Dec. 6, 1949 B. W. ROTH ET AL 2,490,476

PRINTING TELEGRAPH SYSTEM

Filed June 13, 1946 3 Sheets-Sheet 1

Fig. 1

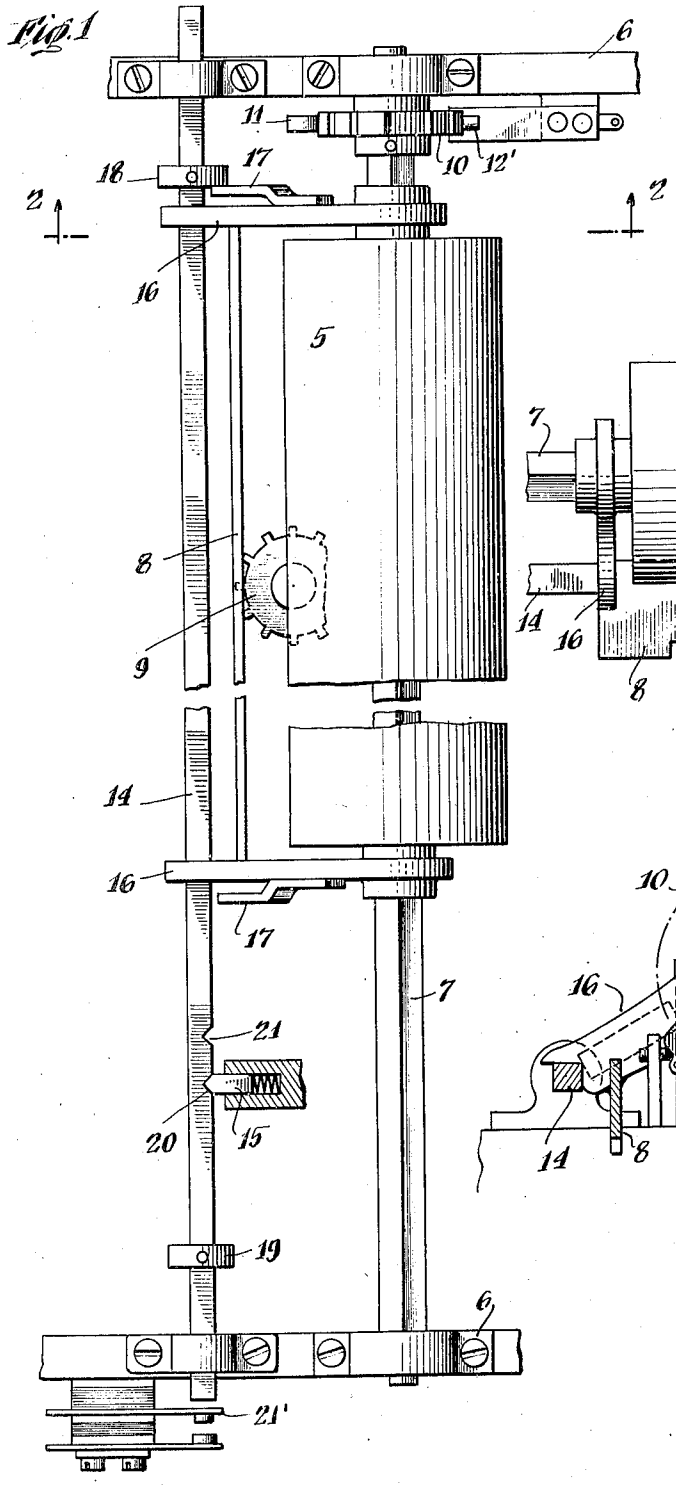


Fig. 3

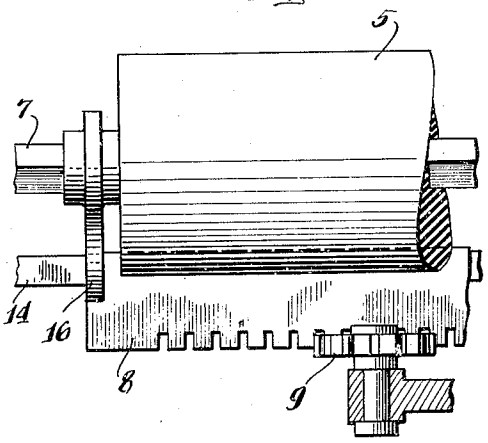
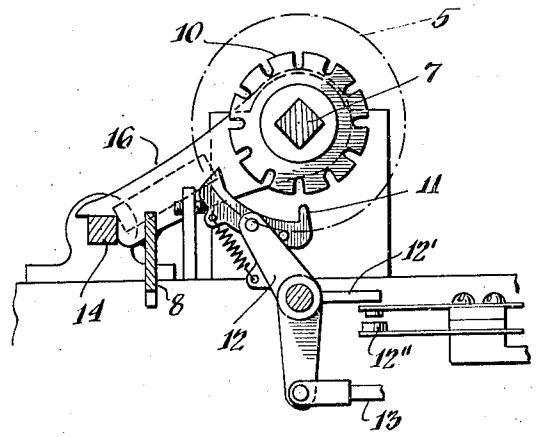


Fig. 2



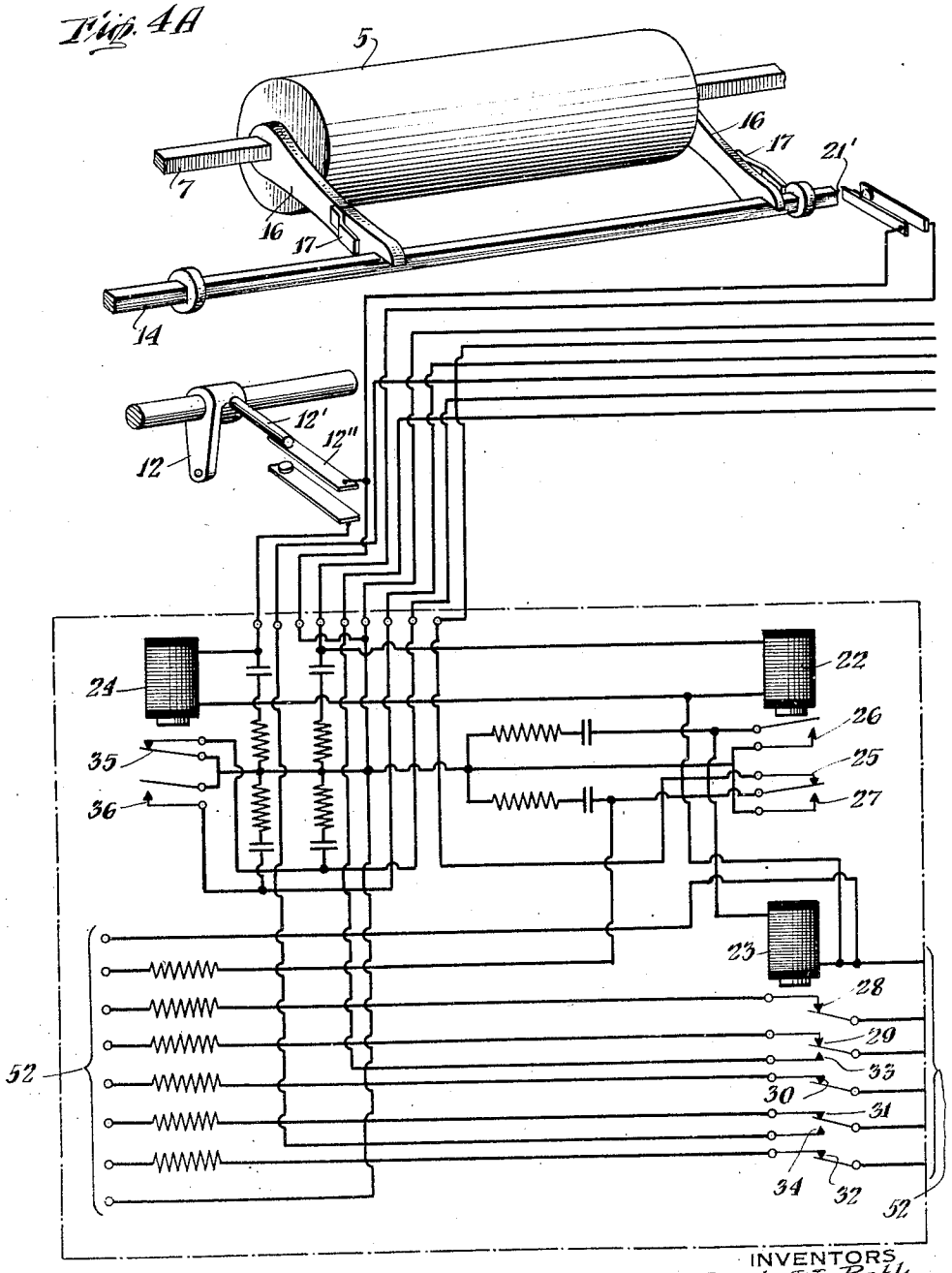
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PRINTING TELEGRAPH SYSTEM

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Fig. 4A



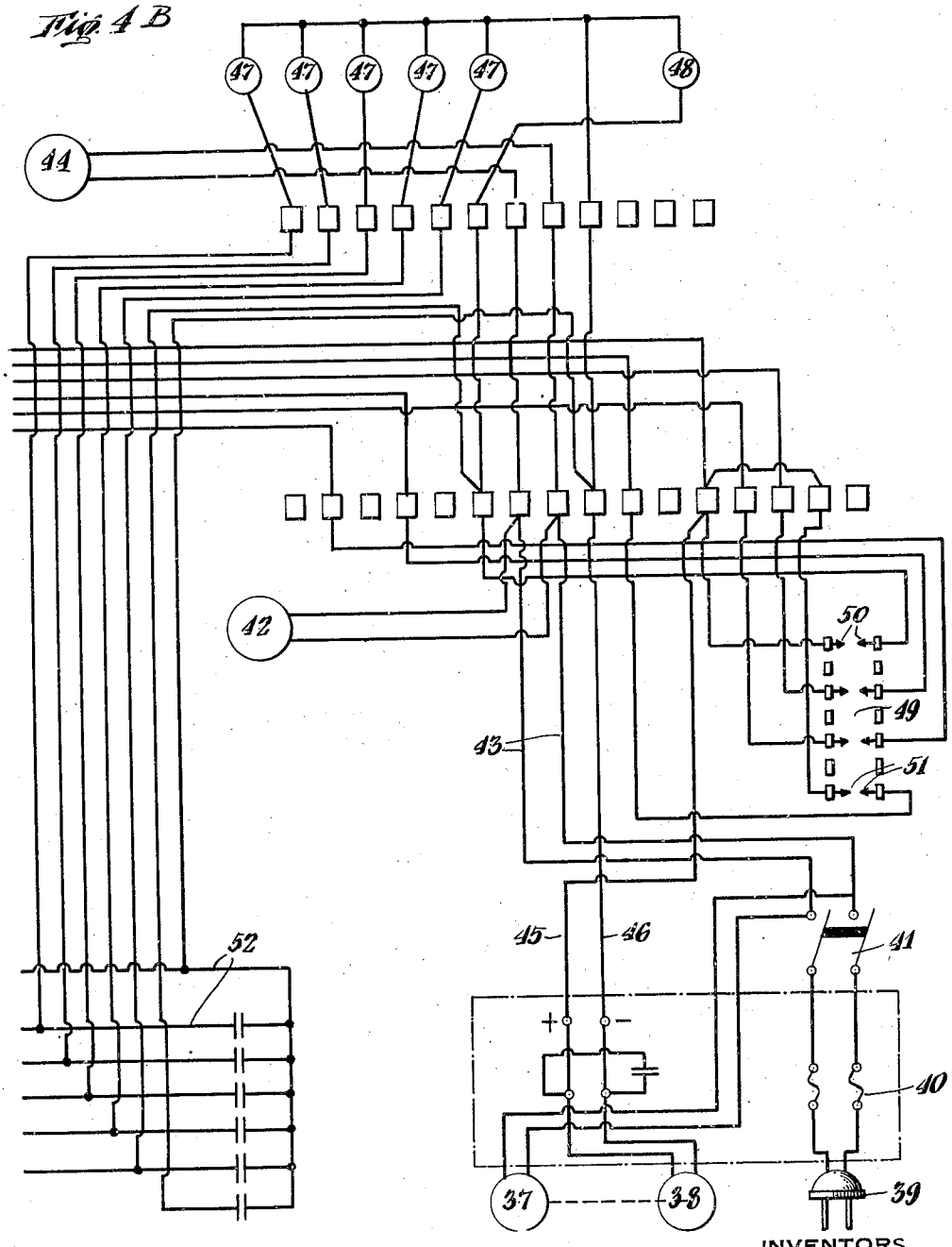
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PRINTING TELEGRAPH SYSTEM

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Fig. 4B



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PRINTING TELEGRAPH SYSTEM

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3 Claims. (Cl. 178—25)

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This invention relates to a structurally and functionally improved control apparatus capable of use in numerous different associations but primarily intended for employment and to be embodied in an automatic printer of the types shown, for example, in the prior United States patent to Kleinschmidt 1,448,750 of March 20, 1923, Noxon et al. 2,252,232 of August 12, 1941, and Rothermel 2,291,759 of August 4, 1942.

As is well known, mechanisms such as are disclosed in the prior patents are controlled by a tape perforated in accordance with predetermined permutations of apertures. This tape is fed through a transmitter which is electrically connected with the control apparatus governing the operation of the automatic printer. The latter is therefore operated in accordance with the arrangements of perforations appearing in the body of the tape.

In the case of printers which involve a returnable carriage and a line feed, the control apparatus has been operated to cause platen rotation and carriage return in response to impulses from the transmitter. Such impulses have originated as a consequence of perforations in the body of the tape.

By means of the present invention, it will be unnecessary to perforate the tape to secure the results of platen feed and carriage return. Rather, by means of a functionally and structurally improved arrangement of the parts, these operations will follow automatically upon a line of typing having been completed by the printer.

Further, while a carriage return and platen rotation are occurring as a result of the functioning of mechanisms constructed in accordance with the present teachings, the transmitter will have its operation interrupted. Therefore, no "loss" of a unit of indicia will occur. Consequently, the entire area of the tape may be dedicated to signal-producing perforations such that characters, numerals, and symbols only will be reproduced by the printer in response to the signals emanating from the transmitter.

Another object of the invention is that of providing a control apparatus which, while primarily intended for association with a printer, need not necessarily be so employed. Rather, such apparatus may be advantageously utilized in numerous other associations.

An additional object is that of furnishing an improved mechanism which will be fully automatic in operation so that when once installed it will function with freedom from any manual supervision.

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Still another object is that of furnishing an assembly of parts, each of which will be relatively rugged and simple in construction, these parts being capable of economical manufacture and ready assemblage with each other to furnish a unitary and rugged structure operating over long periods of time with freedom from all difficulties.

With these and other objects in mind, reference is had to the attached sheets of drawings illustrating one practical embodiment of the invention, and in which:

Fig. 1 is a partly fragmentary plan view of a printer showing a portion of the improved control mechanism in association therewith;

Fig. 2 is a transverse sectional view taken along the lines 2—2 and in the direction of the arrows as indicated in Fig. 1;

Fig. 3 is a fragmentary front elevational view of certain of the parts as shown in Fig. 1;

Fig. 4A is a somewhat diagrammatic perspective view of a rear portion of the printing mechanism and showing generally a part of the circuit layout of the control mechanism associated therewith; and

Fig. 4B is a continuation of the circuit illustration as embraced in Fig. 4A and which, when taken in conjunction with that former figure, provides a complete operative circuit.

For the sake of clarity, a somewhat diagrammatic illustration has been resorted to in these several figures. As will be apparent in an actual commercial apparatus, the mechanisms might be redesigned, and—in the interest of compactness—be arranged in manners different from those illustrated. Also, with a view to avoiding unnecessary illustration, parts such as permutation bars, drop-in bars, selector bars, and related mechanisms have not been included in the drawings. These will usually be of more or less standard construction and operate in a manner as taught in the prior art.

Thus, in these drawings, the numeral 5 indicates the platen of the machine and 6 the frame of the same. The latter rotatably supports a shaft 7 upon which the platen 5 is slidably mounted. A platen carriage 16 is suitably supported by the frame. A feeding and return of this carriage (to the position shown in Fig. 1) may be effected by any desired and more or less conventional mechanism. For example, a rack bar 8 may be secured to this carriage and shifted by the teeth of a pinion 9 while a spring (not shown) may return the carriage to its initial position. A rotation of the platen—or in other words a "line

feed"—may be assured by turning the shaft 7 upon which the platen is mounted.

To secure this result, it is again proposed to utilize any desired and conventional mechanism such as has been diagrammatically illustrated in Fig. 2. In that view it will be seen that an annular ratchet 10 or segmental member is secured against rotation with respect to the shaft 7. The notches or teeth of this member are engaged by a double-ended pawl 11. The latter is normally urged in a given direction by means of a spring and is mounted for pivotal movement upon a crank 12. Conveniently secured to and movable with the crank 12 is an actuating arm 12'. This is engageable with a normally open switch 12''. Connected to the crank 12 is a control 13. As is apparent, when the control is actuated to shift crank 12 in a clockwise direction as viewed in this figure, the pawl 11 will cause an arcuate movement of the member 10. This will in turn result in the shaft 7 being partially rotated, carrying with it the platen 5, to secure the desired results. Also, the actuator 12' will close the switch 12''.

As has been previously stated, various detailed showings have been eliminated from the drawings in that such showings would merely serve to illustrate more or less standard parts and thus render the drawings unnecessarily redundant. Suffice it to say, however, that an apparatus of this nature customarily includes type bars which strike against a web of paper associated with the platen. These type bars are sequentially actuated by drop-in bars, selector bars, permutation bars, etc., etc., all of which are in turn controlled by the passage of the perforated tape through the transmitter as afore described. As the type bars sequentially operate, the platen shifts axially so that successive imprints of letters, characters, numerals, etc., may be effected on the paper associated with the platen. Upon this imprinting being continued to a point adjacent the rear edge of the paper web further imprinting is interrupted. Thereupon, the platen should be returned to a position at which further imprint of the type bars will occur in zones adjacent the left-hand or forward edge of the web. Simultaneously with this operation or in any event before further imprinting commences, a "line spacing" should be resorted to.

In accordance with the teachings of the present invention, these desired results of carriage return and line feed are achieved without the use of control perforations in the tape. The preferred method of accomplishing such results has been illustrated. As will be seen especially in Figs. 1 and 4A, a bar 14 is movably supported by, for example, bearings in frame 6, as shown. This bar normally occupies positions predetermined by detent notches 20 and 21 which may conveniently be located near one of its ends. Actuating members 17 may be secured to the outer faces of the carriage 16. These members are engageable with stops 18 and 19 secured to the bar 14 at points substantially coincident with the limits of travel of the platen carriage. A spring-pressed detent catch 15 may maintain the bar 14 in any position to which it has been shifted by cooperating with, for example, the notches 20 and 21. The relative disposition of parts has been illustrated generally in Fig. 2.

Thus, it is apparent that when the carriage moves to its extreme left-hand position the actuator 17 will bear against the stop 19 thereby shifting the bar 14 to a position at which the detent 15 engages notch 21. As the parts so move the spring-pressed detent 15 will ride out of the notch 20 and project into the notch 21 to thus retain the bar in the position to which it has been moved. As the carriage moves to its extreme right-hand position, under the "carriage-return" action of the spring, or any functionally equivalent mechanism, the actuator 17 at the right-hand side of the carriage will engage against the stop 18. Such engagement will cause the bar 14 to be shifted to the right. Again, the parts will be retained in position by means of the detent structure and until engagement between the left-hand actuator 17 and stop 19 is again effected as afore described.

As afore brought out, when the carriage reaches a position at which the imprinting by the type bars is occurring adjacent the limit of the right-hand zone of the inscription-receiving surface upon the platen, the actuator 17 will contact the stop 19 to shift the bar 14 in a downward direction as viewed in Fig. 1. As illustrated, this may cause the lower end of the bar (as shown in this figure) to project beyond the main frame 6 of the machine and engage the movable arm 21' of a switch to close the latter. However, when detent 15 is not within notch 20, this switch will be open.

With respect to the electrical units of the apparatus, it will be observed, as in Fig. 4A, that three relays 22, 23 and 24 have been provided. Relay 22 controls one break contact 25 and two make contacts 26 and 27. Relay 23 controls five break contacts 28, 29, 30, 31 and 32 and two make contacts 33 and 34. Relay 24 is provided with one break contact 35 and one make contact 36. The latter relay is of the slow-release type. Further with reference to the electrical units and directing attention especially to Fig. 4B, it will be observed that the reference numeral 37 indicates an A. C. motor which may be, for example, of the 120 volt, 60 cycle type. This motor drives a generator 38. A source of A. C. current supply is connected to the system by, for example, a plug 39 within the leads of which fuses 40 are interposed. A control switch 41 may be provided. The leads from the latter will extend to the motor 37 as well as to the distributor motor 42. Beyond this, the leads 43 will extend to the motor 44 of the printer. The direct current-supplying leads 45 and 46 are connected to supply energy as required to the code coils 47 of the printer, which coils control the operation of the permutation bars.

Lead 46 is also connected to what is usually termed the "sixth pulse" coil 48, this circuit being completed through a distributor 49. The latter embraces a series of cam-controlled contacts operated by the motor 42. The numeral 50 indicates the distributor contacts which control the coil 48. A further pair of contacts indicated by the numeral 51 are connected to control the tape-feeding magnet of the transmitter.

Under ordinary conditions of operation switches 21' and 12'' will be open. With switch 41 closed and leads 40 connected to a suitable source of power supply, the apparatus will function in a manner well-known to those conversant with the art. This is, of course, conceding that the leads 52 as indicated in the left-hand side of Fig. 4A are connected to the proper conductors extending to a transmitter and that the latter has associated with it in proper operative relationship a suitable perforated tape.

Under these circumstances, each revolution of the cam driven by the distributor motor 42 will result among other functionings in a momentary

closing of the contact 50. This will energize the "sixth pulse" coil 48 to initiate printing functions and advance the carriage 16 incident to the operation of the printer motor 44. Such advance will be step-by-step so that successive characters may be imprinted upon the sheet carried by the platen. Following energization of the coil 48, the distributor motor 42 causes a momentary closing of the contacts 51. This closes a circuit through the magnet of the transmitter resulting in a tape step. In other words, the code-perforated tape is advanced one step to its next code character. In so far as the functioning of a standard apparatus is concerned, it will be observed that the present layout differs from the same in that these contacts 51 achieve the aforementioned result.

This cycle of operation involving carriage advance, the feeding of the transmitter tape one step, the actuation of imprinting bars, etc., etc., will continue until the carriage 16 has shifted to a point at which it carries with it the bar 14, thus disengaging latch 15 from notch 20 and thereupon permitting it to project into notch 21. Under these circumstances, the lower end of bar 14 as viewed in Fig. 1 will be projected to a point at which it engages the movable element of switch 21' to close the circuit through that element. As will be apparent, in lieu of a "pile-up" of the character specifically shown, a different form of switch assembly might be employed should this be desired.

When switch 21' closes, relay 22 will be energized. This will result in an opening of the circuit through contact 25 and a closing of the circuit through contacts 26 and 27. The opening of the switch or contact indicated at 25 will result in a disconnecting of the magnet of the transmitter from the cam-controlled contacts 51 of the distributor assembly. Therefore, the further feeding of transmitter tape will be interrupted. The circuit through the contacts or switch 27 which has been established by energization of the relay 22 results in a locking of the transmitter magnet in one position. Accordingly, a continuous rotation of the cam in the distributor assembly will not result in a loss of a character during subsequent operation. Such operations result from a closing of the contact or switch 26 which energizes relay 23.

With the energization of the latter relay, contacts or switches 28, 29, 30, 31 and 32 are opened. Similarly, contacts or switches 33 and 34 are closed. The opening of switches 28 to 32 inclusive results in the disconnecting of all wires 52 leading to the pin-operated contacts of the transmitter. The closing of contacts or switch 33 then causes an operation of the line-feeding mechanism by shifting the control 13. Such shifting results from the fact that the closing of contact 33 provides the second of the coils 47 as in Fig. 4B with the necessary pulse through the rotating cam of the distributor assembly and the normally closed contacts or switch 35 of the relay 24. The line-feed mechanism functions as soon as the ensuing "sixth pulse" is delivered through the operation of the contacts 51 by the cam of the distributor with the resultant energization of the coil 48.

As aforedescribed with a line feed occurring, crank 12 is oscillated to correspondingly move the actuator or extension 12'. This results in a closing of the contact of switch 12''. This closes the circuit to relay 24. With the resultant energization of this relay, contacts 35 are opened and contacts 36 are closed. While the closing of switch 12'' is only momentary, it will be borne in mind the relay 24 is of the slow-release type. Therefore, contact 35 remains open and contact 36 remains closed for a short period after switch 12'' has re-assumed its open position. Accordingly, the cam of the distributor 49 will have sufficient time to deliver a pulse through contact or switch assembly 34 to the code magnet 47 which is fourth from the left as viewed in Fig. 4B. Accordingly, this will initiate the carriage return function which is completed as a result of the subsequent closing of contacts 50 of the distributor 49 with resultant energization of the coil 48.

With the return of the carriage to the position shown in Fig. 1, bar 14 will be shifted upwardly as viewed in that figure. Therefore, switch 21' will be opened. The printing operation will not be resumed until this has occurred. With such opening of the switch 21' the cycle is completed and all relays are again in their normal positions as illustrated in the drawings. Consequently, the transmitter will again function and imprinting will occur and the entire cycle will be repeated continuously. As will be apparent, the cam-operated contacts of the distributor are employed to limit the duration of both the second and fourth pulse so that these two signals will not be introduced to the code coils between two successive "sixth pulses." Such an operation would cause a letter to be printed instead of resulting in a line feed and carriage return.

From the foregoing it will be appreciated that an apparatus is provided by the present invention, in which no permutation of perforations or other expedient will have to be resorted to in connection with the tape or its equivalent to assure a line feed or carriage return. Rather, these results occur automatically upon the parts of the apparatus reaching positions such that these functions are required. With the occurrence of such functions, the transmitter ceases to operate in a manner such that one may be assured no characters represented by code perforations on the tape will be lost or skipped during the functions of line feed or carriage return.

Thus among others the several objects of the invention as specifically aforenoted are achieved. Obviously, numerous changes in construction and rearrangements of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

We claim:

1. A printing mechanism including in combination a shiftable platen carriage, a rotatable platen supported thereon, means for rotating said platen with respect to said carriage, said carriage being shiftable in a series of successive steps to advance in an axial direction, switch means operated automatically by the movement of said carriage upon the latter reaching a predetermined position to cause said platen to be rotated, and further switch means automatically operative responsive to platen rotation for causing a return of said platen in an axial direction to a predetermined position.

2. An imprinting mechanism including an axially shiftable and rotatable platen, leads to be connected to a tape receiving and feeding transmitter and governing the shifting of the platen in one direction, a switch, means connected to said platen and operating said switch upon the platen reaching a predetermined limit of shifting, a relay connected to be operated by said

switch, a circuit controlled by said relay and connected to one of said leads to cause a discontinuance of transmitter operation upon said relay functioning, a further relay connected to be controlled by said first named relay, means connected to function upon said further relay operating to cause a rotation of said platen, a second switch arranged to operate upon said platen rotating, a final relay controlled by said second switch and means controlled by said final relay for causing an axial shifting of said platen to an initial position.

3. An imprinting mechanism including an axially shiftable and rotatable platen, leads to be connected to a tape receiving and feeding transmitter and governing the shifting of the platen in one direction, a switch, means connected to said platen and operating said switch upon the platen reaching a predetermined limit of shifting, a relay connected to be operated by said switch, a circuit controlled by said relay and connected to one of said leads to cause a discontinuance of transmitter operation upon said relay functioning, a further relay connected to be controlled by said first named relay, means connected to function upon said further relay operating to cause a rotation of said platen, a second switch arranged to operate upon said platen rotating, a final relay controlled by said second switch, means controlled by said final relay for causing an axial shifting of said platen to an initial position and final means controlled by said latter relay to re-establish a continuation of operation of said transmitter and reenergization of the leads extending therefrom.

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