March 10, 1942. C. R. DOTY 2,275,615

TAPE TRANSMITTER

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FIG. 1a.

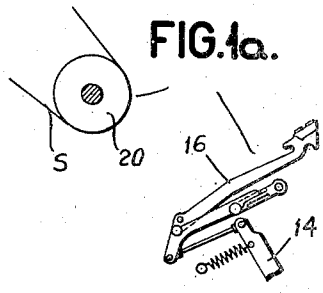

FIG. 1.

FIG. 4.

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FIG. 2.

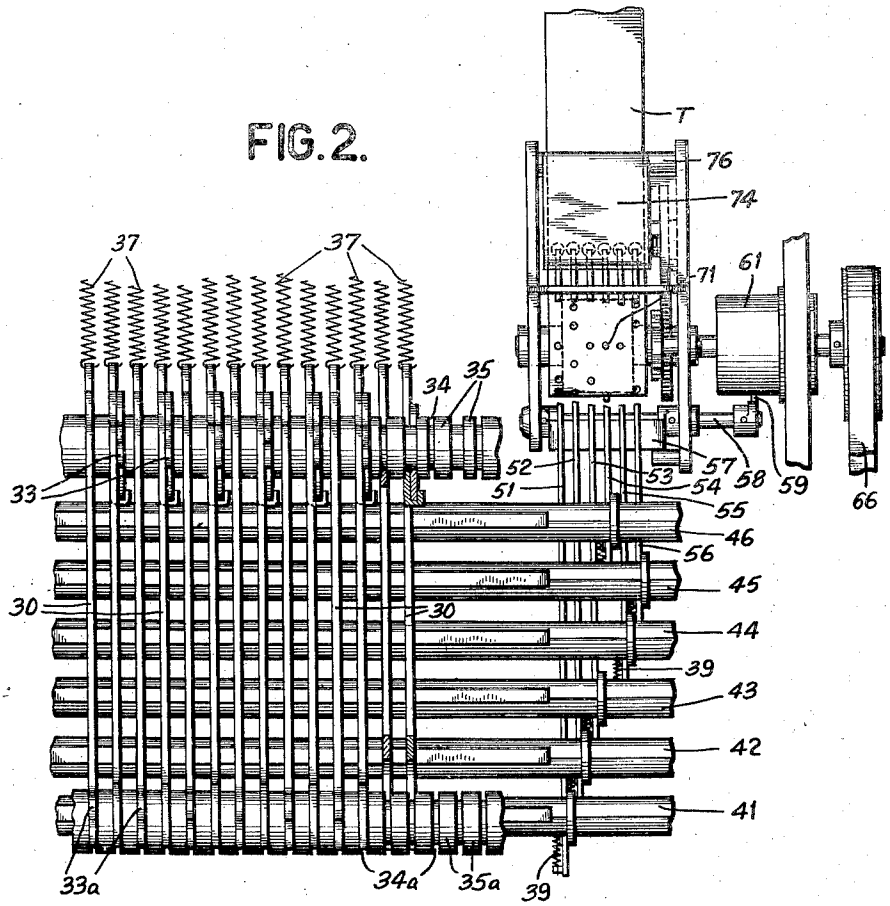
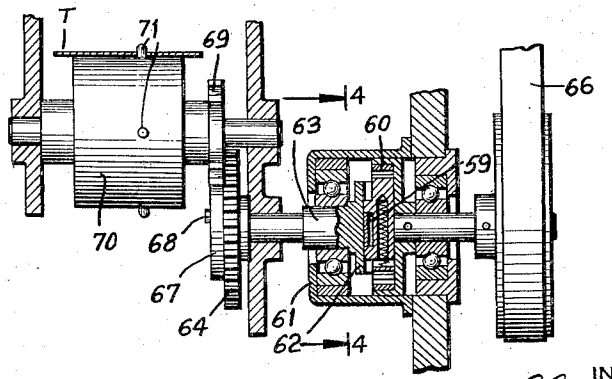


FIG. 3.



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TAPE TRANSMITTER

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3 Claims. (Cl. 164—112)

This invention relates to tape transmitters and, more particularly, to high speed tape perforating attachments for power driven typewriters and the like.

It is the general object of the instant invention to provide an improved high speed tape perforating apparatus which may be operated from the keyboard of an ordinary power operated typewriter.

More specifically, it is the object of the invention to utilize the power available in the movement of certain of the elements of a power driven typewriter to operate a combinational tape perforating and spacing unit at high speed.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a sectional view of the entire apparatus showing the typing and punching mechanism and the interconnecting parts.

Fig. 1*a* shows the upper portion of a type bar with its associated platen and record strip therebetween.

Fig. 2 is a sectional view taken at 2—2 of Fig. 1.

Fig. 3 is a detail view in section of the drive mechanism for spacing and perforating the tape taken along the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken at 4—4 of Fig. 3 showing the drive clutch in detail.

The apparatus comprises broadly a typewriter and a punch and interconnecting members for causing the operation of the punch elements under the control of the typewriter keyboard to perforate a tape for various purposes such, for example, as in the operation of a transmitter. Provision is made for intermittently spacing the tape, i. e. between punching operations. The typewriter may be of any convenient type but, for purposes of illustration, a power driven typewriter known as the Electromatic, the principles of which are disclosed and described in detail in United States Patent No. 1,777,055, forms the operating means in the invention herein disclosed. In view of the detail description in the aforementioned patent, a brief explanation of the main elements of structure and principle of operation of the typewriter will suffice to bring out a preferred embodiment of the instant invention and reference may be made to the above cited patent for further details.

Referring now to Fig. 1, any suitable means may be provided to rotate power roller 10, in the direction indicated by the arrow, which is adapted to cooperate with two rows of cam units arranged in the front and rear of the roller. Cam 11 is arranged to be pivoted on one arm of a bell crank lever 12 which is, in turn, pivoted in the frame of the typewriter as indicated generally by reference character 13, the other arm of said bell crank lever being operatively connected with an arm of bell crank lever 14 by means of link 15. Another arm of the said lever 14 is connected to the type bars 16 in a well known manner, so as to effect operation of the type bars or any other suitable means connected to the bell crank levers upon selective operation of the controlling key bars 17. The operation of the type bars effects printing on a record sheet S placed between bars 16 and a platen 20.

The pivoted bell crank lever 12 is operated by the associated cam 11 whenever the latter engages the driven rollers; the engagement of the cam with the roller is controlled by means of the associated control key bar 17 in a manner which will now be briefly described.

The cams occupy normally the positions shown in Fig. 1. In this position the impeller-arm 18 is urged, by the associated coil spring 19, against one of the impeller-lugs 29, which at the time is in the lower position, and tends to turn the cam 11 in a clockwise direction. This is prevented, however, by the engagement of one of the detents 21 on the cam, with the upper stop lug 22 on the stop lever 23. If, however, the corresponding key bar is operated, the bifurcated lower end of extension arm 24 associated with one of the said key bars 17 engages an arm 25 at the upper end of the stop lever 23 which is provided with an offset projection at its end which extends laterally through an opening in the bell crank lever 12. The arm 25 of the stop lever 23 is then swung rearwardly, or to the left as viewed in Fig. 1, about the pivot 26 and its lower end forwardly or to the right as viewed in this figure, thus releasing the cam, which then turns under the influence of the spring urged impeller-arm 18. In doing so the upper serrated lobe of the cam is brought into engagement with the power roller, which turns in a counterclockwise direction and therefore causes a continued rolling movement of the cam until the high point has been reached and passed. This causes the whole cam unit to swing around the pivot 13 so as to pull down the corresponding link and actu-

ate one of the type bars or any other mechanism with which the cam unit may be connected.

After the high point of the cam is passed, the cam loses contact with the roller, but the said impeller-arm 18 tends to continue the rotation thereof by engaging the second impeller-lug 29 of cam 11 until the second detent 27 engages one of the stop lugs. Since the half rotation of the cam consumes only a small fraction of a second, it is difficult to release the key bar within this short interval, so that it is the lower lug 28 which is first engaged, but upon the release of the key bar and the return of the stop lever 23 to normal position, this lug 28 disengages the detent, whereupon the impeller-arm rotates the cam slightly, and the said detent then engages the upper stop lug 22.

It is obvious then that depression of a key bar releases the revolubly mounted cam to engage and be actuated by the power roller in turn operating the associated bell crank lever and its attached links to cause the associated mechanism such as type bars 16 and other operating mechanisms to be operated. It is to be understood that an individual cam unit is provided for each type bar or other functional mechanisms associated therewith.

The action of the cam mechanism has been described with respect to one of the rear bank of cam units; in the case of those of the forward bank the operation is analogous but the directions of movement and the order of operation of the stop lugs is reversed. For example, if the bifurcated arm 24*a* is positioned to engage the arm 25*a* at the upper end of stop lever 23*a* by virtue of operation of the associated key bar, the said arm is positioned rearwardly or to the left as viewed in Fig. 1, and the lower end of the stop lever 23*a* is moved forwardly, that is, to the right as viewed in the said figure. This said operation is effective to release the cam, by virtue of positioning the lower stop lug 28*a* out of the path of detent 21*a*, thus permitting the spring-urged impeller-arm 18*a* to rotate the cam slightly in a clockwise direction to effect engagement of the lower lobe of cam 11 and power roller 10. Upon completion of a half revolution of the cam 11, the second detent 27*a* engages first the upper stop lug 22*a* while the stop lever 23*a* is in an operated position, but upon release of the associated key bar and the return of the said stop lever to normal position, this lug 22*a* disengages the said detent and the impeller-arm rotates the cam slightly so that the said detent then engages the lower stop lug 28*a*, as shown in the figure. In this manner the bell crank lever 12*a* is rotated about the pivot 13*a* to operate the associated type bar 16 or any other mechanism associated therewith.

In addition thereto, the bell crank levers are provided with arms 31, 31*a* depending therefrom and on which are rotatably mounted individual cam rollers 32, 32*a*, which are displaced whenever the associated bell crank levers 12, 12*a* are actuated by the released cams 11, 11*a*. The cam rollers 32, 32*a* are located so as to be adapted to position or displace a plurality of slidable members 30 whenever the said rollers are displaced by virtue of upwardly extending projections 33, 33*a* of the members which engage with the rollers.

The movement of the above described cam unit is thus utilized to selectively operate a plurality of sliders 30 to condition a permutation means, in accordance with the particular typewriter key depressed, in a manner now to be described in detail. Upon operation of one of the cams 11*a*, roller 32*a* is shifted to the right against projection 33*a* of one of the slides 30, causing that slide to move also to the right. It will be remembered, however, that cams 11 of the rear bank of the cam unit have reverse rotation from cams 11*a*, i. e. roller 32 is shifted to the left upon operation of its related cam 11. In order that this leftward movement of roller 32 will impart a rightward movement of its associated slider 30, a simple reversing method is employed. Projection 33 is, strictly speaking, an arm which extends down below the associated slider and which has operating connection with a fork-like downward extension 36 of the slider. Arm 33 is located adjacent slider 30 in a groove 34 of rod 35, and is arranged for pivotal movement about the rod so that as the upper end of the arm is carried to the left, the lower part of the arm is caused to move to the right, thus imparting rightward movement to the slider. The reversing method is applied to alternate sliders as illustrated in Fig. 2. Rod 35 acts as a sliding support for the left end of the sliders 30 and a similar rod 35*a* serves to support the right end. The ends of the sliders are bifurcated so as to provide for a slidable fitting in grooves 34 and 34*a* of rods 35 and 35*a* respectively. Individual springs 37 lend a leftward bias to each of the sliders 30, taking up the clearance between the bifurcated left end of the sliders and the contour of the grooved portions 34 of rod 35 under normal conditions.

Tab portions, designated in Fig. 1 as 1, 2, 3, 4, 5 and U, are formed on the under side of the sliders 30 according to any convenient permutation system. In other words, each slider will be provided with one or more tabs in different positions. Six bails, designated by reference characters 41 to 46, extend upwardly from different points so as to lie in the path of movement of the various tabs. These bails are pivotally supported by the side frames of the typewriter (not shown), so that when encountered by any of the tabs U, 1, 2, 3, 4, 5, clockwise rotation of the individual bails so encountered is effected. The downwardly extending portions of the bails are each provided with a spring 40 which imparts a counterclockwise bias to help maintain the parts in the normal position as shown. Other individual springs 39 are connected from the lower tip of the bails to interposer bars 51 to 56 (Fig. 2). Thus, upon operation of any of the bails the interposers are urged to the left as viewed in Fig. 1.

Since the operation of all of the interposers is the same, interposer 54 will be taken as an example. Interposer 54 has a downwardly extending projection 54' which operates against an arm 57 so as to rotate the arm in a counterclockwise direction about its pivot point 58. This arm extends downwardly and forms a latching lever for clutching pawl 59 (Fig. 4). As arm 57 is rotated, pawl 59 is released to permit engagement of the internal ratchet 60 of clutch member 61 by engaging member 62. The engaging member 62 of the clutch is normally spring-biased (see Fig. 3) toward the ratchet 60 but is withheld from the ratchet when the pawl 59 is latched on the arm 57. Engagement of the clutch has the effect of connecting the power roller 10 of the typewriter for rotating gears 64 and 65 in the direction indicated by the arrows through the medium of belts 66. Gear 64 is provided with a cam element 67 and a pin 68 which

rotate with the gear and cooperate with the Geneva element 69 carried by a tape spacing wheel 70. Wheel 70 is provided with protruding pins 71 which are adapted to fit through holes in the tape punched there upon each operation of a typewriter key.

Gear 65, upon rotation, causes rotation of crank arm 72 in the same direction in such a manner as to impart vertical movement to the punch operating arm 73. The upper part of arm 73 is connected to a motor plate 74 which is pivoted to the frame of the punch at a point 76. Interposers 51 to 56 are arranged to extend to the left beneath the motor plate 74 and over a row of punch elements 75. Each of the interposers has a corresponding punch element 75. With the interposers 51 to 56 in their normal positions, the downward movement of motor plate 74 is ineffective to operate any of the punches 75, because only a thin projection of the interposers lies beneath the motor plate. However, this condition does not exist in practice, because in order for the motor plate to be operated the clutch must be tripped and that only occurs upon operation of interposer 54. Interposer 54 is operated every time a typewriter key is depressed by virtue of the fact that each of the sliders is provided with a tab U, so that no matter what other interposers are operated, the full width of interposer 54 will be projected beneath the motor plate 74. Thus, as the motor plate 74 is brought downward, it moves interposer 54, and any other interposer which has also been operated, downwardly with it on top of the associated punch elements 75 to perforate the tape T.

As gear 64 with its cam element 67 and pin 68 continue their rotation, and after the punch operating arm 73 has moved down to perforate the tape and sufficiently upward to allow the punch 75 to be raised clear of the tape by its spring 76, pin 68 engages any one of the slotted portions of the Geneva element 69 and causes this element to be rotated a predetermined distance. The leading portion of the tape is perforated at regular predetermined intervals so that the tape is engaged for feeding operations by pin 71 of wheel 70. Only a few such perforations are necessary because, as soon as certain of the punched holes reach the wheel 70, the feeding operations continue automatically, since pins 71 pick up certain of the holes just previously punched by one of the punch elements 75 which is reserved for feed hole punching. In order that this arrangement may be effective to produce the desired results, it is necessary that the sprocket wheel 70 be located at such a distance from the feed hole punch element that the pins 71 will coincide with the holes properly for the feeding of the tape by the Geneva. The remaining five punches are employed for perforating the tape according to the familiar Baudot five unit code to represent the characters.

When using a tape with feed-holes prepunched over the entire length, it becomes unnecessary to use one of the punching elements 75 and, under these conditions it is also unnecessary to provide any extension of interposer 54 beyond its operating projection 54'. However, in applicant's proposed structure with the use of a simple punching element and a normal length interposer, an automatic tape feeding means is produced and the necessity of using a prepunched tape is avoided with the exception noted above as to the few holes necessary to connect the tape with pin 71 of the spacing wheel 70.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. Apparatus for perforating a record strip comprising, in combination, a keyboard having a plurality of operable key levers, a plurality of punches and means for operating said punches to perforate said strip, a constantly rotating power means, a plurality of slides having tabs differentially positioned thereon according to a predetermined permutation code, each slide having a special tab portion in the same relative position as the other slides, means actuated under control of the keyboard upon each operation of a key lever for positioning a related one of said slides directly with the operation of said lever, a plurality of interposers controlled by the tabs on the positioned slide for selecting certain of the punches for operation, a clutch for connecting the punch operating means with the power means, and a special interposer actuated by the special tab portion of the positioned slide for engaging said clutch to render the punch operating means effective to cause the selected punches to perforate the strip.

2. Apparatus for perforating a record strip comprising, in combination, a keyboard having a plurality of operable key levers, a plurality of punching devices and means for operating said devices to perforate said material, means for feeding said strip a predetermined amount between successive operations of said punching devices, a constantly rotating power means, a plurality of slides having tabs differentially positioned thereon according to a predetermined permutation code, each slide having a special tab portion in the same relative position as the other slides, means actuated under control of the keyboard upon each operation of a key lever for positioning a related one of said slides directly with the operation of said lever, a plurality of interposers controlled by the differentially positioned tabs on the positioned slide for selecting certain of the punches for operation, a clutch for connecting the punch operating means and the feeding means with the power means, and a special interposer actuated by the special tab portion of the positioned slide for engaging said clutch to render the punching means effective to cause the selected punches to perforate the strip and the feeding means effective following each punching operation to feed the strip.

3. Apparatus for perforating a record strip comprising, in combination, a keyboard having a plurality of operable key levers, a plurality of punching devices and means for operating said devices to perforate said material, means including a Geneva drive mechanism for feeding said strip a predetermined amount between successive operations of said punching devices, a constantly rotating power means, a plurality of slides having tabs differentially positioned thereon according to a predetermined permutation code, each slide having a special tab portion in the same relative position as the other slides, means actuated under control of the keyboard upon each operation of a key lever for positioning a related

one of said slides directly with the operation of said lever, a plurality of interposers controlled by the differentially positioned tabs on the positioned slide for selecting certain of the punches for operation, a clutch for connecting the punch operating means and the feeding means with the power means, and a special interposer actuated by the special tab portion of the positioned slide for engaging said clutch to render the punching means effective to cause the selected punches to perforate the strip and the feeding means effective following each punching operation to feed the strip, said Geneva drive mechanism being such that although the feeding means and the punch operating means are connected to the power means simultaneously, the record strip actually is fed at a time subsequent to each operation of the punch operating means.

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