Jan. 4, 1944. W. LEATHERS 2,338,288

CARD FORMING AND PERFORATING APPARATUS

Filed Aug. 20, 1943 3 Sheets-Sheet 1

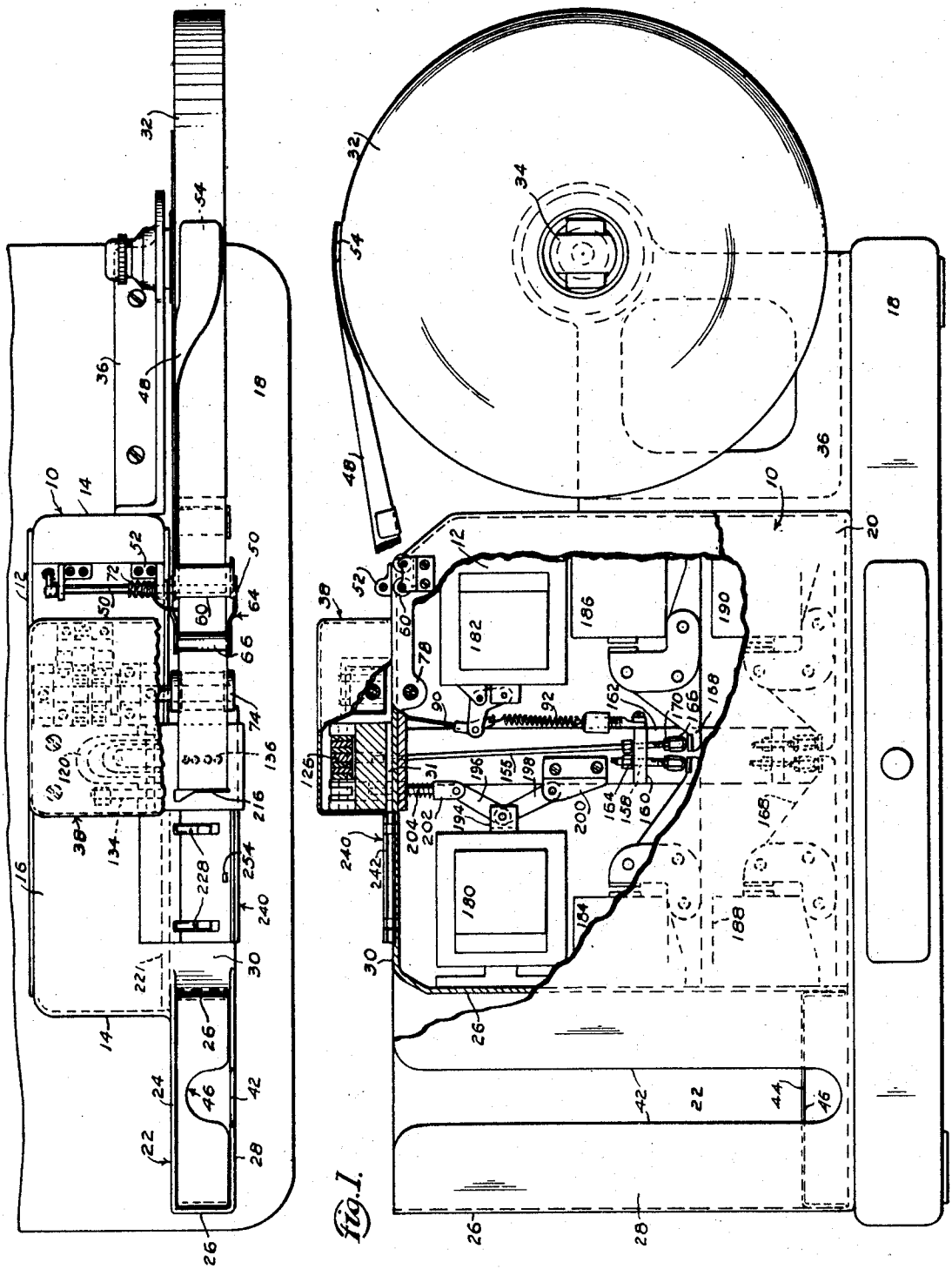


Fig. 1.

Fig. 2.

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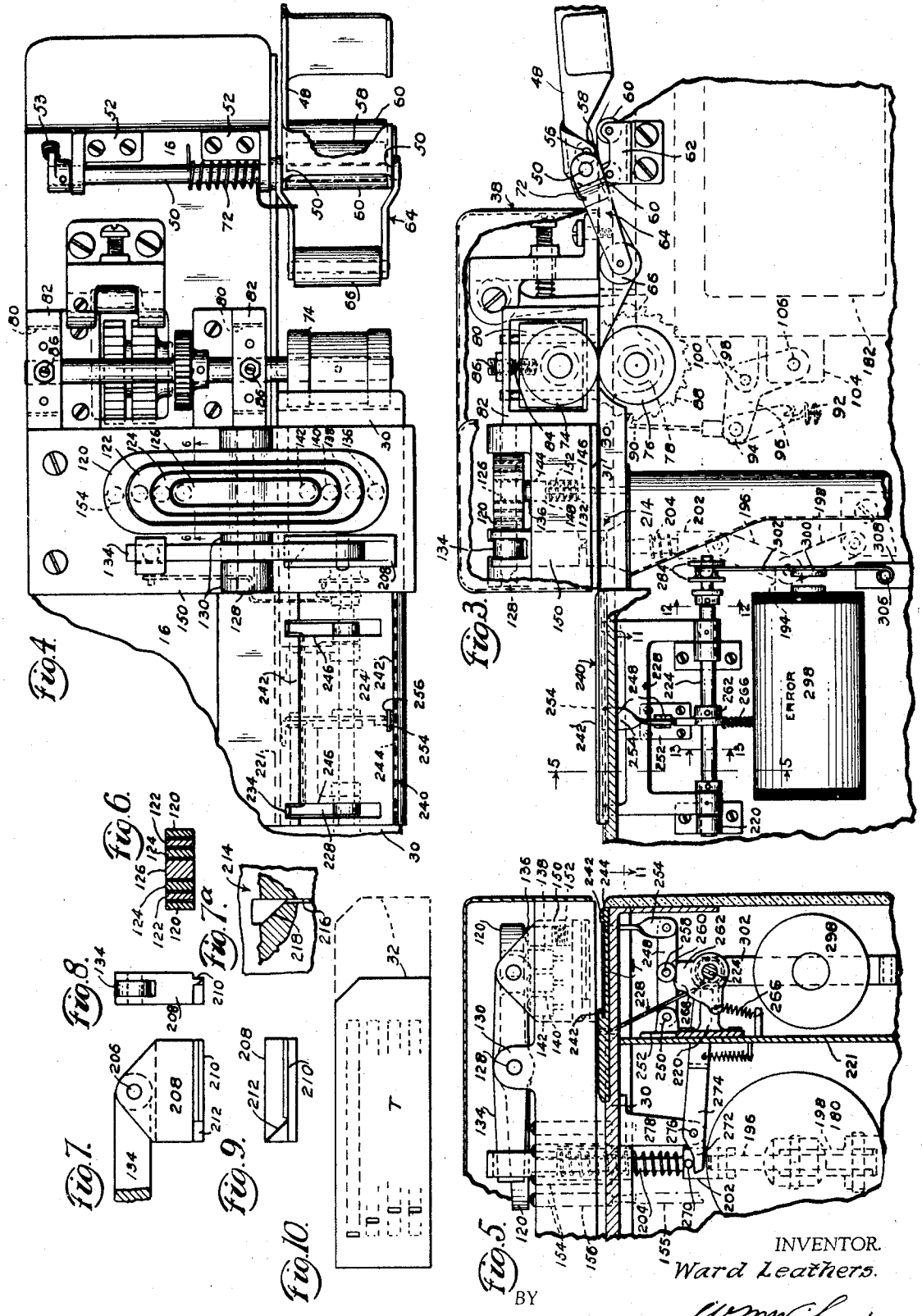
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Jan. 4, 1944. W. LEATHERS 2,338,288

CARD FORMING AND PERFORATING APPARATUS

Filed Aug. 20, 1943 3 Sheets-Sheet 2



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CARD FORMING AND PERFORATING APPARATUS

Filed Aug. 20, 1943 3 Sheets-Sheet 3

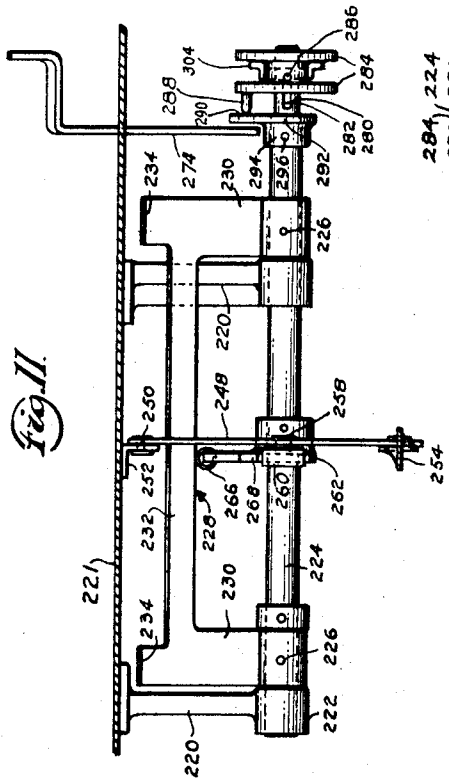


Fig. 11.

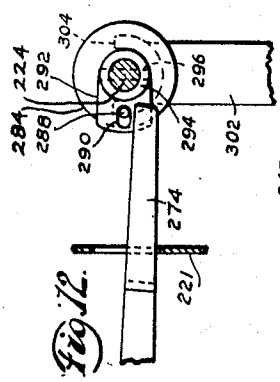


Fig. 12.

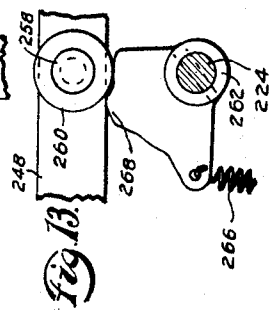


Fig. 13.

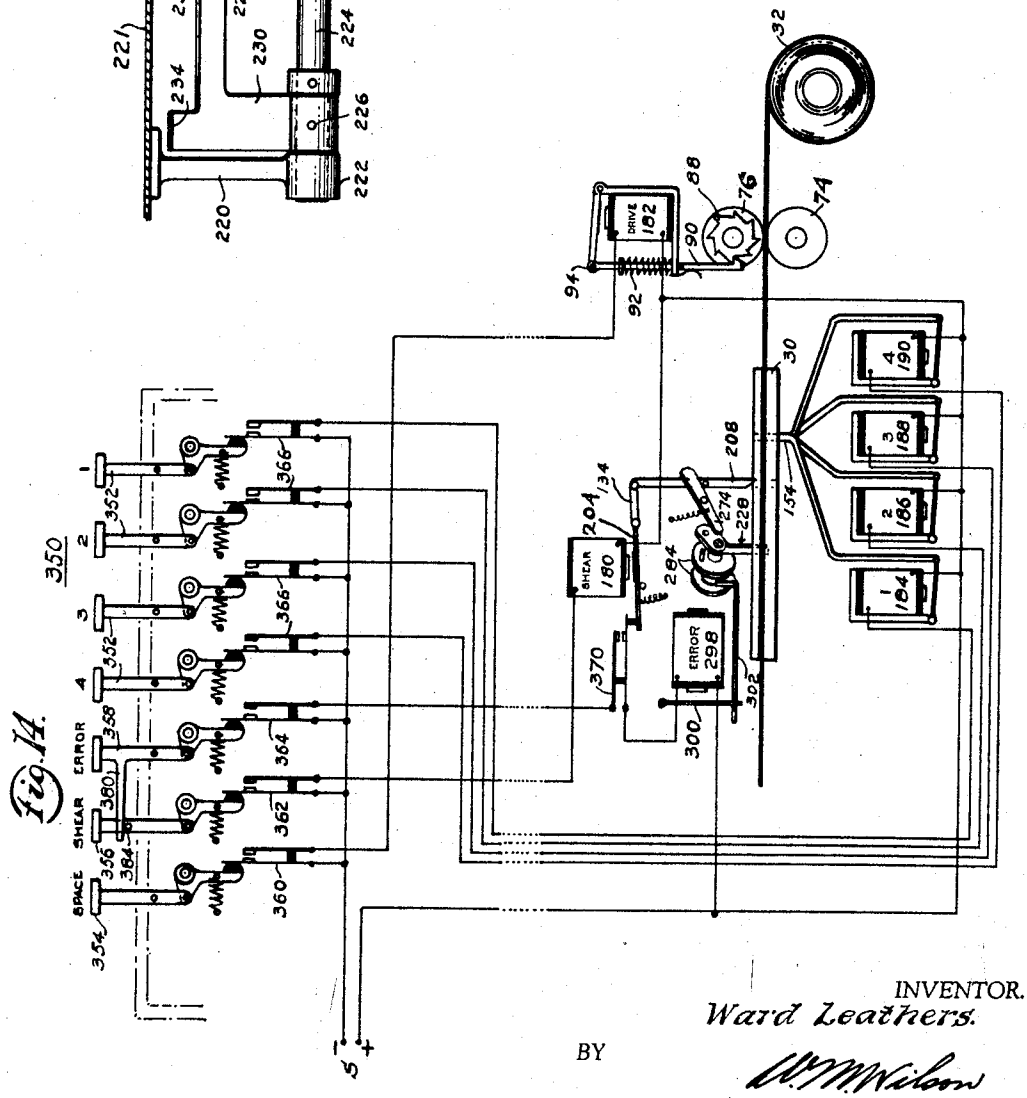


Fig. 14.

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Patented Jan. 4, 1944 2,338,288

UNITED STATES PATENT OFFICE

2,338,288

CARD FORMING AND PERFORATING APPARATUS

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Application August 20, 1943, Serial No. 499,352

8 Claims. (Cl. 164—113)

The present invention relates to accounting machines, and more particularly to an apparatus for progressively applying code perforations to a record media which is in the form of a continuous strip of paper or tape and for periodically severing perforated portions of the tape from the unperforated portions thereof to provide separate and individual record cards or "tokens," which are susceptible to normal automatic card handling operations, such as stacking, sorting, duplicating, verifying and the like, as conducted by conventional automatic card handling machinery.

One of the objects of the present invention is to provide an apparatus of this character which will operate to receive the tape from a roll and pass the same through a tape perforating station, while at the same time biasing the tape in such a manner as to remove the tendency of the tape to curl due to its curved origin in the roll, thus producing cards or "tokens" which are substantially flat and which are, therefore, conductive to proper stacking, sorting or other handling operations. An ancillary object of the invention is to provide such a tape biasing mechanism wherein the degree of bias applied to the tape becomes progressively greater as the roll is unwound so that where the tendency for the tape to curl would be the greatest, the counteracting biasing of the tape is correspondingly large.

Another object of the invention is to provide a perforating apparatus wherein the perforating operations may be controlled by means of a manually operable keyboard having associated therewith a shear key operable upon manual depression thereof to effect a shearing operation upon the tape to sever the perforated portion thereof from the unperforated portion.

A further object is to provide an apparatus of this character in which the keyboard is provided with an error key operable upon manual depression thereof to effect shearing of the perforated portion of the tape from the unperforated portion thereof and to automatically eject the severed portion from the machine, thus clearing the same for further tape perforating operations.

A still further object of the invention is to provide a novel form of tape ejecting operation which is electromagnetically controlled from the keyboard associated with the machine.

Yet another object of the invention is to provide an apparatus having associated therewith a novel form of tape punching assembly which is extremely compact in its design yet rugged and durable and efficient in its operation, thus materially effecting a saving in available space and making possible the production of an apparatus which is relatively small in size and inexpensive to manufacture, considering the character of the service required of it.

Another object of the invention is to provide a shearing mechanism which operates at one stroke thereof to shear the perforated portion of the tape from the unperforated portion, while simultaneously notching the severed portion of the tape and removing the counterpart of the notch from the unsevered portion of the tape.

Other objects and advantages of the invention will become more readily apparent hereinafter.

In the accompanying three sheets of drawings forming a part of this specification, one embodiment of the invention is shown for illustrative purposes. In these drawings:

Fig. 1 is a side elevational view of a tape perforating and severing apparatus constructed in accordance with the principles of the present invention, a portion of the machine casing being broken away to more clearly reveal the nature of the invention.

Fig. 2 is a fragmentary top plan view thereof.

Fig. 3 is a fragmentary, enlarged, detailed, side elevational view, partly in section, of the upper portion of the machine.

Fig. 4 is a plan view of the structure shown in Fig. 3.

Fig. 5 is a sectional view taken substantially along the line 5—5 of Fig. 3.

Fig. 6 is a sectional view taken substantially along the line 6—6 of Fig. 4.

Fig. 7 is an enlarged, fragmentary, detailed, side elevational view of card shearing die per se.

Fig. 7a is an enlarged, fragmentary, detailed plan view of the anvil used in cooperation with the shearing die.

Fig. 8 is an end view of the structure shown in Fig. 7.

Fig. 9 is a bottom plan view of the shearing die per se.

Fig. 10 is a plan view of a perforated card or "token" which has been sheared from the strip of tape.

Fig. 11 is an enlarged, sectional view taken substantially along the line 11—11 of Fig. 3.

Fig. 12 is a sectional view taken substantially along the line 12—12 of Fig. 3 showing the ejector arm in its lowest position.

Fig. 13 is an enlarged, detailed, fragmentary view of a portion of the card ejecting mechanism taken substantially along the line 13—13 of Fig. 3.

Fig. 14 is a diagrammatic view showing the relation between the keyboard and operative card punching and shearing instrumentalities and also showing the electrical circuits associated with the apparatus.

In all of the above described views like characters of reference are employed to designate like parts throughout.

Structurally and mechanically, the present apparatus is similar in many respects to the perforating apparatus shown in my Patent No. 2,325,961, dated August 3, 1943, for Tape perforating apparatus, and reference may be had to this patent for a disclosure of many of the details which are obscure in the present disclosure.

Referring now to Figs. 1 and 2, the apparatus involves in its general organization a rectilinear casing 10, including a rear wall 12, side walls 14 and a top wall 16. The casing 10 is mounted upon a hollow base member 18, the front wall 20 of which is turned inwardly to form a bottom wall or floor for the casing 10. A relatively deep token receiving well 22 is provided with a front wall 28, a rear wall 24 and side walls 26, one of which merges as at 30 with the upper wall 16 of the casing 10.

The roll of tape 32 is removably mounted upon a chuck 34 carried by a bracket 36 positioned at one side of the apparatus and mounted on the hollow base 18. Suitably supported on the top wall 16 of the casing 10 is a relatively small, box-like housing 38 which serves to enclose the operative punching die instrumentalities for applying perforations to the tape issuing from the roll 32 thereof together with the operative shearing instrumentalities, by means of which perforated portions of the tape are severed from the unperforated portions thereof to provide individual cards or tokens. The casing 38 also serves to enclose a portion of the tape advancing instrumentalities, as will be set forth in detail hereinafter. The portion 30 of the wall 16 forms in effect a table over which the tape is adapted to pass. The box-like housing 38 is spaced upwardly a slight distance above the top wall or table portion 16 to provide a channel 31 through which the tape passes to be operated upon by the die instrumentalities contained within the housing 38. Thus, the interior of the housing 38 constitutes a perforating station at which the tape is suitably processed. An area of the table portion 16 at one side of the casing 38 constitutes an ejecting station wherein the severed portions of the tape may be ejected from the machine, if desired, as for example, in case of an error appearing in the perforations therein. The severed cards or tokens are received by and stacked automatically in the well 22 as they are ejected from the ejecting station. The front wall 28 of the well 22 is provided with a vertical slot 42 through which the finger of the operator may be inserted to lift the stack of cards or tokens from the well 22. A horizontal ledge or partition 44 is disposed in the well 22 near the bottom thereof to prevent the cards from resting flush with the bottom wall of the well. This ledge or portion 44 is provided with a semi-circular notch 46 (see Fig. 1) in order that access may be had to the lowermost card in the stack for lifting purposes.

As previously stated, the tape issuing from the roll 32 (see Figs. 3 and 4) is adapted to pass along the upper surface of the top wall 16, which in effect forms a table portion for passage of the tape thereover and beneath the box-like housing 38. The chuck 34 is freely rotatable about its axis and, in order to prevent undue slack in the tape, a friction member 48 has its inner end secured to a horizontal rock shaft 50 carried in bearing brackets 52 mounted on the upper wall 16 of the casing 10. The outer end of the arm 48 is provided with a friction pad 54 which rests lightly on the upper surface of the roll 32 to restrain the roll in its periodic rotary movements. A tension spring 53 normally urges the shaft 50 in a clockwise direction, as seen in Fig. 3.

The arm 48 is generally of U-shaped cross section and carries adjacent its inner end a horizontal pin 56 (see Fig. 3) on which there is rotatably mounted a roller 58. The roller 58 cooperates with a pair of spaced rollers 60 carried in a bracket 62 in order to apply a bias to the tape to counteract the tendency of the tape to curl by virtue of its association with the roll 32. The tape is adapted to pass over the first roller 60, under the roller 58, and over the second roller 60 before passing to the table portion of the apparatus. It is to be noted that as the arm 48 gradually swings downwardly due to a decrease in the diameter of the roll 32 as the tap is fed therefrom, the roller 58 will move deeper and deeper into the space existing between the two rollers 60, thus gradually increasing the bias on the tape. Obviously, the tendency for the tape to curl will become greater as the diameter of the roll 32 decreases and thus this increased bias applied to the tape by the roller 58 is necessary to effectively counteract this increased tendency of the tape to curl. Pivotally mounted on the rock shaft 50 is a U-shaped bracket 64 which carries at its outer end a roller 66 under which the tape is adapted to pass. A coil spring 72 surrounds the rock shaft 50 and one end of the spring 72 bears against the top wall 16, while the other end thereof bears downwardly against the bracket 64 and normally urges the roller 66 downwardly into engagement with the tape to take up any slack that may exist in the tape.

The tape advancing instrumentalities are best illustrated in Fig. 3 and comprise a pair of rolls, including an upper roller 74 and a lower roller 76, which rollers serve to frictionally engage the tape therebetween and advance the same along the table portion 16. The lower roller 76 is rotatably mounted in fixed bearings 78, while the upper roller 74 is mounted in a pair of floating bearings 80 carried in a bearing cage 82. A tension spring 84, the tension of which may be adjusted by means of an adjusting screw 86, bears downwardly against the floating bearings 80 to yieldingly urge the upper roller 74 against the tape passing between the pair of rolls. Means are provided whereby the box-like casing 38 may be manually removed from its position on the casing 10 in order that access may be had to the adjusting screw 86, as well as to the other instrumentalities enclosed by the casing 38. The lower roller 76 is adapted to be indexed to advance the tape through the perforating station one index point position at a time. Toward this end, a ratchet wheel 88 is secured to and rotatable with the roller 76 and the teeth thereof are successively engaged by a pawl 90, which is biased inwardly by means of a spring 92. The pawl 90 is pivoted as at 94 to a bell crank lever 96, which is in turn pivoted at 98 to a stationary bracket 100 mounted on the frame of an electromagnet 182. The magnet 182 is provided with a sliding core 104 to which one end of the bell crank lever 96 is pivoted as at 106. Retraction

of the core 104 will serve to swing the lever 96 in a counter-clockwise direction, thus moving the pawl 90 downwardly and indexing the roller 76. The ratchet drive mechanism just described is, therefore, of the direct acting type, the roller 76 being indexed upon energization of the electromagnet 182. Whereas in my copending application above referred to the tape is transferred from one roll to another without being severed, in the present instance the tape is removed from the roll 32, processed, and severed into cards or tokens. For this reason, a friction drive mechanism, such as has just been described, is employed inasmuch as it is not desired to have center drive hole perforations appearing in the individual severed cards. The electromagnet 182 is adapted to be energized at will by means of certain keys forming part of the keyboard mechanism to be described hereinafter.

The operative tape perforating instrumentalities are best illustrated in Figs. 3 and 4. These instrumentalities are enclosed in the box-like casing 38 and include a plurality of tiltable rocker arms which are four in number and are designated at 120, 122, 124 and 126. The various tiltable members are arranged in nested fashion, the outer member 120 comprising a generally oval frame-like structure having a central opening in which the next smaller member 122 is disposed. The member 122 is similar in shape to the member 120 but of smaller size and is similarly nested within this latter member 124. The member 124 is also generally oval in shape and disposed within its central opening is the central member 126. This latter member 126 is in the form of an elongated bar, the ends of which are rounded. The various members 120, 122, 124 and 126 are pivoted medially of their ends to a fixed supporting shaft 128 carried in bearings 130 provided at the upper end of an upper die block 150. The shaft 128 also serves to support a rocker arm 134, which is included in the tape shearing instrumentalities and which will be referred to presently. Adjacent ends of the various members 120, 122, 124 and 126 carry on their underneath sides respective punching dies 136, 138, 140 and 142. These latter dies act downwardly on the tape passing through the perforating station and are in the form of relatively small pins having enlarged heads 144 and reduced shanks 146, the latter comprising the operative punching elements of the dies. The dies 136, 138, 140 and 142 are vertically slidable in cylindrical bores 148 provided in the upper die block 150. A coil spring 152 surrounds each of the shanks 146 of the various dies and serves to normally elevate the dies to their inoperative position.

Referring now to Figs. 1, 3, 4 and 5, the die actuating instrumentalities are substantially identical to the die operating instrumentalities shown and described in my copending application above referred to and reference may be had thereto for a full disclosure of such instrumentalities. It is thought that a brief description of the die actuating mechanism, as shown in the present application, will be sufficient in the light of the disclosure of my copending application. Briefly, a plurality of thrust rods 154 project upwardly through guides 156 formed in the die block 150 and engage the underneath sides of the respective rocker arms 120, 122, 124 and 126 near the end thereof which is opposite to the punching dies proper. The thrust rods 154 are engaged by respective offset thrust rods 155 of varying lengths and the lower end of each rod 155 projects through openings 158 provided in a series of horizontal supporting flanges 160 carried on a standard 162. Each of the thrust rods 155 is provided with a stop collar 164 which bears against the upper surface of one of the flanges 160 and limits the downward movement of its respective thrust rod. The lower end of each of the thrust rods 155 is formed with an adjustable abutment head 166 which is threadedly received thereon and which cooperates with a hammer or operating lever 168, the movements of which are electromagnetically controlled and by means of which the rod may be elevated to cause its respective rocker arm 120, 122, 124 or 126, as the case may be, to become tilted to depress the punching dies and cause the same to engage the tape during its operative perforating stroke. Each abutment head 166 has associated therewith a lock nut 170, and thus it will be seen that by rotating the abutment head 166 relative to the thrust rod upon which it is mounted and then securing the same in position by means of the lock nut 170 the effective length of the thrust rod may be varied to in turn vary the stroke of the punching die.

A plurality of operating magnets designated at 180, 182, 184, 186, 188 and 190 (see Fig. 14) are secured to the walls of the casing 10 interiorally thereof. The magnets 180, 184 and 188 are secured to one side wall in superimposed relationship, while the magnets 182, 186 and 190 are similarly secured to the opposite side wall. Each of the magnets 184, 186, 188 and 190 is provided with an armature 192, upon which armatures the various hammers 168 are disposed. The hammers underlie the abutment heads 166 and remain normally spaced therefrom a slight distance in order that upon energization of its respective controlling electromagnet an initial free impetus will be imparted to the armature before actual engagement with the thrust rods 155. Thus it will be seen that the punches are actuated rather by a hammer effect than by a small pressing or driving motion, and in this manner a very positive and effective operation of the punching dies is attained.

The magnets 184, 186, 188 and 190 cooperate with their respective thrust rods 155 for perforating code characters in the tape 32. Since four of these perforating magnets have been shown, it is obvious that the use of a four-line code is contemplated.

The electromagnet 182, as has previously been described, is the magnet which controls the operation of the ratchet and pawl mechanism 88, 90 by means of which the tape driving rolls 76, 80 are driven. The magnet 180 (see Fig. 1) forms part of a shear relay mechanism and operates upon energization thereof to cause a perforated portion of the tape 32 to be severed from the remaining unperforated portion. Toward this end, the magnet 180 is provided with a retractable core 194 to which there is pivoted a pair of toggle links 196 and 198. The lower toggle link 198 is pivotally secured to a bracket 200 mounted on the standard 162. The other and upper toggle link 196 is pivotally secured at its free end to a thrust collar 202 secured to the lower end of a thrust rod 204 which projects upwardly through the die block 150 (see Fig. 3). The thrust rod 204 bears at its upper end against the underneath side of the rocker arm 134 previously mentioned. The other end of the rocker arm 134 has pivotally secured thereto as at 206 (see Figs.

7, 8 and 9) a shearing die **208**. The shearing die **208** is of irregular configuration and includes a straight cutting edge **210** and a bevelled cutting edge **212**. The shearing die **208** is designed for cooperation with a shearing anvil **214** (see Fig. 7*a*) in making a transverse cut in the tape and also in notching one corner thereof, this latter notching operation being conventional in practice in the manufacture of cards which are designed to be perforated for accounting purposes. The anvil **214** is provided with a cutting edge **216** which cooperates with the cutting edge **210**, and a second cutting edge **218** which cooperates with the cutting edge **212**.

Referring now to Figs. 3, 4, 11, 12 and 13, wherein the card ejecting mechanism for cards which have been erroneously perforated is best illustrated. This ejecting mechanism involves in its general organization a pair of extended brackets **220** which are located directly beneath the top wall **16** and are attached to an intermediate wall **221**. The ends of each of the extended brackets **220** are formed with integral bearings **222** which serve to support therebetween a rotatable rock shaft **224**. Anchored to the rock shaft by means of tortion pins **226** is the ejecting piece proper **228**. This ejecting piece is in the form of an H-shaped member having parallel arms **230**, by means of which the piece is anchored to the shaft **224** and a bridge portion or strut **232**. Each of the arms **230** is formed with a laterally extending ejecting ear **234** designed for actual contact with the severed cards or tokens to eject them from the apparatus, such ejection taking place when the shaft **224** is turned about its axis in such a manner as to swing the ejecting piece **228** upwardly into engagement with the card.

The cards which are severed from the tape **32**, before they are ejected from the machine, are supported in a guide member **240** positioned on the table portion **16** of the machine. The guide **240** is in the form of a substantially flat plate having upstanding edge portions **242** at opposite sides thereof, each provided with an elongated groove **244** adapted to retain therein the edges of the cards. In order that the ejecting ears **234** may engage the edge of the card and propel the same to one side of the apparatus, the guide member **240** is formed with slots **246** at one side thereof adjacent the ends of the member **240** to provide clearance for the ears **234**. Before the card can be ejected, however, from the member **240**, it is necessary to disengage one edge of the card from the slot **242** in which it is normally retained, and toward this end an arm **248** has one end thereof pivoted as at **250** in a bracket **252** secured to the wall **221**. The free end of the arm has secured thereto an upstanding finger **254**, the upper end of which projects through an opening **256** provided in the top wall **16** beneath the card which is retained in the member **240**. It will be seen that when the arm **248** is swung upwardly, the finger **254** will project through the aperture **256** and forcibly remove the edge of the card from the groove **244** in which it is retained. A pin **258** projects laterally from the arm **248** medially thereof and carries a roller **260** adapted to be engaged by a cam member **262** (see Figs. 5 and 13) mounted on the shaft **224** and normally held in an inoperative position by means of a spring **266**. The cam **262** is provided with a raised portion **268** which upon engagement with the roller **260** performs the actual elevating of the arm **248**. It will be seen, therefore, that when the shaft **224** is turned in a clockwise direction, as viewed in Fig. 13, the raised portion **268** will engage the roller **260** and elevate the same, thus elevating the arm **248** and causing the finger **254** to engage the card, as previously described, and disengage the latter from the slot **244** in which it is retained.

Rocking of the shaft **224** is automatically accomplished upon lowering of the thrust rod **204**, by means of which the shearing mechanism is operated subject to certain other conditions which must be obtained and which will be set forth presently. Toward this end, the collar **202** carried at the lower end of the thrust rod **204** is provided with a pin **270** designed for engagement with an extension or finger **272** provided on an arm **274** which is pivoted as at **276** to a depending bracket **278** supported from the top wall **16**. The arm **274** projects laterally in the casing and terminates in the vicinity of the shaft **224** and slightly below the same.

The shaft **224**, as shown in Fig. 11, is provided with a relatively short, reduced extension **280** having an elongated slot **282** extending completely therethrough. A collar **284**, generally of spool-shaped design, is slidably mounted on the extension **280** and is retained thereon by means of a pin **286** which projects through the slot **282**. A finger **288** projects laterally from one face of the spool-like member **284** and is aligned with an opening **290** formed in a flange **292** provided on a collar **294** which is rigidly secured to the shaft **224** by means of a pin **296**. It will be seen from the above description that when the spool-like member **284** is in its extreme right-hand position, as shown in Fig. 11, the finger **288** will occupy a retracted position. When the member **280** is in its extreme left-hand position the finger **288** will be projected through the aperture **290** and into the path of movement of the free end of the arm **274**.

Referring now to Figs. 3 and 12, reciprocal movement of the spool-like member **284** is effected by means of an electromagnet **298**, labeled "Error," and having associated therewith an armature **300** on which there is mounted a forked member **302** having a bifurcated outer end **304** which straddles the spool-like member or collar **284**. The forked member **302** is secured as at **306** to a bracket **308** and is in the form of a leaf spring which is normally biased in such a manner as to maintain the spool-like collar **284** in its retracted position. Upon energization of the error magnet **298**, the forked member will be moved to the left, as viewed in Fig. 3, thus urging the spool-member **284** to its projected position wherein the finger **288** extends through the aperture **290** and is in the path of movement of the arm **274** (see Fig. 12). In actual operation when the thrust rod **204**, by means of which the shearing mechanism is operated, is moved to its lowermost position, the pin **270** engages the finger **272** and depresses the same, thus swinging the arm **274** upwardly into engagement with the finger **288** and imparting rotary movement to the shaft **224** to actuate the cam **262** (see Figs. 11 and 13), as previously described, and cause the finger **254** to forcibly remove the edge of the card from the groove **244** in which it is retained. Further turning movement of the shaft **224** serves to cause the ears **234** to engage the edge of the severed card or token and eject the same laterally from the machine. The ejected cards may fall into a basket or bin, not shown, wherein they are available when desired.

Referring now to Fig. 14 wherein the electrical connections for the apparatus are illustrated, this figure is purely diagrammatic in its representation and for convenience of illustration certain parts thereof have been juxtaposed in order that the electrical circuits leading thereto may appear less complicated than otherwise. In this view the keyboard is designated in its entirety at 350 and is more or less of conventional design.

Still referring to Fig. 14, the contacts 366 associated with the four code keys 352 are directly connected to the respective perforating magnets 184, 186, 188 and 190 in such a manner that upon closing any one of these pairs of contacts current is conducted from a source S thereof to the proper perforating magnet 184, 186, 188 or 190, as the case may be, to energize the same and cause the tape 32 to be perforated. The pair of contacts 362 associated with the shear key 356 is directly connected to the shear magnet 180 in such a manner that upon depression of the key 356 the shearing magnet 180 will become energized to operate the shear mechanism in the manner previously described. The shear magnet 180, in addition to operating the shearing instrumentalities, serves upon energization thereof to close a pair of contacts 370. The contacts 370 are electrically connected to the "Error" magnet 298. These latter contacts, however, are arranged in series with the pair of normally open contacts 364 which are adapted to be closed upon depression of the error key 358. Since the contacts 370 and 364 are arranged in series, energization of the shear magnet 180 will not operate to cause energization of the error magnet 298 and thus, although the shearing instrumentalities will operate to shear the perforated portion of the tape from the unperforated portion thereof to produce a card or token, this token will not be ejected from the machine.

The stem of the error key 358 has rigidly attached thereto a laterally projecting finger 380. The stem of the shear key 356 has projecting therefrom a pin 384 which becomes engaged by the finger 380 upon depression of the error key 358. Thus, the key 356 may be depressed with no effect upon the key 358, but the key 358, when depressed, will cause automatic depression of the key 356.

Should it be desired to eject a token from the machine, the key 358 is depressed, thereby closing pairs of contacts 362 and 364 in the manner previously described. The contacts 362 cause energization of the shear magnet 180 and subsequent closure of the contacts 370 associated therewith. However, since the contacts 364 are in this instance also closed, closure of the contacts 370 will cause the error magnet 298 to become energized. This will cause ejection of the token undergoing processing in the manner previously described.

Upon depression of the space key 354, the pair of contacts 360 will become closed. These contacts are directly connected to the drive magnet 182 and thus each time the key 354 is depressed the tape will be advanced in the manner set forth previously.

In Fig. 10 a plurality of cards or tokens of different size have been illustrated. It will be understood that the specific length of the cards produced by the present machine is under the control of the operator of the machine. If desired, a suitable indicating mark, a scale or the like may be provided on the top wall 16 of the casing 10 to assist the operator in the production of cards which are uniform in size.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit of the invention. Only insofar as the invention has been particularly pointed out in the accompanying claims is the same to be limited.

What is claimed is:

1. In an apparatus for applying code perforations to a continuous strip of tape, a table over which the tape is adapted to be moved, means for advancing the tape over said table, a perforating station including a die block substantially flush with said table and over which the tape is adapted to pass, a fixed supporting shaft above the level of said table, a plurality of elongated rocker members pivoted to said shaft medially of their ends, said members including an outer enveloping arm and a plurality of inner arms nested within said outer arm, said arms overlying the die block at adjacent ends, a depending punch secured to each member adjacent said latter ends thereof and cooperating with the die block for tape perforating operations, a plurality of thrust rods projecting upwardly through said table and designed for elevating engagement with the other ends of said members, and means for selectively actuating said thrust rods to cause tilting movement of said rocker members.

2. In an apparatus for applying code perforations to a continuous strip of tape to produce characters in a four-line code, a table over which the tape is adapted to be moved, means for advancing the tape over said table, a perforating station including a die block substantially flush with said table and over which the tape is adapted to pass, a fixed supporting shaft above the level of said table, a plurality of elongated rocker members pivoted to said shaft medially of their ends and overlying the die block at adjacent ends, said members including an outer framelike member, a second framelike member closely nested within said outer member, a third framelike member closely nested within the second member and a central elongated block-like member nested within the third member, a depending punch secured to each member at adjacent ends thereof and arranged in alignment for cooperation with the die block for tape punching operations, a plurality of thrust rods projecting upwardly through said table in alignment and designed for elevating engagement with the other adjacent ends of said members, and means for selectively actuating said thrust rods to cause tilting movement of said rocker members.

3. In an apparatus for applying code perforations to a continuous strip of tape to produce characters in a four-line code, a table over which the tape is adapted to be moved, means for advancing the tape over said table, a perforating station including a die block substantially flush with said table and over which the tape is adapted to pass, a fixed supporting shaft above the level of said table, a plurality of elongated rocker members pivoted to said shaft medially of their ends and overlying the die block at adjacent ends, said members including an outer framelike member, a second framelike member closely nested within said outer member, a third framelike member closely nested within the second member and a central elongated block-like member nested within the third member, a depending punch

secured to each member at adjacent ends thereof and arranged in alignment for cooperation with the die block for tape punching operations, a coil spring surrounding each punch and normally urging the latter upwardly, a plurality of thrust rods projecting upwardly through said table and designed for elevating engagement with the other ends of said members, and means for selectively actuating said thrust rods to cause tilting movement of said rocker members against the action of said coil spring.

4. In a tape perforating apparatus, a table over which the tape is adapted to be moved, a chuck for rotatably supporting a roll of the tape adjacent one end of the table, a tape retarding and straightening device comprising a pair of rollers rotatably mounted on said table in spaced relationship, an arm pivoted to said table and having a free end adapted to rest upon said roll of tape by gravity and to move downwardly as the size of said roll of tape diminishes, an additional roller carried by said arm adjacent its inner end and adapted to pass between said spaced rollers progressively as said arm moves downwardly, the tape issuing from said roll being adapted to pass over said spaced rollers and under said additional roller.

5. In a tape perforating apparatus, a table over which the tape is adapted to be moved, a chuck for supporting a roll of the tape adjacent said table, a tape straightening and retarding device comprising a pair of spaced rollers positioned adjacent the table substantially at the level thereof, an arm pivoted to said table adjacent said rollers and having a free end adapted to rest upon said roll of tape and to move downwardly gradually as the diameter of said roll of tape decreases, an extension on said arm projecting below the level of said table, a roller mounted on said extension adapted to bear downwardly against the tape passing over said table, an additional roller carried by said arm adjacent its point of pivotal connection to the table and positioned medially of said spaced rollers, said latter roller being adapted to move downwardly with the arm into the space existing between said spaced rollers for tape straightening purposes, the tape issuing from said roll thereof being adapted to pass over said spaced rollers and beneath said additional rollers cooperating therewith.

6. In a tape perforating apparatus, a table over which the tape is adapted to be moved, a chuck for rotatably supporting a roll of the tape adjacent one end of the table, a tape retarding and straightening device comprising a pair of tape flexing members mounted on said table in spaced relationship, an arm pivoted to said table and having a free end adapted to rest upon said roll of tape by gravity and to move downwardly as the size of said roll of tape diminishes, an additional tape flexing member carried by said arm adjacent its inner end and adapted to pass between said spaced members progressively as said arm moves downwardly, the tape issuing from said roll being adapted to pass over said spaced members and under said additional member.

7. In an apparatus for applying code perforations to a continuous strip of tape and including a table over which the tape is adapted to be moved, and a shearing station at which perforated portions of the tape are adapted to be severed from unperforated portions thereof, a guide extending along said table adjacent at least one longitudinal edge of the tape for maintaining the same in position on said table portion, an ejecting mechanism for ejecting the severed portions of the tape comprising a horizontal rock-shaft underlying said table and supported therebeneath for rocking movement, an arm mounted for limited swinging movement about a pivotal axis disposed above said rock-shaft, a tape engaging finger carried by the free end of said arm and projecting upwardly through said table and designed for engagement with the tape adjacent one edge thereof for elevating the latter from engagement with said guide, a cam secured to said rock-shaft and designed for lifting engagement with said arm, and means for causing rocking movement of said rock-shaft.

8. In an apparatus for applying code perforations to a continuous strip of tape and including a table over which the tape is adapted to be moved, and a shearing station at which perforated portions of the tape are adapted to be severed from unperforated portions thereof, a guide extending along said table adjacent at least one longitudinal edge of the tape for maintaining the same in position on said table portion, an ejecting mechanism for ejecting the severed portions of the tape comprising a rock-shaft disposed beneath the level of said table and substantially parallel with the latter, said rock-shaft being mounted for rocking movement about its longitudinal axis, an arm mounted for limited swinging movement about a pivotal axis and disposed above said rock-shaft, a finger carried by the free end of said arm and projecting upwardly through the table and designed for engagement with one edge of the tape, a cam mounted on said rock-shaft and designed for lifting engagement with said arm, and means for actuating said rock-shaft.

WARD LEATHERS.