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RUB-OUT SIGNAL DELETER FOR TAPE TRANSMITTERS

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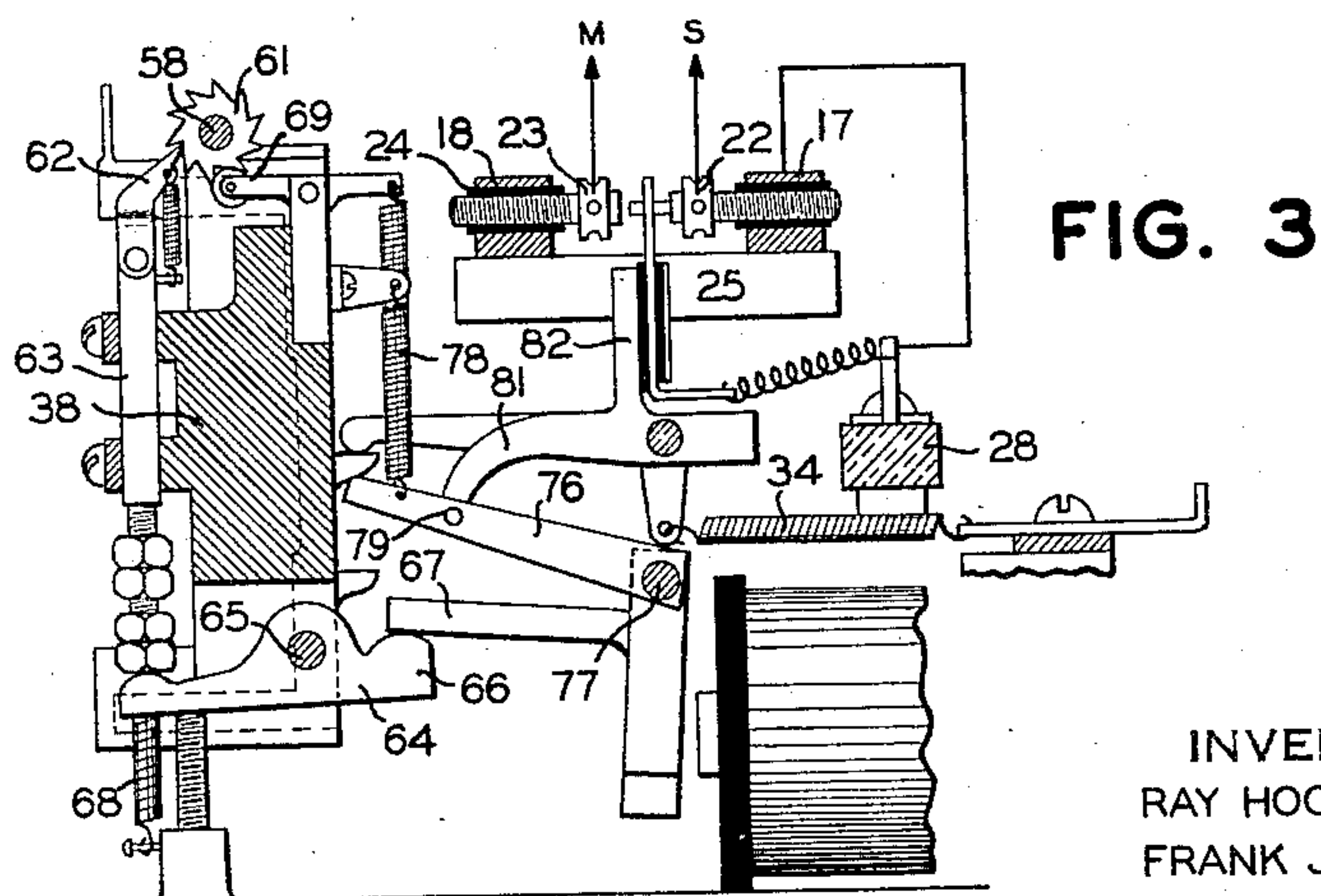
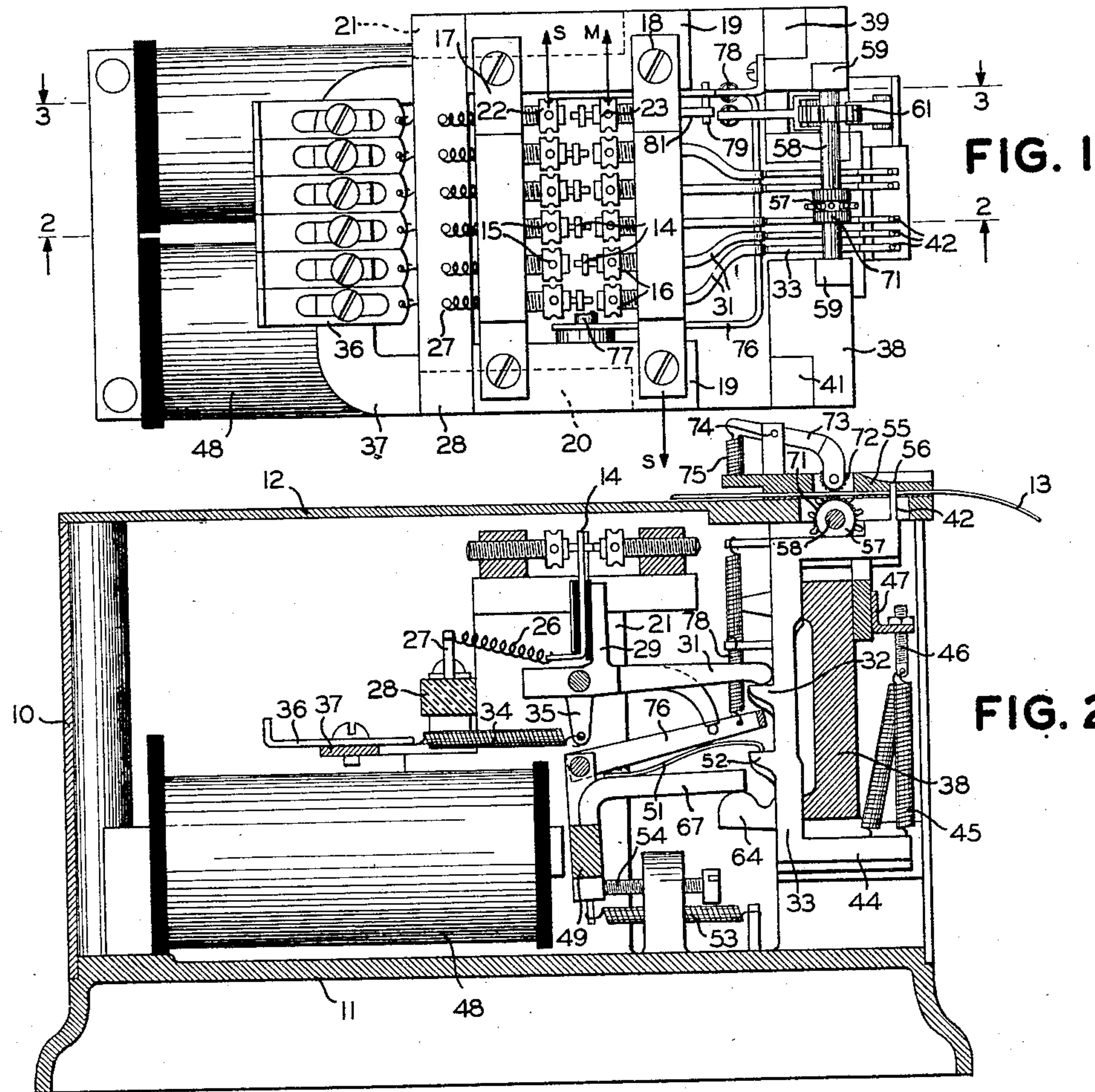


FIG. 3

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RUB OUT SIGNAL DELETER FOR TAPE TRANSMITTERS

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This invention relates to a transmitter for automatic telegraph systems in which a previously perforated tape passes across the path of a series of reciprocating transmitting pins which determine the electrical impulses to be transmitted over the line.

More particularly, the invention relates to that type of tape transmitter disclosed in patent to G. R. Benjamin, No. 1,298,440, granted March 25, 1919, in which the tape is fed longitudinally across the top of the transmitter, the pins being disposed vertically beneath the tape and being raised against or withdrawn from the tape by an electromagnet.

In tape transmitters of this type, the pin carriers actuate individual switch tongues which play between a marking bus bar and a spacing bus bar, so as to set up on the tongues various combinations of marking and spacing conditions in accordance with the perforations appearing in the tape. The switch tongues are connected to the contacts of a rotary distributor so that as each code combination is set up through the tape transmitter it is transmitted over the line by means of the rotary distributor. The tape is perforated in transverse rows in accordance with a five or six unit code, the perforations representing marking conditions and the blank or unperforated tape representing spacing conditions. The tape is perforated either by means of a manual keyboard perforator or by an automatic perforator operated in response to transmitted code signals. In the manual perforation of the tape, if the keyboard operator produces the wrong combination in the tape, this is remedied as soon as discovered by backing up the tape in the perforator and re-perforating the signal group with a "rub out" signal which consists of all marking impulses, that is, with perforations in each position of the transmitting pins. Since a number of characters may intervene between the perforation of the wrong character and its detection, it is often necessary to repeat the "rub out" character a number of times to delete all of the characters appearing after the mistake was made. When

such portion of the tape passes through the tape transmitter, the "rub out" signal is sent to the line the same as regular intelligence signals. Consequently, means must be provided at the recording apparatus so that the printing and tape feed mechanism of the receiving printer will not respond to the "rub out" signals, otherwise a corresponding number of blank spaces would appear in the received message. In case receiving perforators are employed at the distant station for producing tape for re-transmission of the signals over one or more routes, the "rub out" signals will be repeated in each tape formed and the result of the original error will be carried throughout the entire transmission. Valuable line time is lost in each repetition of the "rub out" signals.

One of the objects of the present invention is to produce a tape transmitter which will delete the "rub out" signals occurring in the tape so that they will not be transmitted to the line.

Another object is to provide a tape transmitter which will normally cause marking conditions to be sent to the line in accordance with marking perforations appearing in the tape but which will cause spacing conditions only to be sent to line in case of a "rub out" signal appearing in the tape.

Other objects of the invention will appear as the description proceeds.

In accordance with a preferred embodiment of our invention, we provide the tape transmitter with an auxiliary contact which, during the normal transmission of intelligence, applies marking potential to the marking contacts of the transmitter and which is actuated when the transmitting pins are all in marking position, that is, raised through perforations in the tape, to apply spacing potential to the marking contacts. Since in this latter case all of the contacts of the transmitter have spacing potential applied thereto, spacing conditions only are transmitted over the line. This corresponds to the idle condition of the line and as a consequence the receiving apparatus does not respond thereto. As soon as a portion of the tape, including at least one spacing condition, is

advanced into the tape transmitter above the pins, marking potential is again applied to the marking contacts so that normal transmission may be resumed. By eliminating the
 5 "rub out" signals at the transmitting station, it is unnecessary to provide auxiliary mechanism at each receiving instrument for deleting these signals. This is particularly important in broadcast or ticker systems where
 10 a single transmitter may control a large number of recording machines.

In order that the invention may be more fully understood, reference will be had to the accompanying drawing in which,

15 Figure 1 is a top view of a tape transmitter having our invention applied thereto;

Figure 2 is a vertical section taken on the line 2—2 of Figure 1; and

20 Figure 3 is a vertical section taken on the line 3—3 of Figure 1.

The transmitter comprises a suitable casing 10 mounted upon a base 11 and enclosing the transmitter mechanism. It is provided with a removable cover 12 adapted for the
 25 passage of a perforated tape 13 thereover, this tape in practice being perforated transversely in accordance with the so-called Baudot code of five impulses, of which some may be positive and others negative. The transmitter is shown as comprising five distinct sets
 30 of transmitting contacts and a set of auxiliary contacts, each set of transmitting contacts being arranged to produce current reversals and the auxiliary contact serving to apply
 35 either marking or spacing battery to the marking side of the transmitting contacts. It is to be understood, however, that the number of contacts may be varied and the transmitter may be adapted for making and
 40 breaking the circuit instead of transmitting current reversals.

Each of the set of transmitting contacts comprises a contact tongue 14 and adjustable
 45 contact stops 15 and 16, between which the tongue is adapted to vibrate.

The several contacts 15 are mounted upon a supporting bridge or marking bus bar 17 and the contacts 16 are mounted upon a supporting bridge or spacing bus bar 18, these
 50 bridges being carried upon insulating blocks 19, in turn carried by spaced uprights 20 and 21, integral with the base 11. The auxiliary contacts 22 and 23 are also mounted on the bus bars 17 and 18, respectively, but are insulated therefrom by insulating sleeves 24. The bus bar 17 is connected to the tongue
 55 25 of the auxiliary contacts, these latter contacts being connected to spacing and marking battery, respectively. The bus bar 18 is connected to a source of spacing battery. The several transmitting contact tongues 14 have
 30 connected to them, conductors 26 extending to individual binding posts or soldering lugs 27, carried by an insulating strip 28, extending
 65 between the uprights 20 and 21. The

terminals 27 may be connected to the segments of a rotary distributor, not shown, as is well understood by those versed in the art.

Each of the transmitting contact tongues 14 is mounted upon a separate pivoted bell crank
 70 lever 29 having a forward extension 31 which engages the upper side of lugs 32 formed on the rectangular pin carriers 33. The levers 29 are normally urged in a clockwise direction by individual springs 34 extending be-
 75 tween the downward extensions 35 of the levers and adjusting slides 36, carried by a U-shaped bracket 37 mounted upon the uprights 20 and 21.

The pin carriers 33, one of which is provided for each unit of the code, are arranged
 80 to slide in guides formed in a block 38, mounted upon uprights 39 and 41 integral with the base. The pin carriers or slides 33 are substantially rectangular in shape the forward
 85 side being removed and each carrier having a pin 42 extending upwardly from the forward end of the upper arm 43, the pins being adapted to pass through perforations in the
 90 tape 13. The lower arm 44 of each of the carriers also projects forwardly and has secured thereto, one end of a spiral spring 45 which extends upwardly in substantial align-
 95 ment with the pin 42 and is anchored at its upper end to an adjusting pin 46, carried by a bracket 47 from the block 38. A separate
 adjusting pin is provided for each spring.

The springs 45 tend to raise the pins 42 against or through the tape and in so doing
 100 to rock the levers 29 against the pressure of springs 34, to position the transmitting contact tongues 14 on their left hand or marking contacts.

The pins are moved downwardly away from the tape against the action of springs
 105 45 by an electro-magnet 48, having a pivoted bell crank armature 49, provided with a bail 51 which engages with lugs 52, one of which is formed on each of the pin carriers 33. It will be apparent that when the mag-
 110 net 48 is energized to attract its armature, all of the pins 42 which are then in elevated position will be depressed. A retractile spring 53 is provided for the armature 49 to move the same against the adjustable stop
 115 54 when the magnet is deenergized, thus assisting the springs 45 which have the same tendency to retract the armature of the magnet upon rise of any of the pin carriers.

The cover 12 is provided with a guide
 120 plate 55, above the tape having a transverse slot 56, through which the pins pass in their upward position. The guide plate limits the rise of the tape under the action of the pins
 125 which do not happen to be in line with perforations of the tape.

A star wheel 57, having a peripheral row of teeth, serves to feed the tape forward, the teeth entering a center row of perforations of the tape, as is well known in the art. 130

The star wheel 57 is mounted upon a shaft 58 journaled in bearings 59 carried by the block. Also mounted upon the shaft 58 is a ratchet wheel 61 arranged to be advanced step-by-step by a spring actuated pawl 62 mounted upon a sliding rod 63. The lower end of the rod 63 is engaged by a lever 64 pivoted at 65 and having its inner end 66 engaged by the forward extension 67 of the armature 49 of the operating magnet. The pawl carrying rod 63 is pulled downward by a spiral spring 68 anchored to the base 11 and is raised upwardly once for each stroke of the magnet 48 to advance the feed wheel one step. A spring pressed jockey 69 prevents reverse movement of the ratchet wheel when the pawl 62 descends and accurately positions the tape with the perforations directly in line with the transmitting pins.

A knurled roller 71 is disposed at each side of the star wheel 57 cooperating with a knurled roller 72 carried by an arm 73 pivoted at 74 and pressed against the tape 13 by a spring 75. These rollers assist the star wheel 57 in advancing the tape through the transmitter. By accurately dimensioning rollers 71 so that their peripheral movement is equal to the distance between adjacent rows of perforations, the tape will be accurately advanced even though the central row of feed perforations in the tape is badly worn or destroyed.

The operation of the transmitting apparatus so far described is as follows. Assuming the magnet 48 to be energized so as to attract its armature, the bail 51 engages the lugs 52 to lower each of the pins away from the tape and as soon as the pins have cleared the tape the lever 64 is rocked upwardly to actuate the feed ratchet 61 and advance the tape through the space of one tooth. At the same time the lugs 32 are forced downwardly permitting the contacts 14 to move to their right hand or spacing side. As soon as the magnet 51 is deenergized such of the pins 42 as are disposed beneath perforations in the tape will rise under the action of the springs 45, thus moving their corresponding contact tongues 14 against their left hand or marking contacts. At the same time the pawl 62 will descend into engagement with the next tooth of the ratchet wheel 61. The new code combination is therefore set up on the contact tongues 14 which as stated before may be connected to the segments of a rotary distributor for transmission to the telegraph line.

It is obvious that if a "rub out" signal appears in the tape all the pins will rise through the perforations in the tape so as to position all of the transmitting contact tongues 14 on their marking contacts 15 and consequently the "rub out" signal will be transmitted to the outgoing line. In a multiplex system, an idle channel is represented by spacing

conditions alone and therefore in order to delete the "rub out" signals and prevent their transmission to the line, it is only necessary to apply spacing conditions to the line when a "rub out" signal is set up in the tape transmitter, that is, to produce an idle line condition for each "rub out" signal. For this purpose, we provide a U-shaped bail 76 pivoted at each free end to the armature shaft 77 and having an intermediate portion extending immediately beneath each of the lugs 32 of the pin carriers 33. The bail is urged upwardly against the lugs 32 by a spiral spring 78. One arm of the bail has a pin 79 extending therefrom which engages a downwardly curved extension 81 of the bell crank lever 82 by which the auxiliary contact tongue 25 is carried. The contact 25 is normally urged towards its contact 23 by one of the adjustable springs 34 and is moved to its opposite contact 22 by the pin 79 whenever the bail is raised by the spring 78.

During the transmission of ordinary intelligence signals, at least one spacing condition will occur in every code combination and consequently at least one of the pin carriers 33 will be held in its lower position by engagement of its pin with a blank portion of the tape. The bail 72 therefore will be held depressed by one or more of the lugs 32 and in this position the auxiliary contact tongue 25 will be maintained against its contact 23 by the spring thereby applying marking potential to the marking bus bar 17. Under these conditions regular transmission of signals set up by the transmitting contacts 14, occurs. However upon the occurrence of a "rub out" signal in the tape, having a perforation for each of the transmitting pins 42, all of the pin carriers 33 will be raised thereby permitting the bail 76 to move upwardly, rocking the contact tongue 25 to its contact 22 and thereby removing marking battery from the bus bar 17 and applying spacing battery thereto. Spacing battery is therefore transmitted over the line for each "rub out" signal appearing in the tape.

It is obvious of course that various other embodiments of the invention will occur to those versed in the art and we do not desire to be limited to the exact construction shown and described.

What we claim is:

1. A tape transmitter comprising a series of transmitting pins, an individual contact arm controlled by each of said pins, a marking and spacing contact for each contact arm, means normally applying marking condition to said marking contacts and means for removing said marking condition and applying a spacing condition to the marking contacts when all of said contact arms are on their marking contacts.
2. A tape transmitter comprising a series of transmitting pins, a series of contact arms

individually controlled by said pins, a set of marking and a set of spacing contacts for said contact arms, means normally applying marking condition to the marking contacts and spacing condition to the spacing contacts and means for removing said normal condition and applying the opposite condition to one of said sets of contacts when all of the contact arms are on said latter set of contacts.

3. A tape transmitter comprising a series of transmitting pins adapted to move through perforations in a tape, movable contact means controlled by said pins, a marking and a spacing contact for said contact means, means normally applying marking and spacing conditions, respectively, to said marking and spacing contacts and means for removing said normal condition and applying a different condition to one of said contacts when all of said pins are in a predetermined position.

4. A tape transmitter comprising a series of transmitting pins adapted to move through perforations in a tape, movable contact means controlled by said pins, marking and spacing contacts for said contact means, means normally applying marking condition to said marking contact and means for removing said marking condition and applying a spacing condition to said marking contact, in response to a "rub out" signal occurring in the tape.

5. A telegraph transmitter comprising a signal storage element, a transmitting mechanism responsive thereto, said transmitting mechanism having potentials of opposite polarity applied thereto for selective transmission of negative and positive impulses and means responsive to a predetermined combination occurring in said signal storage element for reversing one of said polarities.

6. A telegraph transmitter comprising a code element, a transmitting mechanism responsive thereto, said transmitting mechanism having marking and spacing conditions applied thereto for selective transmission of marking and spacing impulses and means responsive to a predetermined code combination occurring in said code element for reversing one of said conditions.

7. A telegraph transmitter comprising a code element, a transmitting mechanism responsive thereto, said transmitting mechanism having marking and spacing contacts and means responsive to a "rub out" signal combination occurring in said code element for applying a spacing condition to said marking contact.

8. A telegraph transmitter comprising a signal storage element, a transmitting mechanism responsive thereto, said transmitting mechanism having marking and spacing contacts and means controlled by said storage element for determining the polarity applied to at least one of said contacts.

9. A tape transmitter comprising a series of pins adapted to move through perforations in a tape, a carrier for each pin, marking and spacing bus bars, an individual contact arm movable by said pin carriers between said bus bars, an auxiliary contact arm having marking and spacing contacts, said auxiliary contact arm being electrically connected to said marking bus bar and means controlled by the position of said pin carrier for holding said auxiliary contact arm on one or the other of its contacts.

10. A tape transmitter comprising a series of pins adapted to move through perforations in a tape, a carrier for each pin, marking and spacing bus bars, an individual contact arm movable by said pin carriers between said bus bars, an auxiliary contact arm having marking and spacing contacts, said auxiliary contact arm being electrically connected to one of said bus bars, means for normally holding said auxiliary contact arm on one of its contacts and means, controlled by the position of said pin carriers, for moving said auxiliary contact arm to its other contact.

11. A tape transmitter, comprising a series of pins adapted to move through perforations in a tape, a carrier for each pin, marking and spacing bus bars, an individual contact arm movable by said pin carriers between said bus bars, an auxiliary contact arm having marking and spacing contacts, said auxiliary arm being electrically connected to said marking bus bar, means normally holding said auxiliary contact arm on one of its contacts and a bail, operable when said pin carriers are in a predetermined position, for moving said auxiliary contact arm to its other contact.

12. A tape transmitter comprising a series of pins adapted to move through perforations in a tape, a carrier for each pin, marking and spacing bus bars, an individual contact arm movable by said pin carriers between said bus bars, an auxiliary contact arm having marking and spacing contacts, said auxiliary contact arm being electrically connected to said marking bus bar, means for normally holding said auxiliary contact arm on its marking contact and a bail operable, when said pin carriers are all positioned through perforations in the tape, for moving said auxiliary contact arm to its spacing contact.

13. A telegraph transmitter comprising a code element, means for transmitting code combinations occurring in said code element and means responsive to a predetermined code combination occurring therein for omitting the transmission of said combination.

In testimony whereof, we affix our signatures.

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