation with the next group of five storage pins. The magnets 8 are now again selectively energized in accordance with a key operation and the pins 17 are correspondingly operated. In this manner, in response to each key operation, as will be described in connection with the electrical circuits shown in Figure 7, the magnets 8 operating though lever arms 10 position a group of storage pins 17 in accordance with a predetermined code to be transmitted individual to the key operation. Following the operation of a group of pins, the magnets are rotated into operative relation with a succeeding group of pins.

In order to prevent counterclockwise rotation of the movable ratchet 27 while the tooth engaging end 34′ slides over one tooth of the ratchet, a pawl member 51 is provided for engaging a tooth of the ratchet. Member 51 is pivotally mounted at 52 urged into engagement with a tooth of the ratchet wheel 27 by a spring 53 secured at one end 54 to the pawl 51 and at the other end 55 to the frame (not shown). When the pawl 32 is being moved from one to the succeeding tooth, the holding pawl 51 in engagement with a tooth of the ratchet prevents counterclockwise rotation thereof. In addition the pawl 51 operates under control of the magnet 56 through its armature 57 rigidly secured to pawl 51 to permit rotation of the ratchet wheel in a counterclockwise direction in the manner and for the purpose to be described in detail hereinafter.

Secured to tube 5 near its upper end is one end of a spring 58, Figure 1, the other end of which is secured to the post 59. Post 59 in turn rotates a shelf 62 which controls the second unit or transmitting mechanisms referred to above, carried by the post 59 is a tooth 63 which is normally in engagement with a tooth on a fixed ratchet wheel 64. Ratchet wheel 64 is secured through collar 65 to the fixed tube 4 by means of screw 66. Tooth 63 normally in engagement with the fixed ratchet 64 prevents the spring 58 from rotating shelf 62.

The shelf 62 is secured to and rotatable with the inner tube 71 by collar 72. Tube 71 is loosely mounted in the tube 4 and is rotatable therein for rotating with the shelf 62 when the latter is released for rotation by spring 58 upon the disengagement of tooth 63 with the fixed ratchet 64 as will be described hereinafter. Fixedly secured to the shelf 62, is the transmitting mechanism including the insulating block 78. Arm 79 secured by screws 81 carried the adjustable contact 82 arranged to engage the contact 83 on spring 84 also secured to the insulating block by screws 85. In the present modification, five such contacts are employed one for each of the five pins 17 of a group operated in accordance with a code to be transmitted.

These contacts are operated by individual feeler cranks 86 pivotally mounted at 87 on a slidable plate 88 through the ends 89 in engagement with the spring contact 84 in accordance with the setting of the pins 17 engaging the end 89 of the bell crank in a manner to be described as follows. The slidable plate 88 is carried by the shelf 62 and slides between the guide plates 89′, Figure 5, mounted on the shelf 62. In order to provide slidable movement to plate 88, a magnet 92, Figure 1, is rigidly mounted on the shelf 62 and is periodically energized in a manner to be described hereinafter for operating its armature 93. Armature 93 is secured to the slidable plate 88 by the screws 94 and is normally held in the position shown in Figure 1 by springs 96, secured at one end to a pair of the guide plates 89′ and at the other end to a cross bar 97. Cross bar 97 is secured by means of rivets to the slidable plate 88 so that the springs 96 normally hold the slidable plate 88 in the position shown in Figure 5 in which the tooth 63 engages one of the teeth of the fixed ratchet 64 preventing rotation of the shelf 62.

As will be described more fully hereinafter, the magnet 92 is energized periodically following the setting of pins 17 in accordance with a code of signals to be transmitted as described above. Energization of magnet 92 moves the plate 88 to the left against the action of springs 96 releasing the tooth 63 from engagement with the fixed ratchet and releasing the power stored in spring 58 for rotating shelf 62 through post 59. The feeler cranks 86 pivotally mounted on the slidable plate 88 are moved to the left therewith and as they move from the storage pins 17, any of the contacts 82 and 83 previously engaged are disengaged. As the tooth 63 disengages a tooth of the fixed ratchet 64, a spring tooth 98 pivoted at 99 on the sliding plate 88 engages a tooth on the ratchet 64. The spring 58 now rotates the table 62 until the spring tooth 98 engages both its own stop 100 and a tooth of the fixed ratchet 64; this rotation being a sufficient angular distance to bring

the cranks 86 into operative relations with a new set of pins.

The magnet 92 is thereupon deenergized and tensioned springs 96 operate to restore the slide plate 88 to its position at the right shown in Figure 1. As the slide plate 88 moves to the right, the lower portion 89 of each of the feeler cranks 86 moves toward its associated pin 17. If the associated pin is in an elevated position as shown in Figure 1, it is in the path of the feeler crank and obstructs its movement. The feeler crank 86, when it engages the pin 17 in its movement to the right is rocked about its pivot 87 and moves its associated spring contact 83 into engagement with the contact 82. If on the other hand the pin 17 has been left in the lower position, it will not be in the path of the feeler crank 86 as it moves to the right and the contacts 82 and 83 will remain disengaged. While the feeler cranks are in operation or right end position, a distributor rotates as will be described in detail hereinafter to transmit the code combination or impulses in accordance with the operation of contacts 82 and 83.

Following the transmission of this code the magnet 92 is again energized and the slidable plate 88 moves to the left, tensioning the springs 96. The contacts 82 and 83 previously engaged, are now disengaged as the feeler cranks 86 rotate counter-clockwise about their pivots 87 and disengage the pins 17. Simultaneously the tooth 63 disengages a tooth on the fixed ratchet 64 and the shelf 62 is released for rotation under control of the spring 58 to position the feeler cranks 86 opposite a new set of storage pins 17 as described above. Thereupon the magnet 92 is again deenergized and the springs 96 again function to move the slidable plate 88 to the right for engaging the feeler cranks 86 with those pins 17 of the succeeding group which have been moved to an elevated position, as described above. In this manner the code set upon the pins 17 are stored to later control the transmitting contacts 82 and 83.

It often happens that the operator sets up a code on the storage pins 17 which for any reason he wishes to wipe out so as to prevent the transmission thereof. I have provided a simple and practical arrangement which enables the operator to erase any code set up on the storage pins before the code is transmitted. As shown in Figures 1 and 3, the shelf 7 carries in addition to the setting up magnets 8, a wipeout magnet 101, suitably mounted on the shelf by means of the magnet base 102. An armature 103 pivotally mounted at 104 is held against its back stop 105 by means of the spring 106. The back stop 105 as is well known in the art may be adjusted to various positions by the adjustable set screw 107 and lock nut 108. Pivotally secured to the armature 103 at 109 is a wipeout pull bar 110 in turn pivotally to the wipeout arm 112 at 113. Secured to and rotatable with the arm 112 about a pivot pin 114 is the pin wipeout member 115. As the arm 112 is rocked about the pin 114, the wipeout member 115 is moved in a clockwise direction about the pivot 114 and restores the group of pins 17, above which it is at the time positioned. These pins 17 have previously been operated to their upper positions in various combinations. As will appear more fully hereinafter, the shelf 7 with the electromagnet 101 may be rotated to a position for associating the pin wipe out number 115 with any group of storage pins 17, for wiping out the code set up thereon.

Referring now to Figure 7, the electrical circuits for controlling the code storing and transmitting apparatus explained in connection with Figures 1 to 6 will now be described. It will be recalled that the shelf 7 carrying magnets 8 is rotated to position the pin operating arms 10 opposite successive groups of storage pins 17. In order to provide proper electrical connections to the magnets 8 while in rotation a plurality of rings 121, one for each of the magnets 8 are mounted on an insulated base 122 carried by the outer tube 5 so that as the tube rotates, the rings rotate therewith. The rings 121 are connected by conductors 123 to 128 to their individual magnets 8 and magnet 101 on the shelf 7 and by a conductor 129 to the common return circuit. As the shelf 7 rotates, the magnets, rings and connections rotate therewith preventing twisting or injury to the conductors.

In operative relation with rings 121 are the individual brushes 131 which are connected by the conductors 132 to 138. Conductors 132–136 are connected in various combinations to contacts on the transmitting keys 141 to 143 mounted on the key board in any suitable manner. Although these key levers are disclosed diagrammatically, it will be understood that they may be arranged on any conventional bank commonly used such as employed in type bar typewriters. Each of the key levers 141 to 143 controls individual groups of contacts completing circuits over the conductors 132 to 136 for selectively energizing predetermined combinations of the pin setting magnets 8. Thus for example if the key lever 141 is operated, a circuit is completed from ground through the key lever 141, contact 144 conductor 132, brush 131, ring 12, conductor 127, through the electromagnet 8 connected to the conductor 127 and over the common return conductor 129, to which it will be noted all the magnets 8 are connected, over the ring 121 and brush 131 connected to the conductor 129 and through battery to ground. Similarly over the contact 145, an energizing circuit is completed over the conductor 133 to energize the magnet 8, connected to the conductor

125. Operation of key 141, as will be clear from the above description energizes the magnets 8 associated with conductors 127 and 125. As a further example, closing of key 142 completes energizing circuits for magnets connected to conductors 124, 126 and 127.

It will be noted that each of the keys control contacts 145 connected to a common conductor 147 which is connected to the solenoid 41. When any key 141 to 143 is operated, the solenoid 41 is invariably energized and as described above operates the pawl 34 through arm 38 to step the ratchet wheel 27 thus rotating the shelf 7 a distance sufficient to position the lever arms 10 in operative relation with a succeeding set of pins 17 and simultaneously tensioning the spring 58 as described in detail above. When therefore a key 141 to 143 is depressed, not only are combinations of the pin operating magnets 8 energized but the solenoid 41 is energized preparatory for stepping the shelf 7. When the key is released, magnets 8 are deenergized and simultaneously magnet 41 is deenergized stepping the ratchet 27 to associate the lever arms 10 of the magnets 8 with a succeeding set of pins 17 and to store energy in the spring 58 for rotating the transmitting shelf 62.

As shown in Figures 1 and 7 the shelf 7 carries an arm 151 arranged to normally engage spring contact 152 to hold spring contacts 152 and 153 disengaged. Contacts 152 and 153 are riveted to a bracket arm 154 carried on the shelf 62. As shown when the pins 17 have no code stored in them, the shelves 7 and 62 have a fixed relative position at which arm 151 engages spring contact 152. When the shelf 7 makes its first movement from this normal relative position, arm 151 is moved from engagement with contact 152 and contacts 152 and 153 thereupon engage each other by their individual spring tension. Thereupon a circuit is prepared for the magnet 92 of the transmitter. Magnet 92 is connected over conductor 156 to a ring 157, on an insulated block 159, carried by the inner rotating tube 71 by member 161 and screw 162. Insulated block 159 carried by and rotatable with tubular member 161 in turn fixedly secured to tube 71 by screw 162 carries in addition to the ring 157, a series of rings 163 connected by individual conductors 164 to 168 to the contacts 82 and 83 on the transmitter block 78, Figure 1. In addition a common return conductor 173 to the contact 152 controlled by the arm 151 as described above and the rings 174 are connected to the striker 177 mounted on the shelf 7. The striker 177 is arranged to engage contact 176 when substantially all of the pins 17 have been set and it is accordingly desirable to warn the operator of this condition. This is accomplished by lighting a signalling lamp 179, to be described in detail hereinafter.

Each of the rings 163 are provided with individual brushes 181, connected by the conductors 182 to 186 to their individual segments 187 to 191 on the distributor 192. In addition to these segments, the distributor 192 is provided with a stop segment 193 and a start segment 194. A continuous ring 195 is connected to the signalling line 196 extending to the remote station and is successively connected to the individual segments 187—191 by brushes 197 carried by and rotatable with shaft 198. In addition there is secured to cam shaft 198 a cam member 199. A spring contact member 201 properly supported is normally in engagement with contact 202 while its cam follower 203 is under the depressed portion of cam 199.

The brush arm 197 is normally held from rotation by the engagement of the armature extension 204 with the shoulder 205, of the cam 199. The armature 206 pivotally mounted at 207 is normally held by the spring 208 one end of which is secured to the armature and other end to the frame (not shown), in a position so that armature extension 204 engages the shoulder 205 of the cam 199. An electromagnet 211 controlling the operation of the armature 206 for releasing the cam is energized periodically in a manner to be described in the following.

When, as described above, a key such as 141 is operated and a combination of the magnets 8 are energized, the rotation of the shelf 7 will move the arm 151 from engagement with the spring contact 152 and contacts 152 and 153 will close. An energizing circuit is thereupon completed for magnets 92 and 211 in series from ground through the start magnet 211 over conductor 212 through the normally closed contacts 201 and 202 conductor 213 to the brush associated with ring 172 over conductor 173 contacts 152 and 153 in series to the electromagnet 92, conductor 156 and ring 157 to battery and ground. Inasmuch as the contacts 152 and 153 will not close except when the shelf 7 has moved from its normal position following the setting up of a code on the pins 17, it is clear that magnets 92 and 211 will energize, only when a code has been set ready to be transmitted over the signalling line.

As a result of the energization of the magnet 92, the sliding member 88, it will be recalled is moved to the left to permit a rotation of the shelf 62, a distance sufficient to set the feeler cranks 86 in operative position with respect to a succeeding group of pins 17, the code for the preceding set having just been transmitted in the manner to be described in connection with the succeeding pins. Simultaneously with the energization of magnet 92, magnet 211 is energized and moves the armature 206 so that the ex-

tension 204 disengages the shoulder 205 of the cam 199, and the brush 197 is released for rotation. As the brush moves from segment 193 to the segment 194, the battery is removed from the conductor 196. The opening of the line 196 is the start signal to which, as is well known in the art and need not therefore be described here, the remote station receiver responds to start the distributor thereat into rotation, for receiving the code to be transmitted.

Simultaneously with the movement of the brush 197 to the segment 194, the cam follower 203 of the spring contact 201 moves over the cam 199, and the contacts are opened, deenergizing the magnets 92 and 211. As a result of the deenergization of the magnet 92, the springs 96 move the sliding member 88, to the right and the crank feelers 86 are operated as described above to in turn operate the contacts 82 and 83 in accordance with the setting of the storage pins 17.

As now the brush 197 engages the first distributing segment 187, for example, a circuit is prepared over the lowermost contacts 82 and 83, Figure 7, from ground through battery, through the brush and ring 171 on the insulated block 159 over the common conductor 169, through the lowermost contacts 82 and 83, conductor 164, the uppermost ring 163 and brush 181, conductor 182 over segment 187, continuous ring 195 and over the conductor 196 to the remote station. The above circuit is traced on the assumption that the lowermost contacts 82 and 83 were operated to their closed position by the movement of the crank to the right, assuming again that the associated pin 17 was in its upper or operated position. Similar circuits will be completed over the other segments as the brush 197 engages them, depending upon whether the contacts 82 and 83 connected therewith through the brush have been operated by their individual storage pins 17. A code is thus transmitted in accordance with the setting of the contacts 82 and 83.

When the brush 197 has made one complete revolution and has returned to the position shown a start signal is transmitted over the line from battery through the segment 193, ring 195 and conductor 196. The apparatus at the receiving end operates in response to this impulse to bring the distributor thereat to a stop. At the same time the contacts 201 and 202 are again closed as the cam follower 203 reaches the depression in the cam 199, and the circuit traced for the magnets 92 and 211 is again completed. Magnet 92 upon energization moves the slider plate 88 to the left permitting a rotation of the shelf 62 as described in detail above for positioning the feelers 86 in operative relation with a new set of storage pins 17. Magnet 211 upon energization moves the armature extension 204 from engagement with the shoulder 205 for releasing the distributor brush 197 for a second revolution as described in detail above. As the brush 197 moves to the first start contact the magnet 92 is deenergized as described above, to permit the movement of feeler cranks 86 to the right, for operating the contacts in accordance with the positioning of the pins 17, with which the feeler cranks at that time are associated. The cycle of operations described, will accordingly be repeated as long as contacts 152 and 153 are connected.

If the operator fails to store any code on the pins 17, and the shelf 62 continues to transmit the previously stored code, these stored in the pins will ultimately all have been transmitted and the shelf 62 thereupon reaches the normal position with respect to the shelf 7 described above. The arm 151 thereupon again engages the spring contact 152 and contacts 152 and 153 disengage, opening the circuit for the magnets 92 and 211. These magnets thereupon remain deenergized until further code is stored in pins 17. During this time the brush 197 is held from rotation by the engagement of the extension 204, with the shoulder 205 of the cam 199. The magnet 92 during this time does not move the slide plate 88 to the left to permit a rotation of shelf 62. The transmitter is thus held now operative.

On the other hand in event the operator stores the code on the storage pins 17 so fast that substantially all of them are set before the code transmitter succeeds in transmitting these codes shelf 7 reaches a position relative to shelf 62 such that striker 177 engages and closes the contact 176. A circuit is thereupon completed from the ground through battery ring 174 and the brush over the conductor 175, through the contact 176 closed, conductor 217 ring 174, conductor 218 and through lamp 179 to ground. The illumination of the lamp 179 warns the operator that he has reached the limit of the storage device and should not attempt to store any more codes until some of the codes already stored have been transmitted before setting up any additional.

In the event that the operator desires to wipe out some of the codes which have been stored, it is only necessary as described above, to energize the magnet 101. This is accomplished by the operation of keys 221 and 222. As a result of the operation of key 221 a circuit is completed through ground and battery over the conductor 223 through key 221, contact 224, conductor 138 through the brush and ring associated with the conductor 138, conductor 128 through the electromagnet 101, the common return circuit 129 through the ring and the brush connected thereto and conductor 137 to battery and ground. The ener-

gization of magnet 101 operates the armature 103, and through it the wipeout pull bar 110 and arm 112 rocking the wipeout lever 115 in a clockwise direction to restore the operated pins 17 to their non-operative position.

Simultaneously with the energization of the magnet 101, and over a parallel circuit an energizing circuit is completed for the magnet 56 over the contacts 224 and conductor 138'. Magnet 56 controls the armature 57 for removing the latching pawl 51 from the tooth of ratchet 27.

It will be recalled that in addition to the operation of the wipeout key 221 the key 222 was also operated. Operated key 222 completes an obvious energizing circuit through the contact 225 for solenoid 41. The energization of the solenoid 41 operates the bell crank 34 removing the tooth 34' of pawl 32 from one of the teeth of the ratchet 27 simultaneously with the removal of the tooth of the pawl 51 from the ratchet 27. The ratchet 27 is thereupon rotated in the reverse direction by energy stored in the spring 58 operating through the outer tube 5. The complete movement of the pawl 51 moves the tooth 225' of the pawl to engage a tooth on the ratchet 27 for stopping the rotation of the tube after it has moved a distance of a half tooth pitch. As a result this rotation in the reverse direction of the outer tube 5, the shelf 7 is rotated and with it the magnet 101 and its associated wipeout levers for positioning them in operative relation with the preceding storage pins. This may be repeated as often as desired, by maintaining key 222 closed and repeatedly operating key 221 until all of the storage pins 17 are restored to normal or non-operated position.

Although in the present modification, the wipeout will reset all of the pins over which it passes, it will be clear that it can be arranged to be stepped back without wiping out all of the pins, but can be directly controlled by the operator to wipe out only certain groups of stored codes.

It will be clear that if desired, an additional key may be provided for preventing operation of the transmitting apparatus shelf 62, while the wipeout function is being exercised as described above.

In addition to the manually operated wipe out feature, described above, the operated pins 17, must be restored to normal non-operative position, after the code individual to their setting has been transmitted just preceding the re-operation of these pins in accordance with a new code. This is accomplished by the cam member 231, Figures 3 and 4, carried on the support 232 and positioned in front of the setting levers 10 on the shelf 7. As the cam 231, moves over the operated pins 17, they are moved to their non-operative position by the cam.

Although I have disclosed my invention in connection with a specific form thereof, it will be understood that it has further application and I do not intend to limit myself by the specific embodiment thereof chosen for illustrating the invention, but only as set forth in the following claims:

1. In a transmitter, a mechanical transmitting mechanism comprising a plurality of stationary mechanically operated members, arranged in groups, means for setting said mechanical members in each group in accordance with a code to the transmitter, means for moving said last mentioned means with respect to said mechanical members, to position said means in operative relation with successive groups of said mechanical members, and manually operated means for restoring any of said operated members before the code in accordance with their setting is transmitted and means comprising a separate remote unit for operating said setting means electrically connected thereto.

2. In a code transmitter, a mechanical storage transmitting mechanism comprising a plurality of stationary mechanically operated members arranged in groups, means for setting said mechanical members in each group in accordance with a code to be transmitted, means for moving said member setting means with respect to said mechanical members to position said means in operative relation with different groups of said mechanical members, manually operated means for restoring any of said operated members before the code in accordance with their setting is transmitted, said last mentioned means being movable with respect to said mechanical members whereby it may be positioned in operative relation with any of said mechanical members and means comprising a separate remote unit for operating said setting means, said operating means being electrically connected to said setting means.

3. In a transmitter, a plurality of pins arranged in a circle, an operating lever individual to each of said pins in a group for operating said pins in accordance with a code to be transmitted, means for moving said operating levers with respect to said pins, whereby said levers are successively positioned in operative relation with different groups of said pins, a wipeout lever for restoring any of said operated pins before the code individual thereto is transmitted and means comprising an independent unit separate from said transmitter and in electrical relation with said levers for variably operating said levers.

4. In a telegraph transmitter, a keyboard, a plurality of groups of storing pins, operating means individual to each storing pin in a group, electromagnetic means responsive to the operation of any one of said keys for operating a combination of said operating means, said operating means in turn operat-

ing said storing pins in accordance with a code to be transmitted, a special key, a wipe out device, and electromagnetic means responsive to the operation of said key, for operating said wipe out device, to restore said operated storing pins to their normal non-operated position.

5. In a telegraph transmitter, a signalling line, a plurality of keys, a plurality of groups of storing pins, operating means individual to each storing pin in a group, electromagnetic means responsive to the operation of any one of said keys, for operating a combination of said operating means, which in turn operate their individual storing pins in a group in accordance with a code to be transmitted, a special key, a wipe out device, electromagnetic means responsive to the operation of said key for operating said wipeout device, to restore said operated storing pins to their normal non-operative positions, and transmitter contacts controlled by said operated pins for transmitting the code combination stored in said pins over said signalling line.

6. In a telegraph transmitter, a signalling line, a plurality of keys, a plurality of groups of storing pins, operating means individual to each storing pin in a group, electromagnetic means responsive to operation of said keys, for operating combinations of said operating means, which in turn operates the storing pins in the groups in accordance with codes to be transmitted, a key lever, a wipe out device, electromagnetic means responsive to the operation of said key lever for operating said wipeout device, to restore said operated storing pins to their normal non-operated position, transmitter contacts, controlled by said operated pins, for transmitting the code combination stored on said pins over said signalling line, and means for operative following the transmission of a code for associating said transmitting contacts with a succeeding group of said storing pins.

7. In a telegraph transmitter, a signalling line, a plurality of keys, a plurality of groups of storing pins, operating means individual to each storing pin in a group, electromagnetic means responsive to operation of said keys, for operating combinations of said operating means, which in turn operate said storing pins in groups in accordance with codes to be transmitted, a key lever, a wipeout device, electromagnetic means responsive to the operation of said key lever for operating said wipeout device, to restore said operated storing pins to their normal non-operated position, transmitter contacts controlled by said operated pins in a group for transmitting the stored code combination over said signalling line, means for operating said transmitting contacts to a succeeding group of said operated pins, and means operative in the event that the pins are all operated in accordance with codes to be transmitted for rendering said storing pin operating means non-operative.

8. In a telegraph transmitter, a signalling line, a plurality of keys, a plurality of groups of storing pins, operating means individual to each storing pin in a group, electromagnetic means responsive to operation of said keys, for operating combinations of said operating means, which in turn operate said storing pins in groups in accordance with codes to be transmitted, a key lever, a wipeout device, electromagnetic means responsive to the operation of said key lever for operating said wipeout device to restore said operated storing pins to their normal non-operated position, transmitter contacts controlled by said operated pins in a group, for transmitting the stored code combination over said signalling line, means for operating said transmitting contacts to a succeeding group of said operated pins, means operative in the event that the pins are all operated in accordance with the codes to be transmitted for rendering said storing pin operating means non-operative, and automatic means operative when a code in accordance with the setting of all stored pins has been transmitted for rendering said transmitter non-operative.

9. In a transmitter, a mechanical storage device, electromagnetic means, a keyboard for operating said electromagnetic means in code combinations for operating said mechanical storage device in accordance with codes to be transmitted, a transmitter normally held non-operative, means responsive to the storing of codes on said mechanical storage transmitter for rendering said transmitter operative to transmit said code, and manually operated means for wiping out any of said stored codes before the code has been transmitted.

10. In a telegraph transmitter, a stationary mechanical storage device, an operative means movable with respect to said stationary mechanical storage device, electromagnetic means for operating said storage device in accordance with various code combinations, a movable transmitter responsive to the operation of said storage device for transmitting said code combination of impulses, said transmitter being normally non-operative and rendered operative automatically in response to the storing of a code on said storing device, and manually operated means for wiping out codes stored in said mechanical storage device before said code has been translated.

11. In a telegraph transmitter, a stationary mechanical storage device, arranged in groups, operating means for storing codes in a group of said storage device, means for moving said operating means from group to group, means responsive to said last mentioned means for storing power, a transmit-

ter for transmitting the code stored in a group, means including said source of power for moving said transmitter from group to group, means for restoring any of said groups of said storage device before the code stored thereon has been transmitted, and means including said source of power for positioning said last mentioned means in operative relation with any group of said storage device.

12. A transmitter comprising a stationary storage member provided with a plurality of groups of circuit controllers; movable means for setting up combinations of said circuit controllers; electro-magnetic means for operating said movable means; a plurality of keys remotely disposed from said electro-magnetic means and electrically connected thereto for variably operating said electro-magnetic means; and movable means for transmitting code combinations of impulse conditions in accordance with positions of said controllers.

13. A transmitter comprising a stationary storage member provided with a plurality of groups of circuit controllers; means movable at varying speeds for setting up combinations of said circuit controllers; electro-magnetic means for operating said movable means, key mechanisms remotely disposed from said electro-magnetic means and electrically connected thereto for variably operating said electro-magnetic means; and means movable at a substantially constant rate for transmitting code combinations of impulse conditions in accordance with the positions of said controllers.

14. A transmitter comprising a stationary storage member provided with a plurality of groups of circuit controllers, means movable at varying speeds for setting up combinations of said circuit controllers, electro-magnetic means for operating said movable means; key mechanisms remotely disposed from said electro-magnetic means and electrically connected thereto for variably operating said electro-magnetic means; means movable at a substantially constant rate for transmitting code combinations of impulse conditions in accordance with the positions of said controllers; and means for preventing interference between said setting-up mechanisms and said transmitting mechanism.

15. A transmitter for transmitting code combinations of electrical conditions comprising contact carrying means; a key board mechanism remotely disposed therefrom; solely electrically actuated means controlled by said key board mechanism for controlling said contact carrying means in accordance with code combinations of impulse conditions to be transmitted, and transmitting means movable from one to another of said contact carrying means for transmitting code combinations of impulse conditions in accordance with the setting of said contact carrying means.

16. In a telegraph transmitter, stationary mechanical storage devices arranged in groups; an electro-magnetic operating means for storing code signals to be transmitted in a group of said storage devices; means for moving said operating means from group to group; a remotely disposed key board mechanism electrically connected to said electro-magnetic means for variably operating said electro-magnetic means; a transmitter for transmitting the code signals stored in said groups; means for moving said transmitter from group to group; and means for restoring any one of said groups of said storage groups before the code storing thereon has been transmitted.

17. In a telegraph transmitter; a stationary mechanical storage device arranged in groups; electro-magnetic means for storing codes in a group of said storage devices, a key board mechanism for variably operating said electro-magnetic means, means for moving said operating means from group to group of said storage devices, means responsive to said last mentioned means for storing power; a transmitter for transmitting the code signals stored in said groups; means including said stored source of power for moving said transmitter from group to group; and means for restoring any of said groups of said storage devices before the code thereon has been transmitted.

18. In a telegraph transmitter; a plurality of groups of storing mechanisms; electro-magnetically controlled operating means therefor for operating each group of storage mechanisms; key board means for variably operating said electro-magnetic means; means for moving said operating means from one to a succeeding group of storing mechanism; and means for back-spacing said operating means, said operating means being thereupon conditioned to wipe out a stored code signal.

19. In a telegraph transmitter, a plurality of groups of storage mechanism arranged on a movable table; operating mechanism carried by said table; electro-magnetic means to operate said operating mechanisms; a key board means for controlling said electro-magnetic means; means for moving said table for associating said operating means with successive groups of said storing mechanism; and means for back-spacing said table for associating said operating mechanism with preceding groups of said storing mechanism.

20. In a telegraph transmitter; a plurality of groups of storing mechanisms arranged on a movable table; operating mechanism carried by said table; electro-magnetic means for controlling said operating mechanism; key board means for controlling said electro-magnetic means; means for moving said table

to associate said operating means with successive groups of said storing mechanism; and means for back-spacing said table to associate said operating mechanism with preceding groups of storing mechanism, certain of said operating means being thereupon effective to restore said operated storing mechanism.

In testimony whereof I affix my signature.

EDWARD E. KLEINSCHMIDT.