

June 26, 1923.

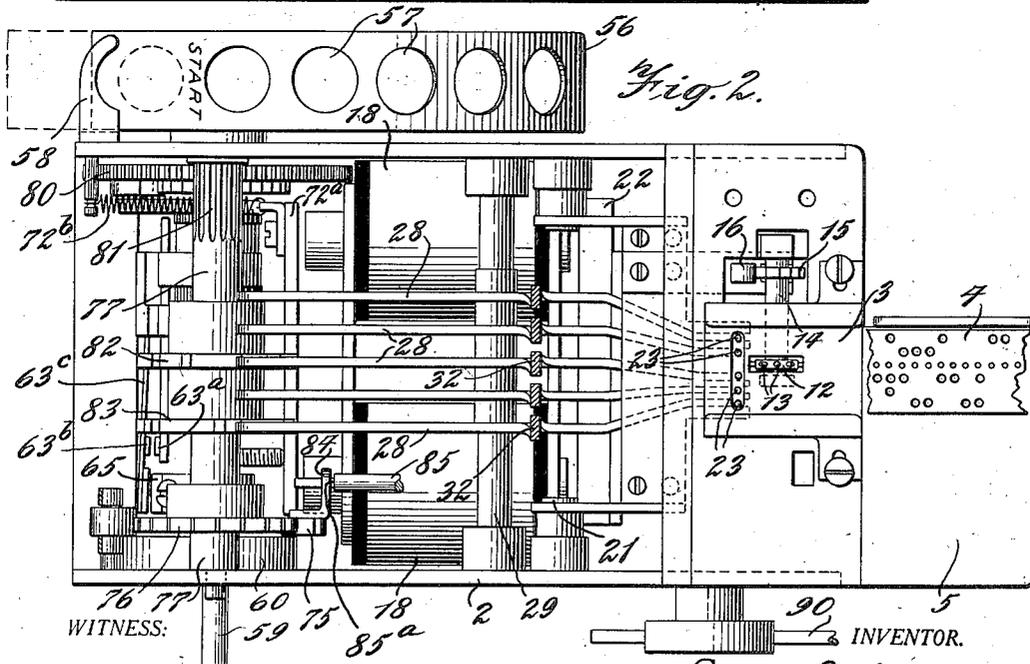
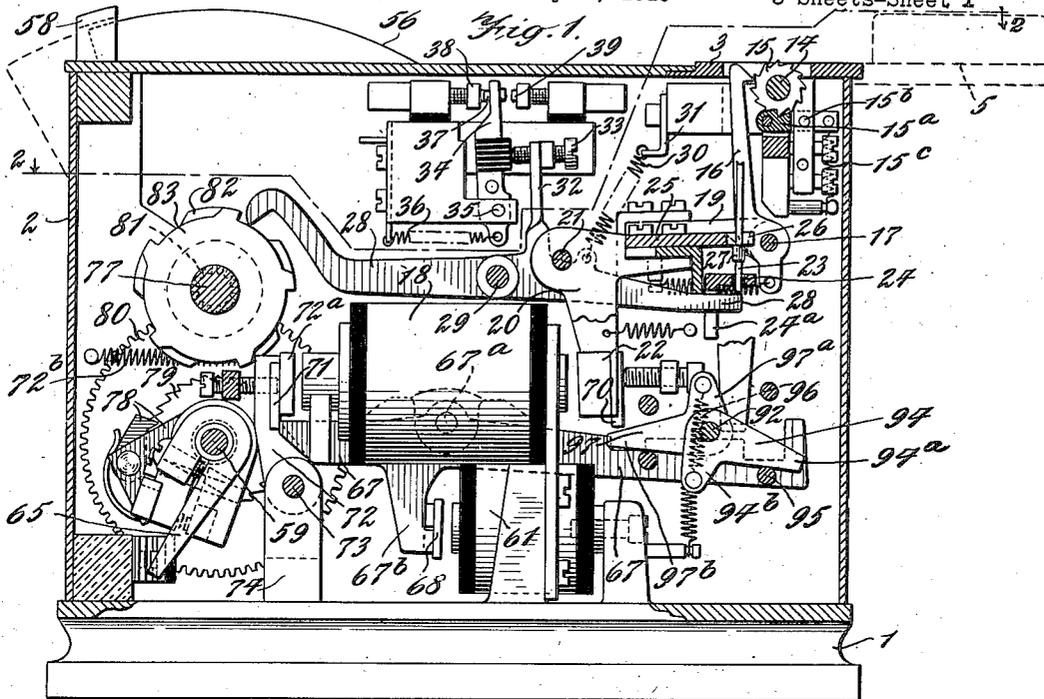
1.460,357

E. E. KLEINSCHMIDT

TRANSMITTER FOR PRINTING TELEGRAPHS

Filed May 1, 1919

3 Sheets-Sheet 1



J. P. O'Leary

Edward E. Kleinschmidt
BY

Gifford & Bull
ATTORNEYS.

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3 Sheets-Sheet 2

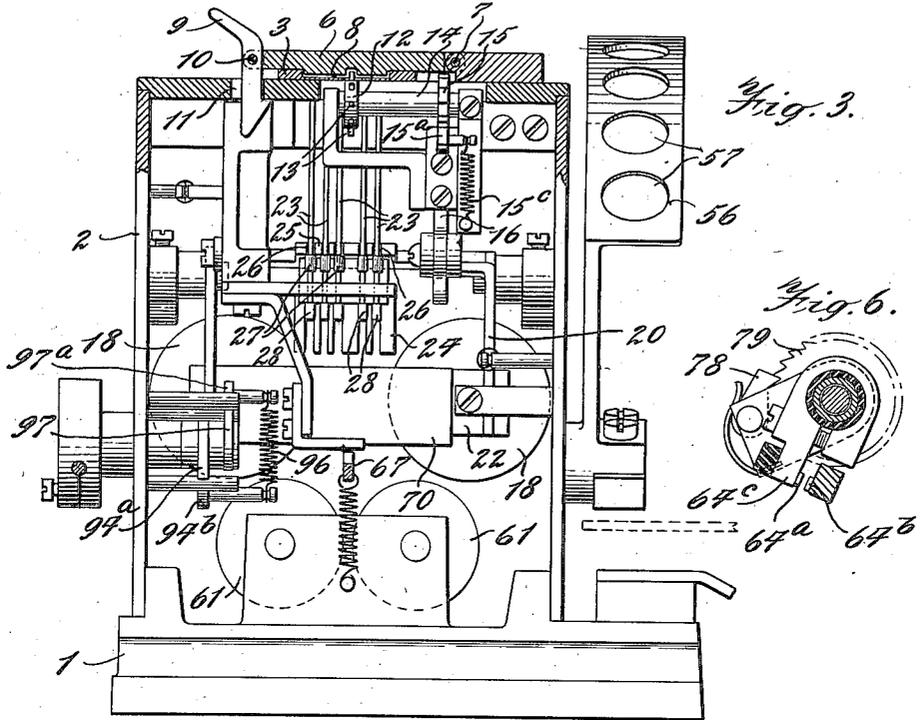


Fig. 3.

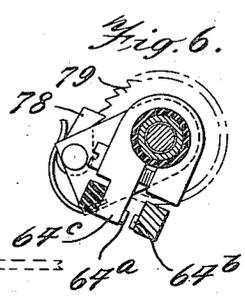


Fig. 6.

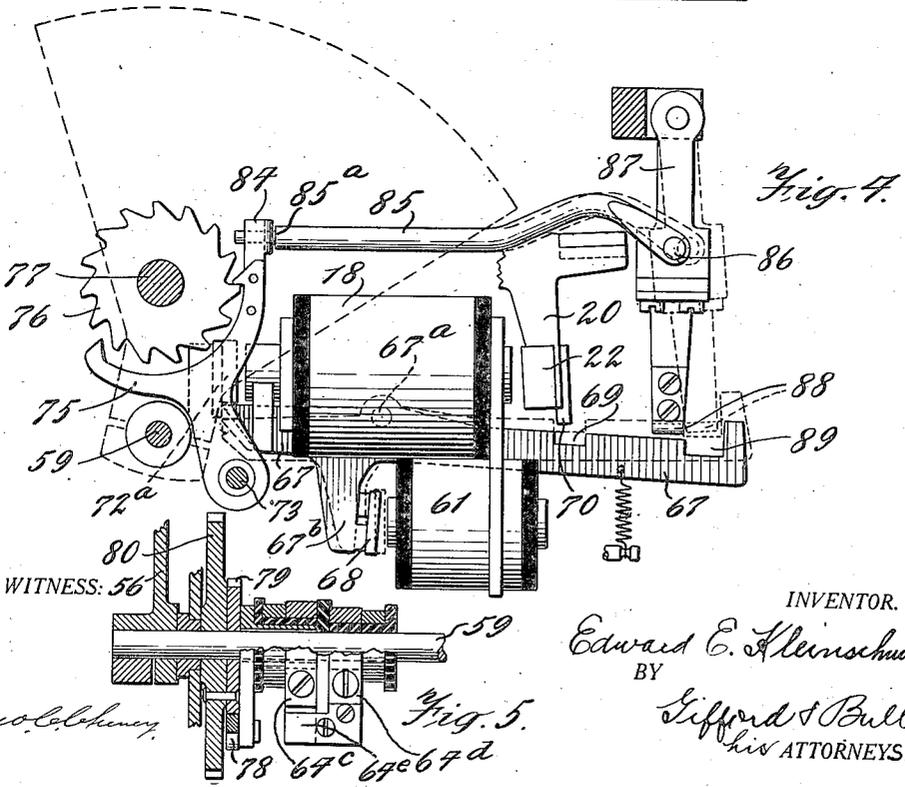


Fig. 4.

Geo. Colburn

Fig. 5.

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June 26, 1923.

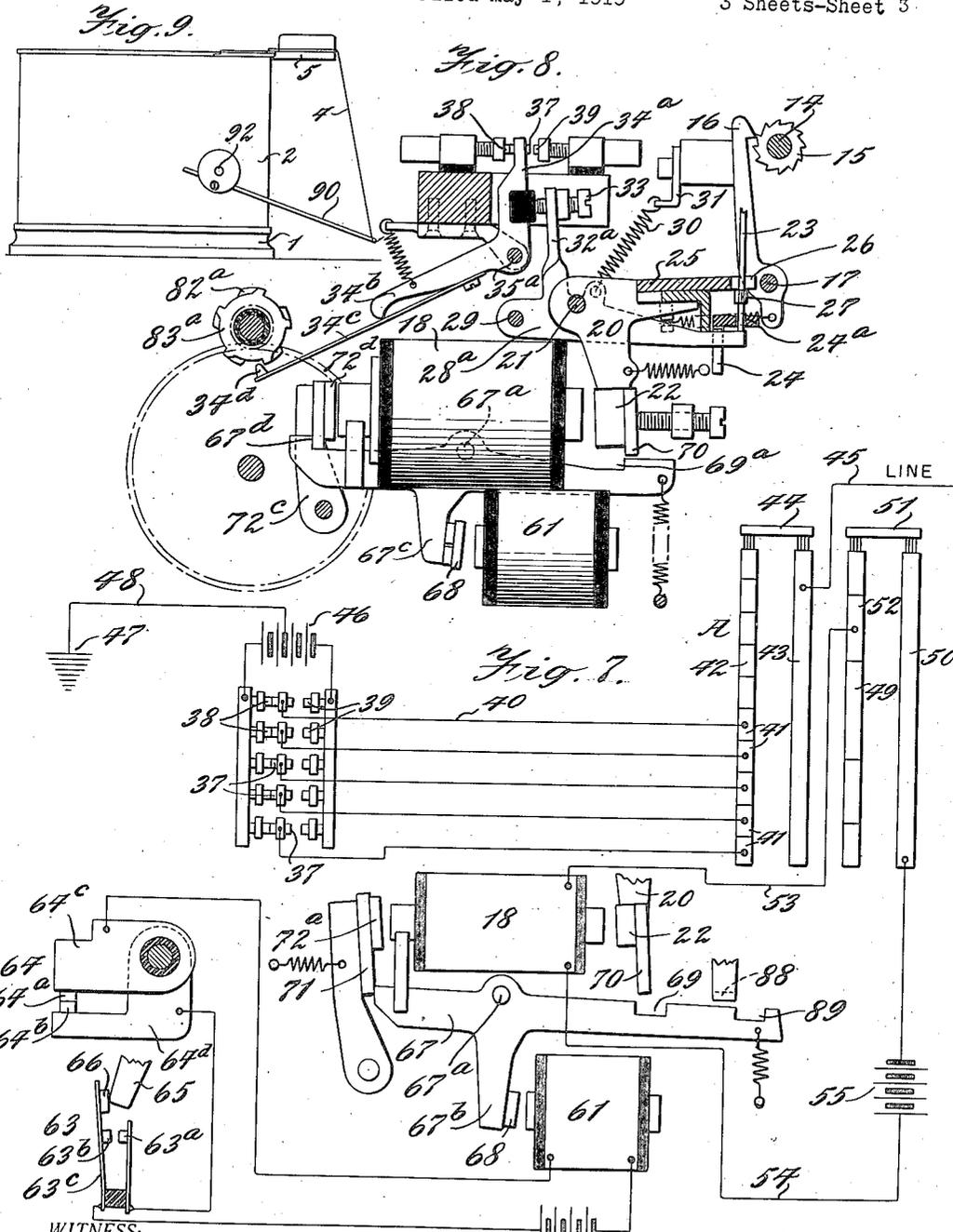
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E. E. KLEINSCHMIDT

TRANSMITTER FOR PRINTING TELEGRAPHS

Filed May 1, 1919

3 Sheets-Sheet 3



WITNESS:

Geo. Lehman

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UNITED STATES PATENT OFFICE.

EDWARD E. KLEINSCHMIDT, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE KLEIN-SCHMIDT ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

TRANSMITTER FOR PRINTING TELEGRAPHS.

Application filed May 1, 1919. Serial No. 293,950.

To all whom it may concern:

Be it known that I, EDWARD E. KLEINSCHMIDT, a citizen of the United States, residing in New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Transmitters for Printing Telegraphs, of which the following is a specification.

My invention is particularly applicable to that type of telegraph transmitter in which a message is sent over a line conductor by means of a tape provided with perforations arranged in such a way as when passed through the transmitter will cause distinctive electric impulses to be transmitted over the line, in response to which impulses appropriate printing mechanism is operated at the receiving station.

My invention is also particularly intended for use in a multiplex telegraph system in which commutating devices, usually termed "distributors," which operate in synchronism, are placed at each end of the line.

In a telegraph system of this character, it is sometimes desirable for the operator at the receiving end of the line to communicate with the operator at the other end directly over the line. In order to accomplish this result, a manually movable member is provided, the tape controlled mechanism at the receiving end of the line being interrupted while the means controlled by the manually movable member is in operation.

One of the objects of my invention is the provision of interlocking means for interrupting the operation of tape controlled mechanism while the means controlled by the manually movable member is in operation.

In the drawings, in which is shown one embodiment of the invention, Fig. 1 is a section through a transmitter embodying my invention; Fig. 2 is a section along the line 2—2 of Fig. 1, but with the parts at the left of the arm 32 in Fig. 1 removed; Fig. 3 is a vertical section at right angles to Fig. 1; Fig. 4 is a detail view illustrating the mechanism by which the plungers are rendered inoperative while the manually controlled mechanism is in operation; Fig. 5 is a detail sectional view showing one of the sets of contacts for controlling the interlocking magnet; Fig. 6 is an end view of Fig. 5; Fig. 7 is a diagrammatic view illustrating

the circuit connections in the form of my invention shown in Figs. 1 to 6; Fig. 8 is a detail view illustrating a modified form of interlocking mechanism, and Fig. 9 is a general view of the transmitter and illustrating the manner in which the taking up of the slack in the tape operates a finger to interrupt the operation of the tape controlled mechanism.

In the drawings, 1 is a base and 2 a suitable housing for the mechanism of the transmitter. On the top of the housing is mounted a guide plate 3, within which the perforated tape 4 is received. It will be understood that the tape is of the same general character as that used in the "Baudot system." On its way to the machine the tape passes over an apron 5 secured to the front end of the housing. A cover plate 6, pivoted at 7 to the frame of the machine, is arranged to form, with the guide plate, a narrow opening 8 in which the tape is received. The cover plate is held in closed position by a latch 9, pivoted at 10, on the cover plate and passes through an opening 11 in the upper wall of the housing, the detent of the latch engaging beneath the wall of the housing adjacent said opening.

The tape is moved forward, step by step, by a feed wheel 12, provided with teeth which engage suitable openings formed in the tape. The feed wheel is mounted on a shaft 14 on which is secured a ratchet wheel 15, which is stepped around by a pawl 16, pivoted at 17. The ratchet wheel is prevented from overstepping by a detent 15^a, pivoted at 15^b, the detent being held against the ratchet wheel by a spring 15^c. The pawl 16 is actuated by a magnet 18 which is, during the operation of the device, successively energized and de-energized in a manner which will be hereinafter more fully explained. The pawl 16 is pivoted on a plate 19 (see Fig. 1), secured on one arm of a bell-crank 20, which is pivoted at 21, on the other arm of which bell-crank is secured an armature 22 co-operating with the magnet 18. The attraction of the armature 22 also depresses a plurality of plungers 23, which normally extend through openings provided in the guide plate (see Fig. 2). Five such plungers are shown, as the combination of impulses obtained by this number is sufficient to bring about the number of combinations to print the desired characters at the

receiving station. The plungers are guided by upper and lower guide plates, the upper one of which is not shown in the drawing, and the lower one of which is indicated by the reference character 24. It is to be understood, however, that the upper guide plate through which the plungers 23 pass is stationary, while the lower guide plate 24 is movable, as will later appear. The plungers 23 are depressed when the armature 22 is attracted by its magnet, by a universal plate 25, which is also secured on one arm of the bell-crank 20, the edge of the plate being formed as a comb with slots 26 within which the plungers are received. Collars 27 are secured on the plungers 23 beneath the plate 25, so that when the plate is depressed, the walls of the plate 25 at the sides of the slots 26 engage the collars 27, thereby depressing the plungers 23.

The plungers 23 are normally elevated by operating levers 28, pivoted at 29, there being one operating lever for each plunger. The ends of the levers are disposed beneath the plungers 23 and are maintained in alignment therewith by slots 24^a formed on a projection of the guide plate 24, as shown in Figs. 1 and 3. The ends of the operating levers 28, which are disposed beneath the plungers 23, are normally elevated by springs 30, one for each operating lever, one end of the spring being secured to the operating lever and the other end secured to a bracket 31, which is secured on the frame. Each operating lever is provided with an upwardly extending arm 32, which engages, preferably by means of an adjustable screw 33, a contact tongue 34, pivoted at 35 and normally held in the position shown in Fig. 1 by the springs 30, which overpower springs 36, one end of each spring 36 being connected to the lower end of contact tongue 34 and the other end being attached to a stationary member. It will, of course, be understood that the springs 36 move the contact tongues 34 to the right, as viewed in Fig. 1, when the tongues are released by the operating levers 28. Each contact tongue 34 carries a double contact 37, which engages, in the position shown in Fig. 1, a stationary contact 38, and a second stationary contact 39 when it is moved to the right. Five movable contact tongues 34, corresponding in number to the number of the plungers 23, are provided, as indicated in Fig. 7, their contacts 37 cooperating with five separate sets of stationary contact points 38 and 39.

The movable contacts 37 are connected by conductors 40 to segments 41, carried on a segment ring 42 of the distributor A. A collector ring 43 co-operates with ring 42, a brush 44 bridging the two members and engaging the various segments 41 in succession as the brushes of the distributor rotate, and subsequent to the energization of the magnet

18. Other contact segments are shown on ring 42, included in channels to other instruments, the five segments 41 representing the segments for the instrument here under consideration. The ring 43 is electrically connected to the line conductor 45. The stationary contact points 38 are electrically connected together and to one pole of a battery 46, while the contact points 39 are connected to the other pole thereof, in the form here shown the battery being grounded at 47 from its middle point through the conductor 48, so that when the movable contacts 37 occupy the position shown in Fig. 7, positive current will, when the circuit is completed through the distributor, flow to the line, and when the contacts are moved to the right, as viewed in Fig. 7, negative current will similarly flow to the line. It is to be understood, of course, that as the brush 44 passes over the segments 41 successively, electric impulses are sent over the line, and the character of these impulses—that is, as to whether they are positive or negative impulses—will depend upon the positions of the movable contacts 37. It will be understood that in the Baudot system, which is the system in general here illustrated so far as the circuit connections are concerned, there is a distributor at each end of the line.

The distributor is also provided with ring 49 provided with one or more insulated segments 52 and cooperating with a collector ring 50, the rings 49 and 50 being bridged by a brush 51. The segment 52 is connected by a conductor 53 to one terminal of the operating magnet 18, the other terminal of the magnet being connected by a conductor 54 to one pole of the battery 55, the other pole of the battery being connected to the collector ring 50. It will be understood, therefore, that the magnet 18 is energized once each time that the distributor brushes make a complete revolution.

Now, when the operator at the receiving station desires to communicate information over the line to the operator at the transmitting station—as, for example, to start the transmitting mechanism, or re-run the tape, or re-punch the tape—a member manually movable by the operator, is provided and an interlocking mechanism for interrupting operation of the tape controlled mechanism at the receiving station while the means controlled by the manually movable member is in operation. For this purpose a movable member, or sector 56, is provided, which is mounted, as here shown, on one side of the transmitter and without the housing. This sector may be in the form of an arch (Figs. 2 and 4) provided with finger openings 57, the sector being moved to the left until, as view in Fig. 2, and when the operator desires to send over the line

information other than that sent by the tape controlled mechanism, the operator's finger, which has been placed in a desired opening, is brought against a stop 58. The distance to which the sector 56 is moved will depend, of course, upon the particular opening in which the operator places his finger, and, likewise, the character of the message that is sent over the line will depend upon the distance that the sector 56 is moved. The sector 56 is mounted on a shaft 59 which has bearings in the housing. The shaft is moved against the action of a coil spring 60, which is wound up by the movement of the sector 56 to the left, as viewed in Fig. 2, the spring 60 returning the shaft and the sector to their original positions. The interlocking mechanism is actuated, by a magnet 61 included in a local circuit comprising a battery 62 and controlled by sets of contacts 63 and 64, controlled by the movement of the sector 56. Contacts 63 comprise a stationary contact 63^a and a movable contact 63^b, which is mounted on a spring-finger 63^c. In the normal position of the transmitter, when the same is in the transmitting position shown in Fig. 1, the contacts 63 are maintained in the open position by an arm 65, which is secured on the shaft 59 and the end of which engages a block or member 66 on the spring-finger 63^c and forces the contact 63^b away from the contact 63^a.

The contacts 64 comprise two co-operating contacts 64^a and 64^b mounted on the shaft 59. The contact 64^a is mounted on an arm 64^c which is insulated from the shaft and loose thereon (Figs. 5 and 6), while the contact 64^b is mounted on an arm 64^d also insulated from the shaft but secured thereto. The arms 64^d is formed with an arm 64^e extending laterally across the back of the arm 64^c, which drags the contact arm along with it when the shaft is rotated anti-clockwise with the contacts open, as viewed in Fig. 6, which corresponds to an anti-clockwise movement of the sector 56, as viewed in Fig. 1, and when the shaft is moved in the opposite direction by the spring 60, the engagement of the contact 64^b with the contact 64^a causes the contact 64^a and the arm 64^c on which it is mounted, to be moved in the opposite direction.

When the sector 56 is rotated anti-clockwise, as viewed in Fig. 1, to start the movement of the mechanism controlled thereby, the contacts 63 are closed by the movement of the arm 65 and the contacts 64 are opened by the movement of the contact 64^a away from the contact 64^b, and as soon as the sector 56 is released and the spring 60 begins to return the same to its original position, the contacts 64 are again closed, and the closure of these contacts completes the circuit through the magnet 61, which is then

energized. The energization of the magnet 61 operates an interlocking lever 67, pivoted at 67^a, and provided with an arm 67^b, on which is mounted an armature 68 cooperating with the magnet 61. One end of the lever 67 is provided with a notch 69, within which is received the end of an extension 70 of the arm 20 on which the armature 22 is mounted, thereby interrupting the operation of the tape controlled mechanism when the end of the operating lever is raised. The movement of the interlocking lever 67 causes the opposite end of the lever from that in which the notch 69 is disposed to drop beneath a member 71 carried on an arm 72, the arm being pivoted at 73 on a stand 74 mounted on the base of the device. An armature 72^a, cooperating with the magnet 18, is mounted on the arm 72, and as soon as the interlocking lever 67 has been moved in response to the energization of the magnet 61, the end of the lever 67, which normally engages the member 71 and prevents actuation thereof, drops below said member and permits vibration of the arm 72 in response to the intermittent energization of the magnet 18 to actuate the mechanism controlled by the manually movable member. The armature 72^a is normally drawn away from the magnet by a spring 72^b (see Fig. 2). The vibration of the arm 72 actuates an escapement mechanism comprising a pallet 75 which co-operates with and releases an escapement wheel 76, mounted on a shaft 77, which has its bearings in the housing 2 of the transmitter. The shaft 59 is connected to the shaft 77 through a gear wheel 80, which is loosely mounted on the shaft 59 and which engages a pinion 81 on the shaft 77, the pinion being shown as formed directly on the shaft. When the sector 56 is rotated anti-clockwise, as viewed in Fig. 1, to start the movement of the transmitting mechanism, no movement is transmitted to the shaft 77, as a pawl 78, which is secured on the shaft, rides over a ratchet wheel 79 loosely mounted on the shaft, and secured to the gear wheel 80. When the sector 56 has been moved to the position desired to transmit the required information, and is released, the spring 60 returns the sector 56 to its original position and, through the action of the pawl 78 and ratchet 79, gear wheel 80 and pinion 81, rotates the shaft 77. Any desired number of cam wheels, here shown as two in number, 82 and 83, are secured on the shaft 77, and when rotated engage the ends of two of the operating levers 28 and actuate the same. The cam wheels and the cams thereon are so arranged as to transmit distinctive impulses and thereby impart the desired information to the operator at the other end of the line, the extent of rotation of the cams depending upon the extent to which the sector 56

has been moved. It is thus apparent that the tape controlled mechanism and the mechanism controlled by the movable member both operate the same contacts.

5 When the armature 72^a is attracted by the magnet 61, mechanism is operated to remove the plungers from the path of the plate 25, and thereby make it impossible to actuate the plungers. An arm 84 is secured to the armature 72^a, and to this arm is connected
10 a rod or link 85 (see Fig. 4). The arm 84 slides on a reduced portion of the rod 85 to permit vibration of the escapement 75. When the armature 72^a is attracted, however, the arm 84 engages a shoulder on the rod 85 and moves the latter to the right, as viewed in Fig. 4. The link 85 is pivoted at 86 to an arm 87 carrying the lower guide plate 24 for the plungers. The lower end of the arm 87 is provided with a laterally extending finger 88 (shown in dotted lines in Fig. 4), which is received in a second notch 89 formed in the end of the operating lever 28 when the latter is raised to the dotted
25 line position shown in Fig. 4. This movement of the arm 87 moves the lower ends of the plungers 23 to the right, as viewed in Fig. 1, out of the path of the bar 25, thereby rendering it impossible to operate the plungers. In order to provide for the movement of all of the operating levers 28 when the magnet 18 is energized and all the plungers 23 are out of the path of movement of the bar 25, a universal bar 25^a is secured to the plate 25, which engages all the operating levers 28 and depresses them each time the magnet 18 is energized.

Automatic means are provided for interrupting the operation of the tape controlled mechanism in response to the taking up of slack in the tape. In case the tape should be fed at a faster rate than it is received from the perforating machine, the tape would be broken, in the absence of any mechanism to stop the operation of the transmitting mechanism. In the present invention, the tape 4 actuates a finger 90, formed with a bent end, extending in front of the machine beneath which the tape is fed to the machine. When the slack is taken up a predetermined amount, the end of the arm is raised and rocks shaft 92, to which the finger is secured. A two-armed member 94 is secured to the shaft 92, one arm 94^a of which normally engages a stop 95, and to other arm 94^b of which is connected one end of an over-centering spring 96. The other end of the spring is connected to one arm 97^a of a two-armed member 97, the other arm 97^b of which normally extends beneath an extension 70 on the arm 20. When the arm 94 is operated by the rotation of the shaft 92, due to the taking up of the slack in the tape in the manner described, the movement of the spring 96 past the center,

causes the arm 97^b of the arm 97 to be moved upwardly, and when the armature 22 is attracted, the arm falls in behind the extension of the arm 20 and holds the same against the magnet and thereby prevents actuation of the tape controlled mechanism. As soon as the desired amount of slack has again been secured in the tape, the finger 90 may be depressed, thereby rocking the shaft 92 in the opposite direction and restoring the parts to normal position.

The operation of the transmitter will readily be understood from the foregoing description, and is as follows:

When the system is in operation, the tape is fed forward in the manner described, the operating levers 28 are all depressed each time the magnet 18 is energized, and the springs 36 move all the contact tongues 34 to the right, as viewed in Fig. 1, and when the magnet 18 is subsequently de-energized and the line circuit completed successively through the contact segments 41 of the distributor, impulses will be sent over the line, and the character of these impulses—that is, as to whether they are positive or negative impulses—will depend upon the positions of the plungers 23 at the time the impulses are sent, it being understood that the movement of any of the plungers through the tape will bring about the movement of the corresponding contact tongues 34 to the left, as viewed in Fig. 1. Now, when the operator at the receiving station desires to communicate information to the operator at the other end of the line, the sector 56 is moved anticlockwise, as viewed in Fig. 1, the correct amount to cause the mechanism controlled by the sector to send the desired information. When the operator starts to move the sector 56 the contact springs 63 are closed in the manner described, and the contacts 64 opened. As soon as the operator releases the wheel, the contacts 64 are also closed and the circuit of the magnet 61 is completed. The energization of the magnet 61 actuates the interlocking lever 67, which stops the operation of the tape controlled mechanism and permits the magnet 18, which is successively energized and de-energized by the movement of the distributor brushes, in the manner described, to vibrate the arm 72, and, through the escapement mechanism, permits the spring 60 to return the sector 56 to its normal position, and thereby causes the cams 82 and 83 to actuate the operating levers 28, and actuate the contacts 27 to send the desired information. As soon as the sector 56 has returned to its normal position, the arm 65 opens the contact springs 63 in the desired manner, thereby de-energizing the magnet 61, releasing the interlocking mechanism, and this permits the tape controlled mechanism again to start operating. The means for con-

veying information to the operator at the other end of the line and which is actuated in response to the electric impulses brought about by the operation of the manually movable member, may be a bell or other indicator, and as the manner in which such an indicator is operated in response to the transmitting impulses is well understood in the art and constitutes no part of this invention, it is not necessary to illustrate or describe the same.

In Fig. 8 is shown a different form of the invention, and this is the preferred form. In this figure, parts which are the same as those described in connection with Figs. 1 to 6 are indicated by the same reference characters, and modified elements are indicated by similar reference characters with the letters *a*, *b*, etc., appended. The transmitting mechanism is the same as that described in connection with Figs. 1 to 7. It is to be observed, however, that while the armature 22 is locked away from the magnet 18 during the time that the mechanism under the control of the manually movable member is in operation in the construction shown in Figs. 1 to 7, in the construction shown in Fig. 8 the armature 22 is locked against the pole of the magnet 18 by the interlocking mechanism, the projection on the arm 20 being received in a notch 69^a in the interlocking lever. In this case, the cam wheels 82^a and 83^a directly actuate the contact arms 34^a. The arms 34^a are formed with an extension 34^b, to which are preferably secured spring arms 34^c, to the ends of which arms are attached teeth 34^d which engage the cam wheels 82^a and 83^a. In the construction here shown when the mechanism controlled by the manually movable member is brought into operation, the armature 22 is locked against the pole of the magnet 18, and the arms 34^a are all moved to the right, and the springs 32^a move all of the contact tongues 34^a to the right, bringing the contacts 37 into engagement with the contacts 39. Then, when the cam wheels are rotated, the teeth 34^d engaging these cam wheels are forced downwardly and the contacts 37 carried by the contact tongues 34^a are brought into engagement with the contacts 38 to transmit impulses of the desired character.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A printing telegraph operable with perforated tape, a manually movable member, message transmitting mechanism, means under control of said tape for actuating said transmitting mechanism, means under control of said movable member for actuating said transmitting mechanism, common electro-magnetic means for actuating said tape controlled means and for controlling said movable member, and electrical interlocking means for interrupting op-

eration of said tape controlled means while said manually movable member is operating.

2. A printing telegraph operable with perforated tape, a manually movable member, message transmitting mechanism, means under control of said tape for actuating said transmitting mechanism, means under control of said movable member for actuating said transmitting mechanism, common electro-magnetic means for actuating said tape controlled means and for controlling said movable member, electrical interlocking means for interrupting operation of said tape controlled means while said movable member is operating, and electro-magnetic means for actuating said interlocking means.

3. A printing telegraph operable with perforated tape, a manually movable member, message transmitting mechanism, means under control of said tape for actuating said transmitting mechanism, means under control of said movable member for actuating said transmitting mechanism, common electro-magnetic means for actuating said tape controlled means and for controlling said manually movable member, electrical interlocking means for interrupting the operation of said tape controlled means while said movable member is operating, and electro-magnetic means energized in response to actuation of said movable member for actuating said interlocking mechanism.

4. A printing telegraph operable with message transmitting mechanism, a perforated tape, means controlled by said tape for actuating said transmitting mechanism, a manually movable member, means controlled by said member for actuating said transmitting mechanism, electrical interlocking means comprising a lever having a plurality of arms and interrupting operation of said tape controlled means while said movable member is in operation, and electro-magnetic means for operating one arm of said lever, the other arms of said lever co-operating with said tape controlled means and with said movable member, respectively.

5. A printing telegraph operable with perforated tape, message transmitting mechanism, means controlled by said tape for operating said transmitting mechanism, a manually movable member, an energy storing device for operating the same, means controlled by said movable member for actuating said transmitting mechanism, common electro-magnetic means for actuating said tape-controlled means and for controlling operation of said movable member, and sets of contacts under control of said movable member, one set of contacts being normally closed and to be opened on movement

of said movable member and another set being normally open and to be closed on movement of said movable member.

5 6. In a transmitter, an electromagnet having an armature, sets of contacts controlled thereby, a second electromagnet having an armature, a lever operated by said last mentioned armature and having a notch where-
10 by on energization of said second electro- magnet, said notch engages the armature

of said first electromagnet and prevents operation of said contacts by said first electro- magnet.

In testimony whereof, I have hereunto signed my name in the presence of two sub- 15 scribing witnesses.

EDWARD E. KLEINSCHMIDT.

Witnesses:

ADELE S. EBERHARDT,
DAUN L. WOOD.