

Feb. 6, 1940.

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2,189,102

PRINTING TELEGRAPH APPARATUS

Filed May 3, 1938

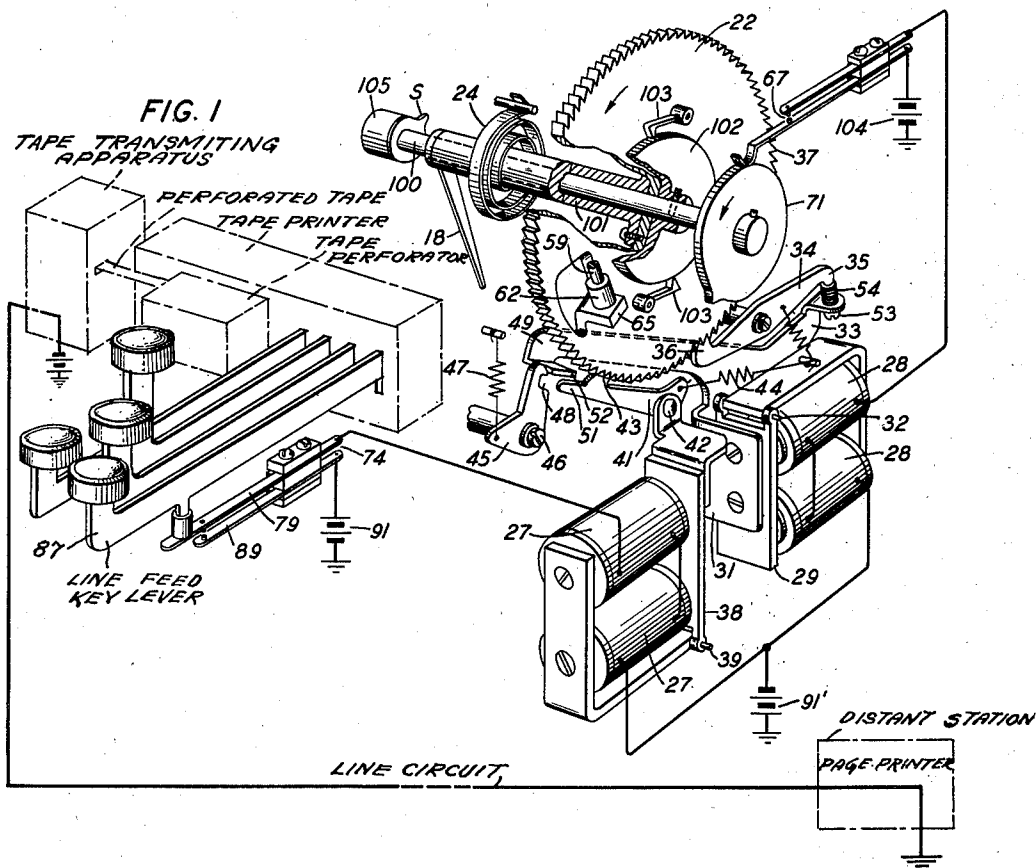
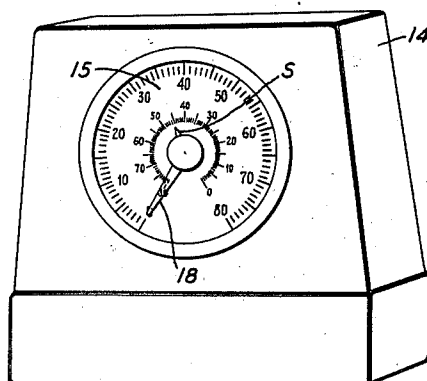


FIG. 2



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2,189,102

PRINTING TELEGRAPH APPARATUS

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Application May 3, 1938, Serial No. 205,822

20 Claims. (Cl. 178—25)

This invention relates to improvements in communication transmission apparatus and more particularly to mechanism for indicating at the sending end of a communication circuit the number of line-feed signaling operations in a message transmitted with a telegraph printer.

An object of the present invention is to keep at the sending end of a communication circuit an accurate count of the number of lines in a message that is being transmitted. More specifically stated, this object is to keep at the transmitting end an accurate count of the lines on form sheets employed in receiving one or more orders, invoices or the like on a single sheet or attached sheets wherein it may be desired to skip, or leave blank a predetermined number of lines in each order or the like.

In printing telegraph practice there have come to be used two general types of devices, one in which the record is printed on a continuous strip of material and where the printing element is stationary with respect to the platen, such as is exemplified by United States Patent No. 1,745,633 granted to S. Morton et al. on February 4, 1930 and another in which the record is printed transversely by a movable or floating printing element upon a full width page or bulletin as is disclosed in United States Patent No. 1,904,164 granted to S. Morton et al. on April 18, 1933. These two general classes of devices, different structurally, as may be seen from the references, are nevertheless controllable by and capable of transmitting the same class of signal impulses, so that devices of either class may be connected with those of the other and operated associatively. Since, however, the former class of device, which for convenience will be referred to hereinafter as tape printers, are adapted to print consecutively without interruption for purposes of carriage-return, or line-feed operation and since in contradistinction therewith the latter class of device, which for convenience will be referred to as page printers, may not be thus continuously operated, but must of necessity receive line-feed and/or carriage-return signals, this sole distinction makes it impracticable commercially to use the two classes of devices together; that is, in communication with each other without some means of indicating in connection with the transmitter associated with the tape printer the approach of the end of a line of page printing. Accordingly, when it is desired to use the two classes of printers together a character counter may be attached to a tape printer which will record the character operations individually and indicate by

a special signal when a predetermined number of characters have been transmitted and/or received.

Printing telegraph apparatuses of the classes referred to comprise complete unitary structures including transmitting mechanism controlled by a keyboard, or keyboard and tape or a perforated tape which serves to issue permutation code signals over a line and receiving mechanism connected to the same line which is responsive to signals of a line character issuing from a distant transmitter. The printing mechanism of each unit is responsive to both the incoming signals which are transmitted from the remote station and the outgoing signals transmitted from the local keyboard, or keyboard and tape or the perforated tape, and transmitting apparatus so that the printed record at each station includes a complete entry of the whole intercommunication. Since the difficulty of coordinating the two classes of devices presents a problem only to the transmitting operator employing the tape printer, the application of the present invention also is requisite only upon this type of apparatus, particularly that employing a perforated tape for the transmitting medium. Where, however, if for any other purposes it is desired to maintain a visual indication of a cumulative record for a transmitting operator, the present invention as well as the character counter may also be readily employed for such purposes. It is noted, therefore, that while the present invention will be described in connection with the particular object of coordinating the two classes of devices that are at present in commercial use, that its utility is by no means limited thereby, but that it is intended as an improvement having general application as a counter for electrical impulses.

The character counter comprises an electrically controlled device having two types of indicators, one of which is a recording indicator and displays progressively the sum total number of signals that are transmitted subsequent to its previous resetting, while the other is an alarm signal in the form of an incandescent electric lamp which indicates the recordation of a predetermined number of the aforementioned signals. Both of the indicators coact in response to the same signals as may be made to record either the received signal, the transmitted signal, or both, although as stated above, the recordation of the transmitted signals is the general commercial practice. The character counter makes use of a dial or other class of index that is capable of recording and indicating successive signals which

are impressed upon a stepping magnet electrically and thereafter communicated to the dial mechanically. Another magnet is adapted upon energization by a circuit to close through the operation of the carriage-return key, to release the dial and permit it to be restored to zero, or normal, position. A detailed description of the aforementioned character counter may be had by referring to United States Patent 2,018,368 granted to R. A. Lake on October 22, 1935.

According to the present invention a line-feed counter is provided for ordinarily keeping at the sending end of a communication circuit, during transmission, an accurate count of the number of lines of a transmitted message, or blank lines, that is skipped lines, received at the receiving end on form sheets that are usually employed for recording orders, invoices, bills of goods, bills of lading, etc., that may be transmitted between stations of an intercommunication system. Such stations may be offices, plants, warehouses and the like connected with the general headquarters. In transmitting information that must be recorded on a form sheet at a receiving station it is, in most cases, necessary to skip lines and spaces in order to reach a line or space wherein information must be furnished in answer to some stock question contained on the form. The counter of the present invention is concerned particularly with the skipping of lines, that is, leaving blank a predetermined number of lines in the message that is being transmitted. Whether or not the transmitting or perforating operator is working "blind", that is, when no printed record of the message on a printed form is before the sending operator, the order or invoice would be correctly received on the particular form sheet at a distant point should the transmitting or perforating operator have at all times an accurate count of the line on which the operator is working.

A feature of the invention is the automatic restoration of the operating mechanism and dial indicator whenever some predetermined number of lines of a message have been transmitted.

Other objects and features will be noted in the following detailed description taken in connection with the attached drawing and appended claims of which:

Figure 1 is a fragmentary perspective view of the operative structure of the line feed indicator with certain parts broken away; and

Fig. 2 is a front elevation perspective view of the line-feed counter as it appears when attached to a telegraph printer.

The operating mechanism of the present invention is substantially the same as that employed in the character counter disclosed in United States Patent 2,018,368, supra, except for the following: no alarm signal in the form of an incandescent electric lamp is provided, there is provided a special set of normally open contacts to operate the counter magnet only when the line-feed key lever is depressed, and the contacts ordinarily closed by the operation of the "carriage-return" are now arranged to close automatically when a predetermined number of line-feed signals are transmitted to close a circuit for operating the release magnets, the operation of which effects the restoration to normal of the operating mechanism and dial indicator automatically. A detailed description of the operation of the operating mechanism may be had by referring to United States Patent 2,018,368, supra, and the reference characters shown in the drawing of the

present application are identical with those for the corresponding parts, or elements, shown in the patent.

In Figs. 1 and 2 of the drawing, the counter comprises two indicator fingers 18 and s. In Fig. 2 the indicator fingers are shown associated with their respective graduated scales shown on dial 15 enclosed in housing 14. The indicator, or index finger 18 denotes progressively the number of line-feed signals transmitted or received and the indicator, or index finger s shows a position to which the counter may be predeterminedly set. When the operating mechanism is operating in response to line-feed signals and indicator finger 18 is stepping around to the point as predeterminedly set, the indicating finger s is stepping a corresponding number of steps back to its zero position. The indicator finger 18 will be restored to normal when the predetermined number of line feed signals corresponding to the previous setting of index finger s have been transmitted or received.

Mounted in the center of the device and fixedly supporting the index finger s is shaft 100. The index finger s is arranged to rotate as shown in Fig. 2, in a counter-clockwise direction around the inner graduated scale shown on dial 15, and the index finger 18 is arranged to rotate in a clockwise direction around the outer graduated scale on dial 15. The shaft 100 fixedly supports at its end opposite to that supporting index finger s, a cam member 71. Shaft member 100 is frictionally mounted in tubular shaft 101 and when index finger s is set before transmission begins at a predetermined point, the projection on cam member 71 is in a corresponding position, although the two positions may not be identical as shown in Fig. 1. Tubular shaft 101 is rotatably supported from the base (not shown) of the device and serves to support shaft 100 as a frictional sleeve. A ratchet wheel 22 is fixedly mounted on tubular shaft 101. Tubular shaft 101 has secured to its outer surface one end of an involute coil spring 24, the other end of which is fastened in some suitable manner to the framework (not shown) of the device. When shaft 101 is rotated in the direction of the arrow on ratchet wheel 22, coil spring 24 is tightened around tubular shaft 101 and thereby stores a potential energy for urging the ratchet wheel back to normal position, as will be evident from the following description.

Fixedly mounted on inner shaft 100 is a steadying wheel 102 to aid in holding ratchet wheel 22 in each of its stepped positions during the stepping operations. Below and at each side of ratchet wheel 22 are pairs of magnets, the left side pair 27 being referred to hereinafter as the operating, or stepping, magnets for the reason that they act to advance index finger 18 and ratchet wheel 22 each time the line-feed key 87 is operated, and the right side pair 28 being referred to hereinafter as the restoring, or releasing, magnets for the reason that they operate to release index finger 18 and ratchet wheel 22 in preparation for a new sheet or order.

The normal condition of the device is to have both pairs of magnets 27 and 28 deenergized although the armatures of these pairs of magnets are held in operated position by a mechanical locking arrangement which will be hereinafter described. Magnets 28 have an armature 29 pivoted at 32 and having fastened to it a lever 31. One arm 33 of the lever 31 is adapted to engage a cooperating arm 35 of a release pawl 34 75

and when not locked remains sufficiently clear therefrom so as to permit the latter by its teeth 36 to engage teeth 37 of ratchet wheel 22. Another armature 38 pivoted at 39 is adapted to be acted upon by magnets 27 and pivotally carries an operating pawl 41 which is a floating member pivoted at 42 and spring-urged by coil spring 44 to engage teeth 37 of ratchet wheel 22 with its engaging teeth 43.

During an interval in which the magnets 27 are first energized and then deenergized pursuant to the transmission of each line-feed signal, the stepping pawl 41 is moved leftwardly to engage a new tooth 37 of the ratchet wheel 22 and then to be moved rightwardly by spring 44 concurrently advancing wheel 22 one tooth distance and bringing into registration with the teeth of release, or holding, pawl 34 the next consecutive tooth 37 of ratchet wheel 22.

A bell crank 45 is pivoted at 46 and is urged by a coil spring 47 which is connected to one arm of crank 45 in a clockwise direction while the other arm of crank 45 is provided with a notch 48. One arm 49 of lever 31 extends over the extremity 51 of operating pawl 41 and engages, with a portion 52 angularly disposed therefrom, the foremost extremity 51 of pawl 41.

Upon the energization of magnets 28 the armature 29 and its associated lever 31 are attracted to rotate counter-clockwise and in so doing arm 33 through an adjustable engagement screw 53 carried by it, is adapted to move release pawl 34 against the tendency of its spring 54 out of engagement with the teeth 37 of ratchet wheel 22, while at the same time the angular portion 52 of arm 49 engaging the extremity 51 of floating pawl 41 withdraws the latter from engagement with teeth 37 permitting the ratchet wheel 22 in response to the torque of spring 24 to resume its normal position as indicated.

After the energization of magnets 28 and the consequent operation of lever 31 the angular portion 52 of arm 49 is adapted to be engaged by the notch 48 of bell crank 45 which latter thereby operates to restrain lever 31 against returning to normal position. The bell crank 45 serves therefore to hold lever 31 in the restoring position even though the energizing circuit for magnets 28 be opened. The last-mentioned circuit may be opened at the end of the day's run by manually turning knob 105 a slight distance in the direction of the arrow on cam member 71 so as to open contacts 67.

For purposes of releasing lever 31 following a restoring signal, operating pawl 41 is provided with the extending portion 51 so that in response to an operating signal next following a restoring signal the leftward movement of armature 38 and pawl 41 serves to rotate bell crank 45 counter-clockwise compelling the latter thereby to release its hold upon the angular portion 52 of lever 31 and permit lever 31 to resume its normal position, while at the same time allowing pawl 41 to engage the next tooth of ratchet wheel 22 and thereby effect the recordation of the line-feed signal as well. Thus, the restoring mechanism is actuated and the first operation is recorded upon the indicator under control of an initial line-feed signal. The extra line-feed signal that is transmitted for effecting the unlatching of bell crank 45 may be compensated for, if desired, in any suitable manner. The number of teeth 37 upon the ratchet wheel 22 will correspond to the maximum number of lines that may be furnished on a sheet.

The release of ratchet wheel 22 in response to the energization of magnets 28 causes the wheel to be restored with considerable velocity and in order to minimize the shock upon the sudden stop, a dash-pot (designated 56 in Fig. 2 of United States Patent 2,018,368 supra) may be provided, which has a cylindrical air chamber in which is adapted to move a close-fitting piston. A rod 59 secured to the piston is provided with a coil spring, and a shouldered portion 62 at the extremity thereof engaged with said coil spring, is adapted to urge for maintaining said piston and rod in its foremost position, shown in dash lines in Fig. 2 of the patent. For a detailed description of the dash-pot reference may be made to United States Patent 2,018,368, supra.

Upon the release of ratchet wheel 22 from any of its advanced positions a cammed shoulder portion 65 formed integrally therewith is adapted first to encounter the shouldered portion 62 or foremost portion of rod 59 which through the shock absorbing action of the dash-pot aids in settling wheel 22 into its normal position.

A pair of contacts 67 controls the operating circuit for the release magnets 28 and are adapted to be closed by the projection on cam member 71 when the ratchet wheel steps around to the position predetermined by the setting of index finger *s*. The setting of indicator *s* in a predetermined position is accomplished by turning knob 105 fixedly attached to index finger *s* and shaft 100. Shaft 100 may be manually rotated against the friction of tubular shaft 101 and thereby knurled wheel 102 and cam wheel 71 are rotated a distance corresponding to the setting of index finger *s*. There is sufficient tensile resistance in coil spring 24 to prevent the rotation of tubular shaft 101 and ratchet wheel 22 when the setting index finger *s* is rotated to a predetermined position. Index finger *s* is shown in Fig. 1 as being set at point 45 shown on the inner scale of dial 15, Fig. 2. Cam wheel 71 is in the position shown in Fig. 1 when the index finger *s* is at point 45 on the inner scale of dial 15. When ratchet wheel 22 begins to step in response to the operation of line-feed key 87, the index finger *s*, the knurled wheel 102 and cam wheel 71 also step in the same direction as the ratchet wheel 22. Index finger 18 in stepping keeps the operator informed as to the total number of line-feed signals that have been transmitted, whereas the index finger *s* in stepping keeps the operator informed as to how many steps are required to reach the predeterminedly set position. The knurled wheel 102 by means of its associated spring pawls 103 assists in steadying the ratchet wheel 22 in each of its successive steps and the cam wheel 71 steps around to its zero position wherein the projection on cam wheel 71 effects the closing of contacts 67 to operate the release magnets 28. By providing a dial having two graduated scales numbered in opposite directions, as shown in Fig. 2, furnishes the operator with an indication of the number of operations of line-feed key 87 and at the same time with an indication of the number of steps yet to be taken before the predetermined position is reached.

General operation

In the construction illustrated in Fig. 1 contact sets 67 and 74 are normally open as shown. Upon transmission of a line-feed signal by the operation of key 87, a circuit is closed from grounded positive battery 91, through the closed contacts of spring members 89 and 79, through

the windings, in series, of counter magnets 27 to grounded negative battery 91'. Counter magnets 27 operate, pulling up armature 38 and advancing pawl 41 into engagement with a next consecutive tooth of teeth 37 of ratchet wheel 22. This performance is repeated with each operation of the line-feed key 87 until a sufficient number of such operations cause the indicator arm to reach a predetermined position on the outer scale of dial 15 (Fig. 2). At this time index finger 5 has concurrently returned to zero. Also, at this time the projection on cam wheel 71 has been stepped around to engage the lower spring member of contact set 67 to close a circuit from grounded positive battery 104, through the windings, in series, of release magnets 28 to grounded negative battery 91'. Release magnets 28 operate causing the latching of lever 31 by bell crank 45 and should it be desired to release lever 31 and the pawls controlled by it, another operation of line-feed key 87 is necessary which will cause the operation of counter magnets 27 in the usual manner which will in addition to advancing pawl 41 into engagement with the next consecutive ratchet tooth of teeth 37, also dislodge bell crank 45 from engagement with levers 41 and 52 thereby restoring normalcy to the armatures of the magnets and their associated elements.

While the present invention has been illustrated and described with reference to a particular structure, it will be understood that numerous modifications and variations may be made without departing from the spirit of the present invention. It is therefore intended not to be limited to the particular language of the foregoing description, nor to the illustration in the accompanying drawing, but to be permitted a latitude of interpretation as afforded by the following claims.

What is claimed is:

1. In a printing telegraph system, a tape printer, a source of signal potential connected to said tape printer, a page printer, a signal transmission medium interconnecting said printers, a line-feed signal key forming a part of said tape printer for causing a line feed signal to be sent from said source to said page printer and a counting device connected to said tape printer and electrically controlled by said line-feed signal key for counting and indicating the line-feed signals transmitted to said page printer.

2. In a printing telegraph system, a tape printer, a source of signal potential connected to said tape printer, a page printer, a signal transmission medium interconnecting said printers, a line-feed signal key forming a part of said tape printer for causing a line-feed signal to be sent from said source to said page printer, and a counting device connected to said tape printer and electrically controlled by said line-feed signal key for counting the line-feed signals transmitted to said page printer, said counting device including means for setting said device in a predetermined release position and other means electrically controlled for automatically restoring said counting device to normal when said device is operated to its predetermined released position.

3. In a printing telegraph system, a tape printer, a source of signal potential connected to said tape printer, a page printer, a signal transmission medium interconnecting said printers, a line-feed signal key forming a part of said tape printer for causing a line-feed signal to

be sent from said source to said page printer, and a counting device electrically controlled by said line-feed signal key for counting the line-feed signals transmitted to said page printer.

4. In a printing telegraph system, a tape printer, a source of signal potential connected to said tape printer, a page printer, a signal transmission medium interconnecting said printers, a tape perforator including a moving tape and forming a part of said tape printer, a line-feed signal key forming a part of said tape printer for causing in conjunction with said source of signal potential a line-feed signal combination to be perforated in said perforator tape, a tape transmitter for impressing said line-feed signals perforated on said perforator tape on said transmission medium, and a device electrically controlled by said line-feed signal key for counting and indicating the number of line-feed signals perforated in said tape for subsequent transmission to said page printer.

5. In a printing telegraph system, a tape printer having a movable tape, a source of signal potential connected to said tape printer, a page printer having a movable page, a transmission circuit interconnecting said printer, a tape perforator including a moving tape and forming a part of said tape printer, a line-feed signal key forming a part of said tape printer for causing in conjunction with said source of signal potential a line-feed signal combination to be perforated in said tape, a tape transmitter for subsequently transmitting signals corresponding to said line-feed signal combination over said transmission circuit, means in said page printer for moving said movable page in response to each of said line-feed signals received from said transmission circuit, and a device for counting and indicating during perforation the total number of line-feed signal combinations perforated in said perforator tape, and electrical means controlled by said line-feed signal key for operating said device.

6. In a printing telegraph system, a local tape printer, a page printer at a distant point, a circuit interconnecting said printers, a source of signal potential connected to said page printer, a tape perforating device, a movable tape perforated in said device with signal combinations corresponding to those received from said signal source of potential, a transmitter controlled by said perforated tape and adapted to impress upon said interconnecting circuit electrical impulses determined by the perforations in said tape, and means enabling the operator of the tape perforating device to prepare tape records suitable for controlling said page printer at the distant point comprising a line-feed signal key for performing a line-feed signal perforating operation in said tape, said enabling means including an indicator electrically controlled by said line-feed signal key whereby the operator is apprised of the position of a page which is being printed at said page printer at the distant point.

7. In a transmission system, a code combination recording and storing instrumentality, a transmission channel, means controlled by said instrumentality to impress upon said channel signals representing the stored combinations, a mechanism for recording line-by-line characters represented by the code combinations impressed upon said channel and under control thereof, a line-feed element operable to store combinations representing line-feed functions in said instru-

mentality to cause a line-feed combination to be sent over said channel, and a counting device connected to said instrumentality and controlled by successive operations of said line-feed element to count and indicate the line-feed combinations passing to said instrumentality.

8. In a transmission system, a code combination recording and storing instrumentality, a transmission channel, means controlled by said instrumentality to impress upon said channel signals representing the stored combinations, a page printer for recording line-by-line characters represented by the code combinations impressed upon said channel and under control thereof, a line-feed element operable to store combinations representing line-feed functions in said instrumentality to cause a line-feed combination to be sent over said channel, and a counting device connected to said instrumentality and controlled by successive operations of said line-feed element to count and indicate the line-feed combinations passing to said instrumentality.

9. In a printing telegraph system, a tape printer, a source of signal potential connected to said tape printer, a page printer, a signal transmission medium interconnecting said printers, a line-feed signal key forming a part of said tape printer for causing a line-feed signal to be sent from said source to said page printer, and a counting device controlled by said line-feed signal key for counting the line-feed signals transmitted to said page printer.

10. In a keyboard transmitter, a counting device comprising a scale, an index finger and spring return means therefor, a series of keys, mechanism including stepping means to move said index finger with respect to said scale in accordance with the operation of said counting device as determined by a certain key of said series, and electromagnetically operated means automatically operable when said index finger is in any predetermined operated position to render said stepping means ineffective to move said index finger and to enable said return means to automatically restore said mechanism and said index finger to normal positions.

11. In a keyboard transmitter, a counting device comprising a scale, an index finger and spring return means therefor, a second scale, an index finger for said second scale, a series of keys, means for manually operating said index finger for said second scale to a predetermined position, mechanism including stepping means to move said index fingers with respect to their respective scales in accordance with the operation of said counting device as determined by a certain key of said series, and electromagnetically operated means automatically operable when said index finger for the first-mentioned scale is in any predetermined operated position to render said stepping means ineffective to move said index fingers and to enable said return means to automatically restore the index finger for the first-mentioned scale and said mechanism to normal positions.

12. A counting device comprising an operating key, electromagnetic means responsive to the operation of said key, a stepping member responsive to the operation of said electromagnetic means, a second stepping member, first, manually rotatable to any predetermined position and then responsive to the operations of said electromagnetic means, a second electromagnetic means automatically responsive to said second stepping

member when said second stepping member is stepped to its normal position, and means responsive to the operation of said second electromagnetic means for rotating said first stepping member to normal.

13. A counting device comprising an operating key, electromagnetic means responsive to the operations of said key, a stepping member responsive to the operation of said electromagnetic means, a second stepping member, first, manually rotatable independently of the first-mentioned stepping member to any predetermined position and then responsive to the stepping operations of the first-mentioned stepping member, a second electromagnetic means responsive to said second stepping member when said second stepping member is stepped to its normal position, an element controlled by said second electromagnetic means for releasing the first-mentioned stepping member in a stepped position, a spring controlled element for locking said element in an operated position, and means operative in response to the stepping operation of the first-mentioned stepping member and capable of restoring the first-mentioned stepping member to normal when said spring controlled element locks the first mentioned element in an operated position.

14. In combination with a telegraph transmitter, a line connected to said transmitter, a source of potential whereby said transmitter is arranged to send and receive signals over said line circuit, a line-feed indicator and counter comprising a dial having a graduated scale, a movable indicator for said scale, a key forming a part of said transmitter for sending signals over said circuit, and electromagnetic means responsive to the operation of said key, a rotatable member responsive to the operations of said electromagnetic means for moving said indicator along said scale, a second rotatable member arranged to be arbitrarily set in any predetermined position and responsive to the operation of said key, contact means responsive to said second rotatable member when said second member is operated to its normal position, a second electromagnetic means automatically responsive to said contact means when said second rotatable member is restored to normal, and means operative when said second electromagnetic means responds to said contact means for restoring the first-mentioned rotatable member to its normal position.

15. In a printing telegraph communication system including a station having signal tape transmitting and signal tape receiving means, a second station having signal page transmitting and signal page receiving means, a circuit interconnecting said stations, an operating key for sending line-feed signals to said page receiving means, a mechanism responsive to the operations of said key, visual means at the first-mentioned station responsive to said mechanism for indicating to an operator thereat the number of line-feed signals transmitted, and means automatically operative when a predetermined number of line feed signals are transmitted to restore said mechanism to normal.

16. In a printing telegraph set, a transmitting mechanism, a receiving mechanism, a line-feed mechanism, means for actuating said line-feed mechanism, and a counter for recording the number of line-feed signals transmitted and/or received, including a stepping magnet under control of said line-feed actuating means, and a release magnet for restoring said counter, means

operative when said line-feed mechanism is operated a predetermined number of times for automatically operating said release magnet, and means responsive to the operation of said stepping magnet for automatically restoring said counter to normal position when said release magnet is operated.

17. In a printing telegraph communication system including a station having a signal transmitting means and signal receiving means, an operating key for sending line-feed signals, a mechanism responsive to the operation of said key, operative means for setting said mechanism to automatically restore itself to normal when it is in a predetermined position, visual means for indicating said predetermined position, other visual means for indicating the number of line-feed signals transmitted at any time during transmission, said first-mentioned visual means being arranged to indicate during transmission the number of operations of said key that may be had before the predetermined position of said mechanism is reached and means automatically operative when the predetermined number of line-feed signals are transmitted to restore said mechanism to normal.

18. A counting device comprising a dial, an outer and an inner graduated scale on said dial, indicator fingers concentrically arranged on said dial for respectively counting in opposite directions the graduations on said scales, a rotatable shaft having at one end one of said indicator fingers fixedly attached thereto, at the other end a cam member fixedly attached thereto, and intermediate said one of said indicator fingers and said cam member, a steadying wheel fixedly attached to said shaft, a tubular shaft frictionally mounted on the first-mentioned shaft, the other of said indicator fingers being fixedly mounted on the end of said tubular shaft, a ratchet wheel fixedly mounted on the other end of said tubular shaft, an involute spring member fixedly mounted at one end to said tubular shaft, means for manually rotating the first-mentioned shaft independently of said tubular shaft so that said one of said indicator fingers and said cam member are set in a predetermined position, an operating key, a counter magnet for operating said ratchet wheel one step for each operation of said key, a release magnet arranged to automatically operate when said ratchet wheel is stepped to the position corresponding to that to which said one of said indicator fingers and said cam member were predeterminedly set, the stepping of said ratchet wheel to its release position

being also effective to concurrently restore said one of said indicator fingers and said cam member to their respective normal positions, an armature including a keying means controlled by said release magnet for unlocking said ratchet wheel in its operated position whereby said involute spring member restores said ratchet wheel and said other indicator finger to their normal positions.

19. In a printing telegraph set, a transmitter having a line-feed signal key, an indicator, means under the control of said key for actuating said indicator, said means including a ratchet wheel, a spring urged pawl for engaging said ratchet wheel, an armature connected to said pawl, an electromagnet for actuating said armature, a circuit including a source of potential for energizing said electromagnet and a pair of normally opened contacts in directly engageable relation with said key for closing said circuit every time said key is operated, a second means including a spring urged pawl for holding said ratchet wheel in an operated position, a keying element in engageable relation with both of said spring urged pawls, an armature connected to said keying element, an electromagnet for actuating the second-mentioned armature, a circuit including a source of potential for energizing the second-mentioned electromagnet, a pair of normally opened contacts in said second-mentioned circuit, a third means including a member arranged to be set in a predetermined position and in engageable relation with the second-mentioned pair of contacts for automatically closing the second-mentioned circuit to operate the second-mentioned electromagnet when said ratchet wheel is operated to the position corresponding to that to which said member was predeterminedly set whereby said spring urged pawls release said ratchet wheel, and tension spring means for restoring said ratchet wheel to normal position while said ratchet wheel is in its released condition.

20. In a printing telegraph set according to claim 19 wherein said second means includes an automatically operated crank cooperating with said keying means in an operated position to lock said spring urged pawls in their released positions with respect to said ratchet wheel, and wherein the first-mentioned armature includes an extended portion controlled by said line-feed signal key for releasing said spring urged pawls in locked positions.

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