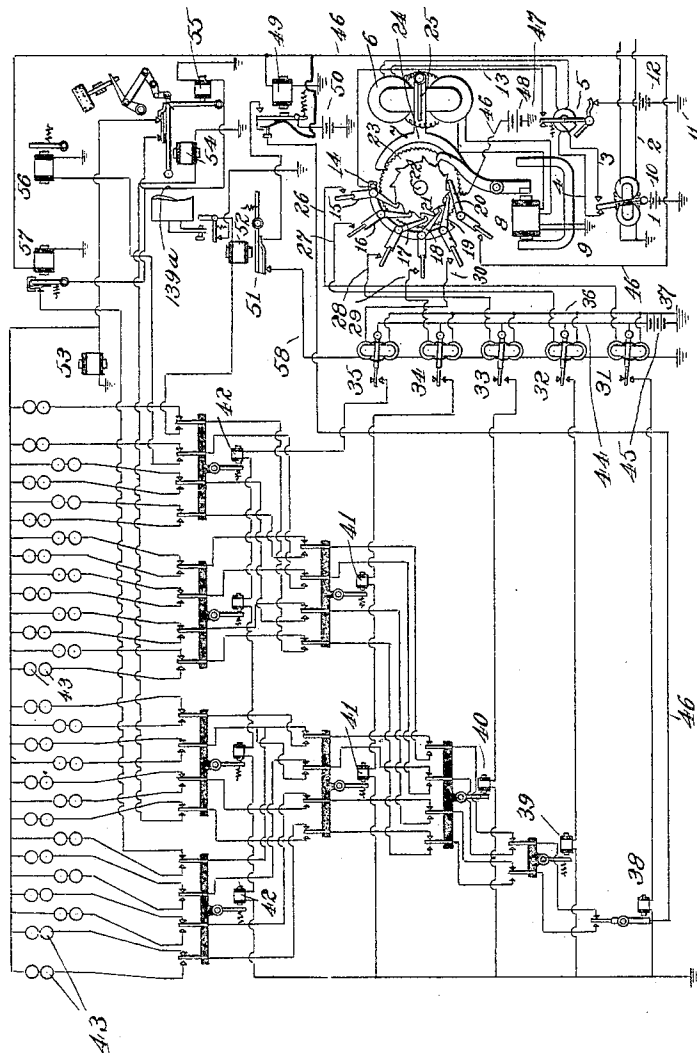


No. 801,173.

PATENTED OCT. 3, 1905.

J. C. BARCLAY.
PRINTING TELEGRAPH.
APPLICATION FILED MAR. 18, 1905.



WITNESSES:

Parker O. Sweet
Wm. B. Smith

INVENTOR

John C. Barclay

BY

H. M. Marble

ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN C. BARCLAY, OF NEW YORK, N. Y.

PRINTING-TELEGRAPH.

No. 801,173.

Specification of Letters Patent.

Patented Oct. 3, 1905.

Application filed March 18, 1905. Serial No. 250,821.

To all whom it may concern:

Be it known that I, JOHN C. BARCLAY, a citizen of the United States, residing in the city, county, 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 invention, 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 Patents No. 758,732, dated May 3, 1904, No. 785,076, dated March 21, 1905, and No. 787,608, dated April 18, 1905. In the said systems I employ electrical selecting mechanism susceptible of control and operation by telegraphic signals and controlling a series of printing-magnets. Said selecting mechanism comprises a plurality of selecting or distributing relays arranged in a number of series, usually five—the stationary contacts of the relay or relays of one series connected to armature-contacts of the next series, the stationary contacts of the last series of such relays connected to the printing-magnets, and other magnets controlled by the selecting mechanism. The operation of these selecting-relays is controlled by suitable means, so that by operating some or all of the series of selecting-relays any one of the printing-magnets may be selected out and the circuit completed therethrough. When this has been done, suitable restoring means causes said selecting-relays to be returned to normal condition.

I have found that when the circuit through the selecting-relays mentioned remains complete until said relays start to return to normal condition. In other words, when the said circuit to the printing-magnet selected is broken by said selecting-relays as they return to normal condition objectionable sparking at the contact-points of these selecting-relays results.

The object of my invention is to avoid sparking at the contact-points of the selecting-relays; and my invention consists in means whereby the circuit through those contacts of said selecting-relays which were closed to select the desired printing-magnet is broken before the said contacts of said selecting-relays are broken.

I will now proceed to describe my invention with reference to the accompanying

drawing, in which one embodiment of my invention is illustrated diagrammatically, and will then point out the novel features in claims.

In the said drawing, 1 designates a line-relay, which is the main actuating device of the selecting mechanism. This relay is located in the line-circuit 2 and is shown as wound differentially to permit duplex or quadruplex operation. Said relay controls two local circuits 3 and 4, connected to opposing contacts of the main-line relay, both of which circuits pass through coils of neutral relay 5—termed the “separator-relay”—through opposing coils of magnet 6, operating escapement mechanism of a sunflower 7, and through a synchronizer-magnet 8 to ground at 9. A battery 10 or other suitable source of electrical energy is connected to ground and to the armature of main-line relay 1. One or the other of circuits 3 and 4 is completed through battery 10, according as the armature of relay 1 is in contact with its right-hand or left-hand contact-stop. The main-line relay 1 is rapid in operation and operates for each pulse produced in the main line, whether short or long. The separator-relay 5 is more sluggish in operation and completes the circuit which it controls only when a long pulse is sent over the line. The circuit controlled by separator-relay 5 passes from ground at 11 through battery 12, the armature of relay 5, and conductor 13 to a plate 14 of the sunflower 7, to which the first five contact-points 15, 16, 17, 18, and 19 of that sunflower are electrically connected. This sunflower consists of contact-points 15, 16, 17, 18, 19, and 20, adapted to be actuated successively in the order named by teeth of a ratchet-wheel 21 during movement of said wheel to the space of one tooth. Said ratchet-wheel is mounted upon a shaft 22, upon which also is mounted an escapement-wheel 23, having three times the number of teeth of ratchet-wheel 21, and controlled in its movement by the escapement-anchor 24, which is actuated by armature 25, which is polarized. The coils of magnet 6, through which circuits 3 and 4 pass, being oppositely wound, alternate pulses in these circuits will cause the vibration of the escapement-anchor 24, and six such pulses, permitting rotation of escapement-wheel 23 through the space of three teeth, will advance ratchet-wheel 21 through the space of one tooth, causing contact-points 15–20 to complete their respective

tive contacts respectively, thus completing one cycle of operation of the sunflower. The shaft 22 of the sunflower is driven by any suitable device, such as a friction-drive or a motor, which will permit intermittent motion of the shaft with rapid starting and sudden stopping thereof.

The first five sunflower contact-points 15-19, inclusive, when operated complete circuits from the contact-points of the separator-relay 5 through conductors 26-30, respectively, to the magnets of the primary selecting-relays 31-35, inclusive, and thence through a common return-conductor 36 to ground at 37. These primary selecting-relays are polar relays. It will be noted that notwithstanding the closing of the sunflower-contacts 15-19 the circuits through these contacts and the primary selecting-relays will not be closed unless, at the instant when the sunflower-contact of any one of such circuits is closed, the separator-relay 5 has responded to a long pulse and has completed said circuit through battery 12 to ground. In other words, the closing of any one of the sunflower-contacts 15-19, inclusive, produces no effect on its corresponding primary selecting-relay unless the closing of that contact was due to the transmission of a long pulse, which not only caused the escapement-wheel 23 to advance one tooth, but also operated the separator-relay. The only effect of short pulses on the selecting mechanism is to cause the escapement-wheel to advance.

Polar or primary selecting-relays 31-35, inclusive, each control the circuit of a corresponding secondary selecting relay or relays. These secondary selecting-relays 38, 39, 40, 41, and 42 are arranged in five series, the contact-stops of the relay or relays of one series connected to armature-contacts of the series next beyond, and so on, the contact-stops of the last series of selecting-relays connected to the printing-magnet 43 and to certain other operating-magnets, as herein described.

The circuits which control the secondary selecting-relays are normally broken. They are connected by a multiple or common current-lead 44 to a battery 45, and thence to ground, and when the magnet of any one of the primary selecting-relays 31-35 is energized and its armature deflected from normal position a circuit is completed through the corresponding secondary selecting relay or relays, thereby operating the latter.

The sixth contact-point 20 of the sunflower when operated closes a circuit 46 from ground at 47 and through a battery 48 through contacts of the secondary selecting-relay to the particular printing-magnet 43 or other operating-magnet controlled by the selecting mechanism, which may have been selected by the operation of the selecting-relays, to ground. This circuit passes through normally closed contact-points of a relay 49, termed the "re-

storing-relay," the magnet of which relay is in a branch of the same circuit. Heretofore the circuit through the contact-points of the secondary selecting-relays to the printing-magnets has been broken by the return of the said secondary selecting-relays to normal, and since at each such break a spark is produced at the contact which first breaks the circuit the result has been that frequent cleaning and adjustment of the contacts of the secondary selecting-relays has been necessary. To obviate sparking at the contact-points of the selecting-relays, I pass the circuit 46 through the normally closed contact of relay 49. Said relay is somewhat sluggish, and, moreover, the normally closed contact of said relay is a continuity-preserving contact which permits some movement of the armature before the circuit is broken. Therefore relay 49 will not break the circuit 46 until the printing-magnet or other operating-magnet selected by the operation of the selecting-relays has been energized. Said relay will, however, break said circuit 46 before the secondary selecting-relays move back to normal position, as hereinafter described, and thus sparking at the contacts of the secondary selecting-relays will be avoided.

While sparking may take place at the contact of relay 49, such sparking at such point is not particularly objectionable, since it is relatively easy to keep a contact of one relay clean and in proper adjustment, and by causing all the sparking to take place at one point the inspection, testing, and adjustment of the apparatus is much facilitated. Furthermore, sparking at this point may easily be overcome by the use of a condenser in the well-known manner.

When relay 49 operates, it closes a restoring-circuit 58 from battery 50 through a normally closed contact of the armature 51 of a magnet 52 and through the magnets of the primary selecting-relays 31-35, inclusive. The armature of relay 49, through which this circuit passes, is insulated from its contact-spring through which passes circuit 46, as indicated in the drawing. This circuit 58 when completed restores the armatures of the primary selecting-relays to normal position, and the restoration of such armatures breaks such of the circuits controlling the secondary selecting-relays as have been completed, causing said secondary selecting-relays to return to normal condition.

Magnet 52, above mentioned, is a carriage-return magnet arranged to be selected by the selecting-relays as a result of the transmission of a particular signal. Said magnet, when it operates and attracts its armature, breaks the restoring-circuit and holds the same broken until the carriage as it completes its movement breaks the circuit through said magnet 52 and permits the armature of such magnet to fall and complete the restoring-circuit.

Magnet 53 is a spacing-magnet in the common return of the various printing-magnets, and also in a circuit which is closed by the secondary selecting-relays when a particular spacing-signal is transmitted. Magnet 54 is a type-shift magnet, 55 is a release-magnet of the shift mechanism, and 56 is a paper-feed magnet. Numeral 57 designates a spacing cut-out relay. The operation of these various magnets is fully described in my Patent No. 785,076 and does not require detail description here. As explained in my said prior patents, the signals by which the selecting mechanism herein described is operated consist always of six pulses, some of which may be short and some long, and the several characters are differentiated from each other by the number of long pulses in the order in which these pulses come. Every pulse, short or long, operates a main-line relay 1 and therefore operates the sunflower; but only the long pulses cause the separator-relay 5 to complete circuit through whichever of the five sunflower contacts 15-19, inclusive, happens to be closed when said separator-relay operates, and therefore only the long pulses cause the selecting-relays to be operated. The first five pulses of each signal cause the proper secondary selecting-relays to be operated to complete circuit through the contact-points of said relays to the particular printing-magnet 24, or other operating-magnet controlled by the selecting-relays, which corresponds to the signal sent. The sixth pulse of the signal causes the closing of contact 20 of the sunflower, the closing of which contact closes circuit 46 through the normally closed contact of restoring-relay 49 and the contact-points of the secondary selecting-relays to the magnet selected, and thence to ground. The magnet of relay 49, being in this circuit 46, is energized simultaneously with the printing-magnet selected; but said relay being somewhat sluggish does not break the circuit 46 and close the restoring-circuit 58 until the printing-magnet or other operating-magnet selected has had opportunity to attract its armature. Circuit 46 being broken before the closing of the restoring-circuit 58 and the consequent return of the armatures of the primary selecting-relays operated to normal has broken the circuits of the corresponding secondary selecting-relays, there is no sparking at the contacts of these secondary selecting-relays when they return to normal, this being the principal object of the invention. It is obvious that this object may be accomplished in various other ways than by the use of the restoring-relay, as described, and I do not limit myself to the particular means described for accomplishing said object.

What I claim is—

1. In a printing-telegraph, the combination with a plurality of operating-magnets, and selecting mechanism for selecting out and com-

pleting a circuit through any one of said magnets, comprising selecting-relays and means for operating the same, of means for breaking the circuit through the contacts of such selecting-relays to the operating-magnet selected prior to the breaking of such contacts by said selecting-relays.

2. In a printing-telegraph, the combination with a plurality of operating-magnets, selecting-relays having contacts connected in tandem adapted to complete circuit through such contacts to any one of said operating-magnets, and means comprising a sunflower controlling the operation of said selecting-relays, of means for breaking circuit through the contacts of said selecting-relays to the magnet selected prior to the breaking of such contacts by said selecting-relays.

3. In a printing-telegraph, the combination with a plurality of operating-magnets, selecting-relays having contacts connected in tandem adapted to complete circuit through such contacts to any one of said operating-magnets, and means comprising a sunflower controlling the operation of said selecting-relays, of a relay controlled by said sunflower and arranged to break the circuit through the contacts of said selecting-relay to the magnet selected prior to the breaking of said contacts by said selecting-relays.

4. In a printing-telegraph, the combination with a plurality of operating-magnets, selecting-relays having contacts connected in tandem adapted to complete circuit through such contacts to any one of said operating-magnets, and means comprising a sunflower controlling the operation of said selecting-relays, of a restoring-relay controlled by said sunflower and arranged to break the circuit through the contacts of said selecting-relay to the magnet selected prior to the breaking of said contacts by said selecting-relays, and restoring means operated by said restoring-relay.

5. In a printing-telegraph, the combination with a plurality of operating-magnets, secondary selecting-relays having contacts connected in tandem adapted to complete circuit through such contacts to any one of said operating-magnets, primary selecting-relays controlling the operation of said secondary selecting-relays, and means comprising a sunflower, a separator-relay and a line-relay controlling the operation of said selecting-relays, of means for restoring said relays to normal condition after operation, and for breaking circuit through the contacts of said secondary relays to the magnet selected prior to the breaking of such contacts by said secondary selecting-relays.

6. In a printing-telegraph, the combination with a plurality of operating-magnets, secondary selecting-relays having contacts connected in tandem adapted to complete circuit through such contacts to any one of said operating-magnets, primary selecting-relays con-

trolling the operation of said secondary selecting-relays, and means comprising a sunflower, a separator-relay and a line-relay controlling the operation of said selecting-relays,
5 of a restoring-relay controlled by said sunflower and arranged to restore said primary relays to normal after operation thereof and to break the circuit through the contacts of said secondary relays to the magnet selected

prior to the breaking of said contacts by said secondary relays. 10

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

JOHN C. BARCLAY.

Witnesses:

B. STEIN,

C. A. VAN BRUNT.