July 21, 1936. W. W. LASKER 2,048,396

PUNCHING MACHINE

Filed June 7, 1934 16 Sheets-Sheet 1

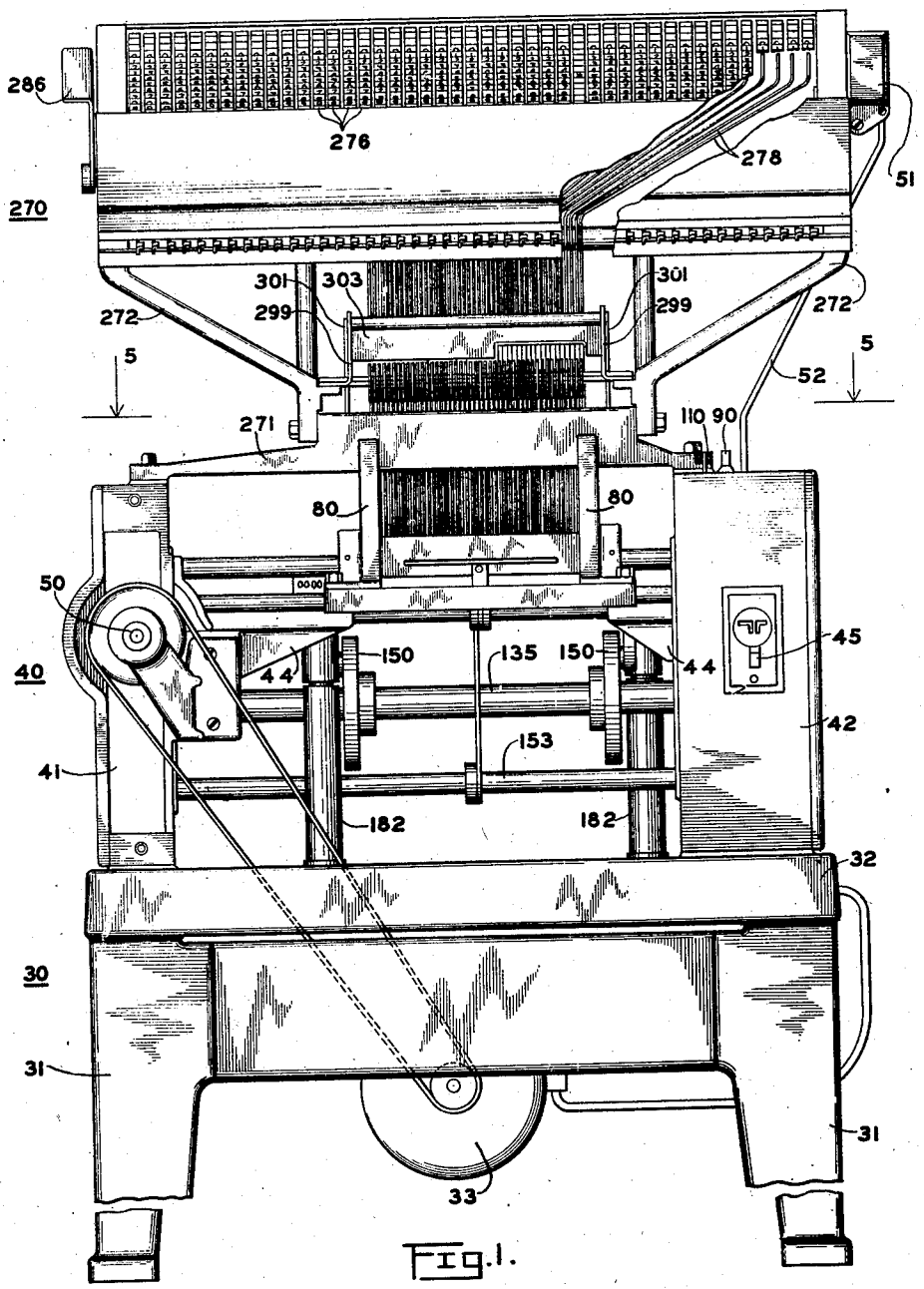


Fig. 1.

William W. Lasker Inventor

by W. A. Sparks

his Attorney

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PUNCHING MACHINE

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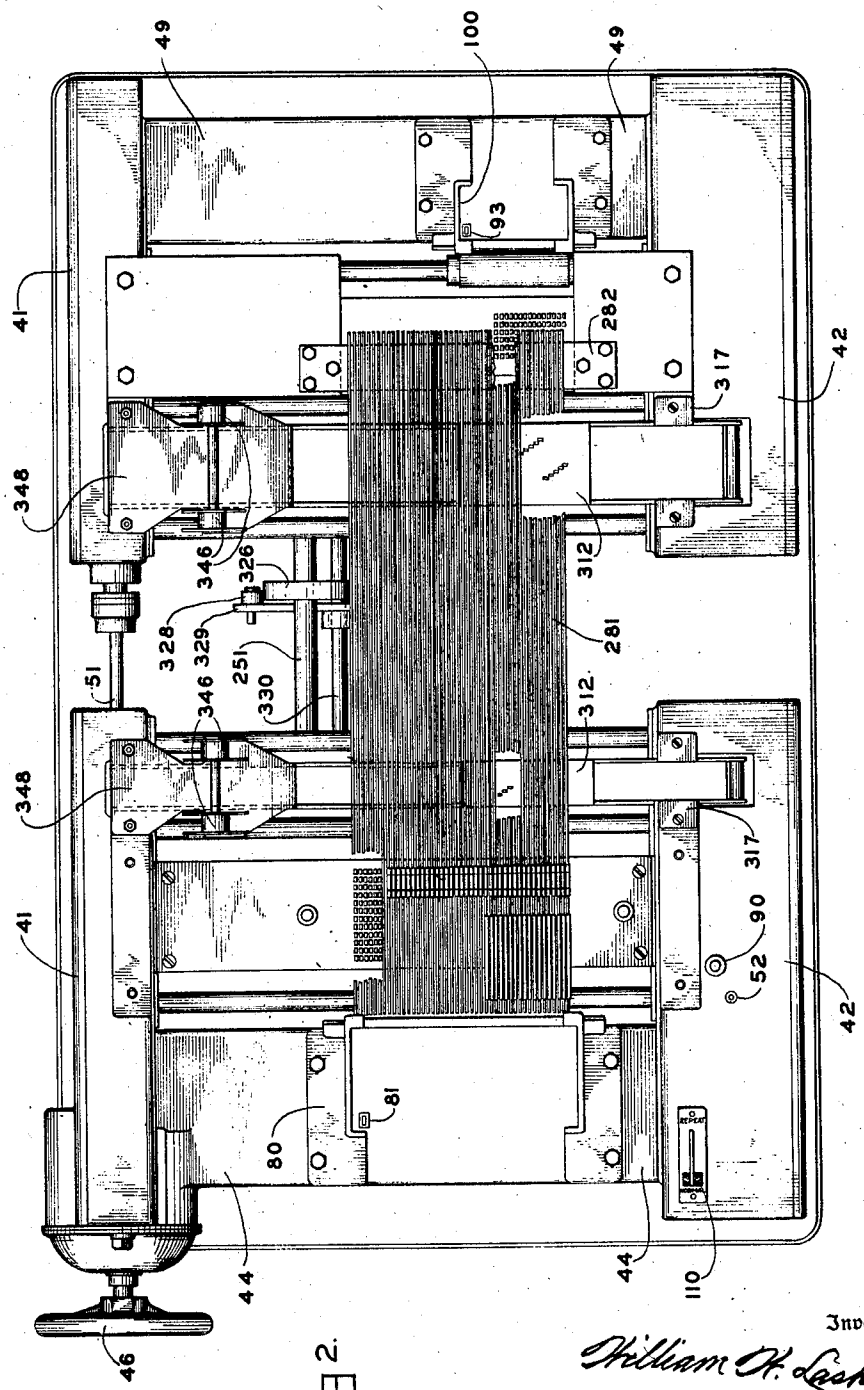


FIG. 2.

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PUNCHING MACHINE

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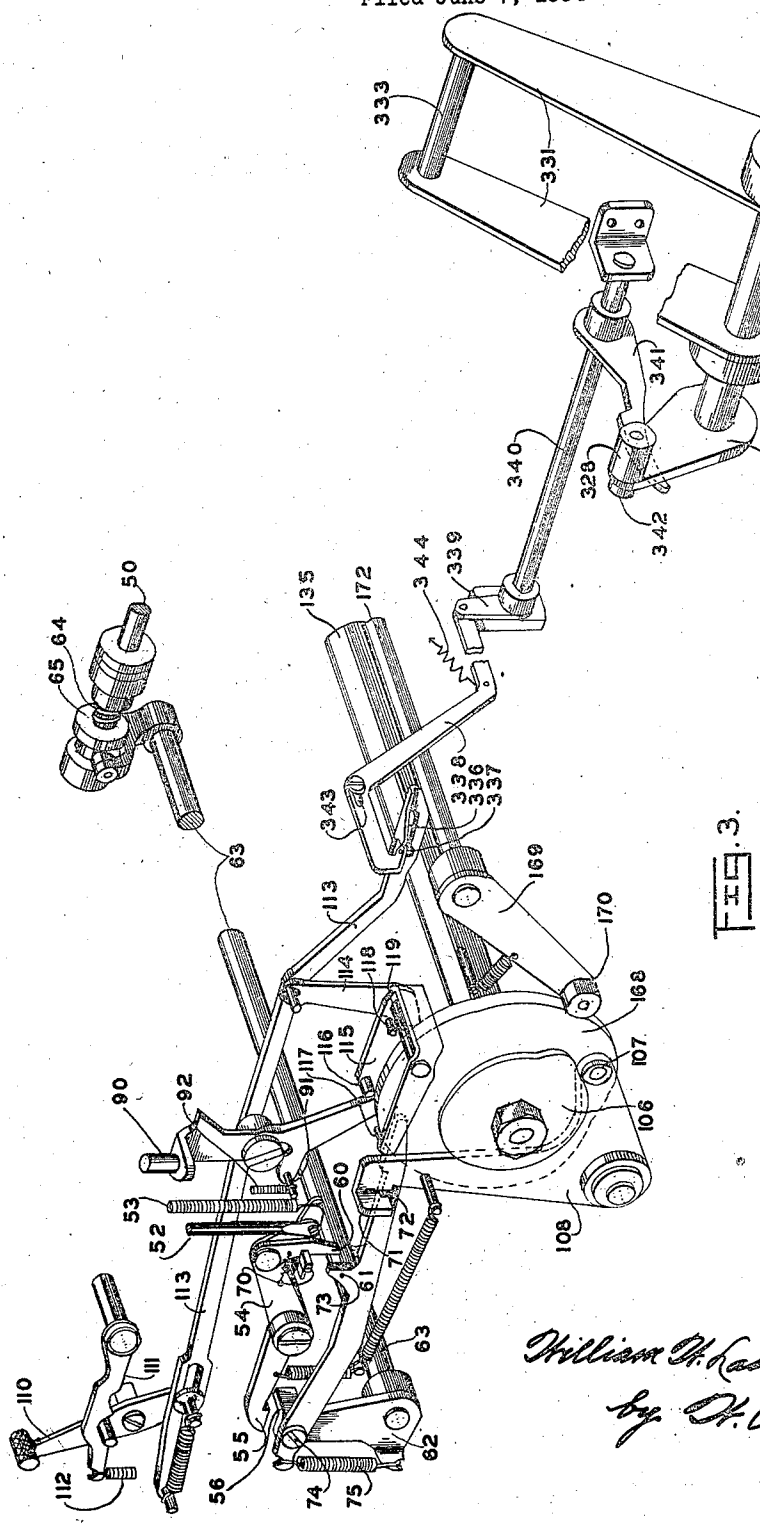


FIG. 3.

William W. Lasker INVENTOR

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PUNCHING MACHINE

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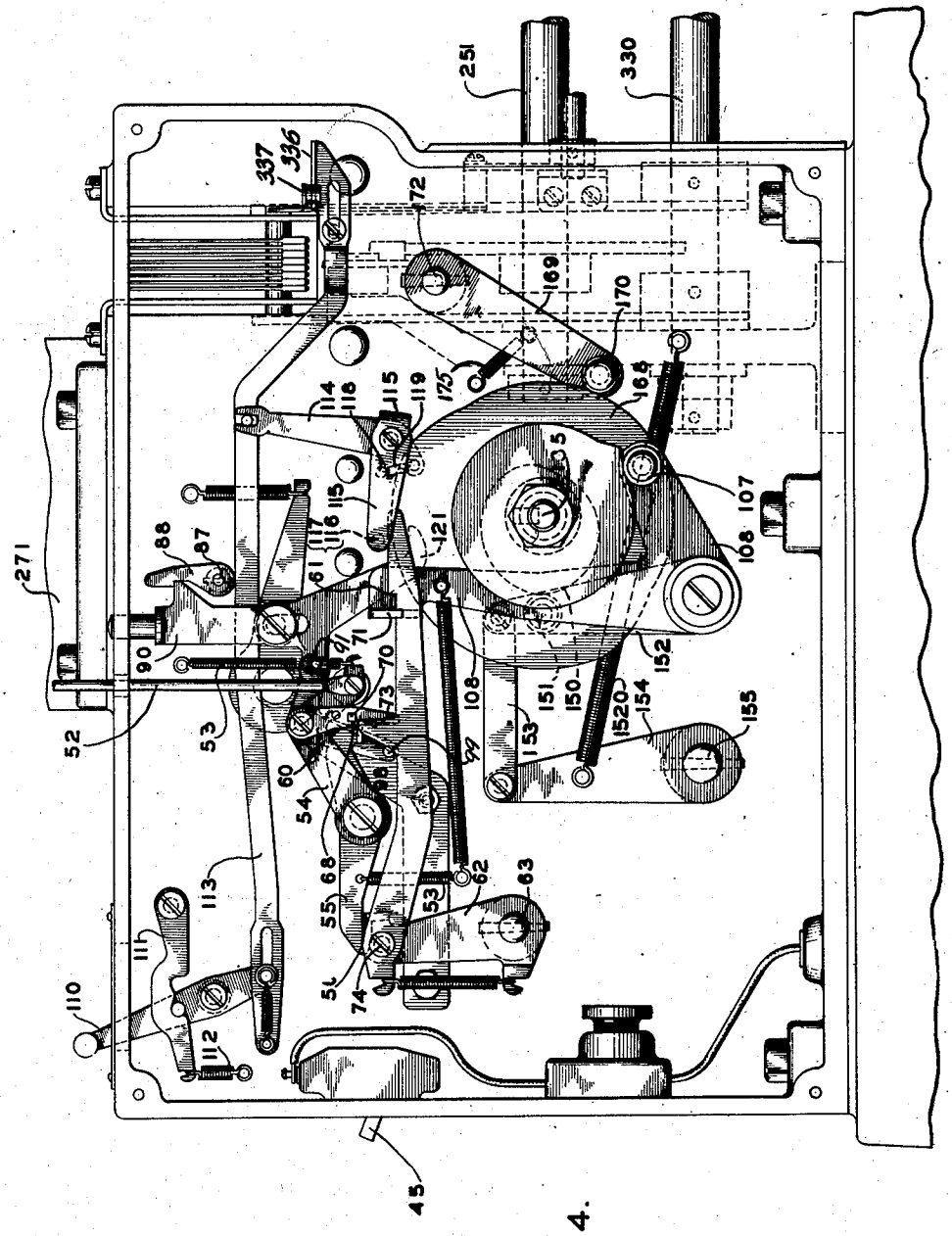


FIG. 4.

Inventor
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PUNCHING MACHINE

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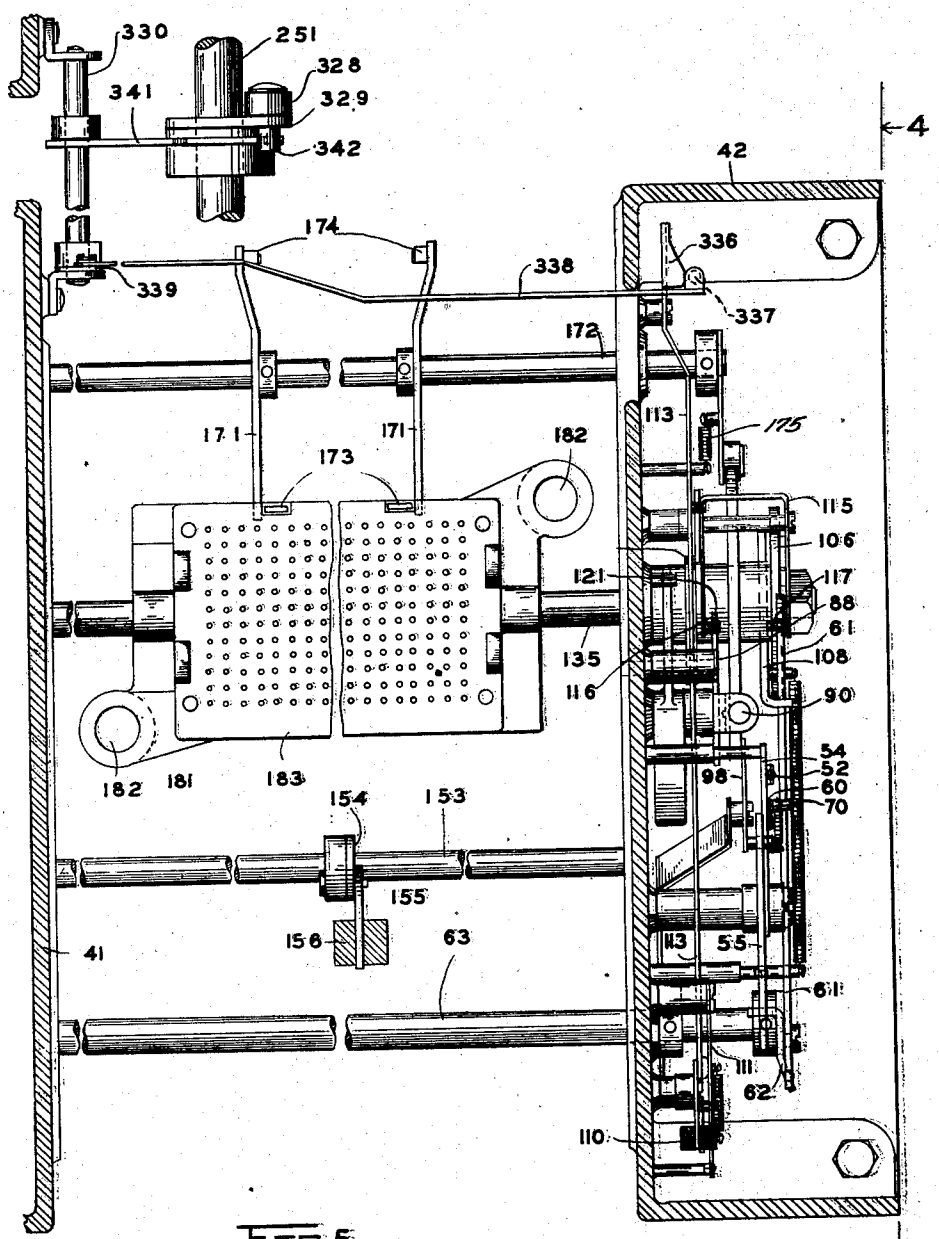


Fig. 5.

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PUNCHING MACHINE

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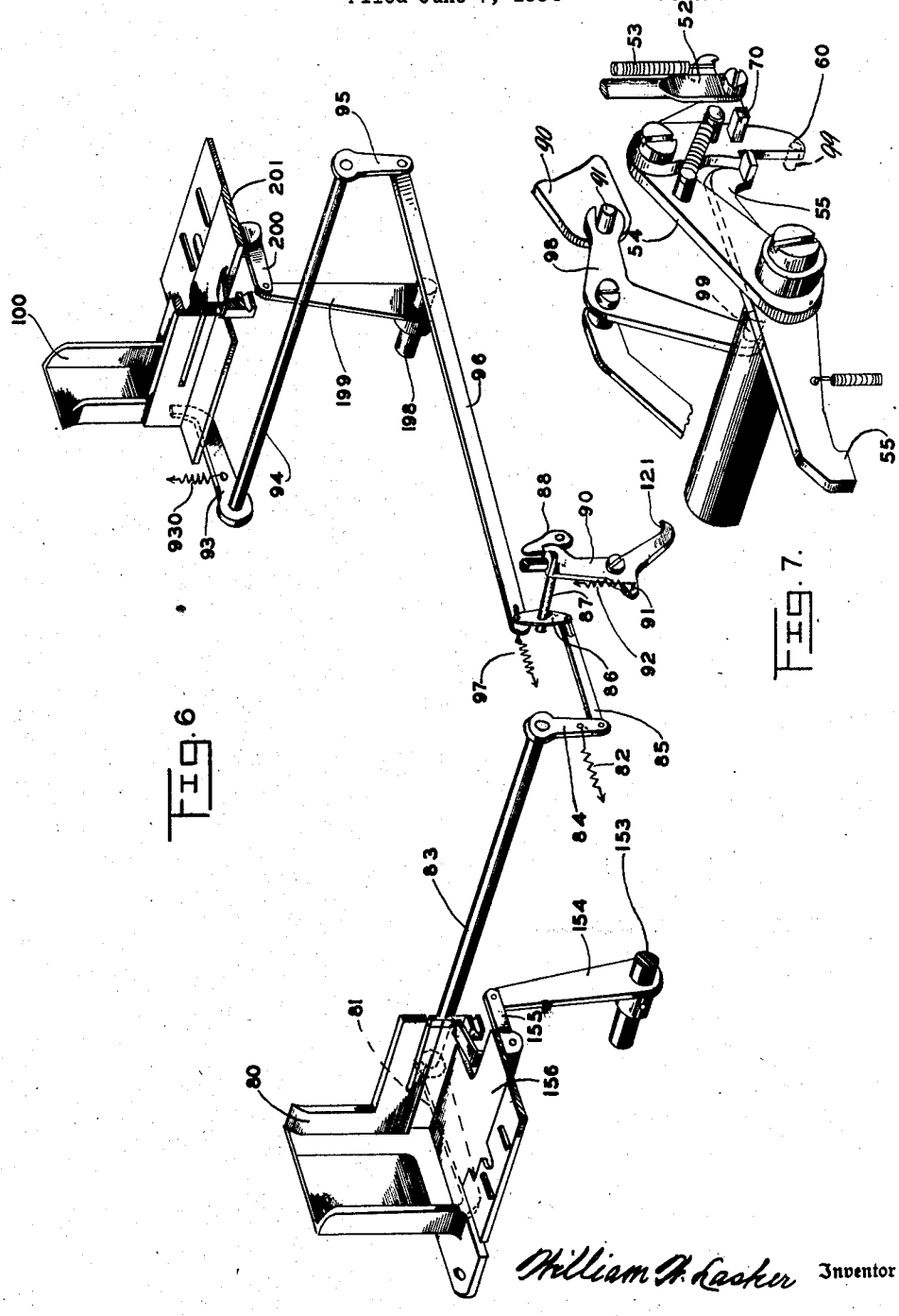


FIG. 6.

FIG. 7.

William W. Lasker Inventor

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his Attorney

July 21, 1936. W. W. LASKER 2,048,396

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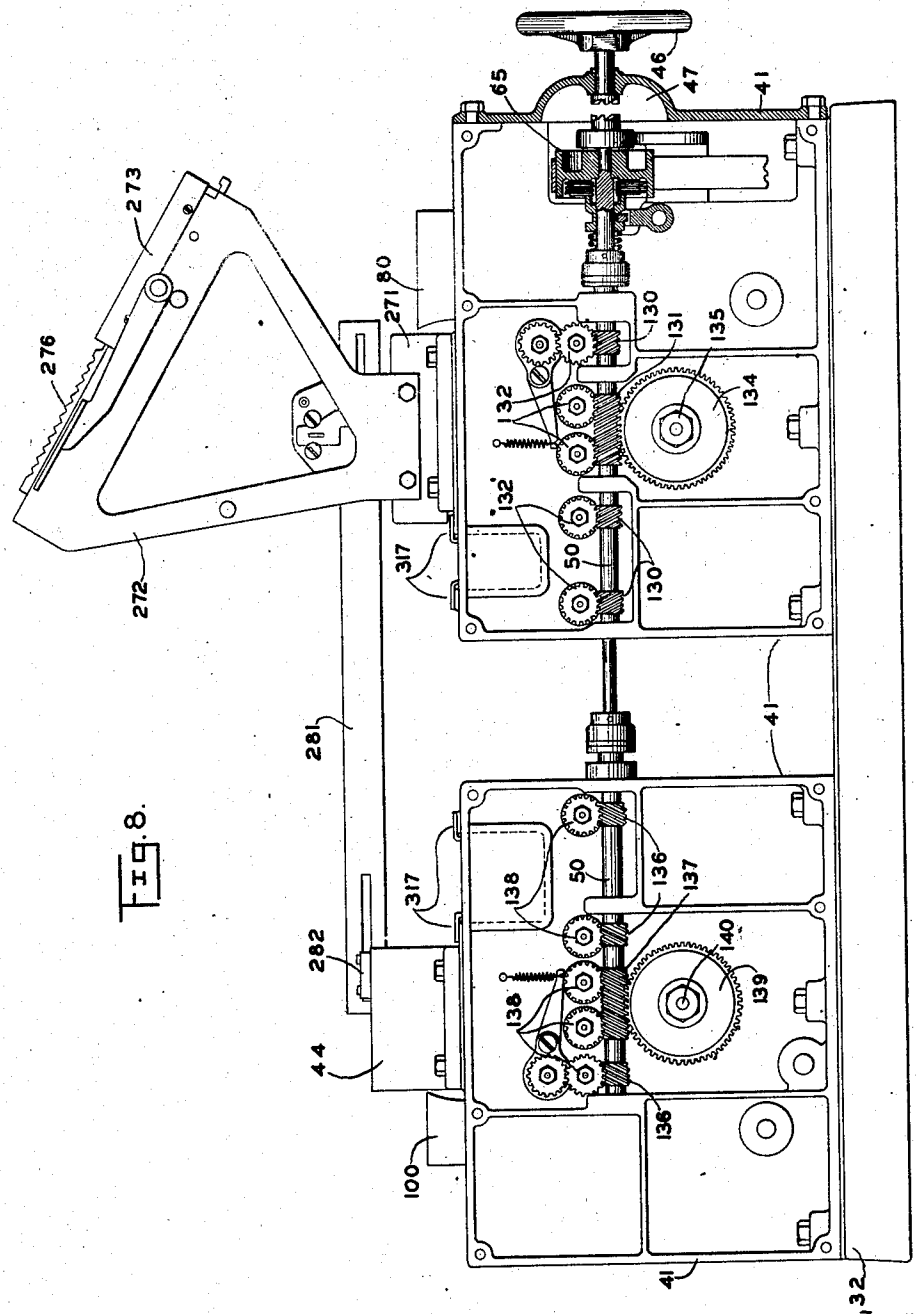


FIG. 8.

Inventor

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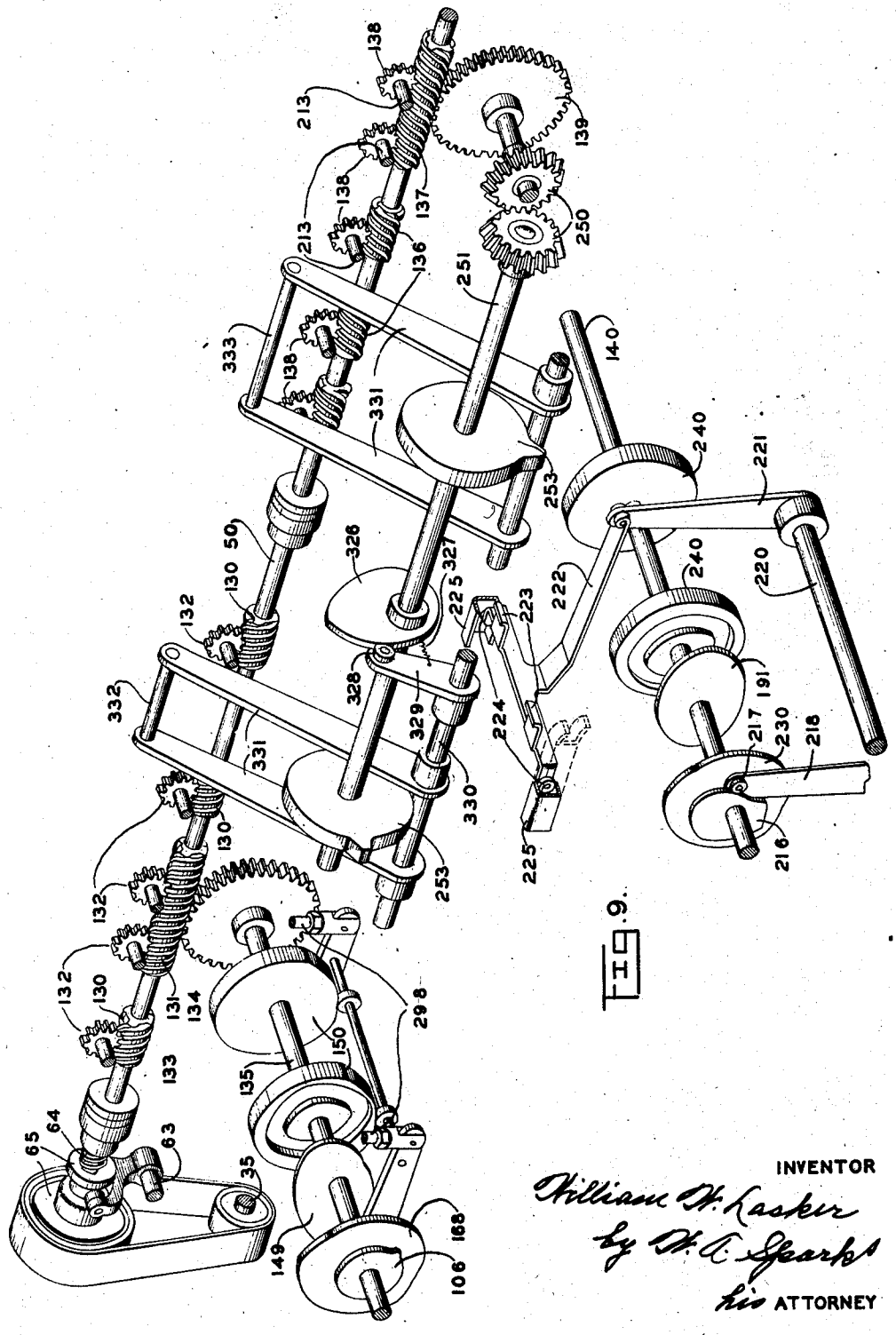


Fig. 9.

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PUNCHING MACHINE

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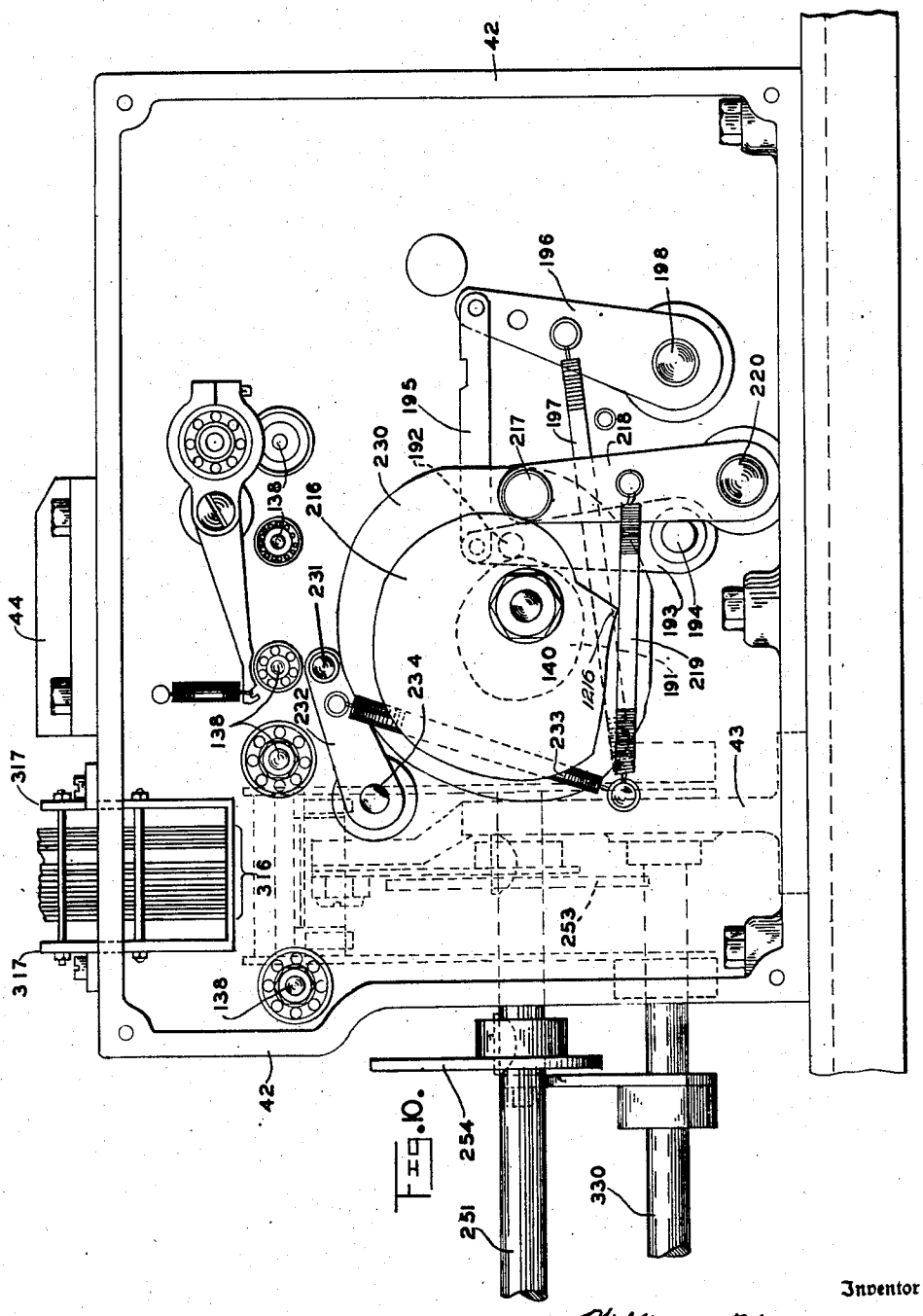


FIG. 10.

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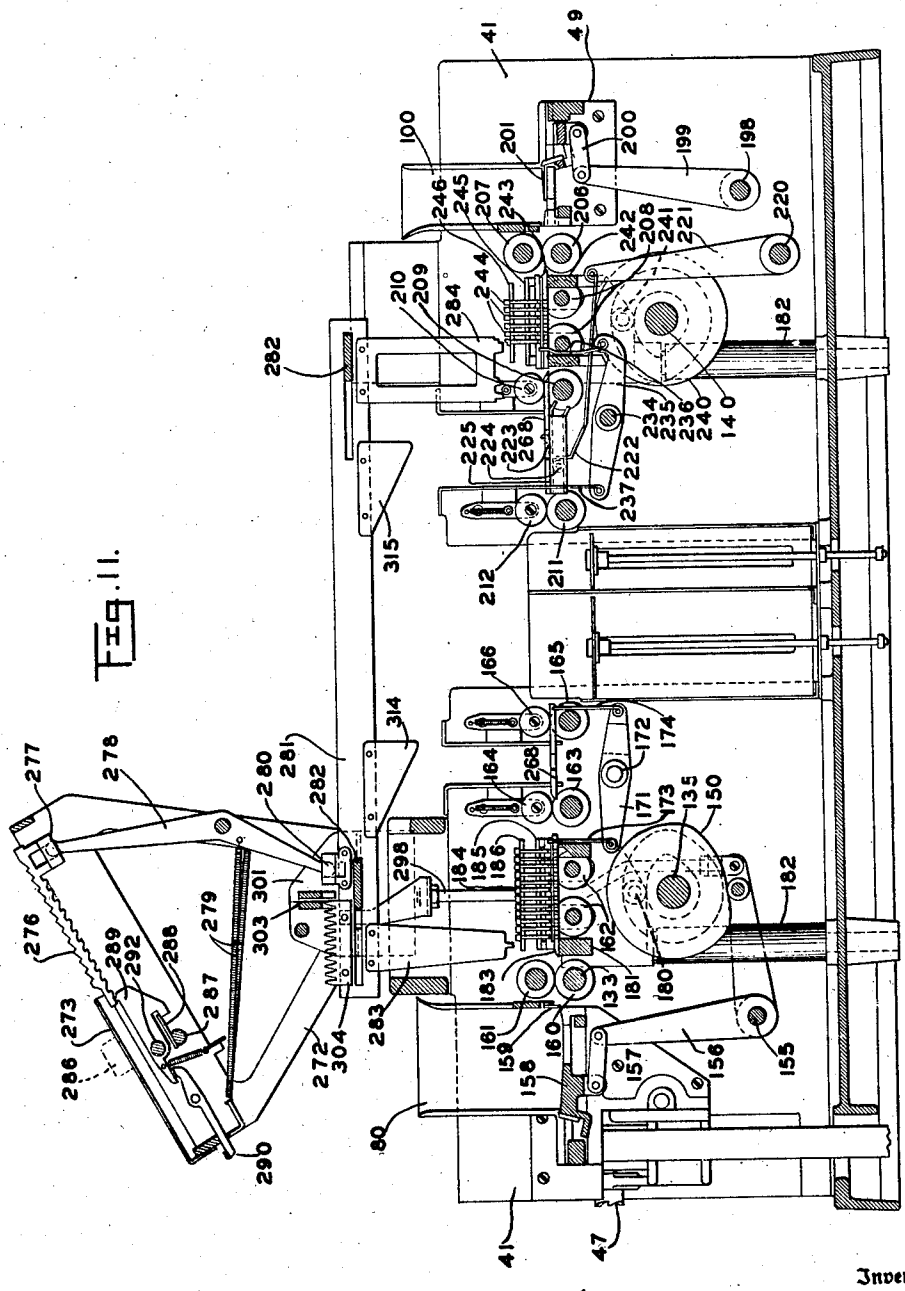


Fig. 11.

Inventor

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PUNCHING MACHINE

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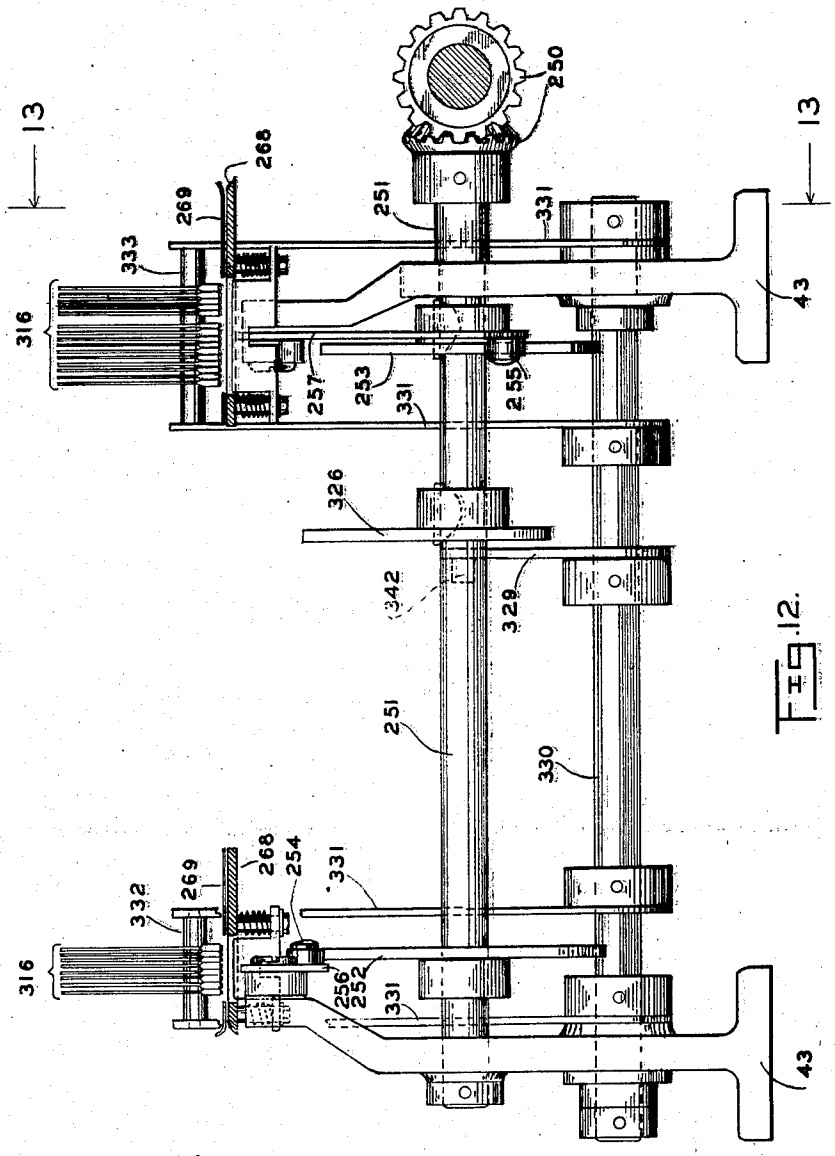


FIG. 12.

William W. Lasker Inventor

by W. A. Sparks

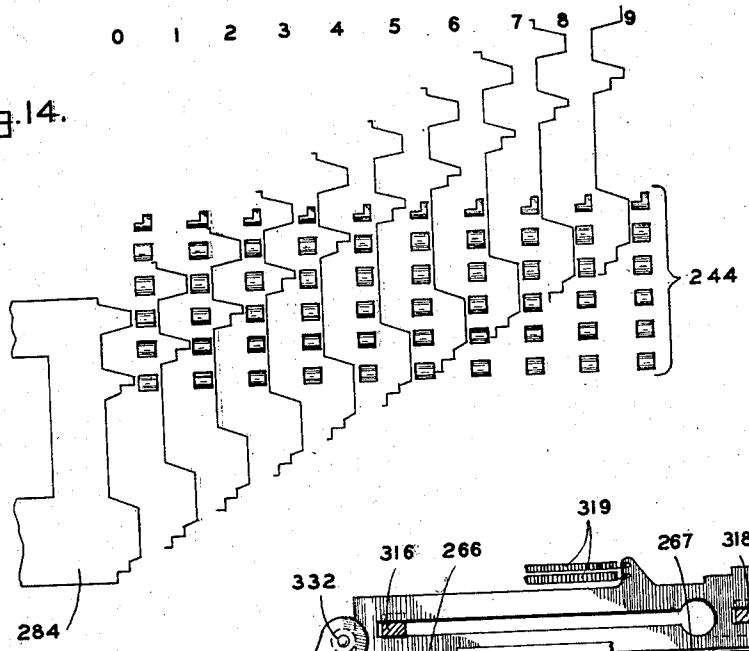
his Attorney

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Fig. 14.



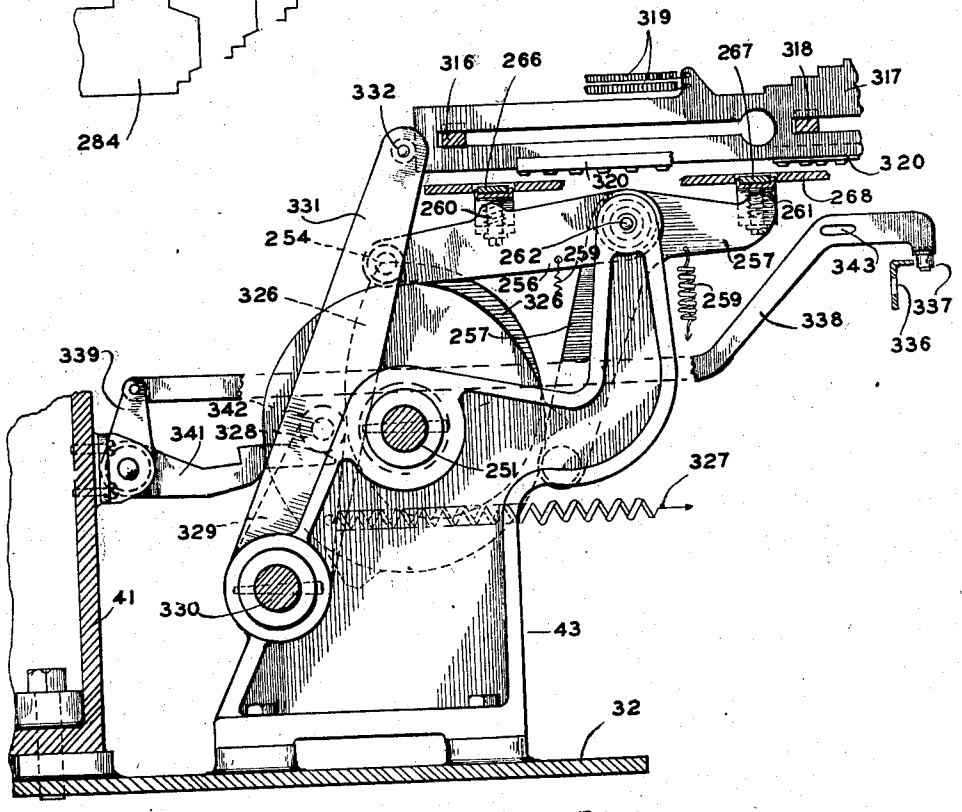


Fig. 13.

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July 21, 1936. W. W. LASKER 2,048,396

PUNCHING MACHINE

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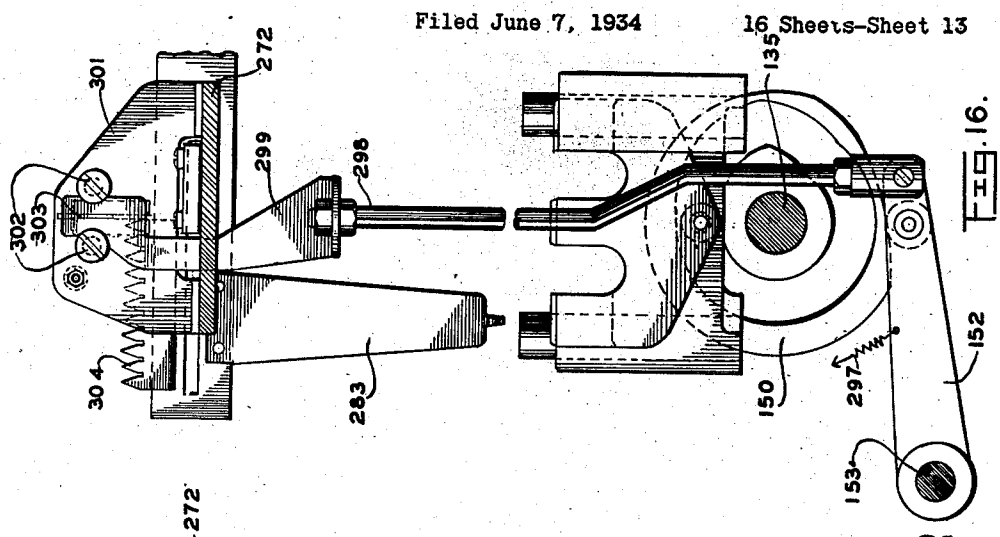


Fig. 16.

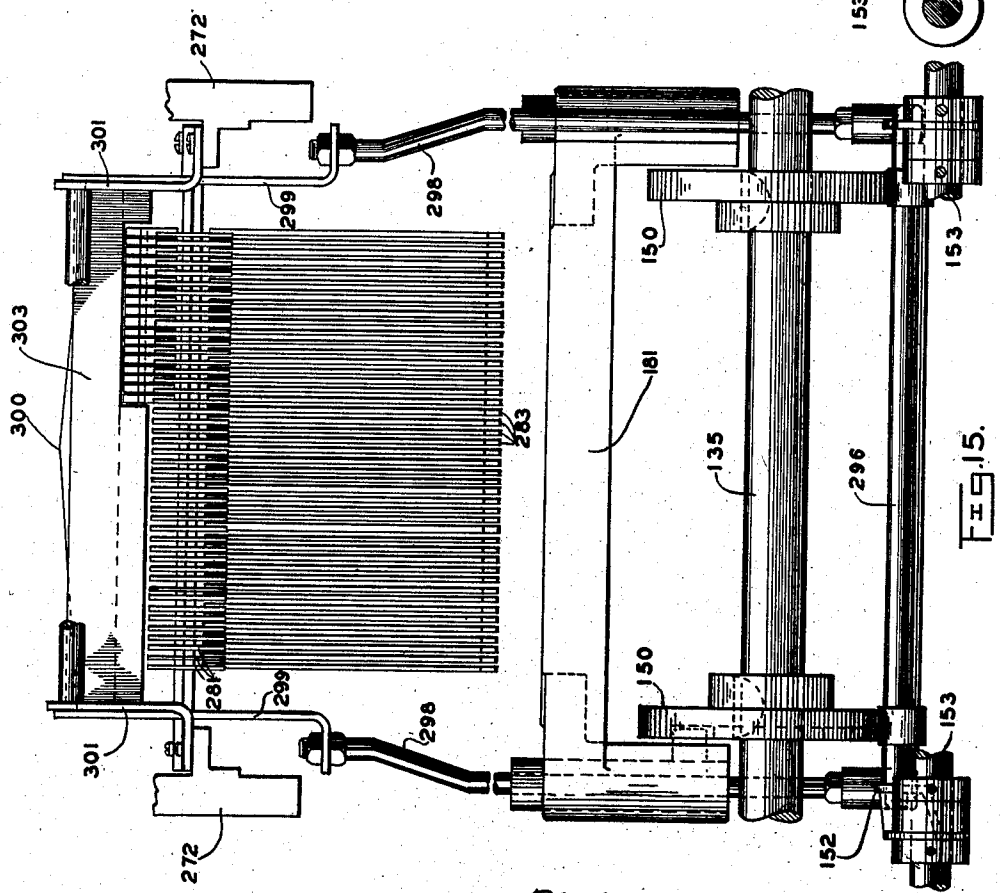


Fig. 15.

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PUNCHING MACHINE

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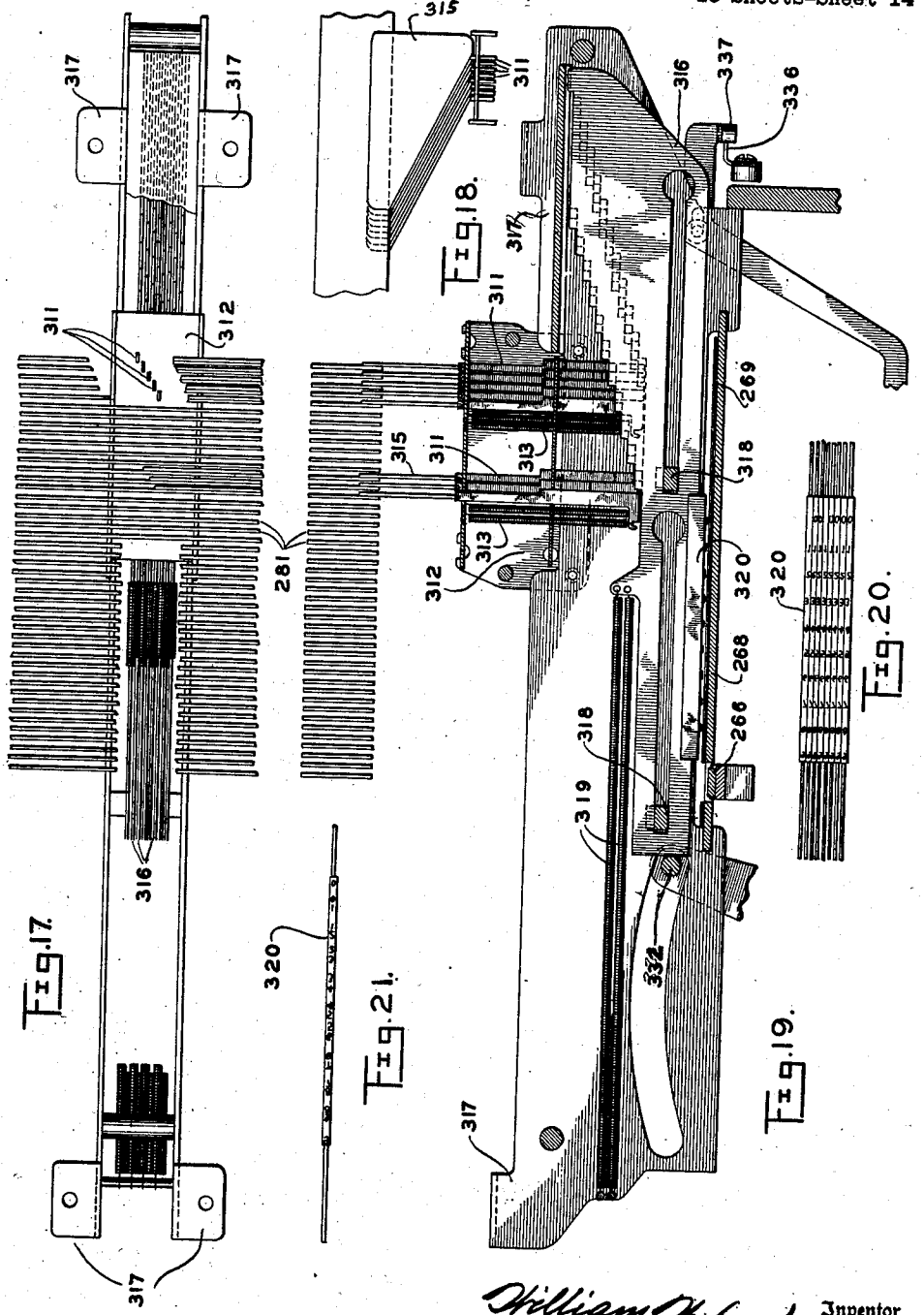


Fig. 17.

Fig. 18.

Fig. 19.

Fig. 20.

Fig. 21.

William W. Lasker Inventor

by A. A. Sparks

his Attorney

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PUNCHING MACHINE

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Fig. 23.

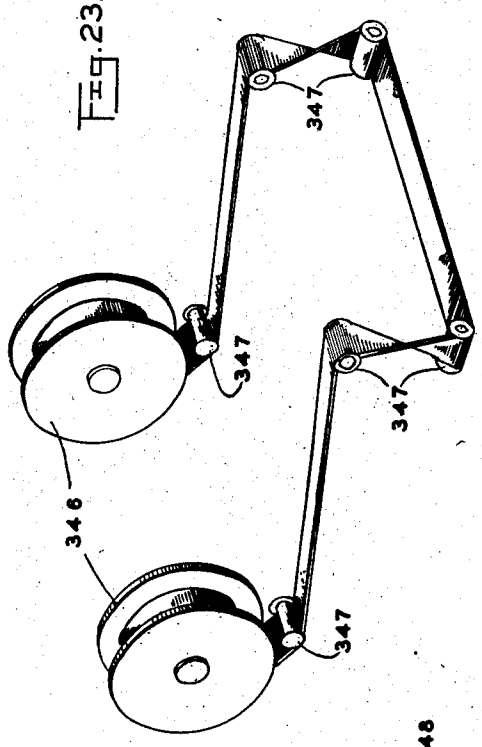


Fig. 22.

Inventor

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PUNCHING MACHINE

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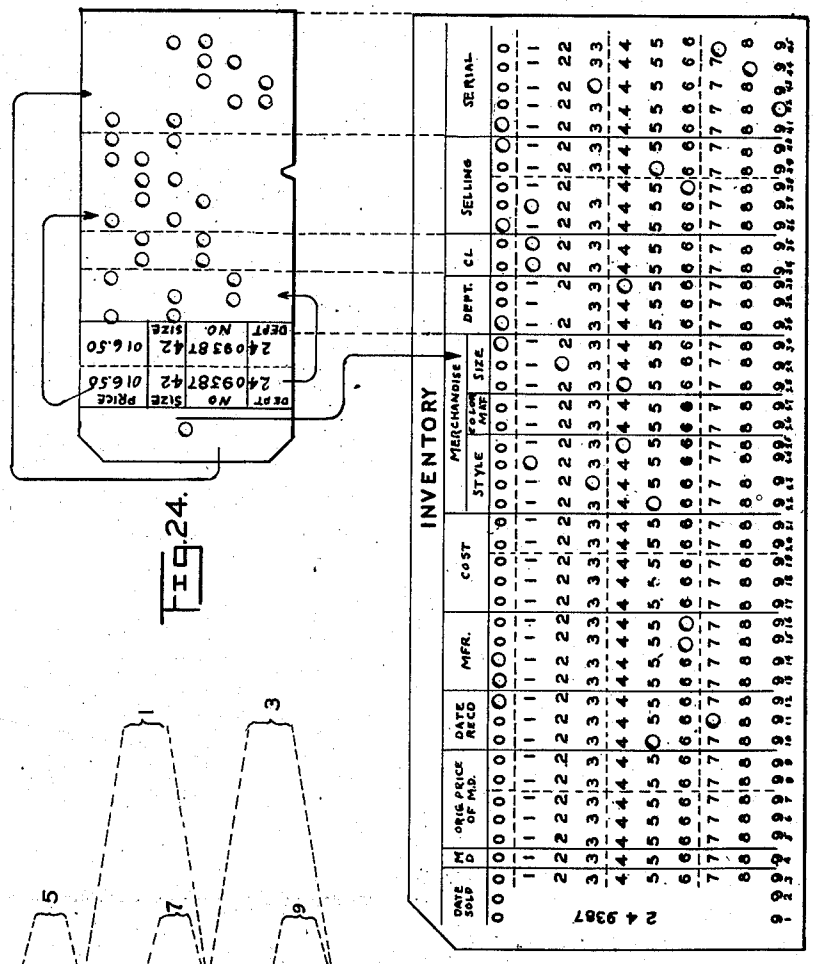


Fig. 24.

Fig. 26.

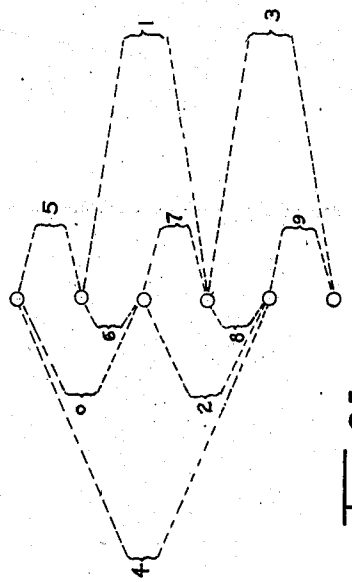


Fig. 25.

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by H. A. Sparks

his Attorney

Patented July 21, 1936 2,048,396

UNITED STATES PATENT OFFICE

2,048,396

PUNCHING MACHINE

William W. Lasker, Brooklyn, N. Y., assignor to Remington Rand Inc., Buffalo, N. Y., a corporation of Delaware

Application June 7, 1934, Serial No. 729,354

3 Claims. (Cl. 101—19)

The present invention is directed to improvements in machines which indicate data by means of code perforations in cards and tags, and particularly to mechanism for simultaneously perforating differing codes in a plurality of cards, and for printing the interpretation of each code on the card which has been perforated according to that code, and, therefore, constitutes a continuation in part of the copending application of Louis F. Woodruff and William W. Lasker for Improvements in punching machines, filed October 22, 1931, Serial No. 570,346.

The machine, of which the present invention is an improvement, is disclosed in patents to Powers 1,086,397, dated February 10, 1914 and 1,242,721, dated October 9, 1917. These machines provide manually settable means which set punches to perforate in a record card the data that has been set up on the keyboard. Machines of this character have been in general use for a number of years.

The present invention contemplates the combination with the above indicated old mechanism of novel improvements, whereby a plurality of cards may be perforated. One of these cards will be called the record card, the other the merchandise tag. The record card is of a pattern such as is used in the Powers tabulating machine, and the system of perforations to be used is the code system usually used with such cards. The merchandise tag is a card of much smaller dimensions than the record card and uses a perforation code such as that of "Woodruff" or "Siemens-Halske". The drawings which form a part of this specification illustrate the record card perforated according to the Powers 45 column code and the merchandise tag perforated according to the Woodruff code. The above recited perforation codes are typical and the machine is in no way restricted to the use of only these codes.

The accounting system in which these cards would be found useful contemplates that the so-called "record cards" might be used for tabulating inventory reports, while the perforated portion of the "merchandise tag" might be used for tabulating sales information. Reference to the drawings (Fig. 24) indicates that a portion of the tag may remain with the goods as an identification of the sale, while a portion may be retained for the compilation of reports.

As an adjunct of the accounting system in which these cards and tags are used, it is desirable that the data indicated by the perforations be printed on each. The present invention involves means for punching the record cards, and merchandise tags simultaneously, and for printing on each the interpretation of the perforations therein.

One object of the present invention is to improve record card perforating machines to perforate a plurality of cards simultaneously.

Another object is to improve record card perforating machines by the provision of mechanism therein which will print on the card the interpretation of the subject matter indicated by the perforations.

Another object of this invention is to improve record card perforating machines to perforate a plurality of cards according to differing codes.

Another object is to provide means which operate automatically to render the machine inactive as need may require.

Another object is to provide means which operate to prevent the machine from being rendered active when conditions indicate that it should remain inactive.

The present invention involves a novel combination of mechanism whereby data cards of differing sizes will be perforated in different codes in accordance with an index set up on a manually operable keyboard.

Other objects and structural details of the invention will be apparent from the following description when read in connection with the accompanying drawings in which:

Fig. 1 is a front elevation of the machine.

Fig. 2 is a diagrammatic plan view of the intermediate section of the machine.

Fig. 3 is an isometric view of the mechanism for controlling the clutch and printing device.

Fig. 4 is a side elevation of the mechanism which controls card punching, as viewed on line 4—4 of Fig. 5.

Fig. 5 is a diagrammatic section taken at the line 5—5 of Fig. 1.

Fig. 6 is an isometric view of the mechanism which controls the clutch when either the card or the tag magazine is empty.

Fig. 7 is a partially exploded isometric view of the mechanism which renders the clutch mechanism inactive.

Fig. 8 is a side elevation showing the main driving shaft and its associated mechanism.

Fig. 9 is an isometric view of the main drive shaft and mechanism associated therewith.

Fig. 10 is a side elevation showing mechanism for controlling the tag perforating means.

Fig. 11 is a diagrammatic section taken on an irregular line at approximately the center of the machine.

Fig. 12 is a diagrammatic view of the mechanism for controlling the printing slides.

Fig. 13 is a diagrammatic end elevation of the above mechanism as viewed on the line 13—13 of Fig. 12.

Fig. 14 is a diagram showing the method of selecting punches according to the so-called "combination code".

Fig. 15 is a front elevation of the mechanism for aligning the punch setting means.

Fig. 16 is a side elevation of the mechanism shown in Fig. 15.

Fig. 17 is a diagrammatic plan view of the mechanism for setting the printing slides.

Fig. 18 is a fragmentary projection of the side of the mechanism shown in Fig. 17.

Fig. 19 is a longitudinal section of the mechanism shown in Fig. 17.

Fig. 20 is a diagrammatic showing of the type faces for printing on record cards.

Fig. 21 is a diagrammatic showing of type faces for printing merchandise tags.

Fig. 22 is a diagrammatic side view of ribbon mechanism.

Fig. 23 is a diagrammatic isometric view of the ribbon mechanism.

Fig. 24 is a typical merchandise tag showing the perforations which corresponds to a setting of the machine and the appropriate interpretation printed thereon.

Fig. 25 is a diagram showing the system by which the perforations are combined to form a code.

Fig. 26 is a typical record card showing the data perforations and essential index information printed thereon.

General description

The machine may be considered as being divided into three sections, which for convenience will be called the base **30**, the intermediate section **40** and the head **270**.

The base supports the machine and contains the power elements. The intermediate section contains starting and stopping mechanism, the principal elements of the driving mechanism, the card and tag transporting mechanism, perforator and printer controlling mechanism, the perforator and the printer. The head contains the mechanism which sets the perforator and printer and that which actuates any special controls which may be present.

The general showing of the card perforating portion of the machine bears a marked similarity to the machines disclosed in the above cited patents.

The base (Fig. 1)

A suitable base **30**, comprising four legs **31** and a bed plate **32**, is provided. This frame work supports a prime mover **33**, which is usually an electric motor.

The intermediate section (Figs. 1, 2, and 12)

A suitable frame work for the intermediate section **40**, consisting of members **41**, **42** and **43** are securely fastened to the bed plate **32**. The members **41** and **42** are in the form of box-like frames and house mechanism which will be described hereinafter. The members **43** (Fig. 12) are brackets which support the shafts of the mechanism for actuating the printing device.

Control of operation (Figs. 1, 3, 4, 5, and 6)

Mechanism is provided for starting and for stopping the machine. This mechanism may be divided into two classes, that for starting the prime mover, and that for clutching the mechanism whenever the machine is to perforate a card and a tag.

The mechanism for starting the prime mover **33** consists of any well known type of snap switch **45**. When this switch is set to the "on" position, power is supplied to the prime mover **33** and causes it to operate. An alternative means for operating the mechanism of the machine is provided in the hand-wheel **46** (Fig. 2) and toothed clutch **47**. When the clutch **47** is placed in mesh, the shaft **50** is rotated by turning the hand wheel **46**.

Means are provided for manually rendering the machine active by clutching the shaft **50** whenever cards are to be perforated. The mechanism of these means are shown in Figs. 1, 3, and 4, and consist of a starting button **51**, rod **52**, spring **53**, arm **54**, latch **55**, shoulder **56**, pawl **60**, hook-shaped lever **61**, arm **62**, shaft **63**, clutch engaging spring **64**, clutch **65** (Fig. 3), ear **68**, square pin **70**, disengaging lug **71**, and guide **72**. The operation of this mechanism is as follows: Downward pressure upon the clutch control button **51** causes the rod **52** to rock the arm **54** clockwise about its pivot and against the tension of its spring **53**. The arm **54** is connected to the rearward arm of the latch **55** by a spring-pressed pawl **60**. The pawl **60** has a shoulder which, when the mechanism is inactive, stands over the ear **68** on the latch **55**. The rocking of arm **54**, therefore, causes the latch **55** to rock releasing the shoulder **56** on arm **62**. Hence, the shaft **63** is released, allowing clutch engaging spring **64** to force the clutch **65** into engagement. The pawl **60** has a square pin **70** which overlies the upwardly extending finger **73** of the hook shaped lever **61** when the mechanism is inactive. The lever **61** is connected to the arm **62** by a pin **74**. A spring **75** between the hook-shaped lever **61** and the arm **62** tends to raise the lever **61** against the disengaging lug **71**. The downward motion of the rod **52** causes the arm **54** to rock clockwise about its pivot point and in so doing causes the square pin **70** to press downwardly upon finger **73** and thus disengage the lever **61** from the lug **71**.

Means are provided for automatically rendering the machine inactive and are shown in Figs. 3, 4, and 5. In order that the mechanism may be in correct position for each succeeding operation it is necessary that unclutching occurs only when the mechanism is in the position corresponding to the end of a card cycle. This is known as "full cycle stop". The mechanism of these means consists of cam **106**, follower roller **107**, bell crank **108**, lug **71**, hook-shaped lever **61**, latch **55**, shoulder **56**, arm **62** and shaft **63**. The operation of this mechanism is as follows: The cam **106** has a long dwell and an almost instantaneous advance and return. The shaft **135**, turning in a clockwise direction under the influence of the main shaft **50**, causes the bell crank **108** to rock about its fulcrum. The rocking of the bell crank **108** forces the lug **71**, which is at the upper end of said bell crank, against the hook on lever **61**. The motion thus transmitted to the lever **61** is applied to the arm **62** and rotates the said arm and the shaft **63** to disengage the clutch **65**, thus stopping the machine. The latch **55**, under the influence of spring **53**, drops over the shoulder **56** and holds the mechanism unclutched.

Mechanism is provided for preventing the actu-

ation of clutch 65 when the card magazines are empty. This mechanism consists of arm 81 (Fig. 6), spring 82, shaft 83, arm 84, link 85, rocker 86, shaft 87, latch 88, automatic release key 90, pin 91, spring 92, arm 93, spring 930, shaft 94, arm 95, link 96, bell crank 98 and pin 99.

The operation of this mechanism is as follows: When the record card magazine 80 is empty, the arm 81 permits the spring 82 to rock the shaft 83 and arm 84, and pull the link 85, thereby rocking the lever 86, the shaft 87 and the latch 88 in a clockwise direction. Clockwise rocking of the latch 88 permits the key 90, which carries a pin 91, to rise under the action of its spring 92. The pin 91 is engaged by the fork of the upper end of the bell crank 98. Hence, the rising pin 91 causes the bell crank 98 to rock in a counterclockwise direction. The pin 99 is thus forced rearwardly and moves the pawl 60 out of its normal position. Depression of the rod 52 will now be ineffective as regard the latch 55 and lever 61. (See Figs. 3 and 4). The rearward motion of the pawl 60 removes the square pin 70 from its position above the finger 73. Hence, it is impossible to unlatch the hook 61 from the disengaging lug 71 and starting of the machine is prevented, even though the key 51 is depressed.

Mechanism, (Fig. 6), consisting of arm 93, spring 930, shaft 94, arm 95, link 96 and spring 97 is provided for preventing the actuation of clutch 65 when the merchandise tag magazine 100 is empty. The operation of this mechanism is as follows: When the tag magazine 100 is empty arm 93 rises under the action of spring 930 and rocks shaft 94 and arm 95 counterclockwise. This rocking pulls link 96 rearwardly and rocks lever 86, shaft 87 and latch 88 clockwise, releasing automatic release key 90, and rendering rod 52 ineffective, as was described above.

Repeat key (Figs. 3, 4, and 5)

Manually operable means are provided for setting the machine to produce a plurality of cards which bear identical perforations. The mechanism of these means may be divided into two groups, which are: that which controls the clutch mechanism and that which controls the setting of the perforating and printing mechanism. The first of these two groups will be considered at this point, while the second group will be described hereinafter. The mechanism for the "repeat" control of unclutching is shown in Figs. 3, 4, and 5, and consists of repeat lever 110, detent 111, detent spring 112, link 113, lever 114, U-shaped lever 115, pins 116 and 117 thereon, pin 118 and spring 119. The operation of the repeat mechanism is as follows: The repeat lever 110 is moved rearwardly and held by the detent 111 under the action of spring 112. The link 113 is carried at the lower end of the repeat lever 110 by a pin and slot connection. The link 113 carries a pin which engages the forked upper end of lever 114. The lever 114 carries a stud which serves as an anchor for one end of the spring 119. One arm of the U-shaped lever 115 carries a stud 118, which serves as anchor for the other end of spring 119. The lever 114 is provided with a lug at its lower end which is normally kept in contact with the stud 118 by the spring 119. The motion of repeat lever 110 pulls link 113 forwardly rocking levers 114 and 115. The tension of spring 119 causes pressure to be applied to the rearward end of hook-shaped lever 61, forcing it downwardly and out of the path of disengaging lug 71. Hence, the full cycle stop cam 106 is rendered ineffective.

Means are provided for stopping the machine if the supply of cards in either magazine becomes exhausted during repeat operations. The mechanism of these means is shown in Figs. 3, 4, and 5, and consists of hook 121 on the automatic release key 90, U-shaped lever 115, pins 116 and 117 thereon, and spring 119. The operation of this mechanism is as follows:—When the stopping mechanism, associated with an empty magazine, is actuated, automatic release key 90 rises causing hook 121 to lift pin 116, lever 115, and pin 117 against the action of spring 119. The lifting of pin 117 permits the hook 61 to again engage the disengaging lug 71, and upon the completion of the cycle, cam 106 rocks bell crank 108 clockwise, thereby pulling lever 61 rearwardly and rocking arm 62 clockwise into position to be latched by member 55. The machine is thus brought to a full cycle stop.

Drive mechanism (Figs. 3, 8, 9, and 10)

There are two members 41 (Fig. 8) mounted in line at the left of the bed plate 32, the forward one of which houses a combination clutch and pulley member 65 (Fig. 3) mounted on a shaft 50. The shaft 50 has keyed thereto three right-hand worms 130 and a single right-hand worm 131. Each worm 130 drives a worm wheel 132, one of which is mounted on each of the shafts 133 of the card transporting mechanism. The worm 131 drives a worm wheel 134, and the shaft 135 which carries a series of cams for controlling the various functions of the record card end of the machine. In addition, the worm 131 drives the two worm wheels 132 and shafts 133 which are associated with that element in the card transporting mechanism frequently called "skid rolls".

The rearward frame 41 contains mechanism comprising worms 136 and 137, worm wheels 138 and 139, and shaft 140 all of which are associated with the functions of the mechanism of the merchandise tag end of the machine. Since the tags are to travel in a direct opposite to that of the cards the worm and wheel mechanism is of necessity, left-hand. The members 42 provide space for the starting switch and the clutch control mechanism and journal for the transverse shafts of the card transporting and clutch actuating mechanism.

Card handling mechanism (Figs. 4, 9, and 11)

Means are provided for storing, selecting, transporting and receiving cards which are to pass through the record card perforator. The device for storing the cards consists of a rectangular frame 80, which rest upon brackets 44 (Fig. 1) which are mounted on frames 41 and 42 respectively.

The mechanism of the selecting means is shown in Figs. 4, 9, and 11, and consists of cam 150, follower 151, arm 152, spring 1520, link 153, arm 154, shaft 155, arm 156, link 157 and picker 158. The operation of the selecting mechanism is as follows: Shaft 135 rotating under the influence of the shaft 50 carries with it cam 150 which acts upon follower 151 mounted on arm 152, and through said arm oscillates arm 152 counter-clockwise about its pivot. This motion pushes link 153 forwardly and causes arm 152, shaft 153 and arm 154 to be oscillated against the action of spring 1520. Oscillation of arm 154 moves picker block 158 laterally through the

medium of link 155. The combined action of cam 150 and spring 152 acting through the above described mechanism, imparts a reciprocatory motion to picker block 158, thereby selecting the card adjacent thereto, and feeding it toward the pair of rolls 160 and 161 which are turning with the shafts 133 under the influence of drive shaft 50. To prevent all but one card from being drawn out of the magazine, a throat knife 159 is provided at the rear of each storage magazine.

Card transporting mechanism (Figs. 8, 9, and 11)

Means are provided for transporting the selected card into the chamber of the perforating mechanism and thence to the card printing mechanism and card receiver. The mechanism of this means is shown in Figs. 8, 9, and 11 and consists of worms 130 and 131, worm wheels 132, shafts 133 and rolls 160, 161, 162, 163, 164, 165, and 166. The operation of the transporting mechanism which is commonly known as the feed roll mechanism is as follows: The forward one of the shafts 133, rotating under the influence of the shaft 50, causes the roll 160 to rotate in a clockwise direction. The upper roll 161 which is geared to the lower will, therefore, rotate in a counter-clockwise direction. Suitable tension is placed between the rolls and when the card is received from the picker block 156 it is moved rearwardly into the punching chamber. Upon the completion of the punching operation, the rolls 162, 163, and 164 under the influence of the shaft 50, cause the card to move onwardly in the direction of the printing mechanism where it is again stopped to receive the imprint of the interpreted code. The rolls 165 and 166 also under control of the shaft 50 will cause the card to again move onwardly when released by the print chamber card stop. It will then pass into the receiving magazine.

Card stopping mechanism (Figs. 4, 5, 9, and 11)

Means are provided for stopping the card in the punching chamber, and also over the printing platen. The mechanism for this purpose is shown in Figs. 4, 5, 9, and 11 and consists of cam 168, arm 169, follower roller 170, rocker lever 171, shaft 172, card stops 173 and 174, and spring 175.

This mechanism operates in the following manner: The cam 168, turning with the shaft 135 under the influence of the drive shaft 50 actuates the follower roller 169 and arm 170 oscillating the rocker 171 about the shaft 172 and reciprocating the card stop 173 and 174. As the follower roller passes from the high dwell to the low dwell of the cam 168, under the action of a spring 175, the card stop 173 will be withdrawn from the path of the card and the card stop 174 will be raised into said path. It is seen that the mechanism so operates as to permit the feeding of a card during a stage of the operation of printing on the preceding card and that each card is released from the printing chamber before the succeeding card reaches the perforator card stop.

Perforating mechanism (Figs. 9 and 11)

Means are provided for perforating the record cards. The mechanism of these means is shown in Figs. 9 and 11 and consists of box cams 150, followers 180, punch frame 181, punch frame guide 182, punch plate 183, punches 184, punch guide plates 185 and stripper plates 186. Shaft 135, turning under the influence of the drive shaft 50, turns the pair of box cams 150. Follower rollers 180, engaging the cam groove, move punch frame 182 with a reciprocatory motion along the punch frame guides 182 and raise the punch plate 183 upwardly against the punches 184. Means which will be described hereinafter set the appropriate punches.

Tag handling mechanism (Figs. 2, 9, 10, and 11)

Mechanism, identical to that for handling record cards except for minor structural changes, is provided for the handling of the merchandise tags. The units of this mechanism consist of a storage magazine, selecting mechanism, transporting mechanism, and tag stopping mechanism. The tag storage magazine 100 is fixed to two brackets 49 (Fig. 2) which are carried respectively by the rear frames 41 and 42. A tag selecting mechanism, shown in Figs. 9, 10, and 11, consisting of cam 191, follower roller 192, arm 193, shaft 194, link 195, arm 196, spring 197, shaft 198, arm 199, link 200 and picker 201 is provided at the rear of the machine. The operating principle of all the above listed elements is identical to that of the record card selecting mechanism. The tag transporting mechanism is of the same general character as that for record card transporting, and consists of rollers 206, 208, 209 and 211 mounted on a set of shafts 213 driven by worm wheels 138, rollers 207, 210, and 212, and an auxiliary picker mechanism. This auxiliary mechanism consists of cam 216, follower roller 217, arm 218, shaft 220, spring 219, arm 221, a T-shaped member 222, hooks 223, rollers 224 and guides 225. The operation of the auxiliary mechanism is as follows: Cam 216, mounted on shaft 140, turns under control of main drive shaft 50. Follower roller 217, acted upon by cam 216, actuates arm 218 against the action of spring 219, thereby oscillating shaft 220. Oscillation of shaft 220 will cause arm 221, through the medium of member 222, to reciprocate hooks 223 in guides 225. The depressed ends of guides 225 permits rollers 224 to carry hooks 223 to a position below the path of the advancing tag. Hence, when the hooks 223 move forwardly they will engage the tail edge of a card and position it against card stop 237 where it remains during the printing operation. The gradual rise of follower 217 to point 1216 on cam 216 thus causes a cessation of motion of hook 223 and the intervening mechanism. When printing is complete and card stop 237 withdrawn, follower 217 rides down the sharp descent on cam 216 causing the intervening mechanism to urge hook 223 forward and thereby transport the card toward the rollers 211 and 212 and thence, into the tag receiving magazine.

Tag stop (Figs. 9, 10, and 11)

Means are provided for stopping the tag in the punch chamber and in the print chamber. The mechanism of these means is shown in Figs. 9, 10, and 11, and consists of cam 230, follower 231, arm 232, spring 233, shaft 234, a pair of levers 235, and card stops 236 and 237. The operation of the mechanism for stopping the tag in the punch chamber is as follows: The cam 230 turning with the shaft 140 actuates follower 231 to elevate arm 232 against the action of spring 233 and to oscillate shaft 234, to which arm 232 is fixed. Elevation of arm 232 will therefore cause oscillation of levers 235, the elevation of tag stop 236 and the retraction of tag stop 237. The continued operation of cam 230 against action

of spring 233, will cause a reversal of the setting of the tag stops. Hence, a tag may be fed to the punch while the preceding tag is being ejected from the printer.

Tag perforating (Figs. 9, 10, and 11)

Means are provided for perforating the merchandise tags in accordance with any suitable code. The mechanism for this perforating is as follows: Box cam 240, follower roller 241, punch frame 242, punch plate 243, punches 244 and punch guide plates 245 and stripper plate 246. The shaft 140, actuated by the drive shaft 50, turns the cam 240 which, through the medium of the follower roller 241, reciprocates the punch frame 242 vertically on the guides 182, thereby elevating the punch plate 243 to engage punches 244. Means to be hereinafter described are provided for the appropriate setting of the punches.

Printing mechanism (Figs. 12 and 13)

Means are provided to cause the printing of information upon the record cards and merchandise tags. The mechanism of these means is shown in Figs. 12 and 13 and consists of bevel gears 250, shaft 251, cams 252 and 253, followers 254 and 255, levers 256 and 257, springs 258 and 259 and protuberances 260 and 261.

The operation of this mechanism is as follows: Shaft 140 turning under the influence of drive shaft 50, rotates bevel gears 250, shaft 251 and cams 252 and 253. Cam 252, acting upon follower 254 mounted on lever 256, oscillates the said lever against action of a spring 259 about its fulcrum 262 and raises the protuberance 260 to elevate the printing platen 266 which is associated with record card printing. The sharp rise and fall of follower 254 as it passes over cam 252 will cause protuberance 260 to strike a percussive blow upon platen 266 which is associated with record card printing. Cam 253 acting upon follower 255 mounted on lever 257 oscillates the said lever against the action of a spring 259 about its fulcrum 262 and due to the sharp rise and fall of the follower as it passes over the cam causes protuberance 261 to strike a percussive blow upon platen 267 which is associated with merchandise tag printing.

Means are provided to guide the cards and tags into position for receiving printing and for supporting them during the printing operation. These means are shown in Figs. 11, 12, 13, and 19, and consist of plates 268 and 269. Plates 268 are mounted on box frames 41 and 42. A plate 268 is provided at each printing position. A plate 269 is mounted above each plate 268 and separated therefrom by a space sufficient to permit the passing of a card. Each plate has cut therein a slot of proper size and so located as to permit printing upon the cards and tags.

Mechanism of the head section (Figs. 1, 4, 8, and 11)

Means are provided for selecting the appropriate punches, the mechanism of which means is contained in the framework of the head 270. This framework consists of bracket 271, side frames 272, and plate 273. Bracket 271 spans the space between the forward box frames 41 and 42. Mounted thereon are side frames 272, which support plate 273 and mechanism of the punch selecting means.

The mechanism for selecting or setting the punches 184 and 244 consists of sets of elements comprising slide 276, socket 277 in the upper end of each slide 276, bent lever 278, spring 279, socket 280, slide 281, guide bars 282, selector fingers 283 and 284, and an aligning device which will be described hereinafter. The operation of the setting mechanism is as follows: The digit to be indicated by perforations in the cards is set by moving slide 276 toward and into line with the upper edge of plate 273. This movement rocks bent lever 278, through the socket 277, counterclockwise about its fulcrum and against the tension of springs 279 thereby moving slide 281, through its socket 280, rearwardly on its guides 282 an amount which corresponds to the setting. Selector finger 283, since it is attached to slide 281, moves rearwardly the same amount, and is positioned over the appropriate punch 184. At the same time selector finger 284 also moves rearwardly an amount identical to that of slide 281 and selector finger 184, and is positioned over the appropriate punch 244. Hence, correct perforations are made in both the card and the tag when the punch frames are elevated under the control of their associated mechanisms.

Means are provided for correcting errors. The mechanism for this purpose is shown in Fig. 11 and consists of error key 286, shaft 287, blades 288 carried thereon, latches 289, springs 279, column error key 290, spring 291 and shaft 292. The operation of mechanism is as follows: Pressure applied to error key 286 rocks shaft 287, to which said error key 286 is fixedly attached. Blades 288 fixedly mounted upon shaft 287, are thereby rocked clockwise and in so doing rock latches 289 clockwise about shaft 292 upon which they are journalled, and release slides 276, which are returned to initial position by the action of springs 279. A "column" error is corrected by pressure upon column error key 290. Said key 290 will trip a single latch 289 and allow a single slide 276 to return to its initial position under action of its associated spring 279.

Punch selector aligning device (Figs. 1, 11, 15, and 16)

Means are provided for aligning the slides 281 in order that they may register exactly over the appropriate punches 184 and 244. The mechanism of these means is shown in Figs. 1, 11, 15, and 16 and consists of cam 150, follower 151, follower shaft 296, arms 152, shaft 153, springs 297, rods 298, slides 299, aligning bar 300, guide plates 301, guide screws 302, guide bars 303 and aligning combs 304. Correct operation of this device requires that the alignment of slides 281 be properly timed with respect to the card which is being sensed. For that reason the mechanism is under control of cam 150. Followers 151 revolve on shaft 296 which is mounted between arms 152. Arms 152 carry at their respective end rods 298 which are adjustable. Each rod 298 carries a slide 299 and these support between them an aligning bar 300. Guide plates 301 support between them guide bars 302. Guide screws 303 direct the reciprocation of slides 299.

Cams 150 turning with shaft 135 under control of main drive shaft 50 actuate arms 152 against the restraint of springs 297. As arms 152 move under control of cams 150, rods 298, slides 299 and aligning bar 300 are drawn downwardly. The descending slides are guided in a proper course by guide screws 302 and the descending aligning bar is guided by bars 303. Aligning combs 304, one on each slide 281, are tooth shaped, which assures that aligning bar 300 will set slides 281 to definite positions. The spacing of the

teeth of aligning comb 304 is that of the spacing of punches 184 and 244. The downward motion of aligning bar 300, due to the action of the cam 150, will, therefore, cause slide 281 to be set over the appropriate punches.

Type setting mechanism (Figs. 17–22)

Means are provided for printing desired information selected from among that which has been set up on the keyboard and which has been indicated in the form of perforations in the record cards and merchandise tags upon these cards and tags. Mechanism for this purpose is shown in Figs. 17–21 and consists of type setting interponents 311, interponent frames 312, springs 313, type setting cam plates 314 (see also Fig. 11) and 315, type carriers 316, frames 317, bars 318, springs 319, and type bars 320.

Type setting interponents 311 are mounted in interponent frame 312, and are held in lowered position against the tension of their respective springs 313 by the action of type setting cam plates 314 and 315 which are securely attached to only those slides 281 from which printed information is to be taken. Type carriers 316 are mounted between a pair of frames 317 which, with bars 318, serve as supports and guides for said type carriers. Type carriers 316 are locked in initial position, shown in Fig. 19, when the machine is idle, by the downwardly pressed interponents 311, the type carrier springs 319 being stretched and hence in condition for actuating said type carriers. Steps which are provided at the top of type carriers 316, provide means for stopping said carriers in correct position for printing. Type bars 320 are mounted in the bottom of each type carrier 316 to provide the type characters.

The operation of this mechanism is as follows: Let it be assumed that digit 5 has been set on the keyboard 276. Lever 278 is rocked clockwise thereby, and moves slide 281 and cam plates 314 and 315 rearwardly. This motion permits the appropriate interponent 311 to rise due to the action of its spring 313 whenever released by bails 332 and 333. The bail 332 under the action of cam 326 is rocked forwardly releasing type carriers 316 which stop when the step on the carrier contacts the position interponent 311. The type bars 320 are then in position for making an imprint of the digit 5 upon both record card and merchandise tag.

Type carrier control mechanism (Figs. 3, 9, 12, 13, 19, 22)

Means are provided for controlling the type carriers so that they will be rendered active or inactive as may be required. The mechanism of these means is shown in Figs. 3, 9, 12, 13, 19, and 22, and consists of shaft 251, cam 326, spring 327, follower 328, arm 329, shaft 330, bail arms 331, bails 332 and 333. Cam 326 is fixedly attached to shaft 251. Arm 329 is fixedly attached to shaft 330 and is kept in contact with cam 326 by spring 327. Arms 331, which support bails 332 and 333, are also fixedly attached to shaft 330. The operation of this mechanism is as follows: Shaft 251, turning under control of main drive shaft 50, rotates cam 326 and actuates arm 329 through follower 328. The oscillation of shaft 330 rocks bail arms 331 and bails 332 and 333, which engage the slot in type carriers 316. Hence, if the bails 332 and 333 rock forwardly, type carriers 316 are free to move to the positions determined by the setting of interponents 311, and if they rock rearwardly they restore type carriers 316 to their normal positions, and stretch springs 319, conditioning them for the next printing operation.

Type carrier holding during repeat operations (Figs. 3, 4, 5, and 13)

Means are provided, as was stated hereinbefore, for holding type carriers in set position during repeat operations. The mechanism provided for this purpose is shown in Figs. 3, 4, 5, and 13, and consists of repeat key 110, detent 111, link 113, cam 336, follower 337, link 338, arm 339, shaft 340, latch 341, pin 342, slot 343, spring 344, arm 329, shaft 330 and bails 332 and 333. Repeat key 110 is connected to link 113 with a pin-in-slot connection. Link 113 carries at its rearward end a lug which is shaped to provide cam 336. Link 338 is supported at 343 to the framework and carries at one end a follower 337, which is in contact with cam 336. The other end of link 154 is pivoted to arm 339 which is fixedly attached to shaft 340, which shaft carries latch 341. Arm 158 carries pin 342.

The operation of this mechanism is as follows: The release lever 110 being pushed rearwardly pulls arm 113 forwardly, causing cam 336 to act upon the follower 337 to permit spring 344 to pull link 338 laterally and rock arm 339, shaft 340, and hook 341. Cam 326 rotating with the shaft 251, under control of main drive shaft 50 rocks arm 328 to that latch 341 snaps into engagement with pin 342, and prevents bails 332 and 333 from further action until such time as the repeat key is released.

Ribbon mechanism (Figs. 22 and 23)

Each printing device is provided with a ribbon mechanism for inking the type as it strikes upon the cards and tags. This mechanism may be of any well known construction and may be driven and reversed by any of the commonly used means. In the present instance only the ribbon carrying and guide mechanism need be shown. This consists of spools 346 and guide pins 347 mounted on a suitable bracket 348.

The operation of the machine

Let it be assumed that record cards and merchandise tags are be punched according to the invoice of goods which have been received by a mercantile establishment. A quantity of unperforated record cards are placed in the magazine 80, and a quantity of unperforated merchandise tags are placed in the magazine 100. The information relative to the first item of the invoice is then set on the slides 30 by moving them downwardly so that the digit to be indicated is in line with the upper edge of the plate 273. Information as to "size" and "price" being obtainable from the invoice and information, such as "Dept. No." and the "Stock item No." from the operator. All information is set up by moving the slides 276 in the manner described above.

As each slide 276 is set, the lever 278 moves the slide 281 a distance which is commensurate with the distance which the slide 276 has moved, the starting button, or lever, is depressed and the mechanism placed in motion. The slide aligning mechanism descends, and the slide 303 enters a notch in the comb 304 causing the placement of the fingers 283 and 284 over their respective punches 184 and 244. As has been described hereinbefore the arrangement of the setting fingers 283 and 284 is such that each finger will stand directly above the punches which cor-

respond to the setting of the slide 276. Hence, upon the actuation of the punching mechanism, the perforation in the respective cards will be identical to the information set up on the slides 276.

The card selecting device, acting through its mechanism under control of cam 150, and the merchandise tag selecting device acting through its mechanism under control of the cam 240 pull the card and tag which are at the bottoms of their respective stacks into engagement with the respective feed rolls 160, 161 and 206, 207, and are transported thereby into the respective punching chambers.

The grooves in cams 150 and 240 cause punch frames 181 and 242 to be elevated, carrying with them punch plates 183 and 243, and making perforations in the positions which correspond to the setting fingers 283 and 284. The continued rotation of cams 150 and 240 cause the retraction of punch frames 181 and 242, and punch plates 183 and 243, and the retraction of card stops 173 and 236. The transporting rolls in the respective chambers move the record card and the merchandise tag onwardly to engage other sets of rolls 163, 164 and 209, 210 respectively, which feed them onto the printing tables 268 where they are stopped by card stops 174 and 237.

As slides 281 are moved into position actuated by slides 276, cam plates 314 and 315 move to permit interponents 311 to assume positions which are appropriate to the setting of the slides 276.

Bails 332 and 333 are rocked forwardly by cam 326 thus freeing type carriers 316, to permit springs 319 to set them in appropriate positions as determined by interponents 311. Printing levers 256 and 257 are rocked by cams 252 and 253 respectively and due to the shape of these cams percussive blows are struck upon platens 266 and 267.

When printing is complete card stops 174 and 237 are withdrawn from the respective paths of the card and tag and both are fed by their respective feed rolls 165, 166 and 211, 212 into their receiving magazines 350 and 351.

While I have described what I consider to be a highly desirable embodiment of my invention, it is obvious that many changes in form could be made without departing from the spirit of my invention, and I, therefore, do not limit myself to the exact form herein shown and described, nor to anything less than the whole of my invention as hereinbefore set forth, and as hereinafter claimed.

What I claim as new, and desire to secure by Letters Patent is:

1. In a machine of the class described, means for perforating a record card comprising settable slides movable in a given direction; and means for recording data so perforated on said record card, comprising a series of differentially positionable selecting slides movable in a direction perpendicular to that of the said first named slides and a series of spring-urged plungers for controlling the positioning of said second named slides according to the setting of said first named slides.

2. In a machine of the class described, a combination of a series of manually adjustable differential controlling slides for selecting punches to perforate a record, means controlled by said slides for governing the positioning of a series of recording slides, a main shaft, means controlled thereby for permitting the record slides to assume positions determined by said manually adjustable slides, means for restoring the recording slides to normal position and manipulative means to disable said restoring means.

3. In a machine of the class described, a series of manually settable differential punch and type selector slides, a field of punches, and a set of type controlled thereby, means for aligning a plurality of said differentially settable slides, means including a pair of cams for perforating the record, and a cam for effecting a printing impression according to the differential setting of said selectors, and means operated by the pair of cams for aligning a plurality of said slides.

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