Nov. 3, 1931. R. HOOVER ET AL 1,830,700

TAPE PERFORATOR AND TRANSMITTER

Filed July 24, 1930 4 Sheets-Sheet 1

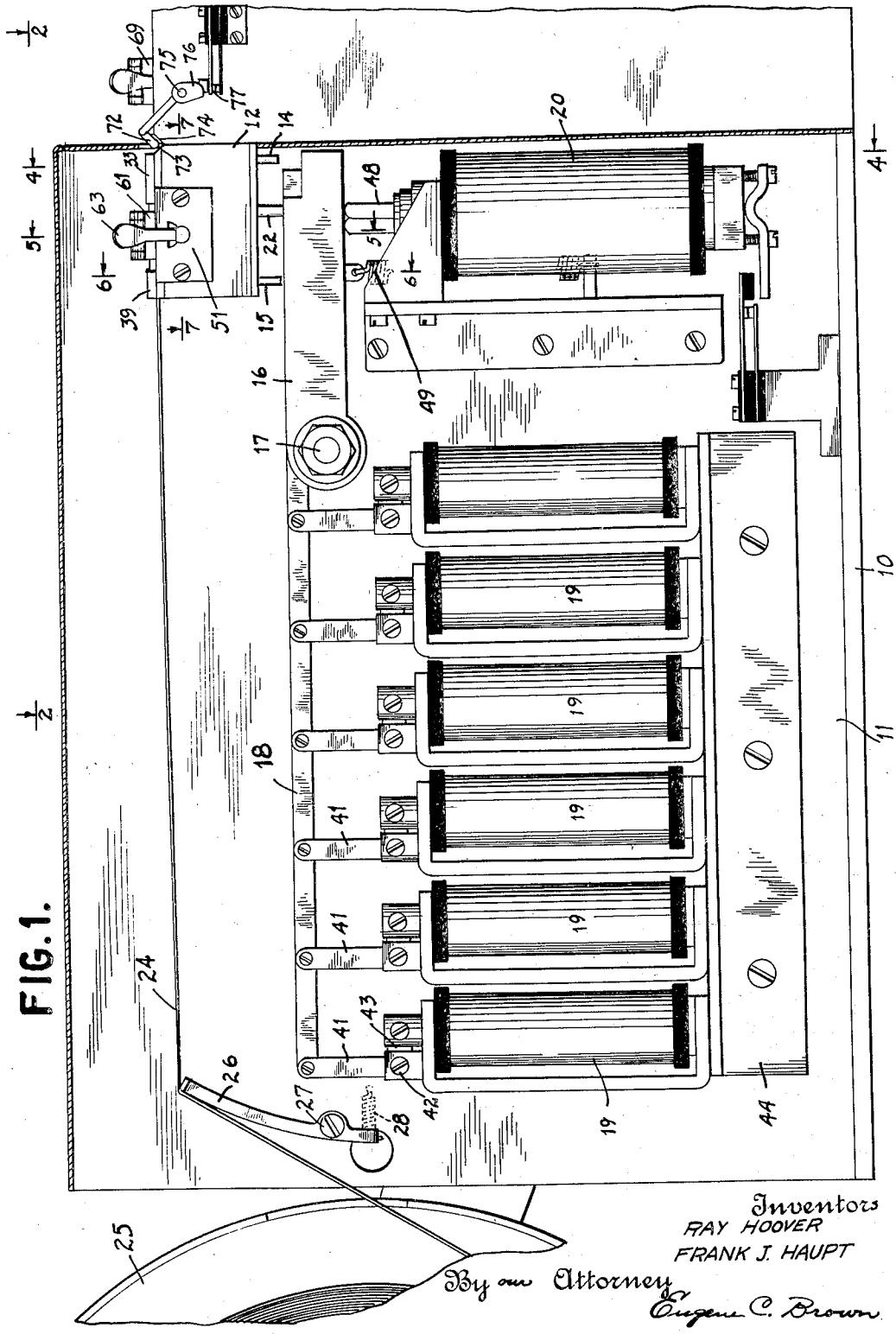


FIG. 1.

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TAPE PERFORATOR AND TRANSMITTER

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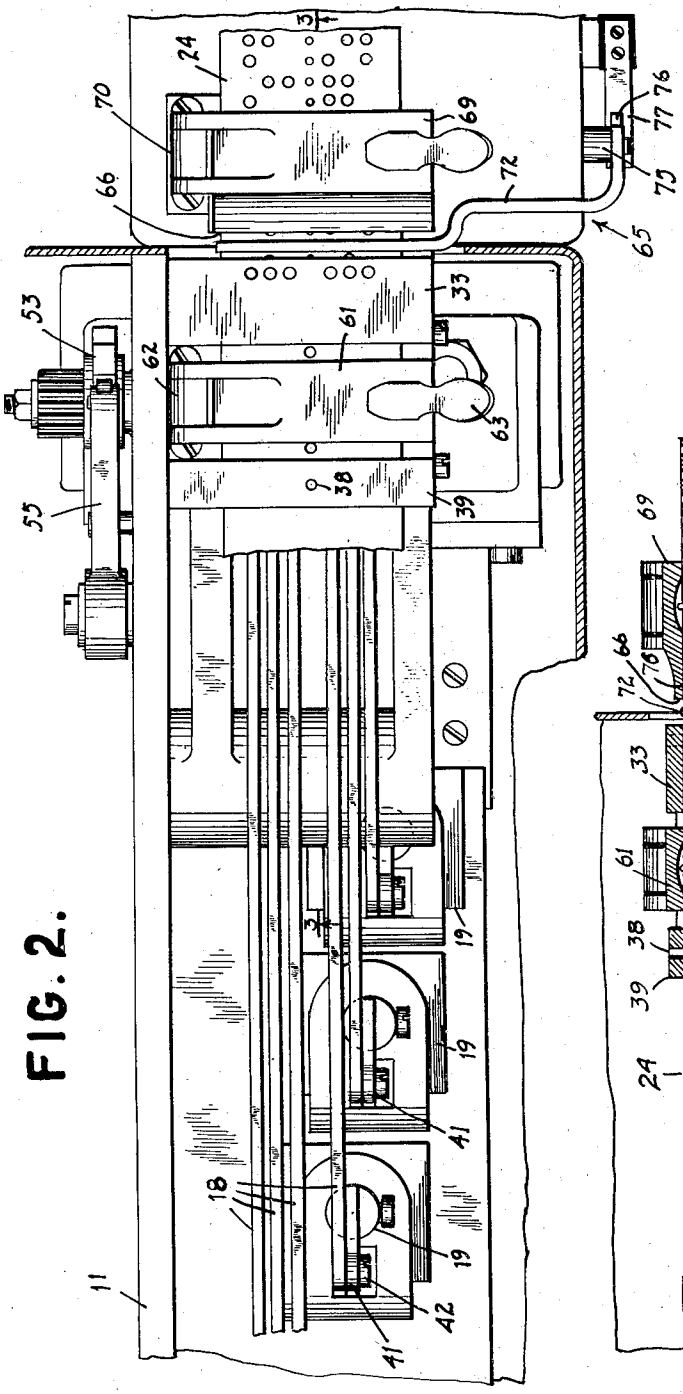


FIG. 2.

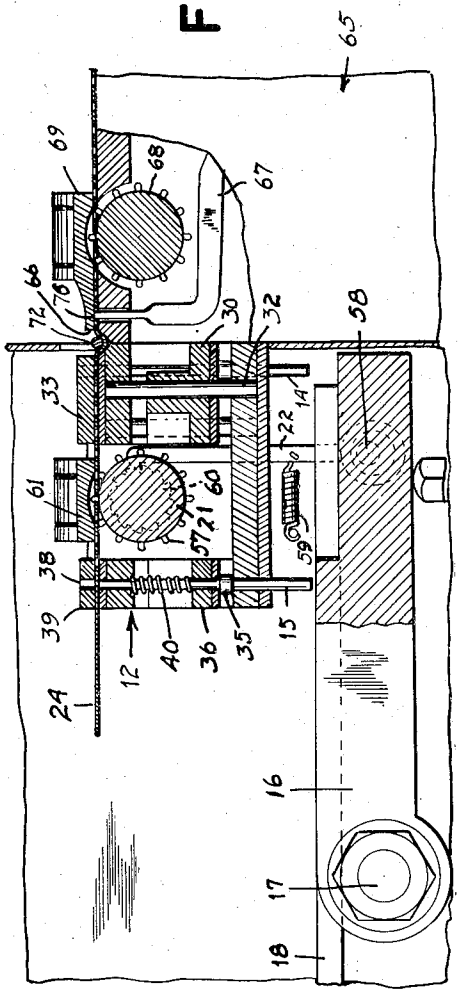


FIG. 3.

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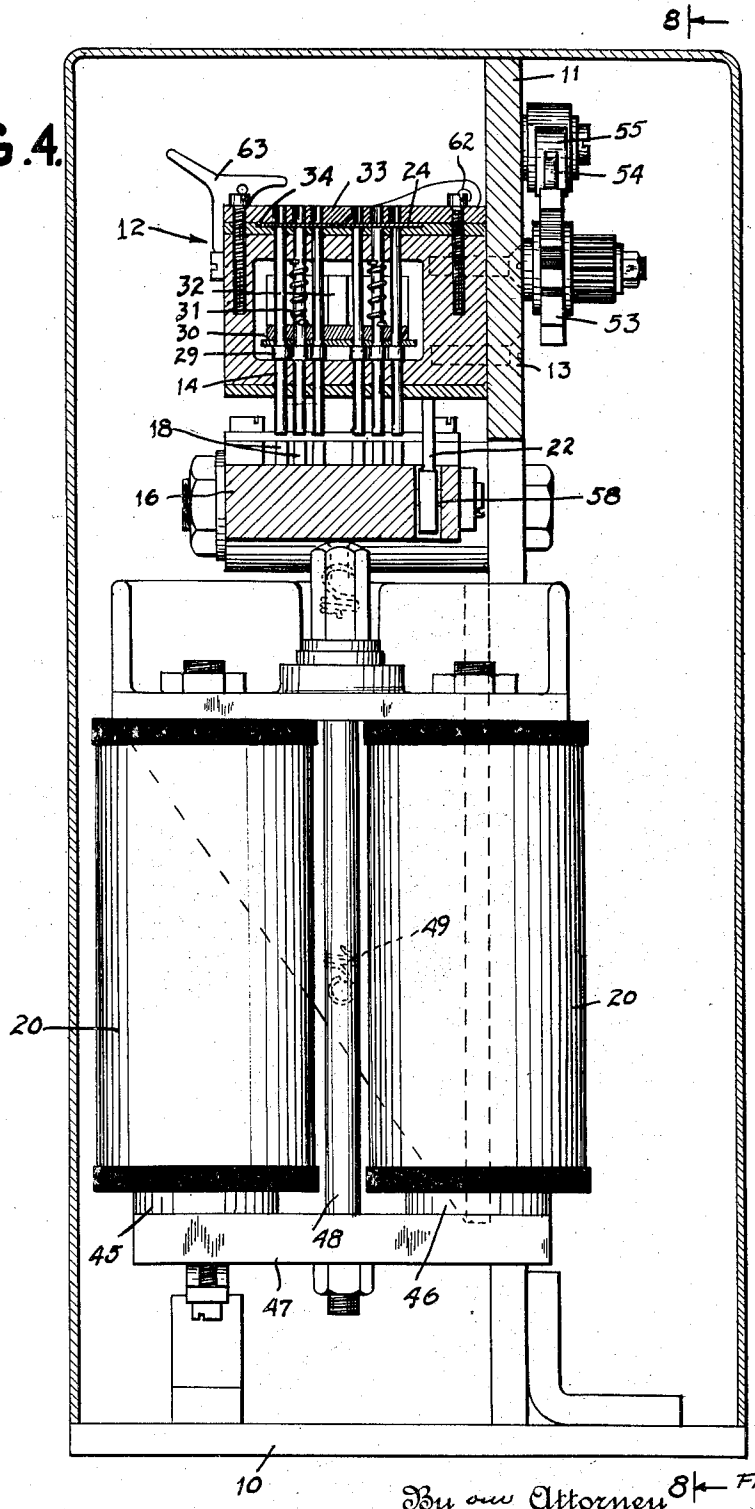
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TAPE PERFORATOR AND TRANSMITTER

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FIG. 4.



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TAPE PERFORATOR AND TRANSMITTER

Filed July 24, 1930 4 Sheets-Sheet 4

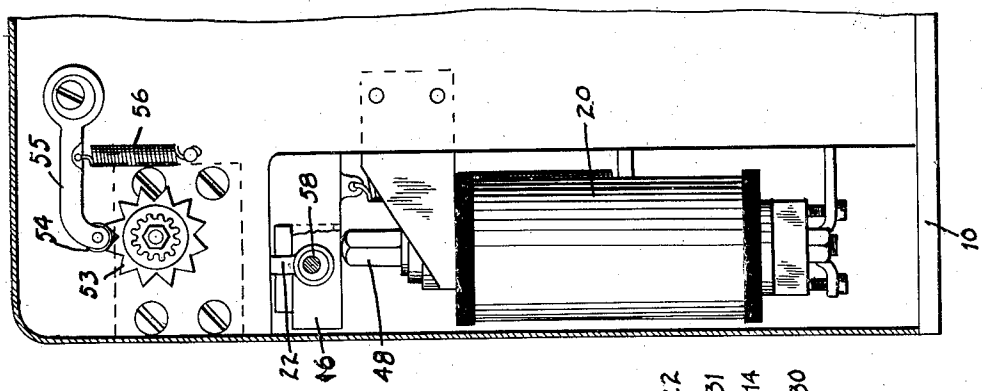


FIG. 8.

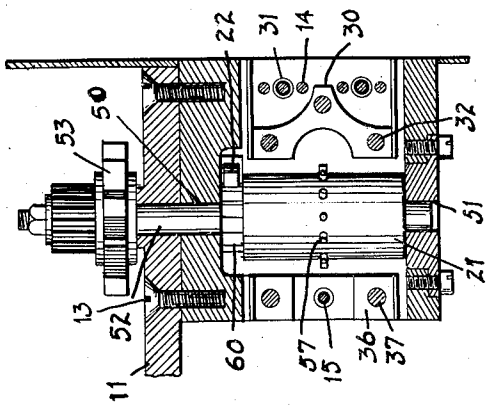


FIG. 7.

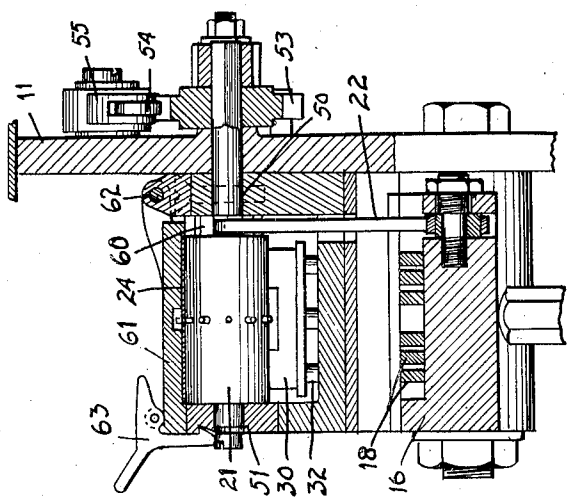


FIG. 5

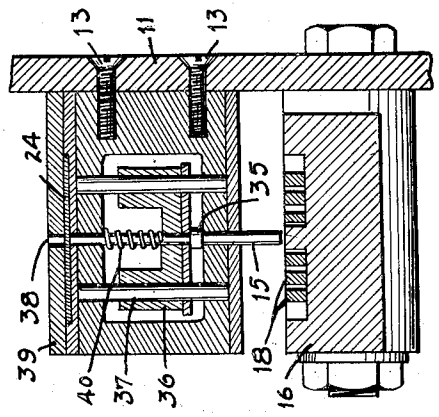


FIG. 6.

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UNITED STATES PATENT OFFICE

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TAPE PERFORATOR AND TRANSMITTER

Application filed July 24, 1930. Serial No. 470,495.

This invention relates to a tape perforator for a telegraph transmitter and more particularly to the construction of the punch block, the arrangement of the elements of the perforator and the combination thereof with a tape transmitter.

The invention is especially concerned with a perforator adapted and arranged for perforating tape for automatic printing telegraph systems employing a code of the Baudot type in which each character comprises a definite number of impulses, usually five or six, the message holes for each character being punched in a single row transversely of the tape, although it is to be understood that the invention is not limited thereto, but may be employed with a Morse or other type of code.

In tape perforators, as heretofore constructed, the code punch pins and the feed hole punch pins have been arranged in a single transverse row and the feed wheel has necessarily been placed following the punching position, that is between the punch pins and the tape transmitter so as to draw the tape through the punch block. This causes an appreciable length of the perforated tape to intervene between the punch pins of the perforator and the transmitter, resulting in a corresponding lag in the transmission of the signals.

One of the objects of this invention is to reduce to a minimum this time lag between the perforating of the tape and the transmission of the corresponding signals.

Another object is to provide a tape perforator of such construction that the inlet of the associated tape transmitter may be placed closely adjacent the punching position of the perforator.

Another object is to reduce the amount of tape intervening between the point of perforating and the point of transmitting.

Other objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings and appended claims.

In accordance with our invention we position the code punches adjacent the outer edge of the punch block and locate the feed hole punch forward thereof with the feed wheel intermediate the feed hole punch and the code punches so as to push the tape past the code perforating position, the punch block being disposed relative to the remaining mechanism of the perforator so that a tape transmitter may abut against the punch block with the tape inlet of the transmitter close to the punching position of the perforator whereby only a short length of perforated tape, corresponding to a few characters will intervene between the perforator and the tape transmitter.

The invention further resides in the special construction and arrangement of the parts of the perforator and transmitter as will appear more fully from the accompanying drawings in which:

Figure 1 is a side elevation of a reperforator for producing a perforated tape in response to line signals;

Figure 2 is a plan view of the reperforator, associated with a tape transmitter;

Figure 3 is a vertical sectional view of a portion of the reperforator and associated tape transmitter on the line 3—3 of Figure 2;

Figure 4 is an end elevation, partly in section, of the reperforator on the line 4—4 of Figure 1;

Figure 5 is a sectional view of the punch block and hammer on the line 5—5 of Figure 1;

Figure 6 is a section view of the punch block and hammer on the line 6—6 of Figure 1, showing the arrangement of the feed hole punch;

Figure 7 is a horizontal section of the punch block on the line 7—7 of Figure 1; and

Figure 8 is a side elevation of one end of

the perforator, viewed from the opposite side from Figure 1, on the line 8—8 of Figure 4.

We have illustrated the invention as applied to a reperforator which responds to line signals received over a multiplex channel for producing a perforated tape for use in transmission over another multiplex circuit, but it is to be understood that the invention is not so limited. It is equally applicable to start-stop simplex reperforators, key-board perforators and the like.

The supporting structure for the reperforator comprises a base plate 10 and a vertical partition plate 11 carried thereby. The reperforating mechanism is supported from one side of the partition plate and consists in general of a punch block 12 mounted upon the plate by screws 13 and having a group of six code punch pins 14 and a feed hole punch pin 15, a punch hammer 16 pivoted at 17 for operating the punch pins, a group of interponent bars 18 adapted to be shifted beneath the code punch pins to determine the selection thereof, selecting solenoids 19 for actuating the interponent bars, punch solenoids 20 for operating the punch hammer 16 and a tape feed roller 21 (Figure 3) disposed between the pins 14 and 15 and actuated on movement of the punch hammer, through a pawl 22. The tape 24 extends from a suitable reel 25 over a tensioning lever 26, pivoted at 27 and provided with a tensioning spring 28, and thence across the top of the punch block 12.

The particular punch block illustrated is provided with punches of such number and arrangement as to adapt the perforator for use in perforating tape for automatic telegraph systems employing a code wherein each character comprises six impulses, although obviously the number of punches and the number of units of the code may be varied. In the form shown it comprises the six code punches 14 and the feed hole punch 15, this latter punch being of smaller diameter than the remaining punches and being disposed at the forward end of the punch block 12, the code punches being disposed adjacent the opposite edge of the punch block.

Each of the code punches has an annular collar 29 normally resting on the lower wall of the punch block, the punches extending downwardly through the lower wall and upwardly through openings in a retracting block 30 and through openings in the top of the punch block. The punches are normally retained in a lowered position by spiral springs 31 surrounding certain of the punch pins and acting upon the retracting block which is guided on fixed vertical posts 32. A die plate 33 is provided with openings in alignment with the punch pins. The top of the punch block is grooved at 34 for the passage of the tape between the die plate and the top of the punch pins.

The feed hole pin 15 is also provided with a collar 35 resting on the bottom wall of the punch block, the pin extending upwardly through an opening in a retracting block 36 which is guided on fixed posts 37 (Fig. 6) extending between the upper and lower walls of the block. The pin 15 extends through the top wall of the punch block in alignment with an opening 38 in the die plate 39 and is surrounded by compression spring 40 which normally maintains it in its lower position.

Since the feed holes have to be punched for every character and also for blank portions of the tape, the punch 15 is made longer than the code punches 14 so that it will always be actuated by the hammer 16. The code punches 14 are shorter than the punch 15 so that the hammer cannot force them through the tape unless the ends of the corresponding interponent members 18 are interposed beneath the punch pins.

The six interponent members are pivoted at the ends opposite the punch pins 14, to bell crank levers 41, pivoted in turn at 42 to the tops of the selecting solenoids 19 and having horizontal portions 43 adapted to be attracted by the selecting solenoids, to shift the interponent bars beneath the code punch pins. The selecting solenoids are mounted upon a shelf 44 carried by the partition plate 11. The plungers 45 and 46 of the punch solenoids 20 are secured to a cross bar 47 having a vertical push rod 48 resting against the lower side of the hammer 16, to elevate the same against the tension of a spiral spring 49, to raise the interponent bars, which have been shifted, against the message punch pins to force the same upwardly through the tape. The hammer 16 directly engages the feed hole punch 15 to punch the feed holes.

The feed roller 21 is journaled in the side walls of the punch block in bearings 50 and 51 and its reduced shaft 52 extends through the partition plate 11 and is provided on the opposite side thereof with a ratchet wheel 53 adapted to be engaged by jockey roller 54 carried by a pivoted lever 55 and held in engagement with the ratchet wheel by a spring 56. The feed roller is provided with a circumferential row of radial pins 57 which engage the central feed opening of the tape to push the tape across the code punch pins. The pawl 22, pivoted to the punch hammer at 58, is held by a spring 59 in engagement with ratchet teeth 60 formed in the feed roller 21. The pawl 15 is positioned in one of the ratchet teeth upon the upward movement of the hammer and serves to rotate the feed wheel one space on the return movement of the hammer.

The tape is held in engagemnt with the feed roller 21, intermediate the die plates 33

and 39 by a plate 61 hinged at 62 and provided at its opposite edge with a thumb latch 63.

It will be noted that the code pins 14 are disposed close to the edge of the punch block, and that the punch block is disposed with its outlet side at the extreme right-hand side of the perforating mechanism, as shown in Figure 1, thus permitting the tape transmitter, indicated generally as 65, to abut directly against the edge of the punch block with the tape inlet 66 of the transmitter close to the code hole perforating position, so that only a few characters intervene in the tape between the perforating position and the inlet of the tape transmitter. The transmitting or contact control pins 67 of the tape transmitter may also be disposed adjacent the abutting side of the transmitter so that the tape will travel only a short distance in the transmitter before coming into transmitting position. The tape is drawn through the tape transmitter by a feed wheel 68, against which the tape is held by a plate 69 hinged at 70. The operating mechanism of the tape transmitter may be of the construction shown in patent to G. R. Benjamin, No. 1,298,440, granted March 25, 1919.

In order to enable the operation of the transmitter to be interrupted when the perforator lags behind the transmitter, an autocontrol mechanism may be provided. As shown, this mechanism comprises a rod 72 extending over the tape in a V-groove formed by beveling the abutting ends 73 and 74 of the punch block and the tape transmitter. The rod 72 is pivoted at 75 and has a cam 76 adapted when the rod is lifted by tightening of the tape, to permit contacts 77 to open, to interrupt the operating circuit (not shown) of the tape transmitter.

It is obvious, of course, that numerous changes and modifications may be made in the construction and arrangement of the parts and other means may be provided for accomplishing the same objects, and, therefore, we do not desire to be limited to the exact details shown and described except in accordance with the appended claims.

What we claim is:

1. A tape perforator comprising a punch block, a group of code punch pins disposed adjacent the outer edge of the punch block, a feed hole punch pin spaced from said message punch pins longitudinally of the tape, and means intermediate said feed hole and code punch pins for feeding the tape through the punch block, said punch block being disposed relative to the remaining perforator mechanism so as to enable the outer edge of the punch block to be brought substantially into contact with the tape inlet of a transmitting mechanism.

2. A tape perforator comprising a punch block, a group of code punch pins disposed adjacent the outer edge of the block, a feed hole punch pin spaced from said code punch pins longitudinally of the tape, a punch hammer, a selecting mechanism for said code punch pins, means for operating said hammer to simultaneously actuate said feed hole and selected code punch pins, said punch block being disposed relative to the selecting mechanism and hammer so as to enable the outer edge of the punch block to be brought substantially into contact with the tape inlet of a transmitting mechanism.

3. The combination with a tape perforator having a punch block provided with a tape outlet at the outer edge thereof and punch pins in said block adjacent said outer edge, of a transmitter having a tape inlet in alignment with the tape outlet of said perforator punch block, said tape outlet and inlet being disposed adjacent to each other and arranged to feed a tape from one to the other along a substantially direct line.

4. The combination with a tape perforator having a punch block provided with a tape outlet at the outer edge thereof and punch pins in said block adjacent said outer edge, of a transmitter having a tape inlet in alignment with the tape outlet of said punch block, contact control pins disposed adjacent the inlet of said transmitter, said outlet and said inlet being disposed adjacent to each other and arranged to feed a tape from one to the other along a substantially direct line, and circuit control means cooperating with the tape intermediate the punch pins and said contact control pins.

5. The combination with a tape perforator having a horizontally disposed punch block provided with a tape outlet at the outer edge thereof, punch pins in said block adjacent said outer edge, and feed mechanism disposed to push the tape across said punch pins, of a transmitter having a tape inlet in substantially horizontal alignment with the tape outlet of said punch block, said tape outlet and inlet being disposed adjacent to each other, tape feed means for the transmitter disposed to pull the tape along a substantially horizontal line from the punch pins of the perforator and across the contact pins of the transmitter.

6. The combination with a tape perforator having a horizontally disposed punch block embodying a groove for the tape terminating at the outer edge of the block, punch pins in said block adjacent said outer edge, and means for selectively operating said pins, of a tape transmitter having a contact control pin block embodying a groove for the tape, said punch block and said contact control pin block being disposed in substantially abutting relation with their respective tape grooves in substantially horizontal alignment, contact control pins for the tape transmitter in said control pin block, the grooves

in said blocks providing a substantially continuous support for the tape as it travels between the punch pins and the contact control pins, a recess in said support intermediate said punch pins and contact control pins to permit a loop to form in the portion of the tape disposed over the recess, and means for controlling the operation of said tape transmitter by variations in said loop.

In testimony whereof we affix our signatures.

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FRANK J. HAUPT.