Jan. 19, 1932. S. W. ROTHERMEL 1,842,122

TELEGRAPH TAPE TRANSMITTER

Filed June 23, 1931

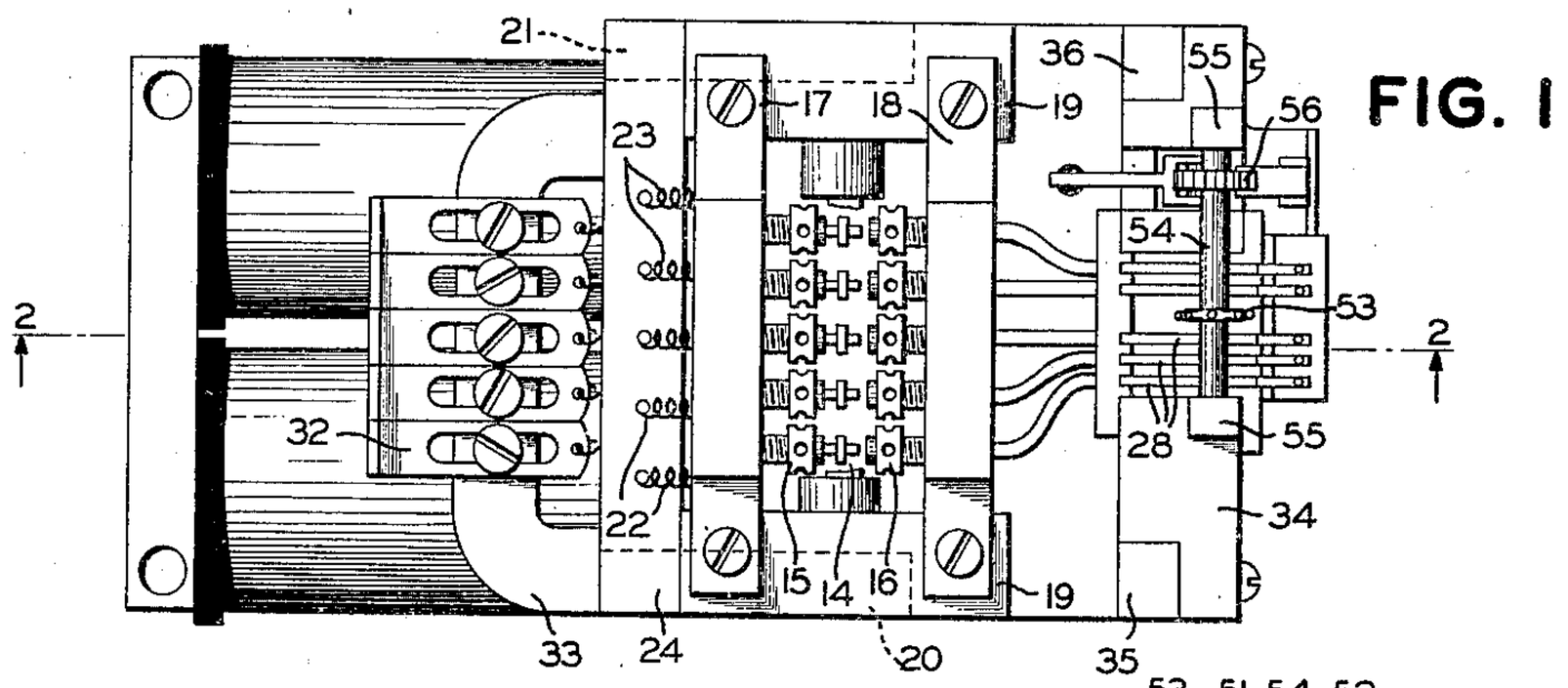


FIG. 1

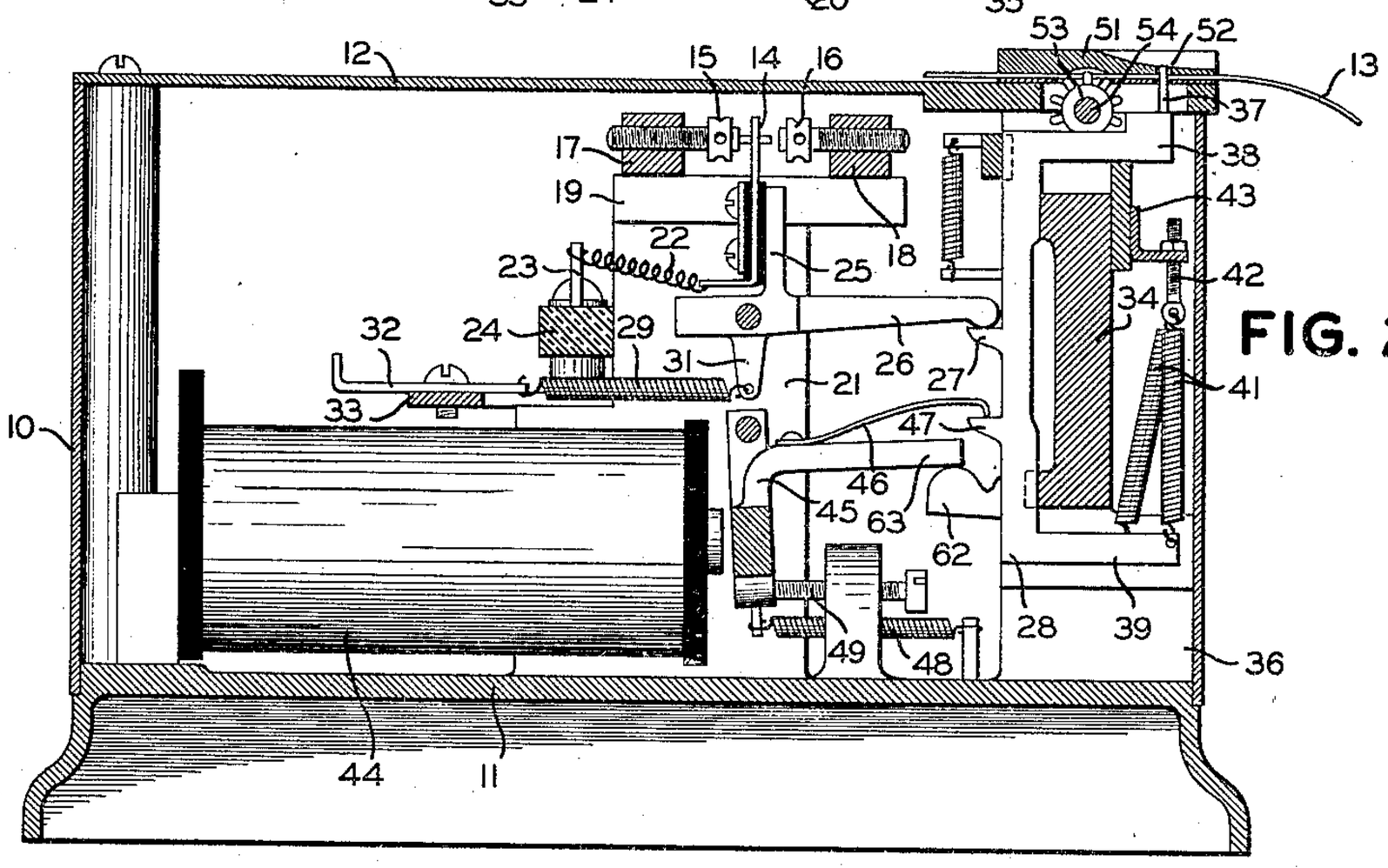
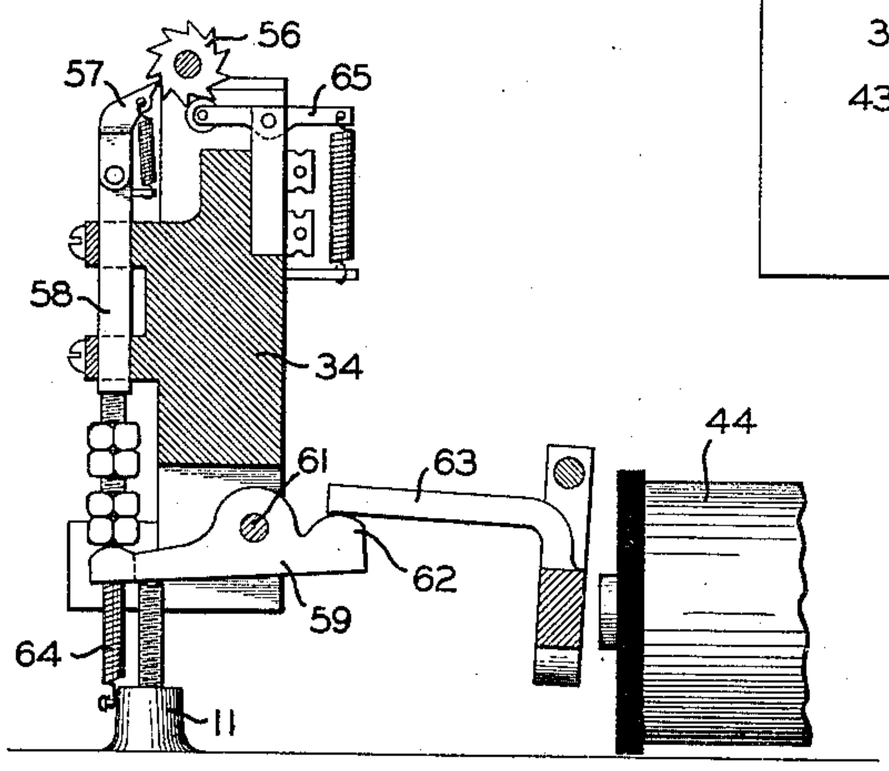


FIG. 2

FIG. 4



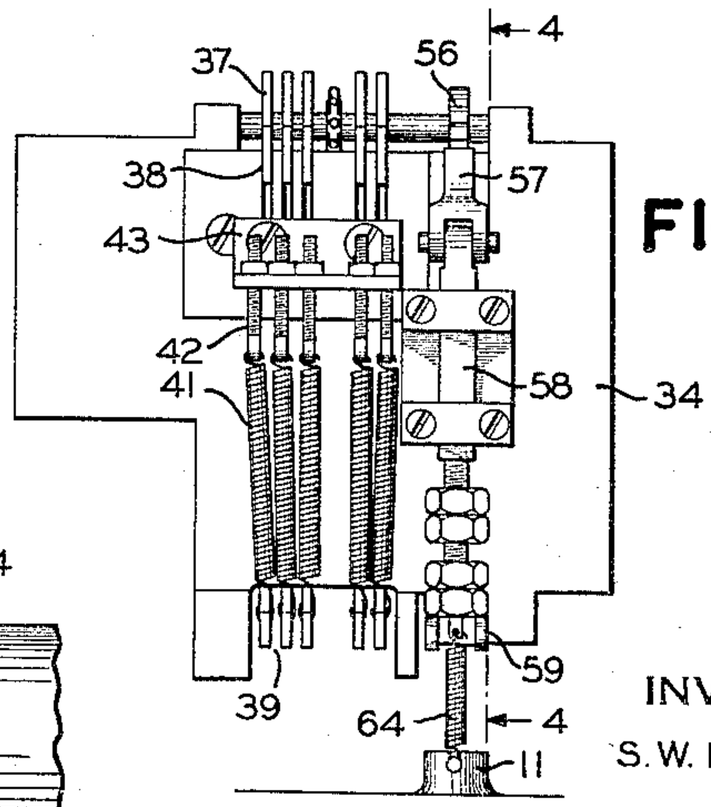


FIG. 3

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TELEGRAPH TAPE TRANSMITTER

Application filed June 23, 1931. Serial No. 546,346.

This invention relates to a transmitter for automatic telegraph systems wherein 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 transmitting pins being disposed vertically beneath the tape and being raised against or through the tape by individual springs and being withdrawn from the tape by an electro-magnet.

In tape transmitters of this type, as heretofore constructed, the spring pressure has been applied to the pin carriers either to one side of the path of movement thereof, in which case the carriers have a tendency to bind in their guides, or the pressure has been applied through pivoted levers bearing against the lower ends of the pin carriers. This latter arrangement increases the number of moving parts of the apparatus and complicates the construction.

One of the objects of the present invention is to produce a tape transmitter of the vertically reciprocating pin type in which the spring pressure for raising the pins against the tape is applied directly to the carriers and substantially in line with the pins.

Another object is to provide an arrangement of parts which will permit the pin actuating springs to have a relatively large number of convolutions whereby they are not critical to adjustment and to position the springs so that they are in a convenient location for adjustment.

Another object is to enable the transmitting pins to be disposed closely adjacent to the inlet side of the tape transmitter, whereby the tape will have to travel a minimum distance across the transmitter before reaching transmitting position. This last object is of importance from the standpoint of reducing the length of tape between the transmitting position and the tape perforator so as to decrease the lag in the transmission of signals to a small value.

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

In accordance with my invention I shape the pin carriers substantially in the form of a rectangle open at the forward side with the pins disposed at the forward end of the upper arm, the spring pressure being applied vertically at the forward end of the lower arm. The springs may extend along the line of the open side substantially in alignment with the pins and they may be of any desired length, sufficient to render their adjustment non-critical. The upper ends of the springs may be anchored to adjusting pins which are positioned so as to be readily available at the front of the transmitter, for varying the tension of the springs. The pin carriers are necessarily placed close together to correspond to the transverse spacing of the perforations of the tape and therefore in order that the springs associated with adjacent carriers will not interfere with each other they may be spaced more widely apart at their upper ends so as to diverge outwardly and may be staggered forward and aft along the lower arms of the carriers.

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

Figure 1 is a top view of my improved tape transmitter with the cover plate removed;

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

Figure 3 is a front elevation of the pin supporting block assembly; and

Figure 4 is a sectional view on the line 4—4 of Figure 3.

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 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 of contacts, each set being arranged to produce current reversals, but it is to be understood that

the number of contacts may be varied and the transmitter may be adapted for making and breaking the circuit instead of transmitting current reversals.

Each of the set of contacts comprises a contact tongue 14 and adjustable contact stops 15 and 16, each tongue being adapted to vibrate between the stops 15 and 16.

The several contacts 15 are mounted upon a supporting bridge 17 and the contacts 16 are mounted upon a supporting bridge 18, these bridges being carried upon insulating blocks 19 carried by spaced uprights 20 and 21 integral with the base 11. The bridge 17 may be connected to a source of current supply of one polarity and the bridge 18 to a source of current supply of the opposite polarity. The several contact tongues 14 have connected to them, conductors 22 extending to individual binding posts or soldering lugs 23, carried by an insulating strip 24, extending between the uprights 20 and 21. The terminals 23 may be connected to the segments of a rotary transmitter not shown as is well understood by those versed in the art.

Each of the contact tongues 14 is mounted upon a separate pivoted bell crank lever 25 having a forward extension 26 which engages the upper side of lugs 27 formed on the rectangular pin carriers 28. The levers 25 are normally urged in a clockwise direction by individual springs 29 extending between the downward extensions 31 of the levers and adjusting slides 32, carried by a U-shaped bracket 33 mounted upon the uprights 20 and 21.

The pin carriers 28, one of which is provided for each unit of the code, are arranged to slide in guides formed in a block 34, mounted upon uprights 35 and 36 integral with the base. As stated, the pin carriers or slides 28 are substantially rectangular in shape the forward side being removed and each carrier having a pin 37 extending upwardly from the forward end of the upper arm 38, the pins being adapted to pass through perforations in the tape 13. The lower arm 39 of each of the carriers also projects forwardly and has secured thereto, one end of a spiral spring 41 which extends upwardly in substantial alignment with the pin 37 and is anchored at its upper end to an adjusting pin 42, carried by a bracket 43 from the block 34. A separate adjusting pin is provided for each spring.

It will be noted that the upper ends of the springs 41 are spaced more widely apart than are the lower ends (Figure 3), whereby the springs diverge upwardly and the lower ends are staggered so that the adjacent springs are disposed in different planes whereby one spring does not interfere with the springs to either side thereof.

The springs 41 tend to raise the pins 37 against or through the tape and in so doing to rock the levers 25 against the pressure of springs 29, to position the contact tongues 14 on their left hand or marking contacts.

The pins are moved downwardly away from the tape against the action of springs 41 by an electro-magnet 44, having a pivoted bell crank armature 45, provided with a bail 46 which engages with lugs 47, one of which is formed on each of the pin carriers 28. It will be apparent that when the magnet 44 is energized to attract its armature, all of the pins 37 which are then in elevated position will be depressed. A retractile spring 48 is provided for the armature 45 to move the same against the adjustable stop 49 when the magnet is deenergized, thus assisting the springs 41 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 plate 51 above the tape. The plate 51 has a transverse slot 52, through which the pins pass in their upward position. The guide plate limits the rise of the tape under the action of the pins which do not happen to be in line with perforations of the tape.

A star wheel 53, having a peripheral row of teeth, serve to feed the tape forward, the teeth entering a center row of perforations of the tape, as is well known in the art. The star wheel 53 is mounted upon a shaft 54 journaled in bearings 55 carried by the block 34. Also mounted upon the shaft 54 is a ratchet wheel 56 arranged to be advanced step-by-step by a spring actuated pawl 57 mounted upon a sliding rod 58. The lower end of the rod 58 is engaged by a lever 59 pivoted at 61 and having its inner end 62 engaged by the forward extension 63 of the armature 45 of the operating magnet. The pawl carrying rod 58 is pulled downwardly by a spiral spring 64 anchored to the base 11 and is raised upwardly once for each stroke of the magnet 44 to advance the feed wheel one step. A spring pressed jockey 65 prevents reverse movement of the ratchet wheel when the pawl 57 descends and accurately positions the tape with the perforations directly in line with the transmitting pins.

It will be noted that the pins are arranged in advance of the star wheel rather than to the rear thereof as in the case of present types of tape transmitters. Due to their position at the forward end of the transmitter they engage the tape as soon as it reaches the transmitter, thus effecting an appreciable reduction in the number of characters stored in the tape between the tape perforator and the transmitter, thus materially reducing lag in transmission.

The operation of the transmitter is as follows. Assuming the magnet 44 to be energized so as to attract its armature the bail 46 engages the lugs 47 to lower each of the pins

away from the tape and as soon as the pins have cleared the tape the lever 59 is rocked upwardly to actuate the feed ratchet 56 and advance the tape through the space of one tooth. At the same time the lugs 27 move downwardly permitting the contacts 14 to move to their right hand or spacing side. As soon as the magnet 46 is deenergized such of the pins 37 as are disposed beneath perforations in the tape will rise under the action of the springs 41, thus moving their corresponding contact tongues 14 against their left hand or marking contacts. At the same time the pawl 57 will descend into engagement with the next tooth of the ratchet wheel 56. 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 will be noted that a construction has been produced in which the spring pressure is applied substantially in line with the pins, this being permitted by the rectangular form of the pin carriers which in turn enables the pins to be disposed adjacent the forward edge of the transmitter. The springs themselves are also conveniently arranged at the forward side of the transmitter where they may readily be adjusted and due to the staggering, relatively large springs containing a considerable number of convolutions may be employed. The springs are attached directly to the pin carriers thereby eliminating intermediate levers and simplifying the construction of the transmitter. There is no tendency on the part of the pin carriers or slides to bind in their guides and they may therefore be operated rapidly and accurately.

It is obvious, of course, that the invention may be embodied in other forms and that various changes and modifications will occur in the construction of the transmitter within the scope of the invention. Therefore, I do not desire to be limited to the exact details shown and described herein.

What I claim is:

1. A tape transmitter comprising a series of pins adapted to move rectilinearly through perforations in a tape, a carrier for each pin having offset arms, the pin being disposed on one of said arms, an individual spring connected to another of said arms substantially in alignment with said pin, and means for withdrawing the pins from engagement with the tape against the tension of said springs.

2. A tape transmitter comprising a series of pins adapted to move rectilinearly through perforations in a tape, a carrier for each pin having forwardly extending arms, the pin being disposed on one of said arms, an individual spring connected to another of said arms substantially in alignment with said pin, and means disposed to the rear of said carriers for withdrawing the pins from engagement with the tape against the effort of said springs.

3. A tape transmitter comprising a series of pins adapted to move rectilinearly through perforations in a tape, a carrier for each pin having upper and lower arms, the pin being disposed on the upper one of said arms, an individual spring connected to the lower one of said arms and extending towards the pin substantially in alignment therewith, the adjacent springs being disposed in different planes, and means for withdrawing the pins from engagement with the tape against the effort of said springs.

4. A tape transmitter comprising a series of pins adapted to move rectilinearly through perforations in the tape, a carrier for each pin having offset arms, the pin being disposed on one of said arms, an individual spring having one end connected to another of said arms substantially in alignment with the pin, the opposite ends of said springs being spaced more widely apart away from said arms and having tension adjusting means associated therewith.

5. A tape transmitter comprising a series of pins adapted to move rectilinearly through perforations in the tap, a carrier for each pin having upper and lower forwardly extending arms, the pin being disposed on the upper one of said arms, an individual spring connected to the lower one of said arms and extending towards said pin substantially in alignment therewith, tension adjusting means associated with said spring, and means disposed to the rear of said carriers for withdrawing the pins from engagement with the tape.

6. A tape transmitter comprising an intermittently operated tape feeding device adapted to engage a tape to feed the same, a series of transmitting pins arranged transversely with respect to the direction of feed of the tape and adapted to move rectilinearly through perforations in the tape, a carrier for each pin, said carrier having a part disposed forwardly of the tape feeding device upon which its pin is supported, a guide in which each carrier is slidingly mounted, a spring attached to the carrier and acting in substantial alignment with the pin to move the carrier towards the tape and restoring means for withdrawing the pins from engagement with the tape.

7. A tape transmitter comprising an intermittently operated tape feeding device adapted to engage a tape to feed the same, a series of transmitting pins arranged transversely with respect to the direction of feed of the tape and adapted to move rectilinearly through perforations in the tape, a carrier having a part disposed forwardly of the tape feeding device upon which said pins are supported, a guide in which each carrier is

slidingly mounted, means tending to move the carrier towards the tape, restoring means for moving the carriers away from the tape, and contact operating means for each of said carriers disposed to the rear thereof.

8. A tape transmitter comprising an intermittently operated tape feeding device adapted to engage a tape to feed the same, a series of transmitting pins arranged transversely with respect to the direction of feed of the tape and adapted to move rectilinearly through perforations in the tape, a carrier for each pin, said carrier having a part disposed adjacent the forward edge of the transmitting mechanism upon which said pins are supported, a guide in which each carrier is slidingly mounted, means tending to move the carrier towards the tape and restoring means for withdrawing the pins from engagement with the tape.

9. A tape transmitter comprising an intermittently operated tape feeding device adapted to engage a tape to feed the same, a series of transmitting pins arranged transversely with respect to the direction of feed of the tape and adapted to move rectilinearly through perforations in the tape, a carrier for each pin, said carrier having a part disposed adjacent the forward edge of the transmitting mechanism forwardly of the tape feeding device and upon which said pins are supported, a spring attached to the carrier and acting in substantial alignment with the pin to move the same towards the tape, and restoring means for withdrawing the pins from engagement with the tape.

10. A tape transmitter comprising an intermittently operated tape feed wheel adapted to engage a tape to feed the same horizontally across the transmitter, a series of transmitting pins arranged transversely with respect to the direction of travel of the tape and adapted to move vertically through perforations in the tape, a carrier for each pin, said carrier having a part extending forwardly of the tape feed wheel upon which the pin is supported, a guide disposed to the rear of the tape feed wheel in which each carrier is slidingly mounted, means tending to move the carrier towards the tape, and restoring means for withdrawing the pins from engagement with the tape.

11. A tape transmitter comprising a tape feeding device adapted to advance a tape horizontally across the transmitter, a series of transmitting pins arranged transversely to the direction of feed of the tape and adapted to move vertically through perforations in the tape, said pins being disposed adjacent the forward edge of the transmitting mechanism, a spring acting in substantial alignment with the pins to move the same towards the tape, and restoring means for withdrawing the pins from engagement with the tape.

12. A tape transmitter comprising a tape feeding device, a tape engaging means, sliding carriers for said tape engaging means, contact mechanism controlled by said carriers, said tape engaging means being disposed adjacent the forward side of the transmitter and the tape feeding device, and contact mechanism being disposed to the rear of said tape engaging means.

13. A tape transmitter comprising an intermittently operated tape feeding device adapted to engage a tape to feed the same, a series of transmitting pins arranged transversely with respect to the direction of feed of the tape and adapted to move rectilinearly through perforations in the tape, a carrier for each pin, said carrier having a part extending forwardly of the tape feeding device upon which its pin is supported, and a guide disposed to the rear of the pin in which each carrier is slidingly mounted.

14. A tape transmitter comprising an intermittently operated tape feeding device adapted to engage a tape to feed the same, a series of transmitting pins arranged transversely with respect to the direction of feed of the tape and adapted to move rectilinearly through perforations in the tape, a carrier having an off-set arm extending forwardly of the tape feeding device upon which said pins are supported, a guide disposed to the rear of the pin in which each carrier is slidingly mounted, means tending to move the carrier towards the tape, restoring means for moving the carriers away from the tape and contact operating means for each of said carriers disposed to the rear thereof.

In testimony whereof, I affix my signature.

SAMUEL W. ROTHERMEL.