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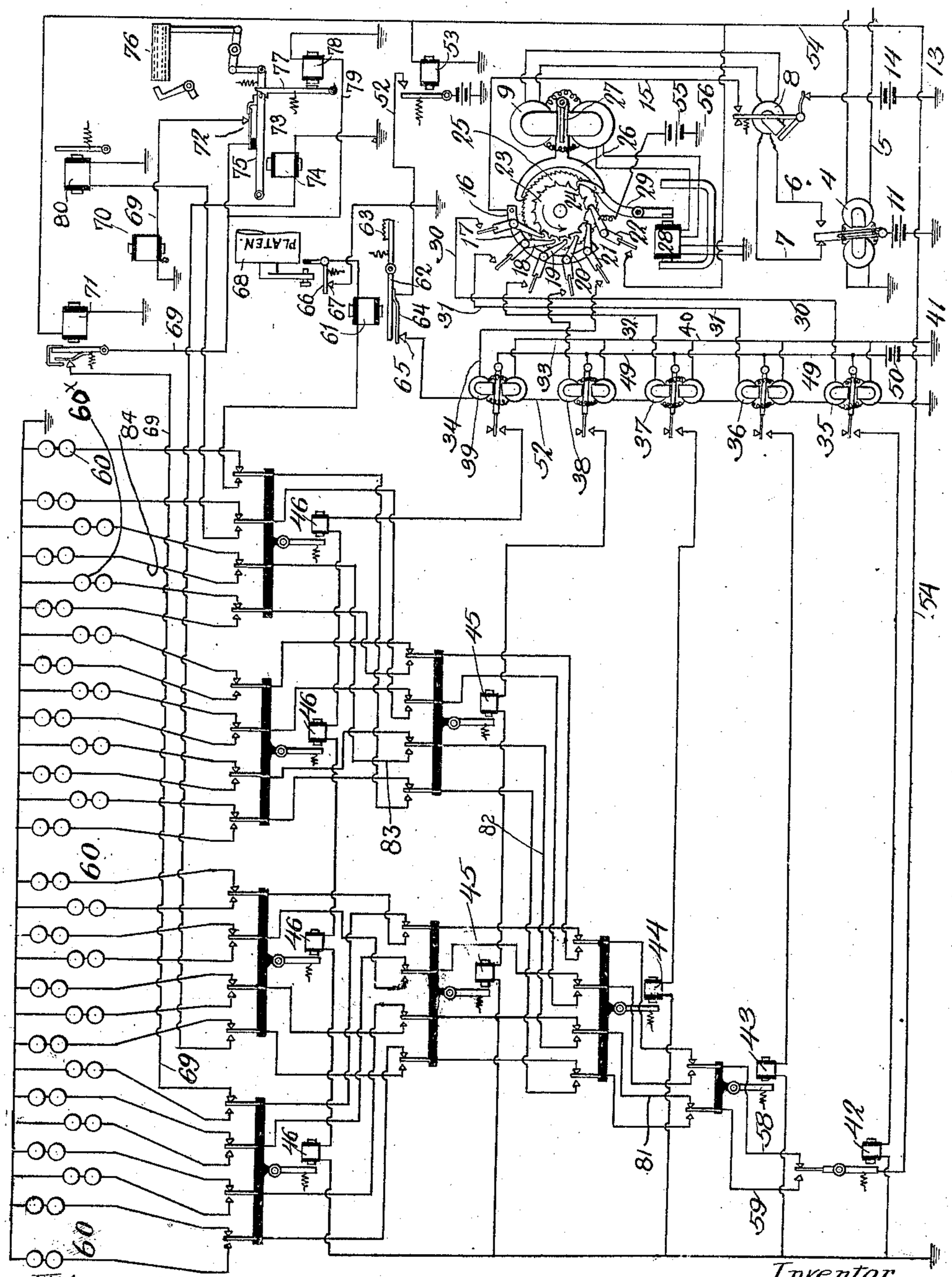
J. C. BARCLAY.

PRINTING TELEGRAPH.

APPLICATION FILED MAR. 1, 1904.



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No. 785,076. Patented March 21, 1905.

# UNITED STATES PATENT OFFICE.

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## PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 785,079 dated March 21, 1905.

Application filed March 1, 1904. Serial No. 196,024.

*To all whom it may concern:*

Be it known that I, JOHN C. BARCLAY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Printing-Telegraphs; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to printing-telegraphs, and embodies certain improvements over the system set forth in my Patent No. 758,732, dated May 3, 1904. In the present system, as in that of my said patent, I employ for the transmission of the messages successions of current pulses, which are the same in number for all the characters, but vary in length, and these pulses are usually, but not necessarily, alternately of opposite directions. For transmitting the characters of the English alphabet I employ six pulses for each message or character, which enables me to operate at will any one of the thirty-two magnets, thus permitting the transmission of all the letters of the alphabet and leaving a margin for transmission of punctuation-marks and for the operation of spacing, carriage-return, shift, and paper-feed mechanism. The particular magnet corresponding to each message transmitted is selected by the action of primary and secondary selecting-relays, a sunflower, and a separator-relay, as hereinafter described.

My invention consists in closing the circuit through contact-points of the selecting-relays to the printing-magnet selected through a contact of the sunflower itself, in delaying completion of the restoring-circuit during the operation of the carriage-return mechanism until the carriage has returned to its starting-point, in improved means for operating the spacing mechanism without the operation of the selecting-relays, in improved shift mechanism, and, generally, in the features of invention hereinafter set forth, and particularly pointed out in the claims.

The objects of my invention are to improve and simplify printing-telegraph systems and apparatus and to render same more certain and rapid in their operation, to insure complete return of the carriage to its starting position, to improve the spacing mechanism, and to improve the shift mechanism.

I will now proceed to describe my invention with reference to the accompanying drawing, which shows diagrammatically one embodiment of my invention comprising circuits and apparatus for operating the mechanism of an electric printer or type-writer. I do not illustrate the said printer or type-writer itself, as I am not limited to the use of any particular machine of that character, but may use any of several such machines which are well known.

Referring now to the drawing, signals incoming over the line-wire 5 actuate a main-line relay 4, which is the primary actuating element of my printing-telegraph and is the only element of such telegraph in the main-line circuit. This main-line relay may of course be differentially wound to permit of duplex or quadruplex operation the same as an ordinary main-line telegraph-relay. The main-line signals for operating this relay 4 may be produced by a hand-key or by a key-board-transmitter or by any other suitable means. This particular line-relay 4 shown is of the polar type, being arranged to be actuated by changes of direction of current in the line-circuit; but obviously it may be a neutral relay instead, arranged to be operated by rise and fall of the line-current. Main-line relay 4 controls two local circuits 6 and 7, connected to opposing contact-points of the main-line relay, both of which circuits pass through coils of a neutral relay 8, termed the "separator-relay," through opposing coils of a magnet 9, operating escapement mechanism of the sunflower, hereinafter described, and through a synchronizer-magnet 28 to ground at 10. A battery 11 or other suitable source of electrical energy is connected to ground and to the armature of main-line relay 4. One or the other of circuits 6 and 7 is completed through battery 11, according as the said armature of relay 4 is in contact with the right-hand or left-hand contact of said relay. The main-line relay 4 is very rapid in action and operates for each pulse produced in the main line, whether short or long. The separator-relay is more sluggish in action and completes

the circuit which it controls only when a long pulse is sent over the line. Being a neutral relay, however, it completes its circuit each time there is a long pulse, whether it be positive or negative. The circuit controlled by separator-relay 8 passes from ground at 13, through battery 14, the armature of separator-relay 8, and conductor 15 to a plate 16 of the sunflower, to which the first five contact-points 17, 18, 19, 20, and 21 of that sunflower are electrically connected. This sunflower is of the type described in the patent to Buckingham, No. 544,347, dated August 18, 1895, and consists of contact-points 17, 18, 19, 20, 21, and 22, adapted to be actuated successively by teeth of a ratchet-wheel 23 during movement of said wheel through the space of one tooth. Said ratchet-wheel is mounted upon a shaft 24, upon which is also mounted an escapement-wheel 25, having three times the number of teeth of ratchet-wheel 23 and controlled in its movement by the escapement-anchor 26, which is actuated by the armature 27, which is polarized. The coils of magnet 9, through which circuits 6 and 7 pass, being oppositely wound, alternate pulses in these circuits will cause the vibration of the escapement-anchor 26, and six such pulses, permitting rotation of escapement-wheel 25 through the space of three teeth, will advance ratchet-wheel 23 through the space of one tooth, causing contact-points 17 to 22 to complete their respective contacts successively and completing one cycle operation of the sunflower. The shaft 24 of the sunflower is driven by any suitable device, such as a spring-motor or friction drive, which will permit intermittent motion of said shaft. Magnet 28 beneath the sunflower is a synchronizer-magnet operating an armature-lever 29, having a hook adapted to engage the teeth of ratchet-wheel 23. The function of this synchronizer is fully described in the patent to Buckingham, No. 544,347, and need not be further described here, since its description is not necessary for the understanding of the operation of the apparatus. Indeed, if automatic correction of the operation of the apparatus for loss of synchronism between the receiver and transmitter is not desired this synchronizer may be omitted.

It was stated above that the metal frame 16, carrying contact-points 17 to 21, is connected by conductor 15, passing through contacts of separator-relay 8, with battery 14 and thence to ground. These contact-points 17 to 21, inclusive, which may be termed "selector-contacts," when operated by the movement of ratchet-wheel 23 complete circuits successively from the contact-points of separator-relay 8 through conductors 30 to 34, respectively, leading to the magnets of polar selecting-relays 35, 36, 37, 38, and 39, respectively, and thence through a common return-conductor 40 to ground at 41; but it will be seen that none of these circuits through the magnets of the polar selecting-relays will be closed unless at the instant when any one of those circuits is closed through the sunflower the transmission of a long pulse through the line has caused separator-relay 8 to complete the circuit through battery 14 to ground at 13. Polar selecting-relays 35 to 39, inclusive, control circuits of secondary selecting-relays 42, 43, 44, 45, and 46, respectively, the contact-points of which are connected in tandem in the order named, the five series of contact-points forming an arithmetical progression. In my said former application each secondary selecting-relay has but one movable contact-piece, there being therefore two relays in series 43, four relays in series 44, eight relays in series 45, and sixteen relays in series 46. In my present system I illustrate the employment of an alternative and equivalent construction involving the mounting of a plurality of contact-points on the relay-armatures, so that there is but one relay 43, one relay 44, two relays 45, and four relays 46, each of the relays 44, 45, and 46 having four contact-points. It of course will be practicable to mount a greater number of contact-points upon the armatures, and thereby to reduce the number of relays 45 and 46. The electrical effect, however, is the same, whether each contact-point is operated by an independent magnet or whether a plurality of contact-points of the same series are grouped together for operation by a single magnet. The primary selecting-relays 35 to 39, inclusive, each controls a circuit of a corresponding secondary selecting relay or relays. The controlling-circuits of these secondary selecting-relays 42 to 46, inclusive, are normally broken; but the armatures of the several primary selecting-relays are connected by a multiple-current lead 49 to a battery 50 and to ground, and when the magnet of any one polar selecting-relay is energized by a current passing through the sunflower and its armature is deflected said polar selecting-relay completes the circuit through the corresponding secondary selecting relay or relays which it controls, thereby operating the same. The armatures of the primary or polar selecting-relays 35 to 39, inclusive, tend to remain in contact with whatever contact-point they are in contact at the time. These relays are provided with a second or restoring circuit 52, passing in series through all of these relays, which circuit when completed by a restoring-relay hereinafter mentioned returns the armatures of all these relays to their normal positions, breaking the circuits of the secondary selecting-relays 42 to 46, inclusive. This restoring-circuit 52 is arranged to be completed by a restoring-relay 53 after circuit is completed through the sixth contact-piece 22 of the sunflower, as hereinafter described.

Referring now to the secondary selecting-

relays 42 to 46, the armature of relay 42 is connected to a circuit 54, arranged to be connected through the sixth contact 22 of the sunflower to a battery 55 and thence to ground at 56. The contacts of the secondary selecting-relays are connected in tandem as follows: Relay 42 has two contact-points connected by conductors 58 and 59, respectively, to movable contacts on the armatures of relay 43. Each of these movable contacts of relay 43 coacts with two contact-points, each connected to a contact-point on the armature of relay 44. In like manner the fixed contact-points of relay 44 are connected each to an armature contact-point of one of the two relays 45, and so on. The fixed contact-points of relays 46 are connected to magnets 60, termed "printing-magnets," or to other magnets hereinafter mentioned.

It will be seen that by means of the various secondary selecting-relays 42 to 46, inclusive, any one of the various magnets 60 may be selected at will for the completion therethrough of an energizing-circuit. This is the circuit of conductor 54 and is completed, and the particular magnet selected is energized upon the closing of the sixth sunflower-contact 22. In my said former system this circuit 54 was closed by a separate relay operated by a circuit passing through the sixth sunflower-contact, to a multiple branch of which circuit was connected the restoring-relay 53, the said relay-controlling circuit 54 being arranged to operate more rapidly than said restoring-relay, so that circuit 54 is completed through whichever magnet has been selected before the armatures of the secondary selecting-relays are returned to normal as a result of the completion of the restoring-circuit 52. Instead of employing a separate relay for completing the circuit 54 I now complete said circuit through the sixth contact-point of the sunflower, thereby obtaining a greater margin of time for the operation of whichever magnet 60 has been selected and permitting the apparatus as a whole to operate more rapidly.

*Carriage-return.*—The carriage carrying the platen or printing-roller of the machine may be of any suitable construction and may be arranged to be returned to its starting-point at will by any suitable means, such as a spring or motor. It is not necessary, therefore, to illustrate the carriage and its returning mechanism in detail, and only a portion of the carriage—viz., one end of the platen—is illustrated diagrammatically in the drawing, being designated by numeral 68. The return of the carriage is governed by an electrically-operated detent mechanism, of which 61 in the drawing designates the magnet and 62 the armature-lever thereof. In the drawing I have shown this lever as provided at one end with a diagrammatic representation of a carriage-detent 63. Magnet 61 is controlled in the same manner as the various printing-magnets 60 by the secondary selecting-relays, and the circuit through this carriage-release magnet will be completed through the sixth contact of the sunflower when the particular message which causes the secondary selecting-relays to select the carriage-release magnet is transmitted. In the arrangement of contact-points shown in the drawing this message is one in which all of the six impulses are dashes, so that all of the secondary selecting-relays are operated; but of course other messages may be used. Since the restoring-relay 53 normally closes the restoring-circuit 52 of the primary selecting-relays 35 to 39, inclusive, immediately after the closing of the circuit through the sixth sunflower-contact and since it is important that when the carriage-return mechanism is operating the carriage-release magnet shall not be deënergized until the carriage has returned to its starting-point, I provide the armature 62 of the carriage-release magnet with a contact-spring 64, arranged to make contact with a fixed contact 65 and cause the restoring-circuit 52 to pass through these contacts 64 65, as well as through the contacts of the restoring-relay, and I further provide in the circuit of the carriage-release magnet 61 a contact-lever 66, normally in contact with the stop 67, but arranged to be moved mechanically out of contact with such stop 67 when the carriage 68 (shown diagrammatically only in the drawing) has returned completely to its starting-point. The operation of this mechanism is as follows: Upon the transmission of the particular message which results in the energization of the carriage-release magnet 61 the armature 62 of said magnet is attracted, thereby breaking between contact-points 64 and 65 the restoring-circuit, which otherwise would be completed almost immediately through the operation of the restoring-relay 53 following the completion of the sixth sunflower-contact. The restoring-circuit remains broken until when the carriage has reached its extreme right-hand position or starting-point said carriage mechanically operates contact-point 66, thus breaking the circuit through the carriage-release magnet, permitting the armature 62 to fall and close the restoring-circuit 52. This restoring-circuit is still closed through relay 53, since the sixth contact 22 of the sunflower remains closed until the first pulse of the next succeeding character is transmitted, and therefore upon the dropping of the armature 62 the restoring-circuit will be completed and the primary and secondary selecting-relays returned to normal condition. As soon as another character is transmitted and the carriage begins its movement contact between points 66 and 67 will be closed again.

*Spacing.*—For spacing—*i. e.*, forming the spaces between words, sentences, and the like—

I employ a message comprising six dots, which message therefore does not cause the operation of any of the selecting-relays, although it does cause the operation of the sunflower. Circuit is completed upon the closing of the sixth sunflower-contact 22 through a back contact of one of each of the five series of secondary selecting-relays and a circuit 69 to a spacing-magnet 70, which may operate suitable spacing mechanism, such as are used on electrical type-writers. This circuit 69 passes through contact-points normally closed of a spacing cut-out relay 71 and through another contact 72, likewise normally closed, of shift mechanism 73. The spacing cut-out relay 71 is employed, because otherwise circuit would be closed through the sixth sunflower-contact and the back contacts of the secondary selecting-relays to the spacing-magnet 70 upon the return of the armatures of the said secondary selecting-relays to normal after the transmission of each character. This spacing-relay 71 is connected in multiple with restoring-relay 53 in a circuit closed by the completion of the sixth sunflower-contact, and like relay 53 relay 71 is somewhat sluggish, so much so that upon the transmission of a message consisting only of dots it permits the circuit of magnet 70 to remain closed long enough for the operation of the spacing mechanism, but nevertheless breaks said circuit of magnet 70 after the transmission of any signal which causes the operation of one or more of the secondary selecting-relays before through the operation of the restoring-relay 53 the armatures of said secondary selecting-relays can have reached their back-stops.

*Shift mechanism.*—This mechanism may be either a carriage-shift or type-shift, as preferred. In the drawing I have indicated diagrammatically a type-shift; but it will be understood that I do not limit myself thereto. This shift mechanism 73 comprises a magnet 74, arranged to be energized upon the transmission of a suitable corresponding selective signal and when energized to attract its armature 75, thereby operating the shift mechanism. In the drawing I have indicated diagrammatically a type-wheel 76, arranged to be shifted by this movement of the armature. The shift mechanism is held in its shifted position by a detent-lever 77, controlled by a magnet 78, which magnet is located in a multiple branch 79 of the spacing-circuit 69, which branch, however, does not pass through contact 72 of the shift mechanism. By this arrangement I am able to use the ordinary spacing-signal for releasing the shift mechanism and permitting it to return to normal condition. When the shift mechanism is in normal position, detent-lever 77 is operated in unison with the spacing mechanism of magnet 70 each time a spacing-signal is set, but operates idly; but when the shift mechanism has been operated and is held locked by the detent 77 the transmission of a spacing-signal does not operate the spacing mechanism, (the circuit to spacing-magnet 70 being then broken at contact 72,) but does operate lever 77, thereby releasing the spacing mechanism and permitting it to return to normal position.

*Paper-feed.*—For operating paper-feed mechanism I employ a magnet 80 in one of the circuits controlled by the selecting-relays, which circuit, like the circuit of the magnet 60, will be completed when the corresponding message is transmitted. No particular paper-feed mechanism is illustrated, and any mechanism suitable for the purpose may be employed.

In the above arrangement of circuits and apparatus I have employed the spacing-circuit for operating the shift-release; but it will be obvious that I may use any other circuit instead. I prefer, however, to employ the spacing-circuit for releasing the shift mechanism, since this spacing-circuit operates especially rapidly.

The following will serve as an illustration of how any one of the various magnets may be selected at will. Suppose that the particular magnet to be selected is one the signal for selecting which is as follows: – : – – . – Upon the sending of the first dash the armature of line-relay 4 will be deflected to the right, thus causing sunflower-contact 17 to close, and since the dash continues long enough for separator-relay 8 to operate a circuit will be completed from ground at 13, through battery 14, selector-contact 17, and primary selecting-relay 35, to ground at 41. Relay 35 being thus operated will complete the circuit through the secondary selecting-relay 42, moving the armature thereof to the position opposite that shown in the drawing. The next succeeding signal being a dot, line-relay 4 and the sunflower escapement mechanism will be operated; but separator-relay 8 will not operate sufficiently to close a circuit through the second primary selecting-relay 36. The third signal being a dash, a circuit will be completed through primary selecting-relay 37, which in turn will close a circuit through the magnet of relay 44, moving the armature of said relay to the position opposite that shown in the drawing. The fourth signal being also a dash, primary selecting-relay 38 will be operated and will close the circuit through secondary selecting-relays 45, moving the armatures of said relays to the position opposite that shown in the drawing. The next succeeding signal being a dot, primary selecting-relay 39 and secondary selecting-relays 46 will not be operated. By the operation of the various secondary selecting-relays connection has been established from conductor 54 through the armature of relay 42 to conductor 59, thence through one of the contacts of said relay to conductor 81, thence through one of the contacts of relay 44 to con-

ductor 82, thence through one of the contacts of the right-hand relay 45 to conductor 83, and thence through one of the contacts of the third relay 46 to a conductor 84 and to one of the printing-magnets, marked $60^{\times}$, which is the particular magnet to be selected. Upon the sending of the sixth signal, which is a dash, a circuit will be closed from ground at 56, through battery 55, sunflower-contact 22 and wire 54, and through the conductors 59 81 82 83 84 and magnet $60^{\times}$, to ground. At the same time a circuit will be completed from sunflower-contact 22 through the restoring-relay 53, and still another circuit will be completed from sunflower-contact 22 through spacing cut-out relay 71. These two relays, however, operate more sluggishly than do the printing-magnets, and hence will not operate to restore the selecting-relays and cut out the spacing-relay until after the mechanism controlled by magnet $60^{\times}$ is operated. It will be obvious that by variations in the number and arrangement of the dots and dashes of the message transmitted any desired magnet of series 60 may be selected and a circuit completed therethrough.

It will be obvious that my invention is susceptible of many variations and modifications without departing from the principles herein set forth, and I do not limit myself to the details of construction and arrangement of the parts herein illustrated and described.

What I claim is—

1. In a printing-telegraph, the combination with an electrically-controlled sunflower having selector-contacts, a separator-relay, a plurality of selecting-circuits controlled thereby and by said selector-contacts, and a plurality of corresponding primary selecting-relays, one for each such circuit, of a plurality of secondary selecting-circuits controlled by said primary selecting-relays, secondary selecting-relays in said secondary selecting-circuits, having contacts connected in tandem, each selecting-relay of each series but the last controlling the circuits through a plurality of contacts of the next series; magnets in circuit with the last series of secondary selecting-relay contacts, a restoring-relay, a restoring-circuit operated thereby passing through said primary selecting-relays, and a circuit connected to the contact of the first of said series of secondary selecting-relays and to a further contact of said sunflower, and arranged to be completed by said sunflower-contact through contacts of the secondary selecting-relays to whichever of said magnets is selected thereby.

2. In a printing-telegraph, the combination with an electrically-controlled sunflower having selector-contacts, a separator-relay, a plurality of selecting-circuits controlled thereby and by said selector-contacts, and selecting mechanism controlled by said circuits, of printing means for effecting the printing, and a printing-circuit therefor passing through contacts of said selecting mechanism and through a further contact of said sunflower.

3. In a printing-telegraph, the combination with selecting means, operating means therefor, and a restoring-circuit and controlling means therefor, of electrically-operated carriage-release mechanism comprising a release-magnet, a circuit for said magnet, arranged to be completed by said selecting means upon the transmission of a predetermined message, and means actuated by said carriage preventing action of said restoring-circuit during motion of the carriage toward its starting-point.

4. In a printing-telegraph, the combination with selecting means, operating means therefor, and a restoring-circuit and controlling means therefor, of electrically-operated carriage-release mechanism comprising a magnet and armature, and a circuit for said magnet, arranged to be completed by said selecting means upon the transmission of a predetermined message, means actuated by said carriage preventing action of said restoring-circuit during motion of the carriage toward its starting-point, and comprising a contact operated by said armature and arranged to be broken when the armature is attracted, and another contact in the circuit of said carriage-release magnet, arranged to be broken by the carriage during motion of the carriage toward its starting-point.

5. In a printing-telegraph, the combination with selecting-relays, means for operating the same, and a restoring-circuit for said relays and controlling means therefor, of electrically-operated carriage-release mechanism comprising a magnet and armature, and a circuit for said magnet, arranged to be completed by said selecting means upon the transmission of a predetermined message, means actuated by said carriage preventing action of said restoring-circuit during motion of the carriage toward its starting-point, and comprising a contact operated by said armature and arranged to be broken when the armature is attracted, and another contact in the circuit of said carriage-release magnet, arranged to be broken by the carriage during motion of the carriage toward its starting-point.

6. In a printing-telegraph, the combination with an electrically-controlled sunflower having selector-contacts, a separator-relay, a plurality of selecting-circuits controlled thereby and by said selector-contacts, a plurality of corresponding primary selecting-relays, one for each such circuit, a plurality of secondary selecting-relays controlled by said primary selecting-relays, having contacts connected in tandem, and a restoring-circuit and controlling means therefor, operated by a further contact of the sunflower, of electrically-operated carriage-release mechanism comprising a magnet and armature, and a circuit for said magnet, arranged to be completed by said selecting means upon the transmission of

a predetermined message, means actuated by said carriage preventing action of said restoring-circuit during motion of the carriage toward its starting-point, said carriage-release mechanism having a contact operated by said armature and arranged to be broken when the armature is attracted, and another contact in the circuit of said carriage-release magnet, arranged to be broken by the carriage during motion of the carriage toward its starting-point.

7. In a printing-telegraph, the combination with selecting means, operating means therefor and means for restoring said selecting means to normal condition after operation, of electrically-operated spacing means and a circuit therefor arranged to be completed by said selecting means when the latter is in normal condition, and a spacing cut-out arranged to prevent the operation of said spacing means upon the transmission of any message other than that designed to effect the operation thereof.

8. In a printing-telegraph, the combination with selecting-relays, means for operating the same and means for restoring said relays to normal condition after operation, of electrically-operated spacing means and a circuit therefor arranged to be completed through contacts of said selecting-relays when said relays are in normal condition, and a spacing cut-out arranged to prevent the operation of said spacing means upon the transmission of any message other than that designed to effect the operation thereof.

9. In a printing-telegraph, the combination with an electrically-controlled sunflower having selector-contacts, a separator-relay, a plurality of selecting-circuits controlled thereby and by said selector-contacts, selecting means controlled by said circuits, a restoring-circuit therefor, and a restoring-relay arranged to close the same upon the closing of a further contact of said sunflower, of electrically-operated spacing means and a circuit therefor, arranged to be completed by said selecting means when the latter is in normal condition, and a spacing cut-out arranged to prevent the operation of said spacing means upon the transmission of any message other than that designed to effect the operation thereof.

10. In a printing-telegraph, the combination with an electrically-controlled sunflower having selector-contacts, a separator-relay, a plurality of selecting-circuits controlled thereby and by said selector-contacts, a plurality of corresponding primary selecting-relays, one for each such circuit, a plurality of secondary selecting-relays controlled by said primary relays and having contacts connected in tandem, and means for restoring said selecting-relays to normal condition after operation, said restoring means operated by a further contact of said sunflower, of electrically-operated spacing means and a circuit therefor arranged to be completed through contacts of said selecting-relays when said relays are in normal condition, and a spacing cut-out arranged to prevent the operation of said spacing means upon the transmission of any message other than that designed to effect the operation thereof.

11. In a printing-telegraph, the combination with selecting means, operating means therefor, a restoring-circuit for said selecting means, and a restoring-relay for closing same operated by said operating means, of electrically-operated spacing means and a circuit therefor arranged to be completed by said selecting means when the latter is in normal condition, and a spacing cut-out relay operating in conjunction with said restoring-relay and arranged to prevent the operation of said spacing means after said restoring-circuit is operated.

12. In a printing-telegraph, the combination with selecting means, operating means therefor, a restoring-circuit for said selecting means, and a restoring-relay for closing the same operated by said operating means, but more sluggish than said selecting means, of electrically-operated spacing means and a circuit therefor arranged to be completed by said selecting means when the latter is in normal condition, a spacing cut-out relay operating in conjunction with said restoring-relay, and a circuit therefor likewise controlled by said operating means, said cut-out relay being more sluggish than said selecting means, and being arranged when operated to prevent the operation of said spacing means.

13. In a printing-telegraph, the combination with an electrically-controlled sunflower having selector-contacts, a separator-relay, a plurality of selecting-circuits controlled thereby and by said selector-contacts, selecting means controlled by said circuits, a restoring-circuit therefor, a restoring-relay for closing said circuit, and a circuit controlling said restoring-relay and arranged to be closed by a contact of said sunflower, said restoring-relay being more sluggish than said selecting means, of electrically-operated spacing means and a circuit therefor, arranged to be completed by said selecting means when the latter is in normal condition, and a spacing cut-out relay likewise located in the circuit controlled by said further contact of the sunflower, said cut-out relay likewise more sluggish than said selecting means, and arranged when operated to prevent the operation of said spacing means.

14. In a printing-telegraph, the combination with a plurality of printing devices, selecting means arranged at will to select any one of said printing devices, according to the message transmitted, and operating means therefor, of shift mechanism controlled like said printing devices by said selecting means and arranged to be operated thereby upon the transmission of a predetermined message, a detent for hold-

ing the shift mechanism in its shifted position, and means for releasing the detent likewise controlled like said printing devices by said selecting means, and arranged to be operated through the operation of said selecting means upon the transmission of a predetermined release-message.

15. In a printing-telegraph, the combination with an electrically-controlled sunflower having selector-contacts, a separator-relay, a plurality of selecting-circuits controlled thereby and by said selector-contacts, and selecting means controlled by said circuits, of shift mechanism arranged to be operated by said selecting means when a predetermined message is transmitted, a detent for holding the shift mechanism in its shifted position, and means for releasing the detent, arranged to be operated by said selecting means upon the transmission of a release-message.

16. In a printing-telegraph, the combination with an electrically-controlled sunflower having selector-contacts, a separator-relay, a plurality of selecting-circuits controlled thereby and by said selector-contacts, a plurality of corresponding primary selecting-relays, one for each such circuit, a plurality of secondary selecting-relays controlled by said primary relays and having contacts connected in tandem, of shift mechanism comprising an operating-magnet and a circuit therefor arranged to be completed through contacts of said secondary selecting-relays when a predetermined message is transmitted, a detent for holding the shift mechanism in its shifted position, a magnet for releasing the detent and a circuit therefor arranged to be completed through contacts of said secondary selecting-relays upon the transmission of a release-message.

17. In a printing-telegraph, the combination with selecting means, and operating means therefor, of shift mechanism arranged to be operated by said selecting means when a predetermined message is transmitted, a detent for holding the shift mechanism in its shifted position, a magnet for releasing said detent and a circuit therefor through which said magnet is operated by said selecting means upon the transmission of a predetermined message, and another mechanism having an operating-magnet connected with the circuit of the said detent-magnet, the shift mechanism having means preventing the operation of such other mechanism when the shift mechanism is in its shifted position.

18. In a printing-telegraph, the combination with selecting means, operating means therefor, shift mechanism arranged to be operated by said selecting means when a predetermined message is transmitted, a detent for holding the shift mechanism in its shifted position, and a magnet for releasing said detent, of spacing mechanism likewise arranged to be operated by said selecting means when a predetermined spacing-message is transmitted, said spacing mechanism comprising an operating-magnet connected in circuit with the said detent-magnet, whereby the transmission of the same predetermined selective message serves for the operation either of the spacing mechanism or for the release of the detent, the shift mechanism having means preventing the operation of the spacing mechanism when the shift mechanism is in its shifted position.

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

JOHN C. BARCLAY.

Witnesses:
H. M. MARBLE,
C. A. VAN BRUNT.