

Sept. 27, 1932.

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1,879,524

TELEGRAPH SYSTEM AND APPARATUS

Filed Feb. 28, 1931

2 Sheets-Sheet 1

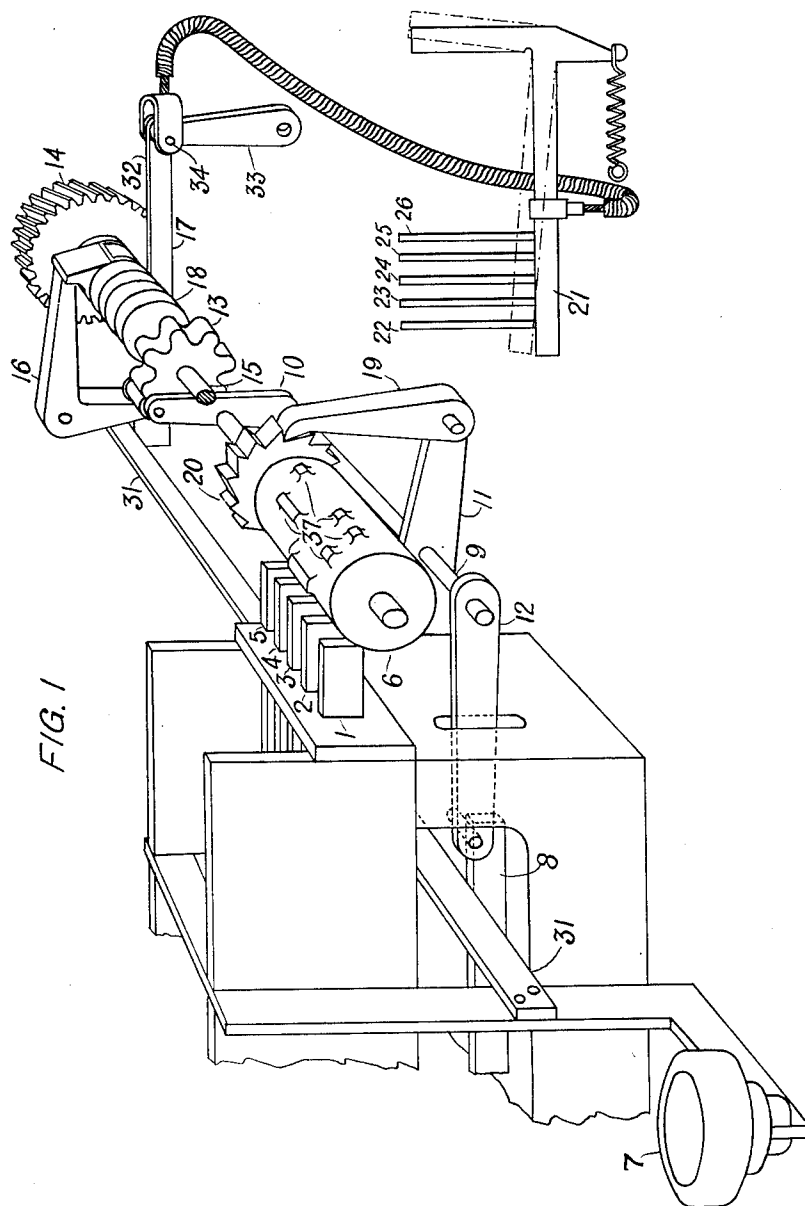


FIG. 1

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FIG. 2

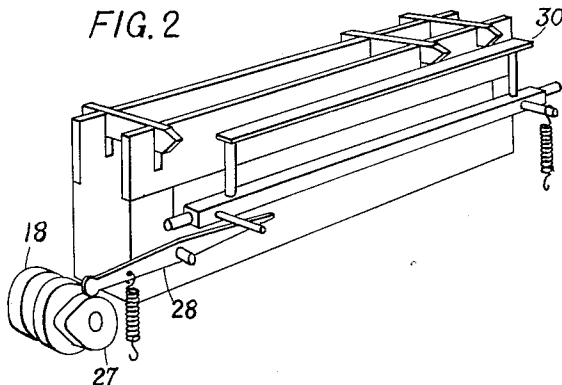


FIG. 3

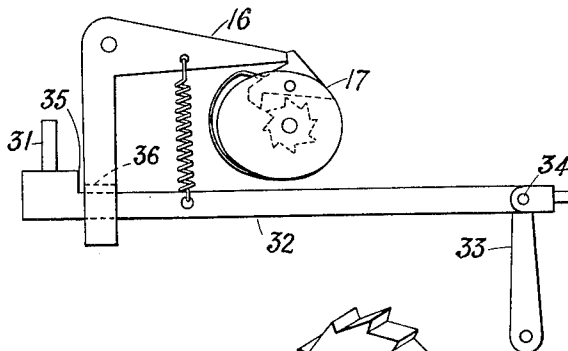


FIG. 4

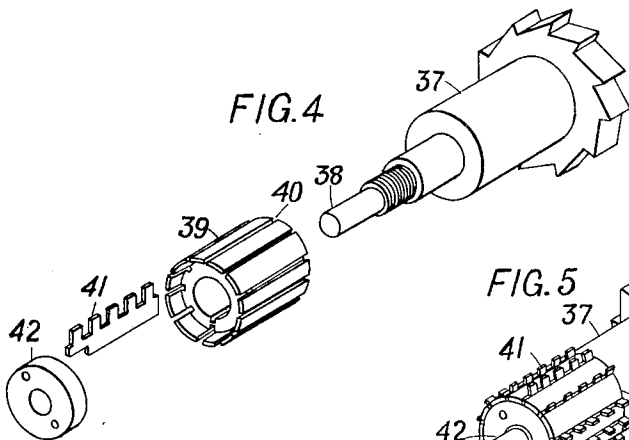
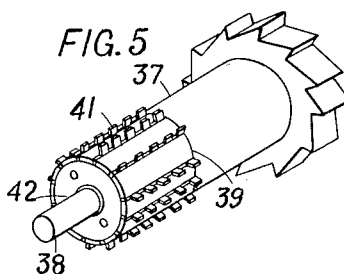


FIG. 5



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TELEGRAPH SYSTEM AND APPARATUS

Application filed February 28, 1931, Serial No. 519,038, and in Great Britain March 19, 1930.

The present invention relates to telegraph systems and apparatus and has more particularly reference to telegraph systems in which a plurality of subscribers or stations may be adapted to be put into communication one with another for example, as in ordinary telephone systems.

The invention has for an object the provision, in a telegraph system of this character, of apparatus of relatively simple construction whereby a calling subscriber may verify, before transmitting a message, whether he has been correctly connected to the station with which he desires to communicate.

Accordingly the invention provides in a telegraph system in which one station is connectible to any one of a plurality of other stations, means operable on transmission of a particular signal from one station to obtain at that station an indication individual to the station to which it is connected.

According to one feature of the present invention, in a printing telegraph system, a keyboard transmitter and a receiving printer at a station are associated with a line circuit, a selector bar in said printer is actuated on receipt of a particular signal over said line, and mechanical means associated with said keyboard transmitter is operable on actuation of the selector bar in said printer to transmit a group of signals characteristic of that transmitter.

According to another feature a printing telegraph system comprises a printer in which one of a plurality of selector bars is actuated in accordance with each received signal. A keyboard transmitter having a series of notched combination bars set longitudinally in varying combinations in accordance with each signal to be transmitted, cam means clutched to a rotating shaft for one revolution on actuation of a particular one of the selector bars in said printer to operate a rock shaft in a series of steps corresponding to successive signals to be transmitted, and other cam means stepped thereby to control the longitudinal position of the combination bars of said keyboard trans-

mitter for successive signals as timed by said steps.

According to another feature, in a telegraph transmitter a series of notched combination bars are set longitudinally in varying combinations in accordance with each one of a plurality of keys in a keyboard, so as to control signalling contact means, and cam means under independent control are adapted to control the signalling contact means also through said series of combination bars to send groups of signals independent of said keyboard.

According to another feature, in a keyboard transmitter local means is associated therewith to transmit an indication individual to that transmitter, a key is allotted therein to transmit a signal adapted to obtain an indication individual to any other station to which it is connected, and means is actuated by said key to prevent the actuation of said local means during the continued depression of said key.

According to yet another feature in a transmitter means is provided operable during the transmission of an indication individual to that transmitter to prevent the depression of any key of the keyboard.

Other features of the invention will be evident from the following description in conjunction with the accompanying drawings.

In these drawings Fig. 1 shows diagrammatically as much of a telegraph transmitter as is considered necessary for the comprehension of the invention together with the means associated therewith for transmitting to line an indication individual to that transmitter.

Fig. 2 shows one method whereby the keys of the transmitter may be locked against operation during the period the means associated therewith are transmitting an indication individual to that transmitter or station to line.

Fig. 3 shows one method whereby the operation of the means shown in Fig. 1 is prevented when the key of the keyboard at that station is depressed for the purpose of ob-

taining an indication individual to the other station to which it is connected.

Fig. 4 is an exploded view of a modified form of signalling drum and

Fig. 5 shows the drum assembled.

Referring to Fig. 1 any convenient type of keyboard transmitter may be employed in which a series of notched combination bars, of which only the extremities 1 . . . 5 are here shown, is set longitudinally in combinations varying in accordance with the key depressed. These notched combination bars may be moved positively on the depression of a key by notches inclined in one direction or the other according to the longitudinal direction in which it is desired that the bar should be moved. Alternatively certain of the bars may be held against longitudinal movement whilst the remainder are actuated either by mechanical power or by spring tension under the control of cams released on actuation of the usual universal bar. According to whichever type is employed, a cam sleeve 6 is adapted to co-operate in the appropriate manner as will hereinafter be evident.

As regards Fig. 1 the essential feature of the foregoing remarks consists in that combination bars 1 . . . 5 are longitudinally movable in varying combinations under the control either of the usual key levers, only one of which, 7 is here shown and to which special functions are allotted as will be clear from that which follows, or under the control of the cam sleeve 6.

On the surface of sleeve 6 is a series of cam projections 37 which co-operate in sequence on rotation of the sleeve with the extremities of the combination bars 1 . . . 5. These projections may be arranged, so that upon rotation of sleeve 6 the projections or groups thereof in an axial direction control the longitudinal position of the series of combination bars 1 . . . 5 to form combinations corresponding to desired characters. The groups of projections at different circumferential positions of the sleeve 6 may be so arranged that different combinations corresponding to different characters can be sequentially set up on the combination bars 1 . . . 5.

In keyboard transmitters of the class herein referred to means is provided to cause the actuation of the distributor or equivalent device on the depression of any key to send in correct sequence the combination of signal impulses as determined by the setting of the combination bars 1 . . . 5. Such means usually consists of a universal bar which is actuated on depression of any key to release a clutch for one revolution. In Fig. 1 this means is represented by bar 8. If now bar 8 is actuated at intervals and the sleeve 6 is correspondingly stepped round so as to bring consecutive groups of the cam projections 37 into operative relation with bars 1 . . . 5 it will be seen that the transmitter will auto-

matically transmit signals corresponding to a group of characters and these characters may be arranged to constitute the indication individual to that transmitter or station. This indication serves as the identity of that station and as in telephone practice may conveniently be a letter or letters indicating an exchange, followed by a number indicating the number of that transmitter or station. It will readily be seen that any desired number of characters may be arranged for by making sleeve 6 of sufficient diameter to contain the requisite number of groups of projections round the circumference.

In order to actuate the universal bar 8 and rotate sleeve 6 step by step for the transmission of successive characters, the means shown in Fig. 1 may conveniently be employed. This consists of a rock shaft 9 to which are fixed lever arms 10, 11, 12 and cam 13. A gear wheel 14 driven at a suitable speed and preferably by the same source of mechanical power as is utilized to drive the distributor device of the transmitter rotates a shaft 15 and a detent 16 engages the escapement of a clutch 17. Upon release of the escapement, clutch 17 operates in a manner already well known so as to rotate sleeve 18 and cam 13 for one revolution only. Cam 13 is arranged with a series of projections corresponding in number to the number of groups of signals on the sleeve 6. Lever arm 10 carries a roller or suitable bearing surface at the extremity which bears on the cam 13.

During the rotation of cam 13, rock shaft 9 is actuated at regular intervals. Lever arm 12 fixed thereto is adapted to actuate the universal bar 8 whilst lever arm 11 rotates sleeve 6 step by step through the medium of ratchet detent 19 and ratchet wheel 20 which is fixed to sleeve 6. Shaft 15, clutch 17, and cam 13 therefore form means under the control of detent 16 for marking off the intervals for sending each character in the group constituting the indication individual to that transmitter or station. These means are here shown as separate from the signalling contact means. This is the preferred arrangement but is not necessarily thus arranged. It will readily be seen that by modifying the constructional details the two means may be combined into one unit.

The detent 16 is preferably under the control of a selector bar in a printer associated with the transmitter at that station. For the sake of clarity only a selector bar 21 and combination discs 22 . . . 26 of such printer are shown in Fig. 1. When a station at the distant end of the line desires the identity of a station to which it is connected, a special signal is sent by the depression of a key allotted for that purpose in the keyboard and which may be called "who are you" or "number enquiry" key which selects selector bar 21 in the printer at the distant station by

means of the setting of combination discs 22 . . . 26 in the same way as any other particular character is selected. The actuation of this particular bar 21 may be arranged to release detent 16 of the automatic return signalling means associated with the keyboard transmitter. This release may be through the medium of mechanical links, through a flexible cable as shown in Fig. 1 or otherwise for example by electromagnetic means controlled by a contact closed by bar 21.

In telegraph systems wherein means is provided according to the present invention, at each station for giving and obtaining an identity of any other station, it is highly desirable to arrange that no possibility of mutual interference due to operation at both ends at the same time can occur with consequent mutilation of the signals. For example, if one station is depressing the special key to obtain the identity of a distant station to which it is connected, it should be impossible for a distant station to effect the release of the automatic return signalling apparatus at the first station for the same purpose or to effect any operation of the keyboard. Means to this effect is preferably arranged as shown in Fig. 2. A cam 27 fixed to sleeve 18 and to cam 13 actuates a lever 28 which operates the locking bar 30 of the keyboard. Cam 27 has a raised portion, as shown, which is arranged to rest under the extremity of lever 28 when the escapement of clutch 17 is in engagement with detent 16, in its normal position of rest. During the one revolution of clutch 17, for the purpose of actuating the return signalling apparatus, the lever 28 rests on the lower portion of the cam surface, the locking bar 30 of the keyboard is thus actuated by spring tension under the ends of the key bars of the transmitter. This prevents any key from being depressed during this period. The special key on the keyboard for obtaining the identity of the distant station is also conveniently locked out during this period and thus prevents the possibility of mutilation of the signals due to mutual interference.

It is not necessary that the precise means above indicated be adopted for this purpose. The actual methods adopted and the details of construction will vary according to the design of the apparatus with which it is desired to incorporate the present invention. Most keyboard transmitters, however, already have a locking bar for ensuring the full transmission of a signal consequent upon depression of a key. This locking bar in some cases may also be used to prevent the premature depression of a second key. In any case it is a simple matter to arrange that the locking bar is actuated either automatically by a cam and lever, as shown in Fig. 2 with reference to locking bar 28, during the actuation

of the return signalling apparatus, or electromagnetically as by a magnet energized by the closing of a contact during the same period. Alternatively as shown in Fig. 3 mutual interference may be prevented by arranging so that when the special key on the keyboard is depressed for obtaining the identity of the distant station, the actuation of the return signalling apparatus at the first station is prevented by disconnecting detent 16 from the selector bar 21 of the printer or other means which would normally effect the release of this return signalling apparatus. In Fig. 3 this is shown as an extension 31 of the special key bar 7 (see Fig. 1). This key 7 may be arranged to be depressed and held down either manually or locked down by convenient means whilst the return signal from the distant station is being received. Whilst the key is down the extension 31 depresses lever 32 which is pivoted on lever 33 at 34.

A projection 35 on lever 32 instead of engaging with a notch 36 on detent 16 thus slides underneath without actuating the latter.

Figures 4 and 5 show a modified method of forming the signalling drum which has the advantage that the designation or number set up and required to be transmitted can be readily changed.

A barrel 37 mounted on the driving shaft 38 is formed with a reduced end on which is feathered a detachable drum 39 cut with slots 40 adapted to receive small plates 41 having projections corresponding to the required combinations of the signal code. These plates 41 are inserted in the stop 40 where they are held by a nut 42 which is threaded on the shaft 38 or upon a reduced portion of the barrel 37. The plates 41 are prevented from moving or vibrating by virtue of the shape of their ends which are dovetailed to engage with suitably inclined abutting faces of the nut 42 and barrel 37.

It will be apparent from the foregoing description that the construction of apparatus shown in the drawings is only illustrative of one manner in which the invention may be carried out, and that various alternatives and modifications are possible within the scope of the invention.

What is claimed is:

1. In a printing telegraph system, a keyboard transmitter and a receiving printer at a station associated with a line circuit, a selector bar in said printer actuated on receipt of a particular signal over said line, and mechanical means associated with said keyboard transmitter operable on the actuation of the said selector bar in said printer to transmit a signal or group of signals characteristic of said transmitter.

2. In a telegraph system, a keyboard transmitter having a series of notched combination

bars adapted to be set in varying combinations in accordance with each one of a plurality of keys in a keyboard, means for controlling signalling contacts in accordance with the setting of said combination bars and mechanical means under independent control adapted to control said signalling contact means through the medium of said series of combination bars to send a signal or group of signals independent of said keyboard.

3. In a printing telegraph system a keyboard transmitter and a receiving printer at a station associated with a line circuit, a series of notched combination bars adapted to be set in varying combinations in accordance with each one of the keys of a keyboard, cam means in said transmitter for actuating said combination bars independently of said keyboard, a selector bar in said printer adapted to be actuated on receipt of a particular signal over said line and means responsive to the actuation of said selector bar in said printer for initiating the operation of said cam means.

4. In a printing telegraph system, a printer, a plurality of selector bars in said printer one of which is actuated in accordance with each received signal, a keyboard transmitter having a series of notched combination bars set longitudinally in varying combinations in accordance with each signal to be transmitted, cam means in said transmitter adapted to be clutched to a rotating shaft for one revolution responsive to the actuation of a particular selector bar in said printer, a rock shaft adapted to be reciprocated by said cam means and other cam means adapted to be advanced step-by-step by said rock-shaft to control the position of the combination bars for successive signals as timed by said stepping operation.

5. In a keyboard transmitter for a telegraph system a series of notched combination bars set longitudinally in varying combinations in accordance with each one of a plurality of keys in a keyboard and controlling thereby signalling contact means, mechanical means under independent control also adapted to control the signalling contact means through said combination bars to send signals independent of said keyboard and means for locking said keys against operation during the actuation of said mechanical means under independent control.

6. In a telegraph system means for connecting one station to a desired one of a plurality of other stations over a line circuit, a keyboard transmitter at said first station having a key the depression of which causes the transmission of a supervisory signal responsive to which said second station is adapted to transmit one or more signals indicative of its identity, local means associated with the transmitter at said first station adapted to transmit one or more signals in-

dicative of its own identity in response to a received supervisory signal and means actuated by said key for preventing the actuation of said local means during the depression of said key.

7. In a printing telegraph system, a printer, a plurality of selector bars in said printer one of which is actuated in accordance with each received signal, a keyboard transmitter having a series of combination bars set in varying combinations in accordance with each signal to be transmitted, cam means in said transmitter adapted to be clutched to a rotating shaft for one revolution responsive to the actuation of a particular selector bar in said printer, a keyboard for said transmitter, a key in said keyboard for causing the transmission of a supervisory signal and means actuated by said key for preventing the clutching of said cam means to said rotating shaft during the operation and continued depression of said key.

8. In a printing telegraph system, a printer, selective means in said printer actuated in accordance with received signals, a keyboard transmitter, selective means in said transmitter actuated in accordance with the operation of a keyboard, mechanical means in said transmitter for transmitting a signal or group of signals individual to said transmitter in response to a particular setting of the selective means in said printer, means associated with said transmitter for causing the transmission of a special supervisory signal, and means for preventing the operation of the said mechanical means during the transmission of said special supervisory signal.

9. In a telegraph system, the combination of a keyboard transmitter, selective means in said transmitter actuated in accordance with the operation of the keys of a keyboard to control the actuation of signalling contact means, mechanical means under independent control adapted to control said contact means to send signals independent of said keyboard, and locking means rendered effective by the initial actuation of said mechanical means to prevent the actuation of said keyboard during the operation of said mechanical means.

10. In a telegraph system, the combination of a keyboard transmitter having a series of notched combination bars adapted to be set in varying combinations in accordance with each one of a plurality of keys in a keyboard, means for controlling signalling contacts in accordance with the setting of said combination bars, cam means under independent control adapted to control said signalling contact means through the medium of said series of combination bars to send signals independent of said keyboard and a locking bar to lock said keys controlled by said cam means.

11. The combination claimed in claim 3 in which said cam means comprises a rotatable drum provided with projections which

cooperate with said combination bars to initiate the transmission of said signals.

12. The combination claimed in claim 3 in which said cam means comprises a rotatable drum or cylinder provided with integral projections which cooperate with the ends of said combination bars.

13. The combination claimed in claim 3 in which said cam means comprises a slotted drum in which is detachably mounted, plate members the edges of which are formed with teeth or projections adapted to cooperate with the ends of said selector bars.

In witness whereof we hereunto subscribe our names this eleventh day of February 1931.

REGINALD DENNIS SALMON.
FRANK REGINALD THOMAS.

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