April 11, 1944. A. W. MILLS ET AL 2,346,267

PERFORATING APPARATUS

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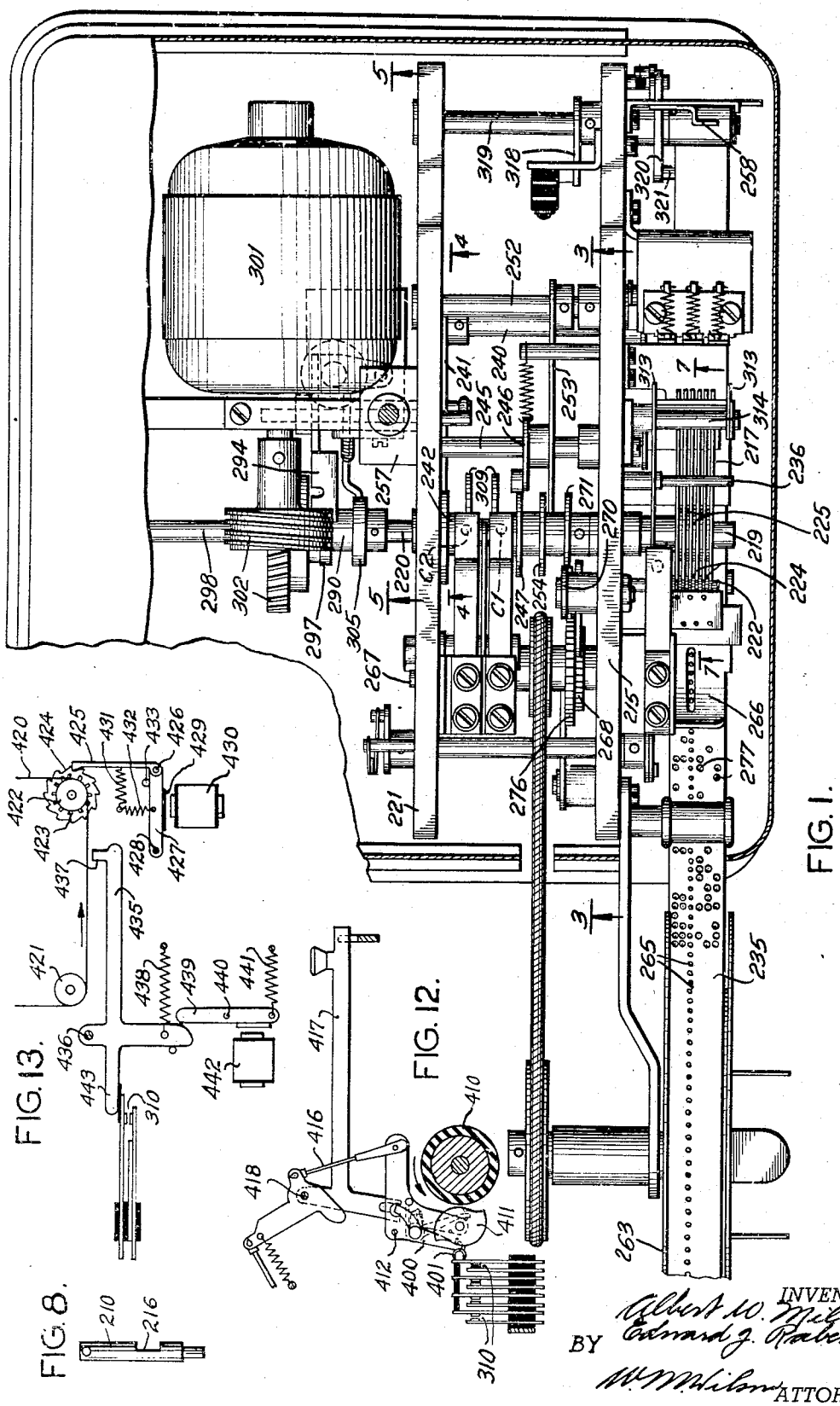


FIG. 1.



FIG. 13.



FIG. 12.



FIG. 8.

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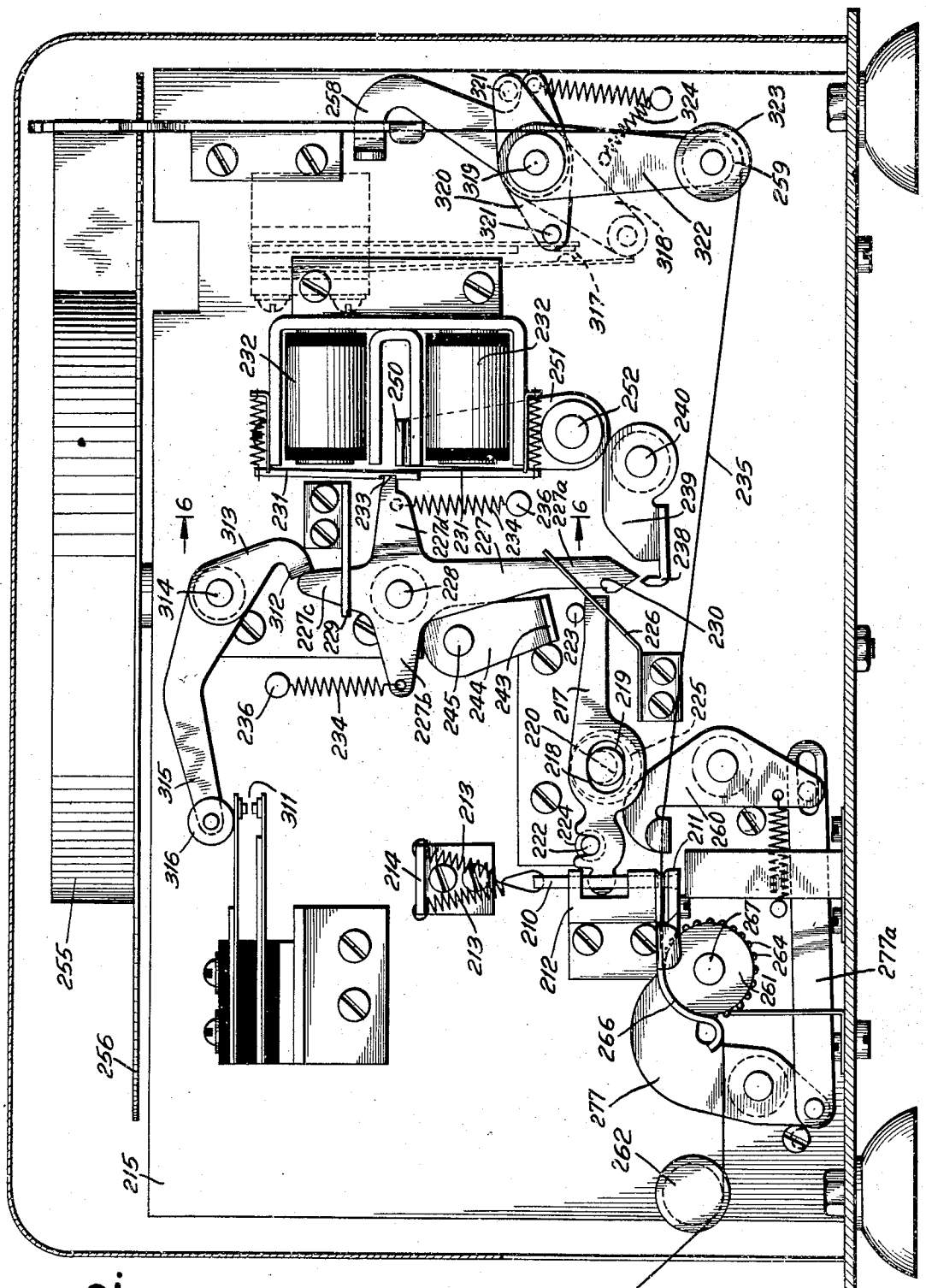



FIG. 2.

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PERFORATING APPARATUS

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FIG. 4.

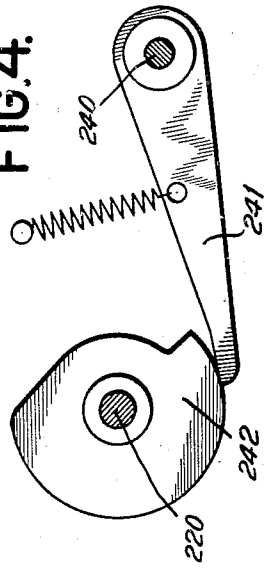



FIG. 3.




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FIG.5.

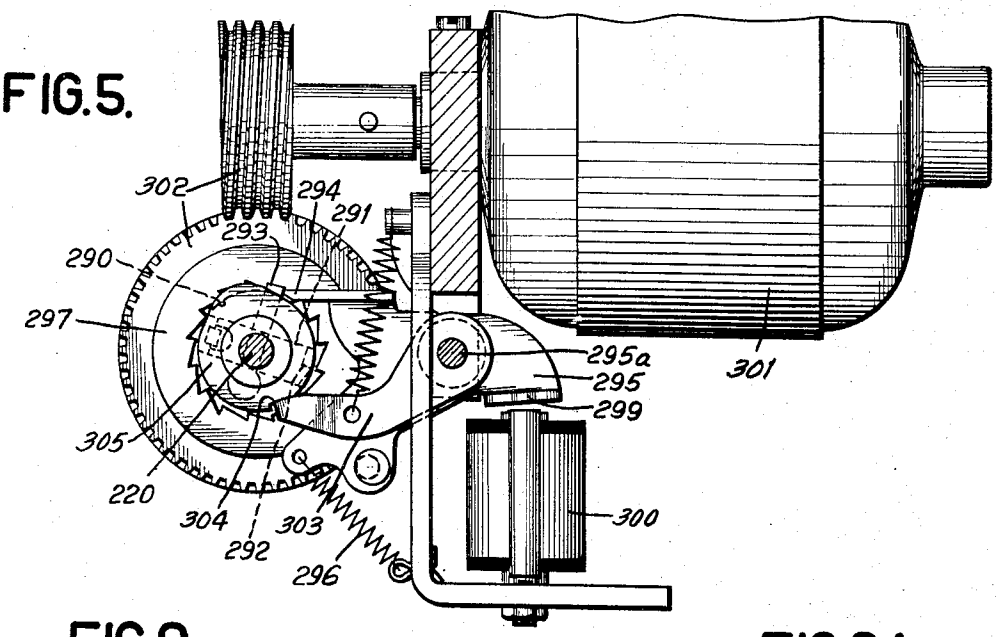



FIG.9.

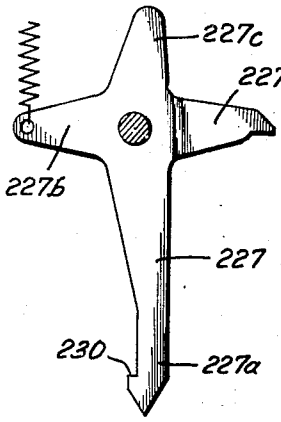



FIG.9A.

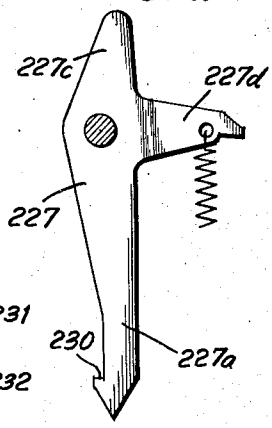
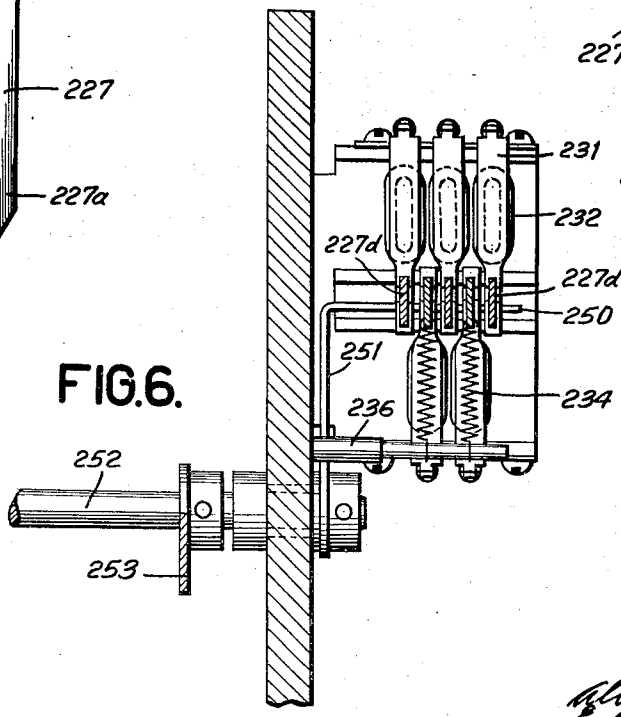



FIG.6.




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PERFORATING APPARATUS

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FIG.7.

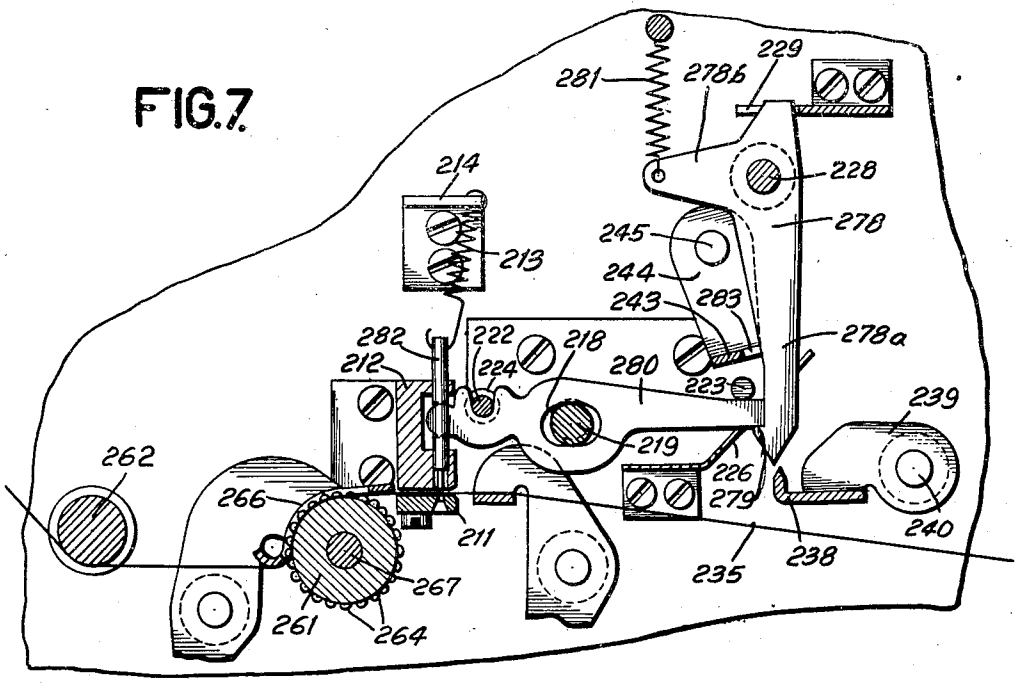



FIG.10.

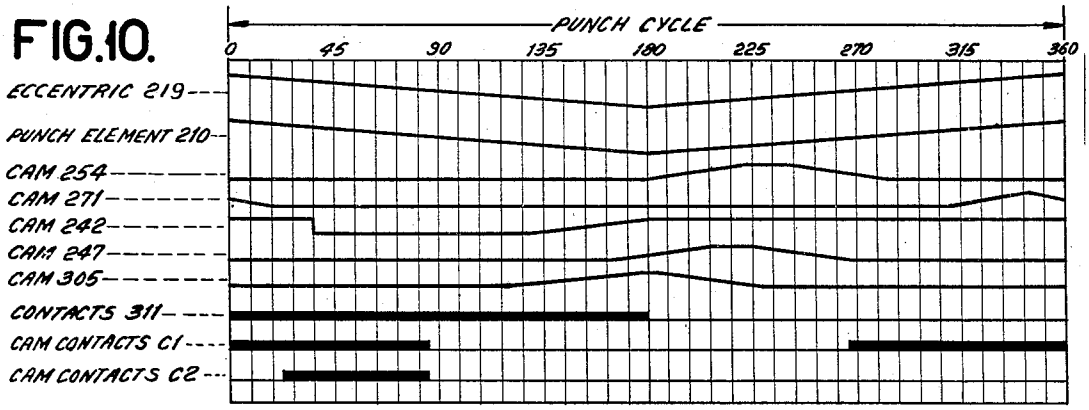
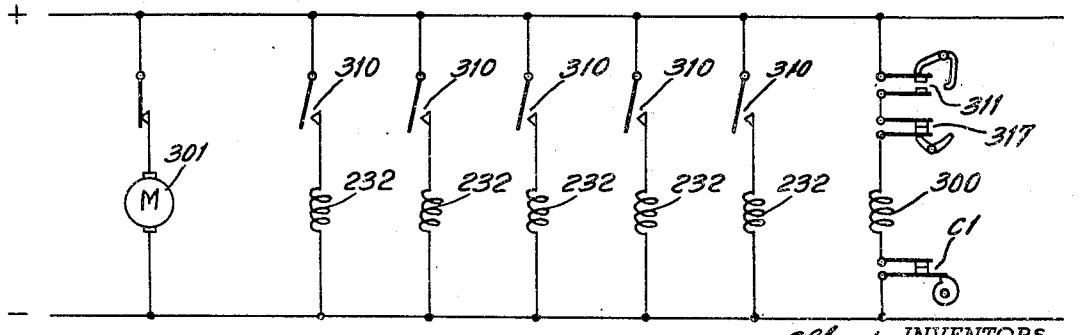



FIG.11.




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Patented Apr. 11, 1944

2,346,267

# UNITED STATES PATENT OFFICE

2,346,267

## PERFORATING APPARATUS

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Application July 2, 1942, Serial No. 449,444

11 Claims. (Cl. 164—113)

This invention relates to perforating means and is an improvement of copending application of A. C. Holt, Serial No. 438,973, filed April 15, 1942.

In the said application a plurality of punch elements are provided, which are pivotally connected to one of the ends of related punch levers. Cyclically operable eccentric means are disposed within the yoke portions of the punch levers and are operated in a start-stop manner for actuating or oscillating the punch levers. Individual latching means disposed in close proximity to the free ends of the punch levers are operated selectively to latch one or more of the oscillated punch levers, thereby causing the connected punch elements to be effective.

In the present application, the cyclically operated eccentric means are disposed within oval shaped openings provided in each punch lever. In addition thereto, the individual latch levers are provided with latching arms cooperating with electromechanically controlled latch members for normally retaining the latch levers out of the paths of the oscillated punch levers. Upon selective operation of the latch members, the related latch levers are released to latch the punch levers, whereupon common control means associated with the said latch levers are operated by one or more of the latter, which are released for initiating operation of the normally stationary eccentric means.

An object of the present invention resides in the provision of an improved perforating apparatus having common control means operated by any one of the released punch lever latching means for effecting operation of the eccentric means.

Another object of the present invention resides in the provision of an improved perforating apparatus having electromechanically controlled latch means for normally latching the individual spring operated latch levers out of the paths of the related punch levers. Due to this provision, a more rapid operation of the said latch levers is possible.

Still another object of the present invention resides in the provision of cyclically operable restoring means for the electromechanically controlled latch means, whereby the armatures are acted upon directly as well as the latches.

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 plan view of the improved perforating apparatus.

Fig. 2 is an elevational view of the perforating apparatus.

Fig. 3 is a sectional view taken along the lines 3—3 of Fig. 1.

Fig. 4 is a detail of the cam control means for the latch lever locking means.

Fig. 5 is a sectional view taken along the lines 5—5 of Fig. 1 showing the start-stop clutch control means.

Fig. 6 is a sectional view taken along the lines 6—6 of Fig. 2 showing the arrangement of the control magnets and latching means.

Fig. 7 is a sectional view taken along the lines 7—7 of Fig. 1.

Fig. 8 is a detail of a code-hole punch element.

Figs. 9 and 9A are details of the latch levers.

Fig. 10 is a timing chart.

Fig. 11 is a simplified circuit diagram.

Fig. 12 is a side elevation of a key operated mechanism for controlling the selector magnet contacts of the perforating apparatus.

Fig. 13 is a side elevation of a tape sensing mechanism for controlling the selector magnet contacts of the perforating apparatus.

Referring now to Figs. 1 and 2, the perforating apparatus is shown to include individual punch elements 210, one for each unit of the code, and a common die block 211. The punch elements are slidably arranged in individual openings in a common punch guide block 212, and are normally held in retracted positions by means of individual springs 213. The said springs are supported by a bracket 214 which is suitably secured to an upright plate 215. The said punch guide and die blocks are also suitably secured to the plate 215. Each punch element 210 is provided with a recess 216 (see Fig. 8), into which recess is placed one end of a positionable punch lever 217 having an oval shaped opening 218. An individual punch lever is provided for each punch element. An elongated cam or eccentric 219 is carried by or, if desired, formed on shaft 220, which shaft is suitably journaled in the said plate 215 and upright plate 221. The eccentric 219 is disposed within the oval shaped openings of the individual punch levers to support and actuate or oscillate the said levers. Suitably disposed stop guides or rods 222 and 223 are provided to maintain proper alignment of the said punch levers.

In order to space the punch levers properly, suitable loose fitting spacing washers 224 and 225 are provided on rod 222 and eccentric 219, respectively, and disposed between each punch lever 217, as shown in Figs. 1 and 2. In addition thereto, the free ends of the individual punch levers extend into correspondingly spaced, individual slots formed in a guide comb 226 suitably secured to plate 215. Normally, during the rotation of the eccentric, the punch levers are moved downwardly and upwardly (as viewed in Fig. 2) about the pivoted connections formed by the ends of the punch levers engaging the recesses of the related punch elements. Under these conditions, it is seen that the free ends of the punch levers are partially rotated first in one direction and then in the reverse direction, or, stated in other words, the said free ends of the punch levers are oscillated.

Individual, suitably spaced latch members or levers 227 are provided, one for each punch lever, said latch levers being pivotally supported by a stud shaft 228 and having the depending arms 227*a* and upright arms 227*c* loosely fitted into individual slots in guide combs 226 and 229, respectively, the latter also being suitably secured to plate 215. Near the extremity of each arm 227*a*, a latching shoulder 230 is provided, which shoulders are disposed in close proximity to, but normally held out of the paths of, the rotatable ends of the punch levers, by means of the individual and related latching armatures 231 of magnets 232. Each armature 231 is provided with a shouldered recess 233 and, when released, engages the tip of arm 227*d* of the related latch lever 227 to latch the latter and hold the arm 227*a* out of the path of the free end of the related punch lever.

Upon momentary energization of magnet 232, the related armature 231 is attracted to trip or release the engaged arm 227*d*, and permit the related latch lever 227 to swing in a clockwise direction, under influence of spring 234, thereby positioning the shoulder 230 of arm 227*a* in the path of the free end of the related punch lever 217.

It should be mentioned at this time that, in the present embodiment, the shaft 220 carrying the eccentric 219 is not constantly rotated, but operated in a start-stop manner, and that the latch levers 227 are arranged to be positioned to latch the desired punch levers before the rotated eccentric displaces or oscillates the said punch levers. Thus, upon latching of a punch lever 227 and rotation of the eccentric 219, the said punch lever is positioned by the eccentric about the pivotal connection formed by the arm 227*a* of the latch lever 227 and the latched end of the punch lever, to force the related punch element 210 downwardly (Fig. 2), thereby causing the sheet, such as a telegraphic tape 235, interposed between the said guide and die blocks to be perforated.

It should also be mentioned that individual springs 234 having the one end thereof secured to posts 236 are attached to arms 227*b* and 227*d* of alternate latch levers 227 for normally urging the related latch levers in a clockwise direction. Due to the close spacing of the latch levers, the springs are alternately arranged as mentioned. For this reason, only the alternate latch levers 227 need be provided with arms 227*b* (see Figs. 9 and 9A). The related armatures 231 and magnets 232 are also placed in staggered positions, as shown in Fig. 6, in order to provide an extremely compact arrangement of the magnets and latch levers.

Locking means are provided for holding the displaced latch lever or levers in a latched position, and for preventing displacement of undesired latch levers during the rotation of the eccentric. This means comprises a locking bail 238, which is common to all latch levers 227, and which is suitably secured to an arm 239, which arm 239 in turn is fixed to shaft 240. Shaft 240 is rotatably mounted in the said plates 215 and 221 and also has affixed thereto a spring urged cam follower arm 241 (also see Figs. 3 and 4) cooperating with cam 242 secured to the start-stop shaft 220. Cam 242 is shaped so that normally (with the shaft 220 in a stop position) the locking bail 238 is held in a position so as to be out of the path of the extremity of arm 227*a* of each latch lever 227. Upon displacement of the desired latch levers in the said latching position and upon rotation of shaft 220, the follower arm 241 drops from the high portion of the cam 242 to permit the locking bail 238 to be raised (in Fig. 2) in the path of the said arms 227*a*, thereby engaging the extremities of arms 227*a* of the displaced latch levers and locking them in the latching position (also see timing chart in Fig. 10). This position of the said locking bail also prevents any faulty displacement of the normally positioned latch levers, since the bail is now effective to engage the extremity of arm 227*a* of any latch lever which inadvertently might be displaced during the rotation of shaft 220, thereby blocking further clockwise rotation of these latch levers and preventing engagement of the latching shoulders 230 and the latching ends of the related punch levers 217. The said raised position of locking bail 238 is maintained until the sheet or tape 235 is perforated, when the high portion of cam 242 again engages the follower arm 241 to lower the said bail. Obviously, the said bail must be lowered before the latch levers 227 are positively restored by the action of a reset bail 243.

For this arrangement, it is preferred to render the reset bail 243 effective from approximately the 207° point to the 225° point in the said cycle (see Fig. 10). The said bail 243 is secured to arm 244, which arm in turn is fixed to shaft 245 journaled in the said plates 215 and 221, which shaft has affixed thereto a spring urged cam follower arm 246 (Fig. 3) cooperating with a related cam 247 secured to shaft 220. Said cam 247 is effective, during each cycle of rotation of shaft 220 (see Fig. 10), to partially rotate the follower arm 246 and shaft 245 in a counterclockwise direction (Fig. 3) to cause the bail 243 to positively urge and restore the latch levers 227 to the normal latched position out of the path of the latching ends of the related punch levers 217, as shown in Fig. 2. Upon release of the latched punch levers 217, the punch elements are withdrawn immediately from the perforated tape under influence of the related springs 213. For this condition, the punch levers are positioned about the eccentric 219 as a pivot. It is evident from the description to follow, if it is desired to withdraw the punch elements positively from the tape under influence of the eccentric, it is merely necessary to prolong the period during which the punch levers are held in latched positions by levers 227 and delay the period in the cycle during which

the bails 243 and 250 are operated for resetting and latching the said levers 227.

Reset means are also provided for positively restoring the attracted armatures 231 of magnets 232 to the normal positions, shown in Fig. 2, at the time bail 243 is operated for resetting the latch levers 227. This means comprises a bail 250 which is arranged common to the free ends of armatures 231 (also see Fig. 6) and is secured to or formed as an integral part of an arm 251 secured to shaft 252, the latter being suitably journaled in plates 215 and 221. Shaft 252 has affixed thereto a spring urged cam follower arm 253 (Fig. 3) cooperating with a related cam 254 secured to shaft 220. This cam is effective, at the same time during which cam 247 positions bail 243 (see Fig. 10), to urge the said bail 250 in a counterclockwise direction to move positively any of the displaced armatures 231 to the normal position, in order to engage and latch the released arms 227*d* of the latch levers 227.

Suitable means for intermittently advancing the tape 235 are provided, which means in the present arrangement are operated near the end of each cycle of rotation of the said shaft 220. The tape 235 is fed, step by step, from a suitable supply 255, the reel 256 for which is loosely mounted in support 257 secured to plate 221, under a pivoted tape lever 258, over hinged roller 259 and tape guide member 260, between the separated blocks 211 and 212, over a sprocket wheel 261, and under a guide post 262 to the take-up reel 263. Said sprocket wheel 261 is provided with centrally located and equally spaced teeth 264 for engaging the centrally located feed perforations 265 in the tape 235. The usual positionable arcuately shaped and slotted tape finger guide 266 is provided to press the tape against the said sprocket wheel. Sprocket wheel 261 is fixed to shaft 267 journaled in plates 215 and 221. Shaft 267 has secured thereto a ratchet wheel 268 (Fig. 3), which is advanced step by step by a spring urged cooperating pawl 269 pivotally mounted on a cam follower arm 270.

Cam follower arm 270 is pivotally mounted on plate 215 and urged against a related cam 271 by spring 272. Near the end of each cycle of shaft 220 (see Fig. 10), the high point of cam 271 moves the cam follower arm 270 and pawl 269 to the left, as viewed in Fig. 3, to advance the ratchet wheel 268 one step, and consequently the sprocket wheel 261. Thus, the tape 235 is advanced to present the next position thereon to the punching elements. During further rotation of cam 271, spring 272 is effective to cause the pawl 269 to ride over a tooth of the ratchet wheel and be in a position for another feeding operation.

A fixed plate 273 secured to plate 215 is provided with a camming surface 274 which is engaged by the free end of pawl 269, as the latter is urged to the left (Fig. 3), thus insuring a positive driving connection between the pawl and ratchet wheel and also preventing an overdrive of the ratchet wheel. The usual spring urged detent arm 275 is provided and cooperates with a detent wheel 276 fixed to shaft 267 for maintaining the said shaft 267, ratchet wheel 268 and sprocket wheel 261 in the advanced position. In order to facilitate tape insertion and removal operations, the tape finger guide 266 is secured to an arm 277 pivotally mounted on plate 215, which arm is pivotally connected to one end of link 277*a*, the other end of which is connected by a pin and slot connection to the pivotally mounted and spring urged tape guide member 260. Thus, whenever the guide 266 is raised manually, the guide member 260 is also partially rotated in a counterclockwise direction (Fig. 2), so that the tape becomes easily accessible on both sides of the punch station.

From the description up to this point, it is understood that, at the start of each cycle of rotation of shaft 220, the latch levers 227 are released and positioned in any desired combination, upon energization of the related magnets 232, so as to be partially rotated in a clockwise direction (Fig. 2), in order to latch the free ends of the related punch levers 217. Next, the locking bail 238 is operated to engage and lock the displaced latch levers 227 in a latched position, during part of the cycle, and to prevent further latching operations by the remaining latch lever or levers during this cycle.

Eccentric 219 is then effective to oscillate the latched punch levers 217 causing the connected punch elements 210 to be operated to perforate the tape 235, in accordance with the selected combination of operated punches, while the said tape is at rest at the punching station (see code groups of perforations 277). After the punching operation, the locking bail 238 is restored to its normal position and the reset bails 243 and 250 are rendered operative to restore the latch levers 227 and armatures 231, respectively, to their normal positions, thereby releasing the latching ends of the related punch levers and permitting the punch elements to be withdrawn from the tape. The tape feeding mechanism is then rendered operative, near the end of the cycle, to advance the tape one step, thus presenting the next punching position on the tape to the said punch elements.

It should be mentioned at this time that the centrally located perforations 265 are not originally provided in the tape 235 but are formed therein during each punching operation. Referring now to Fig. 7, it is seen that for this purpose a special latch lever 278 is provided, which is also pivotally mounted on stud shaft 228 and disposed in related slots in the guide combs 226 and 229. This latch lever is also provided with a latching shoulder 279, similar to latching shoulders 230, which shoulder 279 constantly engages the latching end of the related punch lever 280 under the influence of spring 281, so that during each punching operation the said lever 280 is effective to operate the connected punch element 282, similarly as described hereinabove. In this way, the centrally located feed perforations 265 are formed in the paper tape. It is to be noted that latch lever 278 is not provided with a latch arm similar to arms 227*d*, and obviously there is no need for it, since latch lever 278 always is maintained in a latching position. Also, it is to be noted in Fig. 7 that the reset bail 243 is provided with a recess 283 so that, during the resetting of latch levers 227, the said special latch lever 278 is not engaged by the said bail and accordingly no release of punch lever 280 is effected during the resetting operations. After perforation of the tape, each cycle, the related punch element is withdrawn from the tape under the influence of the eccentric 219. Since the punch lever is latched constantly, a pivotal connection is formed by the latched end of punch lever 280 and the stop guide or rod 223 thereby enabling the eccentric to positively restore the punch element to its normal retracted position.

In order to control the start-stop operations of shaft 220, a well known type of electromagnetically controlled, one-revolution clutch means is provided. For a detailed description of a similar

clutch mechanism reference should be made to U. S. Patent 2,206,646, issued to Schneider on July 2, 1940. Accordingly, the brief description to be given is deemed sufficient for complete comprehension of the present invention. In Figs. 1 and 5, this clutch means is shown to comprise an annular member 290 which is secured to shaft 220. A slidable and spring urged dog member 291 is disposed in a suitable channel formed in the said annular member, which dog member is provided with a single tooth 292. A dog lift lever 293 is pivotally mounted in the annular member 290 and is disposed in a suitable channel-way formed in the slidable dog member 291. The free end of the said dog lift lever extends beyond the periphery of the annular member 290 and normally is positioned against a stop 294 formed on the suitably pivoted lever 295 (secured to stud shaft 295a), which lever normally is urged by spring 296 so that the said stop 294 is in the path of the dog lift lever 293. With the described elements of the clutch means in this position, the dog lift lever 293 is effective to hold the dog member 291 so that the single tooth formed thereon is out of the path of a ratchet wheel 297 secured to constantly rotated shaft 298, and disposed in close proximity to the annular member 290.

Secured to the said pivoted lever 295 is an armature 299 of an associated and suitably disposed magnet 300, which armature upon momentary energization of magnet 300 positions the stop 294 of lever 295 out of the path of the dog lift lever 293, thereby releasing the latter and permitting the dog member 291 to be positioned so that its tooth 292 engages the ratchet wheel 297. Shaft 298 is constantly rotated by means of motor 301, the shaft of which is connected to shaft 298 by a suitable worm and worm wheel drive 302. In this manner shaft 220 is rotated. Upon completion of a cycle of rotation of shaft 220, the dog lift lever 293 is urged against the said stop 294 to disconnect the tooth 292 of the dog member from the constantly rotated ratchet wheel 297, thus preventing further rotation of this shaft. Suitable locking means are provided for this described clutch, and comprises a suitably disposed, spring urged arm 303 (secured to stud shaft 295a) cooperating with a suitable notch 304 formed in a cam 305, the latter being fixed to shaft 220. The high point of cam 305 cooperating with arm 303 serves as a positive resetting device for stop 294 and armature 299 (see Fig. 10).

Any of the known controlling means can be employed for controlling the energization of the punch magnets 232, and the clutch control magnet 300. In the simplified circuit diagram (Fig. 11) individual control contacts 310 are shown for connecting the related punch magnets 232 to a power supply circuit and contacts 311 for connecting the clutch control magnet 300 to the said supply circuit. The contacts 310 can be operated individually, or in any desired combination, to cause energization of the punch magnets 232, thereby causing the tape or sheet to be perforated accordingly. It is preferred to have the contacts 311 closed at substantially the same time the punch magnets 232 are energized, so that the clutch mechanism is operated and effective to connect the punch shaft 220 to the constantly rotated shaft 298. Contacts 310, for example, can be controlled accordingly by means of the well known perforated tape analyzing means employed in printing telegraph systems or, if preferred, can be controlled by means of well known types of keyboard controlled devices.

One example of a suitable keyboard controlled device is shown in U. S. Patent 2,165,237 to C. R. Doty, dated July 11, 1939. In Fig. 12 of the present application, a single view of a keyboard device of this type for operating the selector magnet contacts 310 is shown. The key 417 pivoted on a stationary member 418 operates a trip arm 400 of a well known form of power driven type bar actuating mechanism. This mechanism includes a cam 411 journaled upon one arm of an operating lever 412, in position to engage a power driven roller 410, when released by the trip lever 400. The lever 412 is connected by a linkage 416 to a type bar mechanism not shown in the drawing. As the cam 411 revolves in contact with the roller 410, it engages a roller 401 of a related group of contacts 310. Each cam 411 has a particular group of the contacts 310 associated with it, the groups being different for the different cams. Thus, when a particular key lever 417 is actuated, a certain combination of the contacts 310 is closed.

Fig. 13 shows an alternative mechanism for controlling the selector magnets, in the form of a tape sensing apparatus of conventional design. Tape 420, similar to tape 235, is guided over rollers 421 and 422, the latter having peripheral pins 423 to engage feed holes in the tape, corresponding to the holes 265 of tape 235. Fixed to the feed roller 422 is a ratchet wheel 424 with which coacts a dog 425 articulated at 426 to a lever 427. The latter is pivoted at 428 to a stationary part and has an armature 429 coacting with an electromagnet 430. A spring 431 holds the dog 425 against the ratchet wheel 424, and a spring 432 holds the lever 427 against a stop 433. When the magnet 430 is energized, the dog is retracted to engage another tooth and, when the magnet is deenergized, the dog feeds the ratchet wheel 424 and the feed roller 422, to advance the next combination of holes on the tape to sensing position. There is a set of five sensing levers 435 pivoted at 436, only one being shown in Fig. 13. These levers are spaced transversely to the tape and have sensing prongs 437 to sense the holes in the tape. Each lever 435 is pulled in counterclockwise direction by a spring 438, but restrained by a lever 439 pivoted at 440 and biased by a stronger spring 441. An electromagnet 442, when energized, rocks the lever 439 and releases the sensing levers 435. Those levers which find a hole in the tape close related contacts 310 by their rear arms 443.

With reference again to Fig. 2, a pivoted bail 312 is provided which is common to the arms 227c of latch levers 227 and supported by arms 313 (Fig. 1) mounted on shaft 314. One of the said arms 313 is provided with an extension arm 315 and roller 316 so that, upon the displacement or release of any latch lever 227, the described bail assembly is partially rotated in a counterclockwise direction to close the suitably disposed contacts 311. Thus, it is seen that the clutch control magnet 300 is energized any time the punch magnets 232 are energized to release the said latch levers 227, for effecting rotation of shaft 220.

Suitably disposed cam controlled contacts can be provided, such as contacts C1 and C2, which are operated cyclically by related cam elements 309 secured to the start-stop shaft 220. The normally closed contacts C1 can be inserted in the circuit to the clutch control magnet 300 as common timing control contacts (see Fig. 11). Reference can be made to the copending application of Mills and Rabenda, Serial No. 450,248, filed

July 9, 1942, showing one contemplated embodiment of the instant perforating apparatus and the circuit controlled by the said cam controlled contacts.

Additional controlling contacts can be provided, if desired, for example, the suitably disposed tape controlled contacts 317 secured to upright plate 215. These contacts are controlled both upon the exhaustion of the tape supply to the punch station, and by the tautness of the tape supply. A contact operating arm 318 is secured to shaft 319 journaled in plates 215 and 221, which arm is constantly urged in a counterclockwise direction (Fig. 2) by the elongated spring blade of contacts 317. Also secured to shaft 319 is a dog member 320 having oppositely directed pins 321 fastened thereto. The spring urged tape lever 258 is pivotally mounted on shaft 319 and rides on the tape 235, thus preventing engagement of the lever and one of the pins 321. However, upon exhaustion of the tape, the lever 258 is rotated sufficiently in a clockwise direction to engage and partially rotate the dog member and operating arm 318 to open the contacts 317. A tape tension arm 322 having a roller 323 is also rotatably mounted on shaft 319, which arm 318 is urged in a counterclockwise direction by spring 324. In the event the tape supply to the punch station becomes too taut, the tape 235 is effective to cause the arm 322 to be partially rotated in a clockwise direction to engage the other pin 321 on the dog member 320, to rotate the latter and operating arm 318 to open the said contacts 317. These contacts can be connected in the circuit to the clutch control magnet 300, as indicated in Fig. 11, so that this magnet cannot be energized whenever the tape becomes too taut or the supply thereof exhausted.

While there have 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. Perforating apparatus comprising a plurality of punch elements, a plurality of punch levers, one for each punch element, each lever having one end pivotally connected to a related punch element, rotatable eccentric means constantly engaging the punch levers for actuating the latter, a plurality of positionable latch members, one for each punch lever, individual means for normally latching the said members in positions in close proximity to, but out of the paths of, the other ends of the related punch levers, and means for selectively operating the said latching means and releasing the related members so that the latter engage and latch the said other ends of the related punch levers, thereby causing the latched actuated levers to operate the connected punch elements.

2. Perforating apparatus comprising a plurality of punch elements, a plurality of punch levers, one for each punch element, each lever having one end pivotally connected to a related punch element, rotatable eccentric means constantly engaging the punch levers for actuating the latter, a plurality of positionable latch members, one for each punch lever, each member having a latching arm, individual positionable means normally cooperating with the latching arms of said members for holding the latter in close proximity to, but out of the paths of, the other ends of the related punch levers, and means for selectively positioning the said holding means and releasing the related members so that the latter engage and latch the said other ends of the related punch levers, thereby causing the latched actuated levers to operate the connected punch elements.

3. The invention set forth in claim 2 wherein means are provided for positively restoring the positioned holding means to their normal positions for further cooperation with the said latching arms.

4. The invention set forth in claim 2 wherein cyclically operable means are provided for positively restoring the positioned holding means to their normal positions for further cooperation with the said latching arms.

5. Perforating apparatus comprising a plurality of punch elements, a plurality of punch levers, one for each punch element, each lever having one end pivotally connected to a related punch element, rotatable eccentric means constantly engaging the punch levers for actuating the latter, a plurality of positionable latch members, one for each punch lever, each member having a latching arm, individual positionable means normally cooperating with the latching arms of said members for holding the latter in close proximity to but out of the paths of, the other ends of the related punch levers, and individual electromagnetic means for selectively positioning the said holding means and releasing the related members so that the latter engage and latch the said other ends of the related punch levers, thereby causing the latched actuated levers to operate the connected punch elements.

6. Perforating apparatus comprising a plurality of punch elements, a plurality of punch levers, one for each punch element, each lever having one end pivotally connected to a related punch element, rotatable eccentric means constantly engaging the punch levers for actuating the latter, a plurality of positionable latch members, one for each punch lever, each member having a latching arm, individual positionable means normally cooperating with the latching arms of said members for holding the latter in close proximity to, but out of the paths of, the other ends of the related punch levers, individual electromagnetic means for selectively positioning the said holding means and releasing the related members so that the latter engage and latch the said other ends of the related punch levers, thereby causing the latched actuated levers to operate the connected punch elements, and means for positively restoring the positioned holding means to their normal positions for further cooperation with the said latching means.

7. Perforating apparatus comprising a plurality of punch elements, a plurality of punch levers, one for each punch element, each lever having one end pivotally connected to a related punch element, rotatable eccentric means constantly engaging the punch levers for actuating the latter, a plurality of positionable latch members, one for each punch lever, each member having a latching arm, individual positionable means normally cooperating with the latching arms of said members for holding the latter in close proximity to, but out of the paths of, the other ends of the related punch levers, individual electromagnetic means for selectively positioning the said

holding means and releasing the related members so that the latter engage and latch the said other ends of the related punch levers, thereby causing the latched actuated levers to operate the connected punch elements, and cyclically operable means for positively restoring the positioned holding means to their normal positions for further cooperation with the said latching arms.

8. Perforating apparatus comprising a plurality of punch elements, a plurality of punch levers, one for each punch element, each lever having one end pivotally connected to a related punch element, rotatable means constantly engaging the punch levers for actuating the latter, start-stop control means for rendering the said rotatable means operative for a cycle of rotation, a plurality of positionable latch members, one for each punch lever, individual means for normally latching the said members in positions in close proximity to, but out of the paths of, the other ends of the related punch levers, means for selectively operating the said latching means and releasing the related members so that the latter engage and latch the said other ends of the related punch levers, and common control means actuated by any one of the said released members for influencing the said start-stop control means and rendering the latter operative for a cycle of operation, thereby causing the latched actuated levers to operate the connected punch elements.

9. Perforating apparatus comprising a plurality of punch elements, a plurality of punch levers, one for each punch element, individual latching means, one for each lever, means for selectively displacing the latching means for effecting engagement of the latching means and the related punch levers for latching the latter, rotatable means constantly engaging the punch levers for actuating the latter, start-stop control means for rendering the said rotatable means operative for a cycle of rotation, and common control means actuated by any one of the displaced latching means for influencing the said start-stop control means and rendering the latter operative for a cycle of operation, thereby causing the latched actuated levers to operate the connected punch elements.

10. The invention set forth in claim 9 wherein the said start-stop means includes electromagnetic control means, and the said common control means includes switching means for controlling the energization of the said electromagnetic control means.

11. Perforating means comprising a punch lever, a punch element rockably engaging one part of said punch lever and guided for reciprocation, actuating means engaging a second part of said punch lever, a spring actuated latch normally biased toward effective position to engage a third part of said punch lever to provide a fulcrum therefor, a detent adapted to hold said latch out of said effective position, and means to release said detent from said latch.

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