

G. S. CORNISH.
ELECTRICAL SELECTING AND RECORDING APPARATUS.
APPLICATION FILED JULY 16, 1917.

Patented Feb. 4, 1919.
3 SHEETS—SHEET 1.

1,293,346.

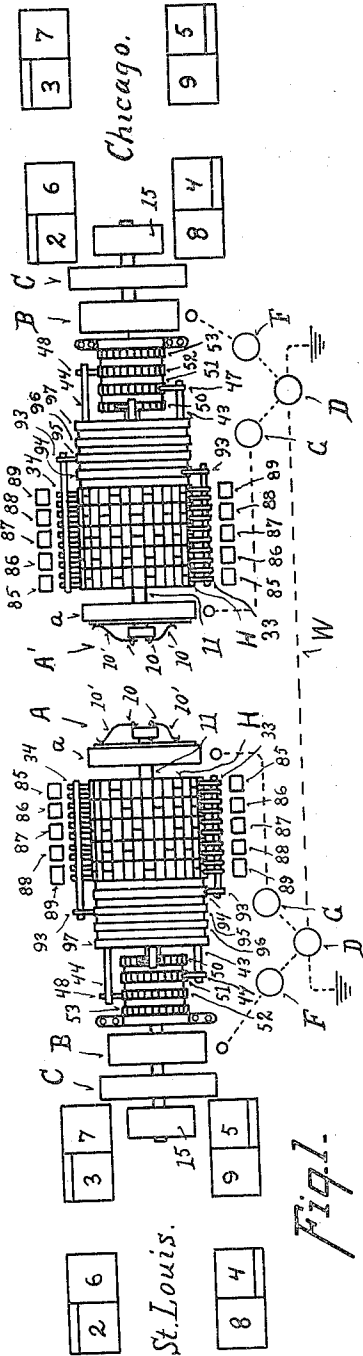


Fig. 1.

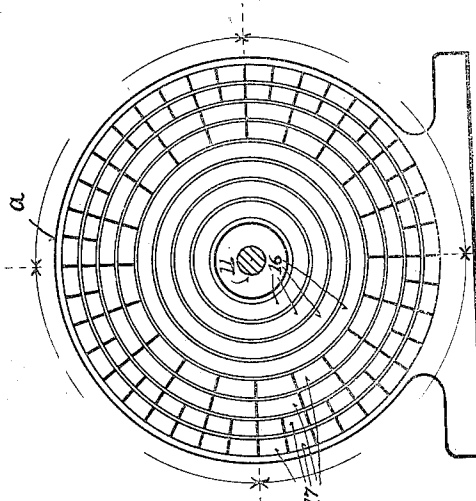


Fig. 3.

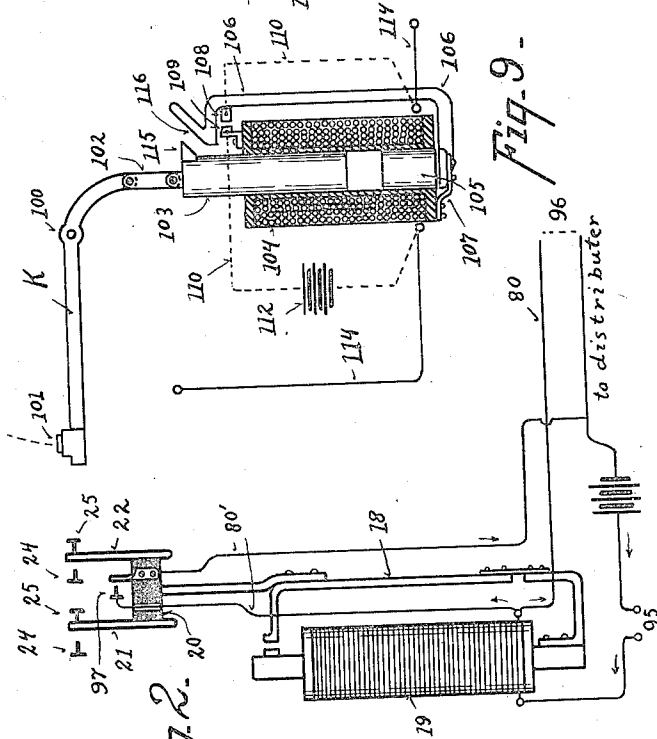


Fig. 2.

Fig. 9.

Witness
C. R. Kropf
a Notary

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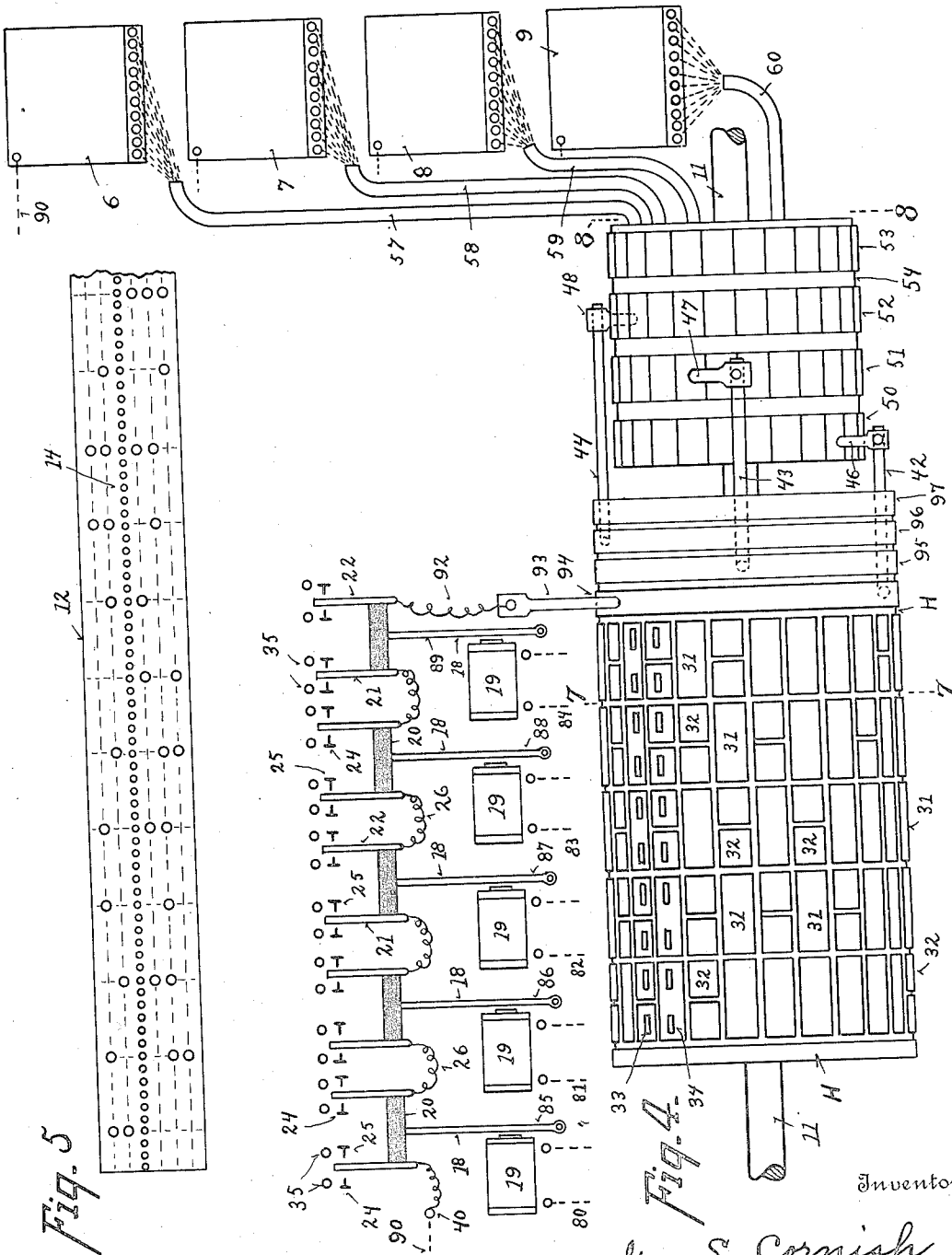


Fig. 5

Fig. 4

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3 SHEETS—SHEET 3

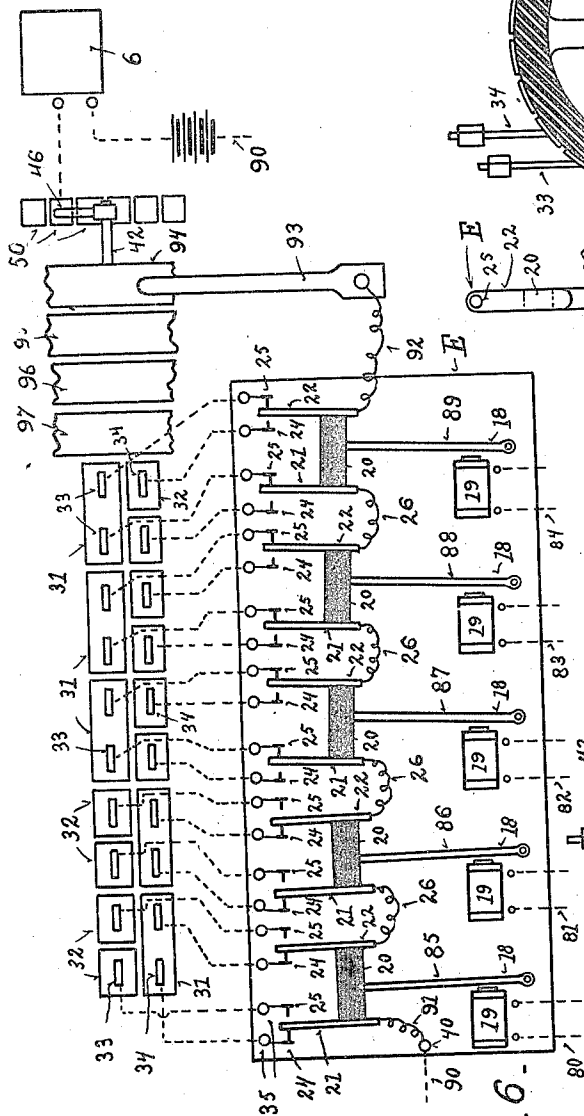


Fig. 6.

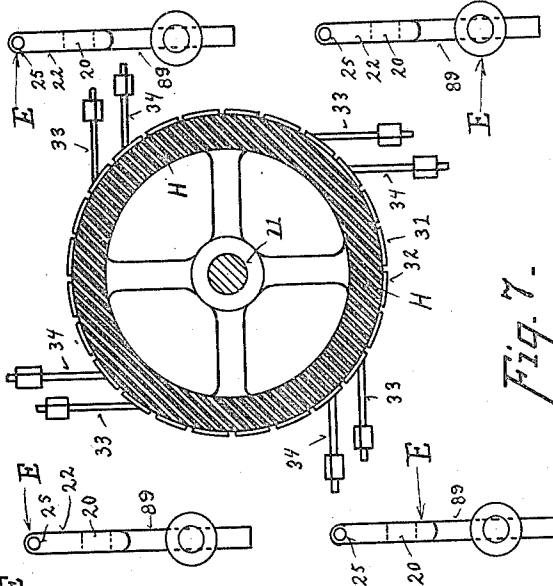


Fig. 7.

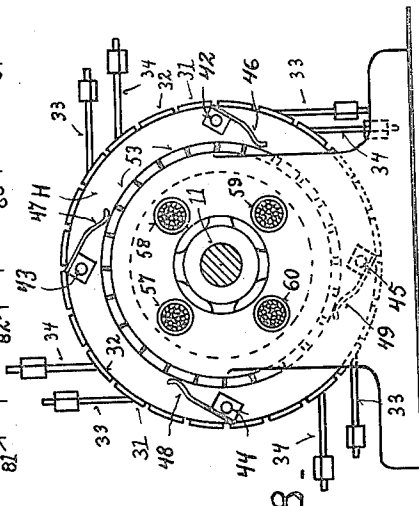


Fig. 8.

Witness
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UNITED STATES PATENT OFFICE.

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ELECTRICAL SELECTING AND RECORDING APPARATUS.

1,293,346.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GUY S. CORNISH, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Electrical Selecting and Recording Apparatus, of which the following is a specification.

My invention relates to improvements in telegraph or other selective and recording apparatus. One of its objects is to provide improved simple and reliable selective apparatus to select out the respectively different signals and apply them to register correctly and directly upon the printing apparatus type bars at the receiving stations. Another object is to provide a plurality of independent series of contact members functioning as to numbers and time to select the letters as indicated by line signals for one or more printers or recorders. Another object is to provide in combination with suitable relays a series of segments and contact members movable relative to each other. Another object is to provide in combination with a series of contact members a movable member carrying a differently arranged series of contact segments each series corresponding to a definite signal and serving to transmit its own and no other signal to the printing apparatus. Another object is to provide a single selector common to a plurality of printers. Another object is to provide improved means to distribute the selected signals to the respective printers over different branch circuits and to record the different characters. My invention also comprises certain details of form, combination and arrangement, all of which will be fully set forth in the description of the accompanying drawings, in which:

Figure 1 is a general diagram of apparatus embodying my invention.

Fig. 2 is a detail of one of the locking selecting relays.

Fig. 3 is a plan view of the face of one type of stationary member for the distributor head.

Fig. 4 is an enlarged diagram illustrating the relation of the selecting relays and movable and stationary conductors relative to a series of printers.

Fig. 5 is a plan of a section of the perforated sending tape with the first twelve letters of alphabet perforated thereon.

Fig. 6 is a diagram illustrating the segments brushes, relays and electrical connections employed to select a single letter out of the series required to actuate the printing apparatus.

Fig. 7 is a section detail on line 7 7 of Fig. 4.

Fig. 8 is a sectional detail on line 8 8 of Fig. 4.

Fig. 9 is a diagram of one of the type-bar actuating solenoids.

The accompanying drawings illustrate the preferred embodiment of my invention as applied to telegraph apparatus, in which A A' represent rotary distributor heads located at different stations, which are or may be each both a sending and a receiving station. The heads A and A' are duplicates of each other. The several sending instruments of a multiplex system, a quadruplex system, for instance, are represented by 2, 3, 4 and 5 and the receiving or recording instruments by 6, 7, 8 and 9. The brush contacts of the distributor heads A and A' are rotated in synchronism by suitable known apparatus indicated by B which it is not necessary herein to set forth in detail. The respective distributor heads each comprise a stationarily mounted disk *a* of insulating material upon one face of which are a series of continuous concentric conductor rings 16 and a series of concentric segmental or distributing conductor rings 17; a series of separate, rotarily mounted brush holders 10 on the shafts 11, serve to hold a series of brushes 10' which make a series of different contacts with said contact rings and across ring, to connect said rings electrically in pairs. The respective sending instruments serve to prepare perforated tapes 12, see Fig. 5 on which tapes there are a series of feeding perforations 14 and spaces for five perforations in a row transversely of the tape. In practice, thirty or more characters are

employed for sending and printing the messages, and by employing different combinations of five or less transverse perforations with different positions and spacing for the perforations, each of the thirty or more characters may be distinguishably represented on the tape by said perforations in transverse rows, and these perforations are in turn translatable into electrical signals over the line wire W connecting, for instance, the receiving head A' with the sending head A.

The line is operated as one type of duplex line, that is one sending instrument at each end of the line, and one recording instrument at each end of the line are operated as a duplex unit or system, and are allotted a definite portion or segment of each revolution of the distributor heads for the exclusive transmission of their signals over the line. Other sending and recording instruments in similar duplex units or systems are allotted other definite portions of each revolution of the distributor heads for the transmission of their signals over the line. This is effected by feeding the perforated tapes from the several sending instruments into operative relation with a series of selecting pins which influence the current so as to translate the perforated signals of the tapes into electrical signals which are sent forward over the line.

The distributor head A' at the receiving station being rotated in synchronism with the distributor head A at the sending station, receives and transmits to the selective apparatus the identical electrical signals received by the distributor head A at the sending station. The head A receives in consecutive order five or less independent signals, which it sends out over the line to head A'. The signals received consecutively at head A' are distributed by head A' directly or indirectly to the respective circuits 80 to 84 to energize the respective magnets 19 of one of the series of relays 85 to 89, there being one series of relays 85 to 89 for each recording instrument. Distributer heads and sending instruments such as herein diagrammatically illustrated and described have been heretofore employed with different, more complicated, and unreliable selective apparatus, and do not require specific illustration and description herein, except that C represents an electric motor, which with its fly wheel 15 tends to drive the shaft 11 at a uniform speed which is slightly greater than the actual speed of said shaft 11, due to the action of the synchronizing apparatus B which by unclutching the shaft 11 from one of the motors C and retarding its movements through sets of rings and brushes carried by the heads A A', serves to keep the two shafts 11 of

the respective stations in step or synchronized.

The main line connections are of the general duplex type or system of telegraphy. At each end of the line is a main relay D, a synchronizing or correcting relay F, and a relay G, which transmits the signals through the desired rings and segments of the distributor in sequence to the circuits 80 to 84 of the respective series of relays 85 to 89, which in turn set up or prepare for the closing of a definite branch of one of the local recorder circuits 90, through the series of relay contacts 24 and 25.

The signals transmitted to the distributor head A' at the receiving station are taken from its collector rings to its segments by the series of brushes 10, so as to separately transmit to the separate local circuits 80 to 84 of four printers those electrical signals sent out from the respective corresponding sending instrument. Signals from sending instrument 2 would be distributed to the locals 80 to 84 of printer 6, the signals sent out by sending instruments number 3 and 4 and 5 are distributed at the head A' and reproduced in the local circuits 80 to 84 of the respective printers number 7, 8 and 9.

The electrical impulses set up in the local circuits 80 to 84 of the respective printers are the duplicate in kind of those passing from the sending instruments 2, 3, 4 and 5 to the distributor head A and are each directed respectively through an independent relay of the series of relays E. For the purposes of identification the respective relays of series E are numbered 85, 86, 87, 88 and 89. Each of the relays of the series of relays E comprises a main movable arm 18 (see Fig. 2) actuated by an electromagnet 19. At the free end of arm 18 is a block of insulating material 20 to the ends of which are attached two contact members 21 and 22. The members 21 and 22 each move between two adjustable contact screws 24 and 25 so as to make contact with the screw 24 when the magnet is energized and with the screw 25 when the magnet is not energized. The members 21 and 22 of adjacent relays are electrically connected in series by means of flexible conductors 26 as shown in Fig. 4. Each relay of series E is connected up electrically as indicated in Fig. 2 so that when the distributor closes the local circuit, say 80 at 95 and 96 the magnet 19 is brought into circuit and the armature attracted which closes circuit 80' at contact 97 and locks the armature 18 to magnet 19 permitting circuit 80 to be opened at 96, until the circuit is finally opened at 95 through the distributor contacts after the character has been printed.

H represents a cylinder of insulating ma-

terial preferably rotatably mounted upon the shaft 11 and having upon its periphery a series of segments or conductors symmetrically arranged in rows or bars longitudinally of the cylinder and separated circumferentially of the cylinder in a partially symmetrical order into full length segments 31 and half length segments 32. At four equidistant points about the cylinder H are arranged double rows of contact brushes 33 and 34 (see Fig. 6), ten in each row, to respectively engage two adjacent rows of contacts and spaced apart, so as to be able to contact two brushes to each full length segment and one brush to each half length segment. The respective series of brushes 33 and 34 are connected up electrically as illustrated in Figs. 6 and 7 through the adjacent binding posts 35 with the several contact screws 24 and 25 of the individual relays 85 to 89 of the respective series of relays E.

In order to select the electrical signals representing a given letter of the alphabet two rows of segments are employed in conjunction with one set of contact brushes 33 and 34 and one series of relays E. The single cylinder H serves to select out the individual character or type signals for each of the local printer circuits, acting in short interval turns to select for each local circuit in synchronism with the movements of the sending apparatus and the heads A and A'. The four independent sets of relays E and brushes 33 and 34 are arranged about the cylinder H, each set being connected up in its own independent local printer circuit 90.

In technical terms the letter "A" is designated as "1-2" meaning that on the sending tape of sending instrument 2, for instance, perforations are made at transverse spaces 1 and 2 only on the tape as shown at the left hand of Fig. 5. Also that corresponding electrical signals are sent out over the line wire W to indicate the letter "A" and that corresponding signals are reproduced in the local circuits 80 and 81 controlling the printer 6. In like manner the letter "B" is known as "1-4-5" meaning that spaces 1, 4 and 5 transversely of the tape are perforated. The letter "C" is known and indicated on the tape as 2-3-4. In like manner a full series of thirty or more characters corresponding to each type-bar of the printing mechanisms and also certain signals required to operate the printers may be indicated on the tape by perforations and on the wire by electrical signals distinguishable one from another.

On the cylinder H the segments 31 and 32 are permanently arranged in rows; two rows jointly to each signal to be selected, successively and systematically to select out

each of the thirty or more different characters or signals which it is possible to send over the wire. As illustrated in Fig. 6 the two rows or bars of segments 31 and 32 are arranged to select out the letter "A", that is to close the local circuit of the printer across the segments 31 and 32 and through the contacts of the co-acting relays 85 to 89 of the series E and to hold said circuit closed for an interval sufficient for a separate electrical signal to operate the type bar actuating mechanism or solenoid and allow the selected type bar to strike, after which the circuits 80 to 84 are each opened at 95 by the distributor, and then closed ready to set up the next character. The brushes 33 and 34 and relays 85 to 89 of the series E then proceed to select and print the next character coming in over the wire. In the interval other relays and brushes are performing in turn a like service for the other sending and printing units, the contacts on each quadrant of the head a, Fig. 3 being devoted successively to the sending and receiving of signals for one sending and printing unit.

As applied to the diagram Fig. 6, the electrical signal "1-2" or any other signal over the line wire would by the distributor head A' be reproduced in local circuits 80, 81, 82, 83 and 84 as signals separately in the order 1, 2, 3, 4, 5 in which they were sent out. The sending of the signal "A" or "1-2" over the line would through local circuits 80 and 81 actuate the relays 85 and 86 to pull over and temporarily lock the contact members 21 and 22 of said relays 85 and 86 in position to make contact with the contact screws 24, while the local circuits 82, 83 and 84 would receive no electrical impulses and relays 87, 88, and 89 would remain in their idle or normal positions with their contact-members in position to contact with contact screws 25.

The local circuit 90 of printer 6, for instance, would thus be closed through contacts 24 of relays 85 and 86 while relays 87, 88, and 89 would close it through contacts 25, leaving circuit 90 still open at the brushes 33 and 34 until the requisite combination of segments 31 and 32 rotated into position beneath the brushes, which would occur when signal 1-2 reached the relays 85 and 86 and when the segments 31 and 32 indicated in Fig. 6 came into position under the brushes 33 and 34. The path followed by the current in circuit 90 would then be from binding post 40 (see Fig. 6) through a flexible conductor 91 to member 21 of relay 85, thence to contact screw 24 and the first brush 34 to segment 31, the first segment of the lower row. Thence by the second brush 34 and contact screw 24 to member 22 of relay 85. Thence by flexible connec-

tion 26 to member 21 of relay 86 and by contact screw 24 and the third brush 34 to the second segment 31 of the lower row. Thence by the four brush 34, and contact 24 to member 22 of relay 86. Thence by flexible connection 26 to member 21 of relay 87 and by contact screw 25 and the fifth brush 33 to the fifth segment 31 in the upper row. Thence by the sixth brush 33, and contact 25 to member 22 of relay 87. Thence by flexible connection 26 to member 21 of relay 88, and by contact screw 25 and the seventh brush 33 to the sixth segment 31 of the upper row. Thence by the eighth brush 33, and contact screw 25 to member 22 of relay 88. Thence by flexible connection 26 to member 21 of relay 89, and by contact screw 25 and the ninth brush 33 to the last segment 31 of the upper row. Thence by the tenth brush 33 and contact screw 25 to member 22 of relay 89. Thence by the flexible connection 92 to a brush 93 which contacts with a conductor ring 94 also carried by the cylinder H. The local circuit 90 when closed across the segments of the selector would serve to energize and operate the type bar "A" and cause it to print and space for a new letter. Other letters or signals when set up by any one series of relays 85 to 89 and the brushes brought into position upon rows of segments suitably divided or spaced would serve to select and print said several characters upon a corresponding printing apparatus. Other conductor rings 95, 96 and 97 serve to separately receive the signals selected for distribution to other printers.

Projecting from one end of the cylinder H and in electrical contact with the respective conductor rings 94 to 97 are four brush holders 42, 43, 44 and 45 which respectively rotate with the cylinder H and carry brushes 46, 47, 48 and 49 to bear upon the stationarily mounted segmental rings 50, 51, 52 and 53 carried upon the cylinder 54. Each of these stationary segmental rings has an insulated segment to correspond to each character or type bar of the printer, and the several segments are connected by separate wires gathered into cables 57, 58, 59 and 60 leading from the respective segmental rings to the respective printers and thence diverging and connected to the individual type bar actuating mechanisms, spacing mechanism and other essentials of a printer, to print the respective characters selected.

The general printing apparatus employed does not constitute a part of the present invention being practically the same as an ordinary manually operated type-writer and does not require specific description herein.

In Fig. 9 I have illustrated one of the several individual type-bar actuating solenoids which I preferably employ with and

as a part of my improved apparatus for directly selecting the characters to be printed. K represents one of the type-bars pivoted at 100 and with a type face 101. At the opposite end the type-bar is pivotally connected by a link 102 to the movable armature section 103 of a solenoid 104. A stationary armature section 105 is also preferably employed with a gap between the two armature sections. When not energized and at rest the movable armature section 103 and type-bar K occupy the position illustrated in Fig. 9, either by being counter-balanced or held by a spring not illustrated. A circuit closing armature 106 has a flexible section 107 so that when attracted by the armature section 105 it moves and closes the movable contact 108 against the stationarily mounted contact 109 to thereby close the local circuit 110 having its own battery or source of energy 112 through the coil of the solenoid. The circuit 114 is one of the several branches of the printer actuating circuit by means of which the selector mechanism sends a momentary impulse through the coil of the solenoid to energize the same and close the circuit 110, which remains closed and the coil of the solenoid energized by the source of energy 112 until the type bar has finished its stroke and effected the printing operation, at which point the inclined projection 115 carried by the movable armature section 103 in its downward movement engages the inclined face 116 carried by the armature 106 and separates the contact 108 from contact 109 and thus breaks the circuit 110, whereupon there being no current flowing in the coil of the solenoid, the type bar and armatures 103, and 106 return to their normal positions of rest ready to be again actuated as described.

The position of the respective brushes 46 to 49 and their holders is so arranged with reference to the respective rows of segments 31 and 32 occurring successively about the cylinder H, that when the brushes 33 and 34 of a given relay series E are in position to select say the letter "A" the corresponding brush 46, for instance, is resting upon and in electrical contact only with that segment of the corresponding segmental ring 50 which would serve to actuate the type bar and other printing apparatus requisite to print the letter "A" on the particular printer 6, for instance. In like manner as the cylinder H revolves under the brushes 33 and 34 and the respective rows of segments 31 and 32 in pairs come into position to select any given letter or character, the brushes 46 to 49 respectively have in like manner moved over the faces of the segments on segmental rings 50 to 53 until the brushes 46 to 49 rest upon the proper seg-

ments to actuate only the type bar of the letter or character being selected.

It will be noted that with the cylinder H rotating and none of the relays 85 to 89 energized, there is no combination of contacts 31 and 32 in a complete rotation of cylinder H which will serve to close a given printer circuit 90. Also that the energizing of any one of said relays 85 to 89, or any combination thereof will in one rotation of the cylinder H find through the brushes 33 and 34 one complementary arrangement of contact members 31 and 32 which will serve to close the printer actuating circuit 90. Also that the arrangement of the rotating contacts 31 and 32 upon the cylinder H to represent respective characters, and the positions of the rotating brushes 46 to 49 carried by the cylinder H is such with reference to the segmental rings or keyboard switches 50 to 53 of the respective printers that when such closure of the printer actuating circuit occurs, the particular brush 46 to 49 is upon the segment requisite to print the character represented in the set up of the relays 85 to 89.

My improved rotary selector picks out the particular letter desired as indicated by the signals passed into it from the distant end, closing a path electrically directly to each individual type-bar without mechanical movement or intermediate apparatus whereas in prior devices from 14 to 25 movements both mechanical and electrical have been necessary in order to print a single letter.

Prior apparatus has generally employed reciprocatory or back and forth movement of all parts, whereas, my improved apparatus is continuously rotating in one direction, which is of material importance where the apparatus is complicated, delicate, or of a general character easily deranged or rendered inoperative. It also obviates the extensive use of retractile springs moving disks, cams, levers and a multitude of other magnetic operations and operates the type-bar in as simple and direct a manner as striking a key with the finger.

The selecting for all four channels is done by one rotary selector whereas prior devices require a complete selecting and printing mechanism for each printer or channel. Another advantage is that the brushes having movable contact with the selecting contacts, attain more perfect electrical contact and require less attention to keep them in operating condition, and the apparatus may be relied upon in the hands of operators of ordinary skill.

It is to be noted that the recording instrument is actuated by the closing and not by the breaking of its local circuit 90, that the circuit is closed through and across a

series of segments insulated one from another, and that when this circuit is broken, it is simultaneously interrupted at points where ten brushes engage the insulated segments 31 and 32, and also at the contact of the brushes 47 with the segments 53, which results in reducing arcing or sparking, at any one point of interruption to a minimum, and prevents injury therefrom to any part of the apparatus. These features also result in a capacity to record signals at an increased rate per unit of time, since only a very small fraction of a second is required, during which the recorder circuit is closed, as the movement of the type bar or act of recording actually takes place after the recorder circuit has been broken, and in the period of time in which other signals are being selected for and distributed to other recording instruments of the series.

The apparatus herein illustrated and described is capable of considerable modification without departing from the principle of my invention.

Having thus described my invention, what I claim is:

1. An electrical selecting and recording apparatus comprising a distributor member, a series of recorder circuit opening and closing elements to be successively energized by signals over the sending line through said distributor member, an element movable in synchronism with the distributor member and provided with distinctively arranged contacts insulated from each other and characteristic of the respective signals to be recorded, and a recording instrument having a branch recorder circuit for each signal to be recorded, and an individual signal recording element for each signal to be recorded.
2. A selecting and recording apparatus comprising a line wire, a recorder actuating circuit, a recording instrument having an individual signal recording element for each signal to be recorded included in a separate branch of the recorder actuating circuit, a recorder circuit closing element rotatable in synchronism with the signals passing over the line wire and provided with a separate group of contacts insulated from each other and distinctively arranged for each signal to be recorded, a plurality of brushes to engage in succession different insulated contacts in groups, and a plurality of relays actuated by signals over the line wire to open and close different branches in said recorder actuating circuit, said brushes and relays being connected in series in said recorder actuating circuit.
3. A selecting and recording apparatus comprising a line wire, a recorder actuating circuit, a recording instrument having an individual signal recording element for

each signal to be recorded included in a separate branch of the recorder actuating circuit, a recorder circuit closing element rotatable in synchronism with the signals passing over the line wire and provided with a plurality of contacts insulated from each other and characteristically arranged in groups for different signals to be recorded, a plurality of brushes to engage in succession different insulated contacts in groups, and a plurality of relays actuated by signals over the line wire to open and close different branches in said recorder actuating circuit, said brushes and relays being connected in series in said recorder actuating circuit.

4. A selecting and recording apparatus comprising a line wire, a recorder having an actuating circuit with a branch for each signal to be recorded, a recorder circuit closing element rotatable in synchronism with the signals over the line wire and provided with a plurality of contacts insulated from each other and characteristically arranged in groups and a collector ring, a segmental ring the segments of which form terminals for the respective recorder branch circuits, a sliding contact to close the recorder circuit from said collector ring to said segmental ring, a plurality of brushes to engage the insulated contacts of said circuit closing element in groups, a brush to engage said collector ring, and a plurality of relays actuated by signals over the line wire to open and close a series of branches in said recorder actuating circuit, said brushes and relays being connected in series in said recorder actuating circuit.

5. An electrical selecting and recording apparatus comprising a recording instrument having a branch actuating circuit for each signal to be recorded and an independent recorder actuating element included in each branch circuit, a series of electrical contact members insulated from each other and arranged in groups characteristic of the respective signals to be recorded, and a series of selecting relays to selectively open and close respective branches of said recorder circuit, said characteristically arranged contact members and said selecting relays being relatively movable.

6. An electrical selecting and recording apparatus comprising in combination with a distributor element a recording instrument having a branch energizing circuit for each signal to be recorded and an individual recorder actuating element for each signal to be recorded included in a separate branch of said circuit, a selecting member rotatable in synchronism with said distributor element and comprising a supporting frame provided with a plurality of electrical contacts insulated from each other and ar-

ranged in successive series distinctive of the signals to be recorded to close a recorder energizing branch circuit when a particular signal set up by the distributor element coincides with the corresponding series of contacts carried by said selecting member.

7. A telegraph selecting and recording apparatus comprising a recording instrument having a branch energizing circuit for each signal to be recorded and an individual recording element for each signal to be recorded included in a separate branch of said circuit, a series of locking relays separately actuated in different combinations to open and close different branches in said recorder actuating circuit, and circuit closing contacts insulated from each other and arranged in groups characteristic of the signals to be recorded, said relays and said insulated characteristically arranged circuit closing contacts being relatively movable.

8. A selecting and recording apparatus comprising in combination with a receiving distributor head having a stationary member and a rotary member, a recording instrument having a recorder actuating electrical circuit with a branch for each signal to be recorded and an individual recording element for each signal to be recorded included in a separate branch of said circuit, a plurality of locking relays actuated by electrical signals over the line wire to said distributor to open and close separate branches of said recorder actuating circuit, a member rotating in synchronism with the rotary member of said distributor head and provided with a series of circuit closing contacts insulated from each other and in relatively fixed relation characteristic of the signals to be recorded to selectively close the actuating circuit of said recorder through different branches thereof.

9. In a selecting and recording apparatus in combination with distributor heads located at the sending station and at the receiving station respectively and rotating in synchronism, a recorder having an actuating electrical circuit with a plurality of branches corresponding to the respective signals to be recorded and independent recording members for the respective signals to be recorded, a plurality of locking relays to open and close different branches of said recorder actuating circuit, and means rotating in synchronism with said distributor heads to selectively close the recorder actuating circuit of said recorder successively through different branches thereof.

10. In a selecting and recording mechanism in combination with a line wire and a pair of distributor heads at opposite ends thereof rotating in synchronism, a plurality of stationarily located printers, a plurality of independent printer-actuating electrical circuits each having a plurality of

branches corresponding to the respective signals to be recorded, a plurality of stationarily located segmental rings connected up in said respective printer actuating branch circuits, a member at each end of the line wire rotating in synchronism with the distributor head at that end of the line wire, and provided with rotary contact members to selectively close respective printer actuating circuits, and brushes carried by said rotary contact carrying member to successively engage the respective segments of said respective stationarily located segmental rings, said selecting contacts, and brushes being so positioned as to make contact with definite segments on the respective stationary segmental rings when the corresponding rotary selecting segments are in position to close the printer actuating circuit.

11. A telegraph selecting apparatus comprising a distributor head having a rotary member, a plurality of printer actuating circuits, each having a branch for each character to be printed, a series of relays for each printer actuating circuit stationarily located to open and close respective branches thereof, a series of stationarily located segmental rings one for each printer circuit and a segment in each for each character to be printed, a member rotating in synchronism with said distributor head and provided with a plurality of contact members arranged in separate series characteristic of the characters to be printed and in sliding contact successively with said relay controlled contacts, and with collector rings having sliding engagement each with a stationarily mounted segmental ring and a relay contact, to selectively close said respective printer actuating circuits through their respective branches.

12. In an electrical selecting and recording apparatus, a recorder having an individual signal recording element for each signal to be recorded, a circuit closing element movable in synchronism with the signals passing over the line and provided with a plurality of relatively fixed characteristically arranged circuit closing contacts insulated from each other, and a plurality of relays actuated by signals over a line, to close different branches of the actuating circuit of said recorder through said characteristically arranged and insulated contacts.

13. In an electrical selecting and recording apparatus, a line wire, an electrical recorder actuating circuit, a recorder having an individual recorder member for each signal to be recorded and each included in a separate branch of said recorder actuating circuit, a plurality of selecting relays actuated by signals over the line wire to open and close different branches of said recorder actuating circuit, and a recorder circuit closing element movable in synchronism with

the signals over the line wire and provided with a plurality of relatively fixed and characteristically arranged circuit closing contacts insulated from each other, to close different branches of said recorder actuating circuit.

14. In a telegraph selecting and recording apparatus an electrical selector comprising a member rotating in synchronism with the signals passing over the line wire and provided with a plurality of contacts arranged in separate series characteristic of the characters to be printed and a collector ring, stationarily mounted contact members to slidably and successively engage said respective series of contacts, a stationarily mounted contact to slidably engage said collecting ring, a stationarily mounted segmental ring having a segment for each character to be printed, and a contact member electrically connected to said collector ring and carried by said rotary member to slidably engage the respective segments successively of said stationary segmental ring and thereby select by the relative positions of said rotary member and said stationarily located segmental ring the particular character to be printed.

15. A selecting and recording apparatus comprising a line wire, a recorder having an individual recording member for each signal to be recorded included in a separate branch of the recorder actuating circuit, a recorder actuating electrical circuit having a separate branch for each signal to be recorded, means actuated by respective signals over the line to open and close a series of contacts in the branches of said recorder actuating circuit, and means movable in synchronism with the signals over the line to selectively close different branches of said recorder actuating circuit.

16. A selecting and recording apparatus comprising a line wire, a recording instrument having an individual recording member for each signal to be recorded included in a separate branch of the recorder actuating circuit, a recorder actuating electrical circuit having a separate branch for each signal to be recorded, means actuated by successive signals over the line to open and close a series of contacts in branches of said recorder actuating circuit and means characteristically arranged to selectively close different branches of said recorder actuating circuit, one of said means being movable in synchronism with the signals over the line.

17. In a selecting and recording apparatus, in combination with a line wire over which signals are transmitted in predetermined cyclic order, a stationarily located recording instrument having an individual recording element for each signal to be recorded included in a separate branch of the

recorder actuating circuit, a recorder actuating electrical circuit having a branch for each signal to be recorded, and a selector element having a cyclic rotary movement in synchronism with the signals over the line and provided with a plurality of relatively fixed and characteristically arranged contact members insulated from each other to close different branches of the recorder circuit through characteristically arranged groups of said insulated contacts at predetermined positions in said cyclic movement.

18. In a telegraph selecting apparatus in combination with a line wire and distributor heads at opposite ends thereof rotating in synchronism with each other, a printer, a printer actuating circuit having a separate branch for each signal to be transmitted over the line wire, a stationarily located segmental ring having a segment forming a terminal for each branch of said printer actuating circuit, and a member having a cyclic rotary movement in synchronism with said distributor head and provided with a plurality of contacts permanently arranged in different series to correspond with the respective signals to be sent over the line wire and a contact member rotating over the terminal segments of said printer actuating circuit branches to selectively close said printer actuating circuit through its respective branches.

19. In a telegraph selecting apparatus a line wire, distributor members at opposite ends of said line wire movable in synchronism with each other, a plurality of sending and printing members at each end of the line, a printer actuating circuit for each printer having a branch for each signal to be sent over the line wire, a stationarily located segmental ring for each printer the respective segments of which form terminals for the respective branches of the respective printer actuating circuits, and a member at each end of the line wire rotating in synchronism with the distributor member at that end of the line wire and each provided with a plurality of contact members permanently arranged in different series to correspond with the respective signals to be sent over the line wire, a plurality of collector rings, and a plurality of contact members engaging and rotating over the segments of the segmental rings of the several printers to each selectively and successively close a plurality of printer actuating circuits.

20. A telegraph selecting apparatus comprising a line wire, distributor members at opposite ends of said line wire rotating in synchronism, a plurality of sending and printing members at each end of said line wire, a printer actuating circuit for each printer having a branch for each signal to be sent over said line wire, a stationarily located segmental terminal for each of said

branches, a member at each end of said line wire rotating in synchronism with the distributor member at that end of the line wire and provided with a plurality of contacts permanently arranged in different series to correspond with the respective signals to be sent over said line wire, a plurality of collector rings and a rotating contact member to successively connect said collector ring with the various segmental terminals of the respective branches of said several printer actuating circuits, a series of printer actuating circuits to respectively engage the several contacts of each series of permanently arranged rotary contacts in succession, and a series of relay controlled contacts in each printer actuating circuit controlled by the signals over the line wire.

21. A selecting and recording apparatus comprising a line wire, a recorder actuating circuit having a branch for each signal to be recorded, a recording instrument having an individual recording member for each signal to be recorded included in a branch of said recorder actuating circuit, a plurality of relays actuated by signals over the line wire to open and close branches in said recorder actuating circuit, and a circuit closing element movable in synchronism with the signals over the line wire and having a characteristically arranged series of electrical contacts for each signal to be recorded, to close said recorder actuating circuit through its respective branches.

22. A selecting and recording apparatus comprising a line wire, a recorder, a recorder actuating electrical circuit, a cylindrical circuit closing member having a plurality of contacts insulated from each other and arranged in groups characteristic of the signals to be recorded, a series of brushes to engage said insulated contacts in groups and the respective contacts of said groups in succession, and a plurality of selecting relays actuated by signals over the line wire and having their vibrating contacts electrically connected in series, said relays serving to include and exclude different brushes from the recorder actuating circuit, and said circuit closing member and said brushes being relatively movable in synchronism with the signals over the line wire.

23. A selecting and recording apparatus comprising a recorder actuating circuit for each recording instrument having a branch for each signal to be recorded, a plurality of stationarily located recording instruments each having an individual recording element for each signal to be recorded included in a branch of said recorder actuating circuits, a series of electrical contact members insulated from each other and arranged in fixed relation to each other in groups characteristic of the signals to be recorded to successively close selected

branches in the different recorder actuating circuits, and a plurality of selecting relays arranged in successive series to selectively open and close respective branches in the respective recorder actuating circuits, said insulated contacts and said selecting relays being relatively movable.

24. A selecting and recording apparatus comprising a line wire, a plurality of stationarily located recording instruments each provided with an electrical recorder actuating circuit having a branch for each signal to be recorded and an individual recording element for each signal to be recorded included in a separate branch of said recorder actuating circuit, means for each recording instrument actuated by successive signals over the line to selectively open and close contacts in the branches of its actuating circuit, and means characteristically arranged to selectively close different branches of said respective recorder actuating circuits in succession, one of said means being movable in synchronism with the signals over the line.

25. In combination with electrical selecting means, recording apparatus comprising type-bar for each signal to be recorded, a type-bar actuating mechanism for each type-bar comprising a solenoid coil, a solenoid armature movable relative to said coil and operatively connected to said type-bar, a circuit closing armature actuated by said coil, a primary circuit to initially energize said coil, a secondary circuit having an independent source of electrical energy included therein and adapted to be closed by said circuit closing armature, and interengaging means carried by said type-bar actuating armature and said circuit closing armature to automatically open said secondary circuit after said type-bar has completed the act of recording.

26. A selecting and recording apparatus comprising a member having a series of permanently located contacts insulated from each other and characteristically arranged for different signals to be selected, a stationarily located recording instrument having an independently operable recording member for each signal to be recorded included in a separate branch of the recorder actuating circuit, a recorder actuating circuit having a branch for each signal to be recorded, and a series of branch circuit opening and closing elements electrically connected in series to open and close branches of said recorder actuating circuit characteristically for different signals to be recorded, said permanently located insulated contacts and said branch circuit opening and closing elements being relatively movable and serving jointly to selectively close said recorder actuating circuit through a distinctive branch corresponding to the signal received.

27. In combination with electrical select-

ing means, recording apparatus comprising a recording element for each signal to be recorded, an actuating mechanism for each recording element comprising an energizing coil, a primary armature energized by said coil to actuate said recording element, a circuit closing armature energized by said coil, a primary circuit to initially energize said coil, a secondary circuit having an independent source of electrical energy included therein and adapted to be closed by said circuit closing armature to secondarily energize said coil, and means actuated in unison with the movements of said recording element to interrupt said secondary circuit when the act of recording is completed.

28. In a selecting and recording apparatus, a recorder actuating circuit having a branch for each signal to be recorded, a rotarily mounted supporting frame having a plurality of contact members mounted in fixed relation thereon in groups characteristic of the signals to be recorded and insulated from each other, and a series of brush terminals for respective branches of said recorder actuating circuit in position to be engaged by said movable insulated contacts, and a series of selecting relays actuated by the signals to be recorded and serving jointly with said rotarily mounted contacts and brushes to close said recorder actuating circuit through a definite branch of said recorder actuating circuit.

29. In a selecting and recording apparatus, a rotary selecting and circuit closing member comprising a rotatably mounted supporting frame having a plurality of electrical contacts mounted in fixed relation thereon and insulated from each other, said contacts being arranged in successive groups and adapted to selectively close an electrical recorder actuating circuit through one or other of said characteristically arranged groups of contacts, a collector ring mounted upon said supporting frame and serving as a collector common to all of said characteristically arranged groups of contacts, a stationarily mounted segmental ring the segments of which constitute branch terminals of a recorder, and a contact carried by said collector ring and movable over the surface of said segmental ring.

30. A selecting and recording apparatus comprising a line wire, distributor members at opposite ends of said line wire operating in synchronism, a plurality of stationarily located recording instruments, a recorder actuating circuit for each recording instrument having a branch for each signal to be recorded, a series of relay controlled contacts for each recording instrument to selectively open and close different branches of said respective recorder actuating circuit.

each recorder actuating circuit, and a circuit
closing member common to all of said re-
corder actuating circuits rotatable in syn-
chronism with one of said distributor heads
5 and having a plurality of electrical contact
members in relatively fixed relation insu-
lated from each other and arranged in
groups characteristic of the signals to be re-
corded, said selecting groups of contacts
10 serving to successively engage the brush

terminals of the respective recorder actuat-
ing circuits to close said respective recorder
actuating circuits through selected branches
thereof.

In testimony whereof I have affixed my 15
signature in the presence of two witnesses.

GUY S. CORNISH.

Witnesses:

W. THORNTON BOGERT,
C. W. MILES.