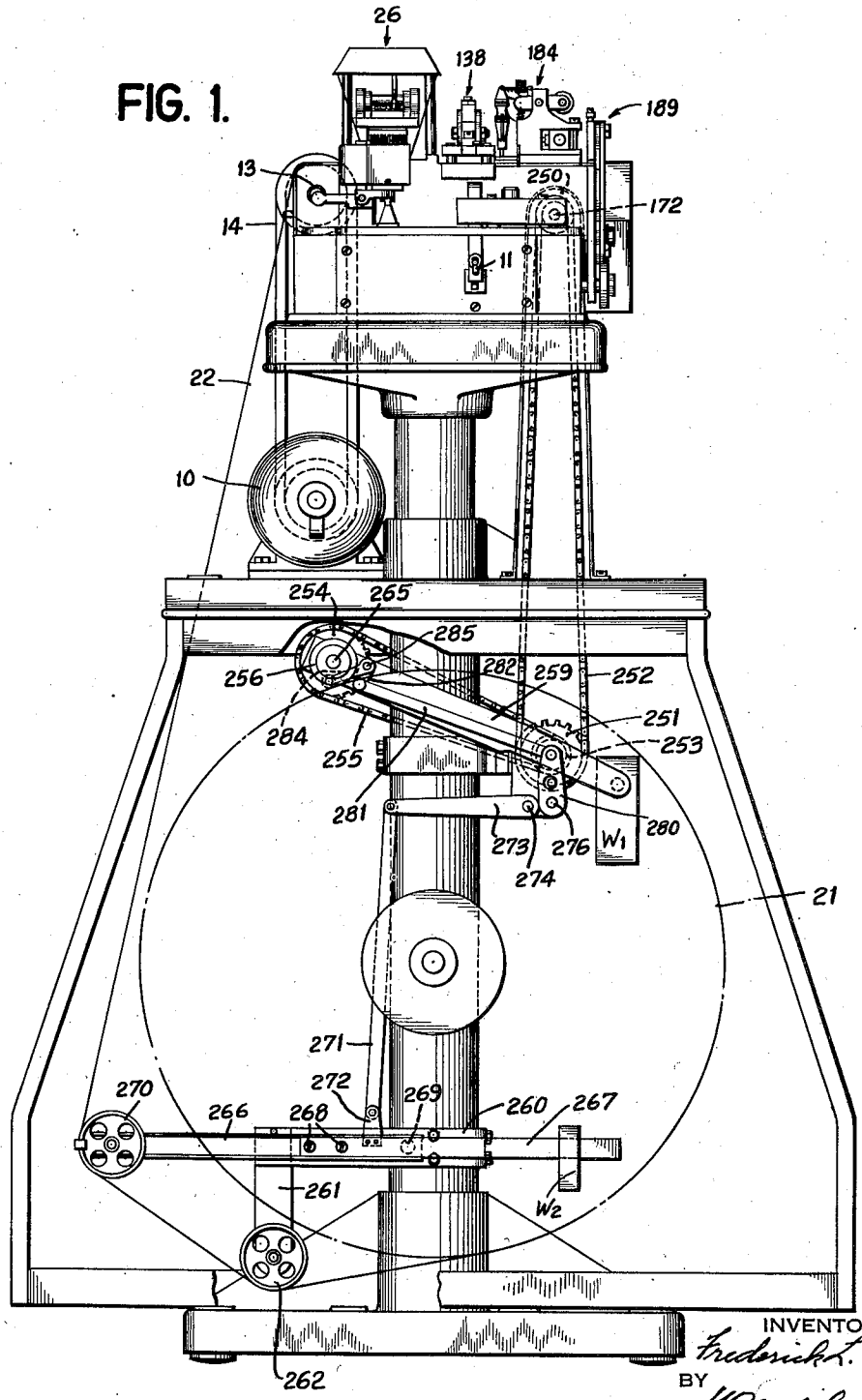
Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 1

FIG. 1.



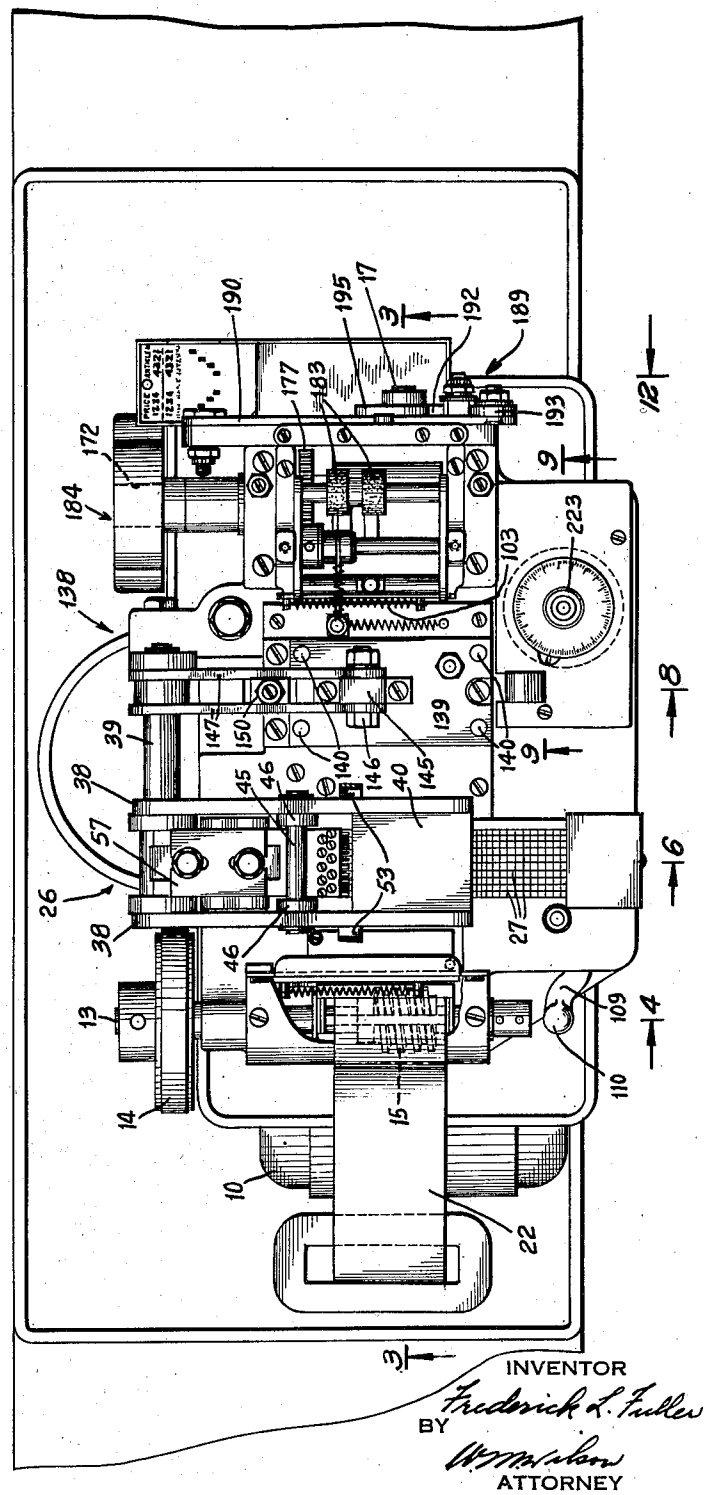
INVENTOR
Frederick L. Fuller
BY
W. Mc Watson
ATTORNEY

Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 2

FIG. 2.



INVENTOR
Frederick L. Fuller
BY
ATTORNEY

Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 3

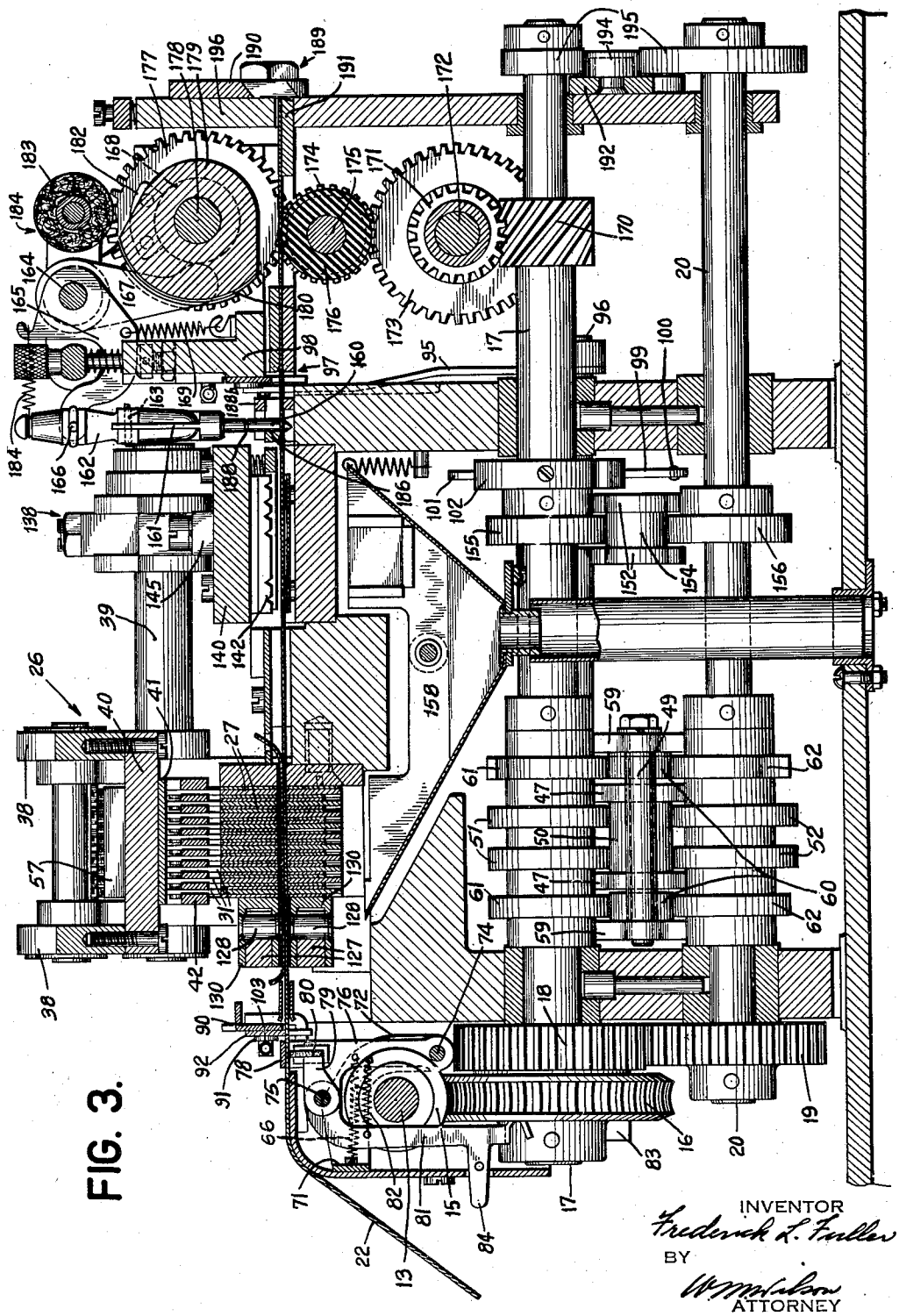


FIG. 3.

INVENTOR
Frederick L. Fuller
BY
W. M. Nelson
ATTORNEY

Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 4

FIG. 4.

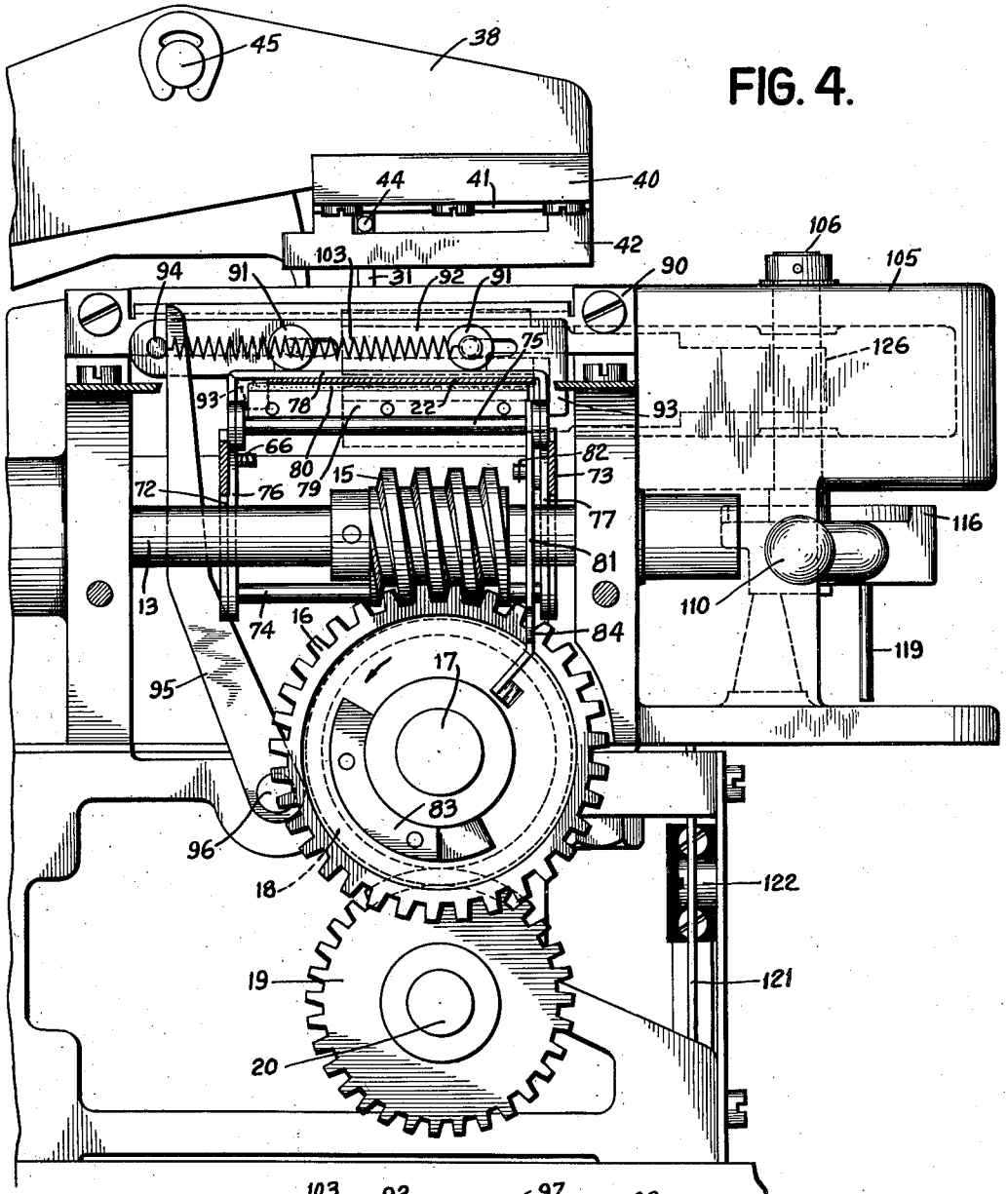
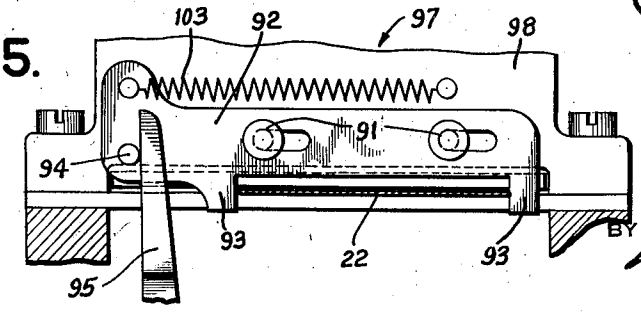


FIG. 5.



INVENTOR
Frederick L. Fuller
BY
W. M. Wilson
ATTORNEY

Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 5

FIG. 6.

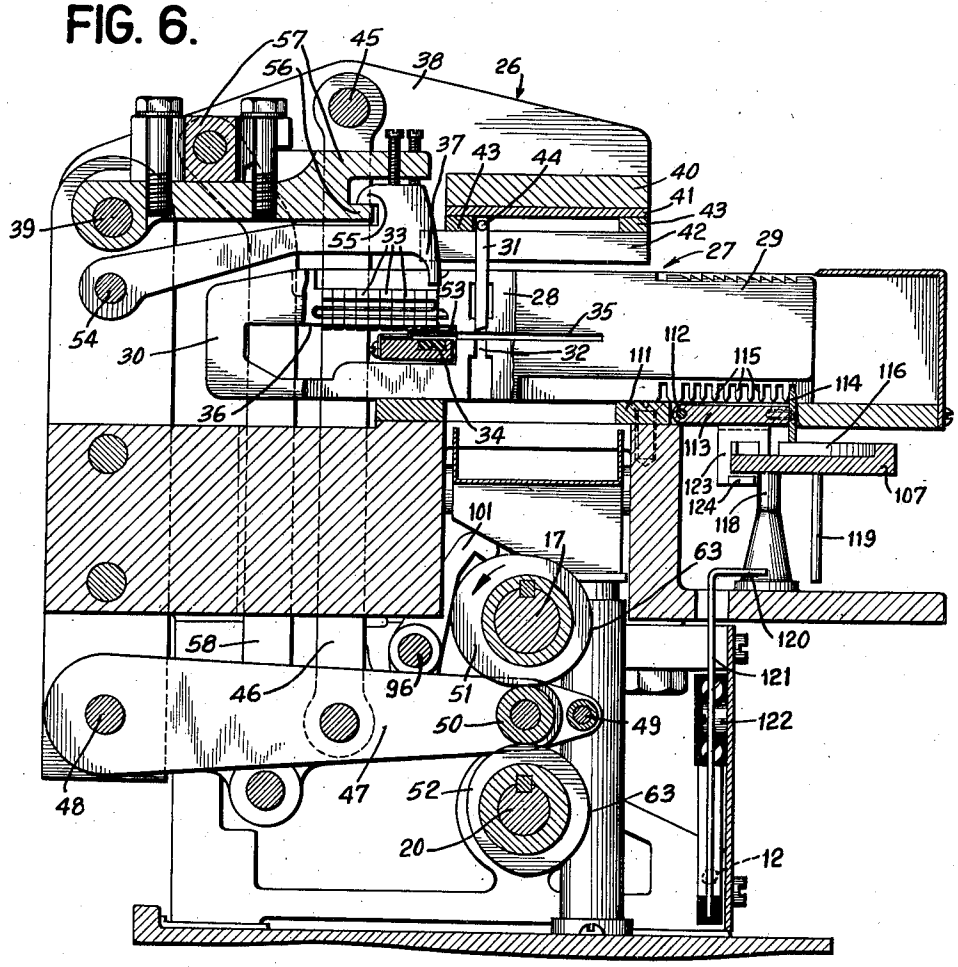
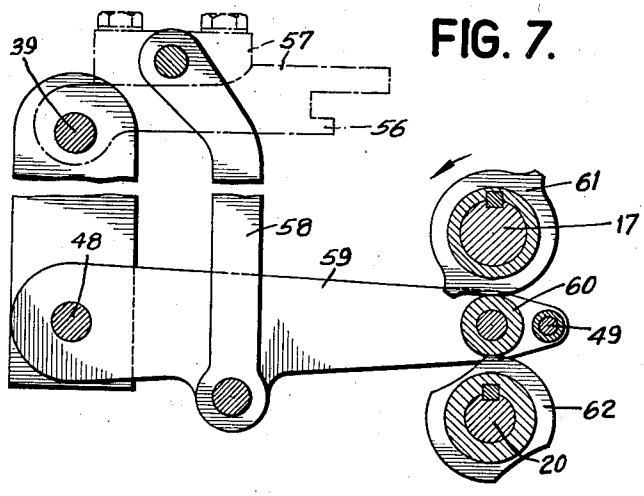


FIG. 7.



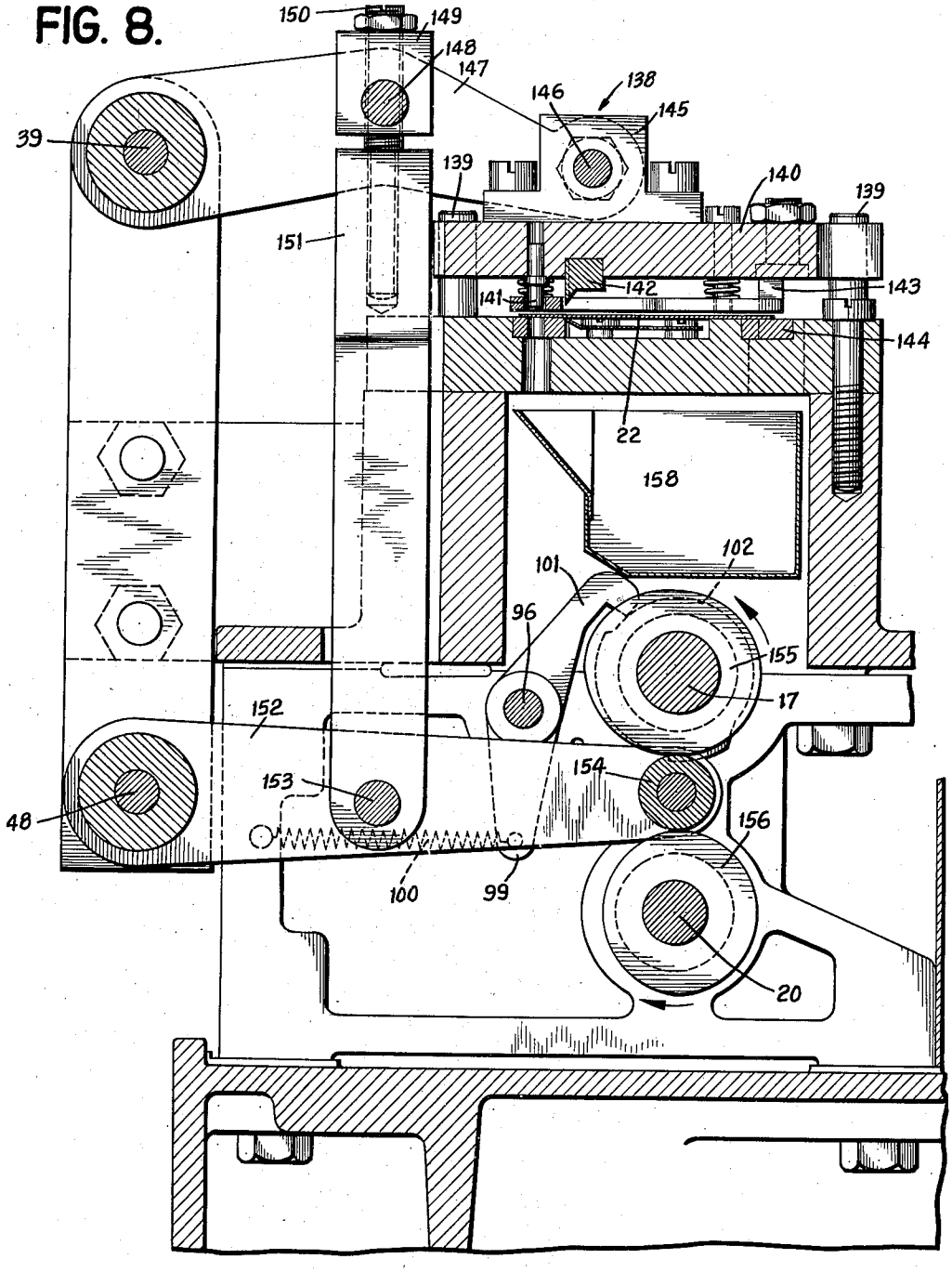
INVENTOR
Frederick L. Fuller
BY
W. McAdam
ATTORNEY

Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 6

FIG. 8.



INVENTOR
Frederick L. Fuller
BY
W. M. Wilson
ATTORNEY

Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 7

FIG. 9.

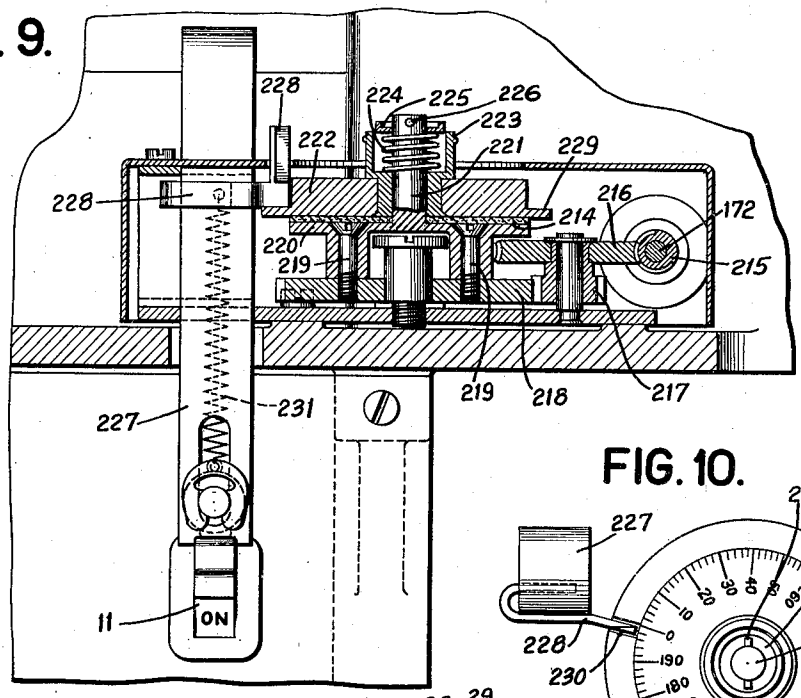


FIG. 10.

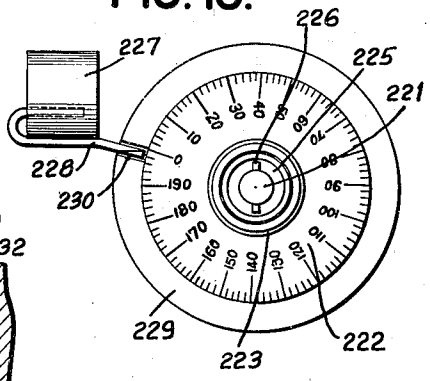
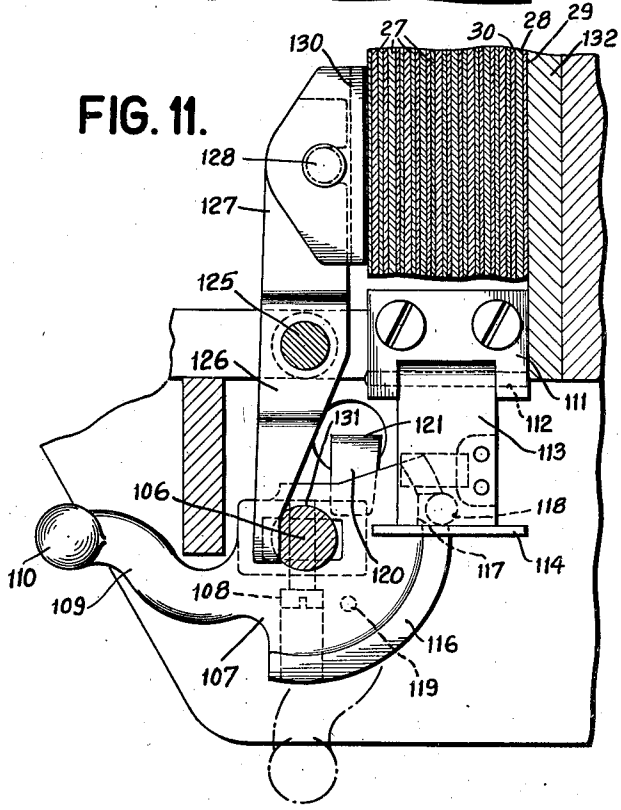


FIG. 11.



INVENTOR
Frederick L. Fuller
BY
W. McNelson
ATTORNEY

Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 8

FIG. 12.

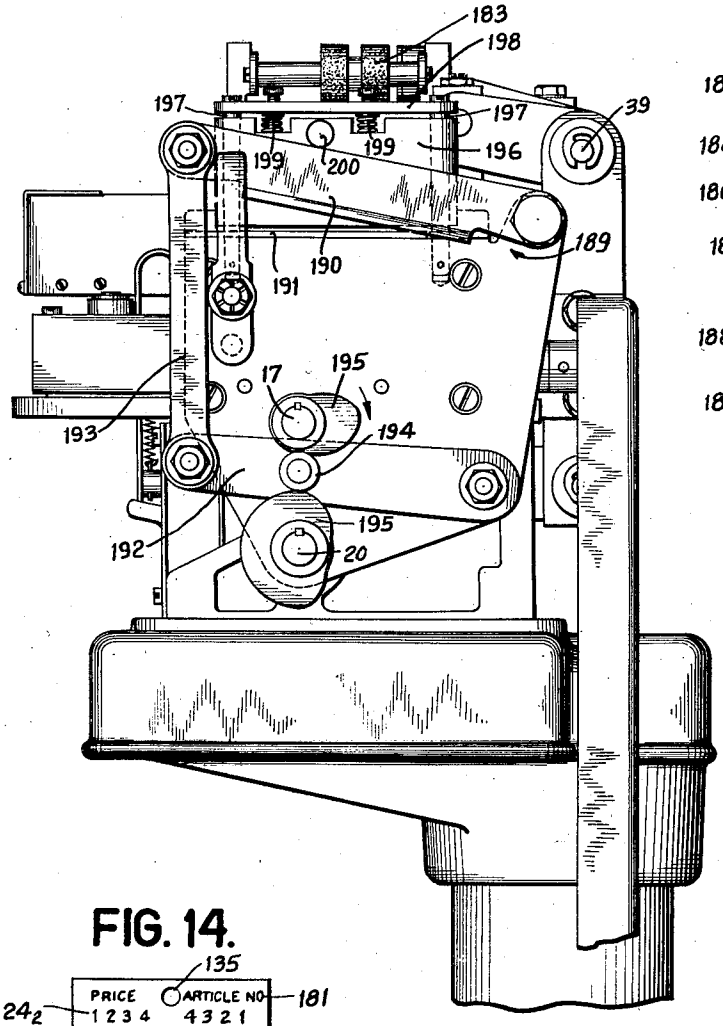


FIG. 13.

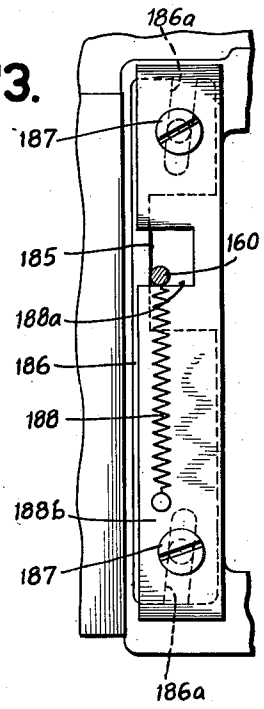
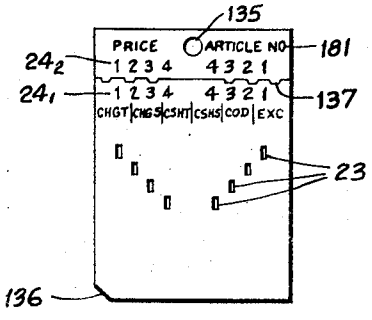


FIG. 14.



INVENTOR
Frederick L. Fuller
BY
W. M. Wilson
ATTORNEY

Feb. 6, 1940. F. L. FULLER 2,189,027

PRINTING AND PUNCHING MACHINE

Filed June 3, 1938 9 Sheets-Sheet 9

FIG. 15.

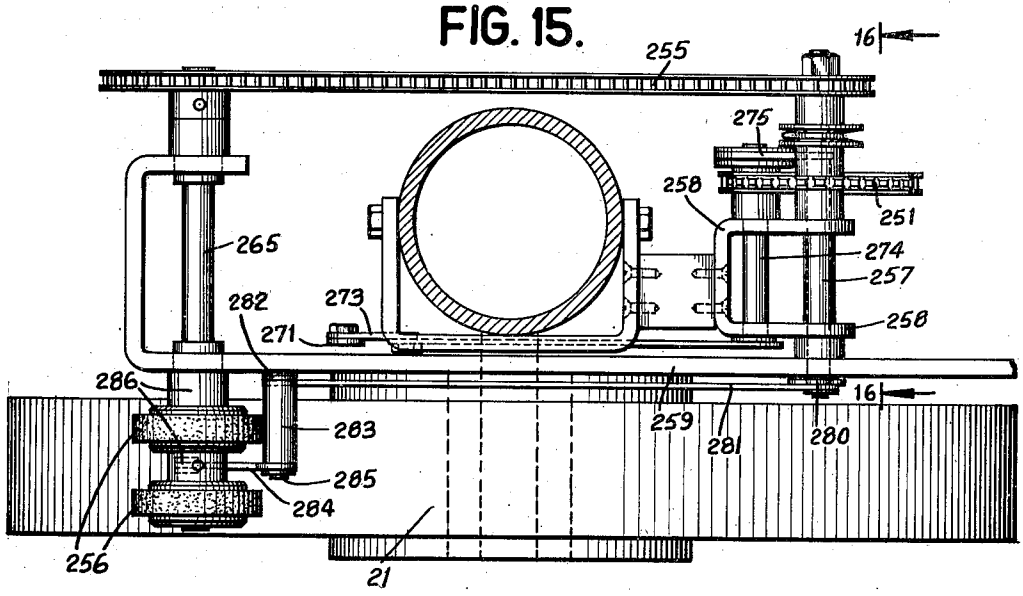


FIG. 17.

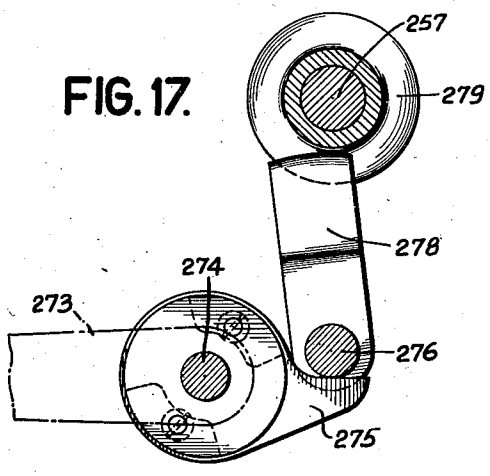
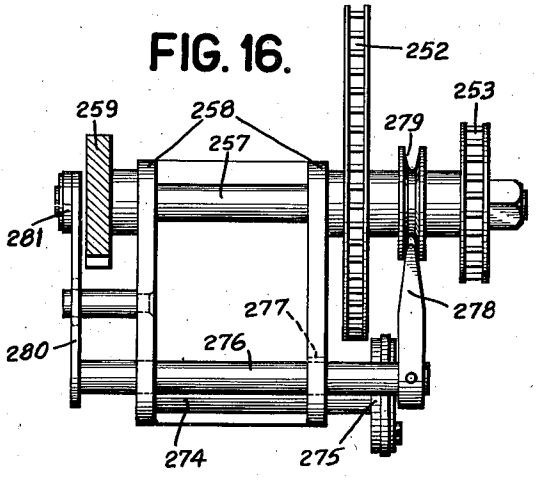


FIG. 16.



INVENTOR
Frederick L. Fuller
BY
W. M. Wilson
ATTORNEY

Patented Feb. 6, 1940 2,189,027

UNITED STATES PATENT OFFICE

2,189,027

PRINTING AND PUNCHING MACHINE

Frederick L. Fuller, West Orange, N. J., assignor to International Business Machines Corporation, New York, N. Y., a corporation of New York

Application June 3, 1938, Serial No. 211,539

10 Claims. (Cl. 101—19)

This invention relates to a machine for working upon a continuous strip so as to manufacture merchandise representing tags which are printed and punched by the machine.

Such tags are utilized for stock control and are punched with perforations to represent the price and the article number and are also printed so that such numbers can also be read.

Incidental operations by the machine comprise printing of legends to indicate the meaning of the data, scoring the sheet so as to produce a main tag section and a stub, punching a hole in the latter so as to make it capable of being attached to the merchandise by a string, and notching an edge of the main tag section so as to insure that the perforated main tag sections are properly placed in the statistical or tabulating machine for auditing operations. When an article is sold, the perforated main tag section is removed and from these lists can be made of the articles sold and the total of the sales. By sorting the perforated tags according to article numbers the machine can count the number of tags and hence indicate the number of articles of the same class which are sold.

The main object of the present invention is to provide a machine which is made up of independently operated mechanisms such as (1) a data printing and punching mechanism; (2) a scoring, piercing, and notching mechanism; (3) a printing and feeding mechanism; (4) an offsetting mechanism to cause a second printing to be effected on the stub, and (5) a severing mechanism, and to cause said mechanisms to be operatively correlated and driven so that they operate upon successive portions of a strip during one cycle of machine operation, and hence by successively operating on the same portion of a strip it is worked upon so as to produce a complete tag.

In connection with the data printing and punching mechanism it is an object of the invention to provide means for pre-setting the data which is to be printed and punched, such means comprising manually set slides carrying a plurality of number printing type bars and a single punch pin. By manually setting each of these slides the punch pin may be set to a differential position so as to punch at a particular index point position of the correlated column. The manual positioning of each slide also correlates a selected number of printing type with a printing hammer.

A still further object of the invention is to provide a means by means of which the slides are alined and locked in their set position and which positions cannot be changed during an operation of the machine. This is effected by providing an aligning bail which may be unlocked by the rocking of a manually operated lever so as to permit the free manual positioning of the punch and printing slides. The aforementioned lever is also capable of being rotated so as to retain the aligning bail in locked position and, in addition, causes the operation of a clamping means so as to securely clamp the punch and printing slides together. This lever, in its rotated position, causes the operation of the clamping means and concomitantly the closing of electrical contacts which are in the motor circuit.

The scoring, piercing, and notching mechanism is independently operated and carries three different tools, one of which is a piercing pin for piercing a hole in the tag; a scoring tool which effects the scoring of a line for the detachment of the main portion of the tag from the stub section; and a supplemental tool for notching the corner of the main tag section.

Another main section of the machine comprises a mechanism for effecting the printing of legends upon both the stub and main sections of the tag so as to identify the data printed and punched thereon. This printing mechanism comprises an electro which is rotated during the operation of the machine so as to print and, in addition, causes the lengthwise feeding of the paper strip being operated upon.

The machine also includes a mechanism for offsetting the paper strip so that in the successive printing operation determined by the printing and punching slides previously mentioned the second imprint will be effected upon the stub section of the tag. This offsetting mechanism comprises a plurality of clamps for engaging the strip so as to cause the offset movement of the paper strip at widely separated points thereof.

In connection with the feeding of the paper strip for predetermined lengths which comprise substantially the length of a merchandise tag, it is an object of the machine to cause the feeding of the paper strip by the electro printing and feeding mechanism to an extent substantially greater than the length of a merchandise tag. The machine also includes a pilot pin which is adapted to enter the hole pierced in the strip so that at the termination of the lengthwise feeding of the strip a spring will act upon the pilot pin now engaging the pierced hole and reversely shift the pilot pin so as to draw it back a pre-

determined distance. Hence, the machine is capable of overfeeding the strip in a lengthwise direction and reversely retracting the same so that when the aforesaid severing mechanism is operated it will sever the strip into sections which are precisely the same in matter of length for each of the merchandise tags manufactured.

It is a further object of the present machine to provide an adjustable device so that the amount of retraction of the paper strip may be governed, thereby preselecting the length of the merchandise tags.

A still further object of the present invention in connection with the successive tags manufactured by the machine is the provision of a counting mechanism which counts and determines the number of tags which are to be manufactured. The reason for this is that upon receiving in stock a number of articles to be sold a merchandise tag is, of course, to be made for each of these articles. The machine includes a mechanism which is set by the operator so as to cause the machine to make a tag for each article which is to be sold. This mechanism includes a part which is set by the operator so that when the number of tags have been made, the part is effective to cause the machine to be automatically stopped.

It is a still further and important object of the present invention to provide a mechanism for automatically unrolling the paper strip from the supply roll. It is common practice to provide the paper strip in rolls of large diameter so that it is not practical to effect the unwinding directly from the roll by the feeding mechanism within the machine. The mechanism now under discussion includes rollers which engage the periphery of the supply roll and rotate the latter a predetermined extent for each machine operation, thus effecting a slack which is taken up by the feeding mechanism in the machine, thus diminishing the load upon the latter and preventing breakage of the paper strip.

A still further object of the invention in connection with the aforesaid mechanism is to provide means to control the extent of unwinding of the paper strip so that too much slack, which cannot be taken up by the machine, will not be produced.

Further objects of the instant invention reside in any novel feature of construction or operation or novel combination of parts present in the embodiment of the invention described and shown in the accompanying drawings whether within or without the scope of the appended claims and irrespective of other specific statements as to the scope of the invention contained herein.

The machine which is now to be described in detail, by reason of the various mechanisms and improvements incorporated therein, is capable of working efficiently at high operating speeds and of manufacturing a number of tags which are precisely the same in matter of data designated thereon and also the incidental operations made in connection therewith. The mechanisms hereinbefore referred to and parts thereof have been designed from the viewpoint of simplicity, manufacture, and service, and are capable of sustained operations for long periods of time without servicing requirements.

In said drawings:

Fig. 1 is a view in side elevation of the machine embodying the present invention and shows the various mechanisms for successively operating upon a portion of a paper strip so as to print, punch, sever and form a number of tags.

Fig. 2 is a plan view of the machine shown in Fig. 1, but shown on an enlarged scale.

Fig. 3 is a longitudinal sectional view of the machine and is taken on the line 3—3 of Fig. 2.

Fig. 4 is a cross-sectional view of the machine and is taken on line 4—4 of Fig. 2.

Fig. 5 is a detail view of one of the devices provided to effect an offset of the paper strip.

Fig. 6 is a cross-sectional view taken on the line 6—6 of Fig. 2 and shows particularly the punching and printing mechanism for printing and punching pre-set data on the strip.

Fig. 7 is a fragmentary detail view showing more clearly the operating mechanism for the printing hammers.

Fig. 8 is a cross-sectional view taken on the line 8—8 of Fig. 2 and shows particularly the mechanism provided to pierce, score and notch the paper strip.

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 2 and shows in detail the mechanism which is pre-set by the operator so as to predetermine the number of tags to be manufactured.

Fig. 10 is a detail view showing in plan some of the parts shown in Fig. 9 to more clearly show their relationship.

Fig. 11 is a detail view of the manually operated device for releasing the aligning bar for the punch operating slides for free manual setting thereof; and also for clamping the punch slides and holding the aligning bar in aligning relationship with the punch slides when the latter have been set and the machine is ready for operation.

Fig. 12 is an end view of the machine and is taken on the line 12—12 of Fig. 2, and shows particularly the severing mechanism for cutting the continuous paper strip into separate printing and punching merchandise tags.

Fig. 13 is a detail view of an adjusting mechanism for predetermining the extent of the lengthwise feeding of the paper strip.

Fig. 14 is a plan view showing one of the merchandise tags capable of being manufactured by the present machine.

Fig. 15 is a plan view of the mechanism provided to cause the paper strip to be unwound from the paper roll and to control the extent of paper feed.

Fig. 16 is a detail view in side elevation and is taken on the line 16—16 of Fig. 15.

Fig. 17 is a detail view of certain parts of the mechanism shown in Figs. 15 and 16.

Driving mechanism

The motive power for the machine is derived from an electrical motor 10 (Figs. 1 and 2). The motor is set in operation by the closure of a switch 11 (Fig. 9) which closes the circuit to the motor and in the circuit are contacts 12 (Fig. 6) to be hereinafter referred to and which are closed under certain conditions.

The motor 10 drives a shaft 13 (Fig. 1) by a belt connection 14 and said shaft carries a worm wheel 15 (Fig. 4) meshing with a worm gear 16 secured to a drive shaft 17. The shaft 17 carries a gear 18 (dotted lines in Fig. 4) meshing with a gear 19 secured to a drive shaft 20. The above described drive and gear connections are also shown in Fig. 3, and in this figure is also clearly shown the two line drive shafts 17 and 20.

Punching and printing mechanism

The strip which is to be worked upon by the

machine is unwound from a supply roll 21 (Fig. 1) and the strip 22 is first fed through the various operating mechanisms of the machine one of which is a punching mechanism for punching pre-set data on the tag shown in Fig. 14. The punched holes are indicated by numeral 23. The printing mechanism is adapted to print two lines of printed data indicated by numerals 24_1 and 24_2 and this data is an interpretation of the meaning of the holes punched.

The printing and punching mechanism is generally designated by numeral 26 in Figs. 1, 2, 3, and 6.

The data to be printed and punched is pre-set by a series of combination punch pin and type carrying slides 27. Each slide consists, as best shown in Fig. 6, of a central plate 28 and two side plates 29 and 30. The central plate 28 carries a single punch pin 31 and is apertured to form a die hole 32. The side plates 29 and 30 confine the punch pin 31. The central plate 28 also carries a series of spring pressed type bars 33 and are also confined in position by the side plates 29 and 30. Beneath the type bars 33 is a rubber platen and the strip to be printed and punched passes between the type bars and platen and under the punch pin 31, and for this reason the slides are provided with a central slit 35 and an aperture 36 to receive the strip.

The slides 27 are slidably guided in the machine and may be manually set to different positions to record and punch pre-set data so that the punch pin 31 is positioned transversely of the strip so as to designate by the location of the hole the digit, according to the Hollerith code for designating digits.

By the same positioning the selected type bar is in position beneath a hammer 37 so as to print on the tag the digit represented by the hole.

All of the slides 27 are set before the machine and are in operation so that a number of tags may be printed and punched with the same data. When set the operation of the punching machine will punch and print by the following described means.

The punching mechanism comprises two side arms 38 pivoted on a rod 39 and have connected thereto a cross plate 40 and a punch operating plate 41. It also carries guide bars 42 spaced by spacer bars 43 from the punch operating plate 41 and between the guide bars the punch pins 31 project and a pin 44 carried thereby rests upon the guide bars to hold the punch pin 31 in position.

The arms 38 also carry a rod 45 and links 46 connect the arms 38 with a pair of arms 47 pivoted on a rod 48. The arms 47 carry a roller 50 (see Fig. 3) engaging two pairs of complementary cams 51 and 52 attached to the drive shafts 17 and 20.

Obviously at the beginning of the machine operation the cams 51 and 52 will rock the arms 47, depressing links 46 and rocking the arms 38 downwardly to cause the operating plate 41 to depress the punch pins 31 and force them through the strip and into the die holes 32. This, of course, is effected irrespective of the differential positions of the slides 27. The guide bars 42 in cooperation with pins 44 positively retract the punch pins 31.

The selected type bars 33 are depressed by hammers 37 to force the type against an inking ribbon 53 positioned under the type but over the strip. The hammers 37 are loosely mounted on a rod 54 and have hooked portions 55 engaging a lip 56 of a frame 57 loosely pivoted on the rod 39.

To the frame 57 are pivoted a pair of links 58 (Fig. 7) connected to arms 59 also loosely pivoted on the rod 48.

The arms 59 are connected by a bolt 49 and carry a roller 60 cooperating with profile cams 61 and 62 carried by shafts 17 and 20, respectively.

The cams 61 and 62 have two sets of operating projections and concurrently with the operation of the punching mechanism the first set of operating projections will depress the frame 57 and cause hammers 37 to print. Thereafter the punch operating frame is idle, by reason of concentric portions 63 of the cams 51 and 52 but the second set of operating projections of cams 61 and 62 is effective at this time to cause a second imprint, but adjacent the first imprint by reason of a slight offset feed given to the strip by means now to be described.

It is pointed out that numeral 24_1 indicates in Fig. 14 the first imprint effected during the punching operation and numeral 24_2 the second imprint effected while the punching mechanism is idle.

Clamping means for paper strip

It is desirable to hold the paper strip during the time it is worked upon and this is effected by the following means:

A bracket is formed of a cross plate 71 (Figs. 3 and 4) and two side arms 72 and 73 and carries at its lower end a rod 74. Supported by the rod 74 is a frame consisting of two side arms 76 and 77 and a cross piece 78 and said frame carries a rod 75. Loosely mounted on the rod 75 is a spring urged bail 79 carrying a rubber block 80. Attached to a side arm of the bail 79 is a depending arm 81 to which is attached a spring 82 connected to a stud carried by the side arm 76, the spring 82 urging the rubber block to clamp the strip 22 between the cross piece 78 and the rubber block 80.

It is desirable to release the aforesaid clamp so that the strip may be offset slightly so as to cause the second printing to be effected on the top line 24_2 of the tag. This is accomplished by having the lower bent portion of arm 81 engaged by a concentric cam strip 83 (Figs. 3 and 4) attached to the worm wheel 16. During the rotation of the worm wheel 16 the arm 81 will be rocked to bail 79 and separate the rubber block 80 from the cross piece 78 to release the strip 22. The arm 81 has a finger piece 84 by means of which the arm 81 may be manually rocked to separate the rubber block 80 from the cross piece 78 to permit the unobstructed threading of the paper strip 22 in the machine when a new roll of paper strip is to be inserted.

Paper strip offsetting means

This will be seen by referring to Fig. 4 and comprises a fixed plate 90 carrying guide studs 91 receiving slots of a shiftable offsetting plate 92. The latter has two depending extensions 93 receiving the lengthwise edges of the strip 22. The plate 92 carries a pin 94 engaged by a shifter arm 95 secured to a rock shaft 96. The above describes the offsetting means which is located near the paper clamp and in Fig. 3 reference numeral 97 indicates a similar mechanism for engaging another portion of the strip for offsetting the same. The details are similar and are shown in Fig. 5, and the sole exception is that the guide pins 91 are carried by a frame 98.

As best shown in Fig. 8 attached to the shaft 96 is an arm 99 to which is connected a spring

100 to rock the shaft 96 so that an arm 101 engages a profile cam 102 secured to the shaft 17.

After the paper clamp is released the cam 102 will rock the shaft 96 and thereby the two offsetting means just before the second print is effected. When the paper strip has been offset a re-print is effected and as previously stated, no punching will be effected at this time.

By the return springs 103 (Figs. 4 and 5) the plates 92 will be returned to their normal positions to reversely shift the paper strip for further operations thereon.

Aligning and clamping means for punching and printing slides

This is best shown in Figs. 4, 6, and 11 which should be referred to.

In a casing 105 (Fig. 4) a pivot rod 106 is journaled. A segment plate 107 (Fig. 11) is pivoted by a screw 108 to the rod 106 so that by means of a lever 109 and a knob 110 the plate 107 may be rocked about the screw 108 or the plate 107 may be rotated with the shaft 106 as a pivot.

A plate 111 has pivoted thereto by a stud 112 a bar 113 carrying an aligning bar 114 adapted, as shown in Fig. 6, to fit in aligning slots 115 of the punch slides 27. The plate 107 carries an integral raised segment 116 upon which the aligning bar 114 rests. By rocking the knob 110 upwardly the plate 107 will be rocked so that the segment 116 will permit the bar 114 to be lowered and by moving out of the aligning slots 115 will release the punch slides for manual positioning.

When the segment plate 107 is rocked as aforesaid a notch 117 formed in the plate 107 and segment 116 will be received by a stationary pin 118 thus preventing the rotation of the segment plate 107 as long as the aligning bar 114 has released the punch slides.

When the punched slides have been set the knob 110 is grasped and by the lever 109 the segment plate 107 is rotated and sufficiently until a pin 119 carried thereby will contact with a bent-over portion 120 of a lever 121 rocking the latter about a stud 122 so as to close the contacts 12 and close the circuit to the motor at this point. It should be observed that the segment 116 will still maintain the aligning bar in elevated position so that the slides cannot be moved during an operation of the machine.

The bar 113 carries a plate 123, a lug 124 of which engages the pin 118 so as to provide a stop for the aligning bar 114 in aligning position.

It is further desirable to clamp the punch slides 27 and to this end there is pivoted on a fixed stud 125 an arm 126. The latter has two integral extensions 127 (see Fig. 3) and each extension 127 is provided with a notch receiving a pin 128 carried by a clamp 130, one side of the latter coacting with the outer punch slide 27. When the rod 106 is rocked by the lever 107 a concentric portion 131 of the rod 106 will rock the arm 126 and, therefore, force the clamps 130 to the right pressing the slides together and against a fixed plate 132 (Fig. 11). Thus, besides being aligned the slides 27 are firmly clamped when the machine is in condition for operation.

When the lever 109 is in the position shown in Fig. 11 the contacts 12 are, of course, opened so that when the lever 109 is rocked to unlock the punch slides the machine cannot be operated.

Piercing, notching, and scoring mechanism

This section of the machine now to be described is adapted to work on the strip so as to pierce a hole 135 (Fig. 14), by means of which a string may be tied to tie the tag to the merchandise, to cut a notch 136, and to make a scoring line 137. This mechanism is generally indicated by the reference numeral 138 and is best seen in Figs. 2, 3 and 8.

By means of pilot studs 139 an operating plate 140 is slidably mounted. The latter carries a punch pin 141 which pierces the hole 135 in the strip and a scoring tool 142. The plate 140 also carries a punching tool 143 (Fig. 8) cooperating with a die bar 144 to cut the corner of the tag diagonally to notch the same.

To the plate 140 (Fig. 8) there is attached a bracket 145 to which is pivoted by a stud 146 a pair of arms 147 loosely mounted on the rod 39. By means of a rod 148 carried by the arms 147 a block 149 carrying a screw 150 is mounted. The latter is screwed into a link 151 and said link is pivoted to a pair of arms 152 by means of a stud 153. The arms 152 carry a roller 154 cooperating with complementary cams 155, 156 carried by shafts 17 and 20, respectively.

The cams 155, 156 operate this mechanism during the part of the machine cycle in which no feeding or offset of the strip takes place, and operate on one portion of the strip during the time the punching and the first printing are effected on another portion of the strip.

It is pointed out that a receptacle 158 receives the chips made by the punching pins 31 of the punch slides, the piercing pin 141, and the tool 143.

Pilot pin aligner

A pilot pin is adapted to enter the hole 135 of the strip to hold the paper strip at this point and its construction will now be described.

This comprises a circular pilot pin 160 (Fig. 3) which has a flattened portion 161 fitting in a slot in a pilot pin holder 162 and the portion 161 is pivoted by a pin 163 to the holder 162 so that as the strip is off-set the pilot pin 160 rocks about the pivot pin 163 but still in engagement with a hole 135 of the strip.

Attached to a rock shaft 164 is an arm 165 to which is pivoted by a pin 166 the holder 162. To the shaft 164 there is secured an arm 167 bearing against the periphery of a circular hub 168, a spring 169 secured to the arm 165 effecting this relationship and thus holding the pilot pin 160 in the position shown. The pilot pin 160 holds the strip while it is being punched by the punching sections 26 and 138.

Strip feeding and electro printing mechanism

This mechanism designated generally by numeral 184 is operated by the shaft 17 and as best shown in Fig. 3 attached to the shaft 17 is a worm wheel 170 meshing with a worm gear 171 secured to a drive shaft 172. To the shaft 172 there is secured a gear 173 meshing with a gear 174 attached to a shaft 175. The shaft carries a rubber platen roller 176 and the gear 174 also meshes with a gear 177 attached to a shaft 178. To the shaft 178 there is secured an electro bearing element 179 carrying at its periphery an electro plate 180 having type which are adapted to print the two lines 181 of printed data of the merchandise tag, (see Fig. 14).

The electro plate 180 is inked by a pair of ink

saturated spring-urged inking rollers 183 of a form and construction well known in the art.

As the drive shaft 178 rotates a cam portion 182 attached to the gear 177 will engage the arm 167 and rock the shaft 164 to draw the pilot pin 160 out of cooperation with the hole in the strip 22. Thereafter the electro plate 180 will cooperate with the platen roller 176 and thus feed the strip 22 to the extent of more than the length of the tag, and at the same time effect printing on the strip.

Before the electro plate 180 terminates the feeding of the strip the cam portion 182 will leave the arm 167 permitting spring 169 to draw the pilot pin 160 downwardly to enter the next hole 135 of the strip as the latter is being fed. As the feeding operation continues the pilot pin 160 now engaging the next hole 135 and holder 162 will be rocked about the pivot 166 against the action of a spring 184 tensioning the latter. When the strip feed has been terminated by the electro plate 180 the spring 184 is now effective to reversely shift the strip until the lower edge of the pilot pin strikes an edge 185 (Fig. 13) of a notch of an adjustable plate 186.

During the initial feed by the electro plate 180 the engagement of the strip between the rubber block 80 (Fig. 3) and cross piece 78 is effected so as to cause the frame comprising side arms 76, 77 and cross piece 80 to be rocked slightly about the rod 74 against the action of a spring 66 secured to the frame until the frame strikes a fixed stop. The further feeding of the paper strip pulls the paper strip between the block 80 and cross piece 78. When the pilot pin 160 is effective to retract the paper strip the spring 66 also retracts the paper strip at the portion engaged by the rubber block 80 and cross piece 78, thus keeping the paper taut between the clamp and pilot pin.

It will be seen, therefore, that the strip is fed beyond the length of a tag and then reversely shifted at two points and by this means it is ensured that each tag will be of the same dimension.

The plate 186 (Fig. 13) is adjustable by means of inclined slots 186*a* cooperating with clamping screws 187 so as to cause the edge 185 to be varied in its position as a stop for the pin 160, and thus predetermine the lengths of the tags.

A spring 188 (Fig. 13) connected to the pilot pin reversely shifts the pilot pin 160 when the paper is returned after the off-set of the paper strip, as previously explained. An edge 188*a* of a fixed plate 188*b* functions as a stop in this operation.

When the strip has been fed a sufficient extent it is severed by a severing mechanism now to be described.

Severing mechanism

This mechanism is identified generally by reference numeral 189 and is described as follows:

A pivoted knife blade 190 (Figs. 3 and 12) cooperates with a fixed knife blade 191 and the knife blade 190 is pivoted to an arm 192 by a link 193 and said arm carries a roller 194 cooperating with complementary cams 195 attached to shafts 17 and 20, said cams rocking the arm 192 to rock the blade 190 and thus sever a portion of the strip which is printed and punched by the mechanisms previously described.

Clamping strip before severing operation

As best shown in Fig. 12 a plate 196 is slidably guided by pins 197 and the latter fixedly hold a plate 198 and between the plate 198 and plate 196 springs 199 are interposed so as to press the plate 196 downwardly, this being prevented by a pin 200 engaging the top of the knife blade 190. When the latter is rocked the springs 199 are now active to depress plate 196 and as will be clear from Fig. 3 clamp the strip 22 against the fixed knife blade 191, before the severing operation.

General summary of operation

It is pointed out that the severing and clamping operations are effected on a portion of the strip during the first half of the cycle which is the time the first printing and punching is being effected on another portion of the strip and also during the time another portion of the strip is being pierced, scored and notched. Thereafter the clamp shown in Fig. 3 is released, and the strip is offset. A second print by the slides 27 is now effected, the strip then being reversely shifted. Thereafter the pilot pin 160 is lifted out of engagement with the cooperating hole in the strip and the electro plate and feeding rollers are operated to feed the strip. The pilot pin 160 and clamp then reversely retract the paper strip. At the next cycle of machine operation the above operations are repeated.

Means for pre-determining number of tags to be made

This mechanism is best shown in Figs. 9 and 10, and as seen in Fig. 9 secured to the constantly rotating shaft 172 is a worm wheel 215 engaging a worm gear 216 and to the latter is secured a pinion 217 meshing with a gear 218. The latter carries by screws 219 a disk 220, the latter having an integral upstanding stud 221.

A control disk 222 and a knob 223 are fixed together and in a recess of the knob 223 a spring 224 is inserted encircling the stud 221 and bearing against a washer 225 carried by the stud 221. The washer 225 is prevented from being urged upwardly by a key pin 226, and thus the spring 224 urges the disk 222 against the disk 220 by an intermediate friction disk 214 inserted therebetween.

Thus disks 220 and 222 frictionally rotate together and are driven by the shaft 172 through the worm wheel 215, worm gear 216, pinion 217, and gear 218.

The switch 11 which is of the usual toggle type switch has mounted over its operating lever a slide 227 and the latter carries an extension 228 which rests upon a flange 229 of the disk 222.

The knob 223 permits the rotation of the control disk to bring the indicia on the flange 229, indicating the number of tags wanted, in cooperation with the extension 228. Thereafter, as the machine is operated the disk 222 is rotated and at the time the pre-determined number of tags are manufactured a slot 230 of the disk 222 will be in alignment with the extension 228. A spring 231 connected to the slide 227 will now be active to quickly draw the slide 227 downwardly, rocking the switch lever to open the motor circuit so as to automatically stop the machine.

Paper roll unwinding device

It is desirable to unwind the paper strip from the roll and not depend entirely upon the feeding mechanism previously described to draw the paper strip directly from the heavy roll. This is effected by the following described means:

To the shaft 172 there is secured a sprocket wheel 250 (Fig 1) which drives a sprocket wheel 251 through a chain 252. To the sprocket wheel

251 there is attached a sprocket wheel 253 driving a sprocket wheel 254 by a chain 255.

The sprocket wheel 254 is secured to a shaft 265 and said shaft carries rubber rollers 256 normally in contact with the periphery of the paper roll 21.

The shaft 257 which carries the sprocket wheel 251 is carried by a fixed bracket 258 and pivoted on the shaft 257 is an arm 259 which carries the shaft 265. A weight W_1 (Fig. 1) is attached to the arm 259 to place the parts off balance and its weight is so selected as to have the rollers 256 press on the roll 21 with sufficient pressure so that as the rollers 256 are rotated the roll 21 is rotated to unwind the strip 22 therefrom.

By means of a bracket 260 a depending plate 261 is carried thereby and said plate carries a pivot for a wheel 262 around which the strip passes.

Two plates 266 and 267 are connected together by screws 268 to act as one piece and both are pivoted by a fixed stud 269. The plate 267 carries a weight W_2 and the plate 266 pivotally carries a wheel 270 around which the strip 22 passes. The parts are so balanced by the weight W_2 so that when a slack is effected in the part of the paper strip 22 between the entrance in the machine and the wheel 262 the wheel 270 will drop and rock about the pivot 269 to effect a function now to be described.

As the slack increases the wheel 270 drops so that a link 271 secured to the plate 266 by a bracket 272 will depress the link 271. The link 271 is connected to one end of an arm 273 attached to the rock shaft 274 which is also carried by the bracket 258.

The rock shaft 274 carries an element having a lifting finger 275. A shaft 276 is also carried by the bracket 258 but the hole 277 (Fig. 16) in one side plate of the bracket is slightly larger than the shaft 276 so that the finger piece 275 elevates one end of the shaft and forces a wedge-shaped end of an arm 278 carried by the shaft 276 in a grooved pulley 279 which is attached to the continually rotating shaft 257.

As the arm 278 is wedged in the pulley groove the rotation of the pulley 279 causes the arm 275 to be rocked slightly clockwise (Fig 17) and, therefore, the shaft 276.

Attached to the shaft 276 is an arm 280 to which is connected a link 281 and said link 281 is pivoted to an arm 282. The arm 282 is connected to a lifting arm 284 (Figs. 1 and 15) by means of a sleeve 283, and the sleeve 283 is carried by a stud 285 which is carried by the arm 259. The lifting arm 284 when it is so rocked engages the roll 21 and elevates the arm 259 at its free end so as to prevent the contact of the rollers 256 with the roll 21 while said rollers 256 are rotating and thus prevent more unwinding of the roll 21. The slack is now taken up by one or more operations of the machine so that link 271 is again raised and the lifting finger 275 depressed permitting the shaft 276 to drop bringing the finger piece 275 below the pulley 279 and returning it to normal by the dropping of the free end of arm 259. As the latter drops the rollers 256 will now contact the periphery of the roll 21 to produce more slack.

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

What is claimed is as follows:

1. A machine for forming from a continuous strip tags to be affixed to merchandise comprising, a main operating means, a plurality of punch pin carrying members, said members also carrying printing type, means operated by said operating means for operating said punch pins to perforate a portion of the strip to represent data related to the merchandise, means operated by said operating means for effecting a printing impression from the type to thereby print on an adjacent portion of the strip the meaning of the perforations, means for feeding the strip through the machine lengthwise as the strip runs to a more or less variable length, a resiliently operated means engaging said strip during said feeding operation, said resiliently operated gauging means reversely feeding said strip to a predetermined stop position of the resiliently operated means thereby exactly gauging the length of the tag, and means operated by said operating means to sever the strip to provide a tag section having the length previously gauged.

2. A machine for forming from a continuous strip tags to be affixed to merchandise comprising, a main operating means, a plurality of settable members carrying punches which are set to predetermined positions so as to perforate said strip to represent data related to the merchandise, a plurality of type carried by said member for printing upon said strip data representing the meaning of the perforations, a strip feeding mechanism comprising feeding rollers driven by said operating means for feeding a predetermined length of said strip, means operated by said operating means for operating said punches to perforate said strip, means comprising a hammer operated by said operating means for causing said type to print upon a portion of the strip adjacent said perforated portion, a strip offsetting means operated by said operating means for shifting said strip in a direction transverse of said feeding direction, means operated by said operating mechanism for again operating said hammer to effect a second printing impression upon said strip after the first printing operation, a strip scoring means, a strip severing means, means operated by said operating means for causing said scoring means to score the strip between the successive imprints, and means operated by said operating means for operating said strip severing means to sever said strip in sections of predetermined length to form separate tags.

3. A machine for forming from a continuous strip separate tags to be affixed to merchandise comprising a main operating means, a punching mechanism for perforating said strip to represent data related to said merchandise and operating means operated by the aforesaid main operating means for causing the actuation of said punching mechanism, a printing mechanism for printing data on said strip at two portions thereof to represent the meaning of the portions, means operated by said operating means for repeatedly operating said printing mechanism, an offsetting means for transversely shifting said strip so as to provide for printing upon said strip at separate portions thereof, a resiliently operated means, a feeding means for

feeding said strip a more or less variable amount, means for causing said resiliently operated means to engage said strip prior to completion of the feeding operation of said strip whereby said resiliently operating means reversely feeds said strip to a predetermined stop position when the feeding operation of the strip is terminated, and means for thereafter severing said strip to provide a tag portion of the predetermined length.

4. A machine for forming tags from a continuous strip and which tags are to be affixed to merchandise comprising a punching mechanism including pre-set members for perforating said strip to represent data related to the merchandise, a printing mechanism for printing upon said strip the meaning of the perforations, an offsetting means for offsetting said strip transversely, means for repeatedly operating said printing mechanism prior to and after the offsetting movement of said strip to effect printing upon adjacent portions of the strip, a strip scoring means for scoring said strip between said printed portions, a hole piercing means for piercing said strip with a hole, means for feeding the strip to a predetermined but variable length, a resiliently operated pilot pin engaging the pierced hole, and resilient actuating means for said pilot pin for reversely feeding said strip when the strip is released by said feeding means to a predetermined stop position to thereby exactly gauge the length of strip feed, and a severing means for severing the strip into portions corresponding to the gauged lengths whereby successively formed tags are of exact lengths.

5. A machine for forming merchandise representing tags adapted to be fixed to merchandise and formed from a continuous strip comprising, a punching mechanism including pre-set punch pin selecting members for predetermining the location of perforations to be effected by said pins upon said strip to represent data related to the merchandise, a severing means for said strip, a gripper including a resiliently operated member for gripping said strip, a feeding means for feeding said strip against the action of said gripping means a more or less variable amount for successive tag forming operations, means for piercing said strip with holes whereby each tag is provided with a hole, a resiliently urged pilot pin, means for causing said pilot pin to engage one of said pierced holes prior to the termination of said strip feeding operation, resilient means for reversely moving said pilot pin when said strip is released by said feeding means and operating conjointly with the aforesaid resiliently operated gripping means to reversely feed the strip, an adjustable stop cooperating with said pilot pin for predetermining the stop positions of said pilot pin in its reverse movement and said strip to provide a predetermined length of strip which is fed, and a severing means for severing said strip to effect said predetermined lengths whereby said successively formed tags are formed of the same length.

6. A machine for forming from a continuous strip separate tags to be affixed to merchandise comprising a main operating means, a plurality of punch carrying members, said members also carrying printing type, means operated by said operating means for operating said punch pins to perforate a portion of the strip to represent data related to the merchandise, means operated by said operating means for piercing said strip with holes, means for feeding said strip in the direction of its length after said punching operation and to an extent varying more or less with each feeding operation, a pilot pin, means operated by said operating means for causing said pilot pin to engage one of said holes, resilient means for reversely feeding the strip when said strip is released by said feeding means to a predetermined stop position, and means for severing the perforated sections of said strip to provide separate tags each of which is of a predetermined and exact length.

7. A machine for forming from a continuous strip separate tags to be affixed to merchandise comprising, a punching mechanism for punching said strip to represent by perforations therein data related to the merchandise, a printing mechanism including pre-selected type for printing upon said strip data indicating the meaning of the perforations, means for feeding said strip to a length equivalent to the length of the tag, means for repeatedly operating said printing mechanism, an offsetting means for offsetting said strip transverse of the direction of the aforesaid feeding movement for causing the second imprint to be effected upon a portion of the strip adjacent to the portion in which the first imprint has been effected, a scoring means for scoring the strip between said printed portions, and a strip severing means for severing said continuous strip into lengths corresponding to the length of the tag sections.

8. A machine for forming tags from a continuous strip comprising a punching mechanism for perforating said strip to represent data related to merchandise, a printing mechanism for printing said strip with data representing the meaning of said perforations, means for repeatedly operating said printing mechanism, means for offsetting said strip transversely of its length to cause said second imprint to be effected upon a portion of the strip adjacent to the portion receiving the first imprint, a scoring means for scoring the strip between said printed portions, a hole piercing means, means for feeding said strip to a length varying more or less for each of the feeding operations, a pilot pin, means for causing said pilot pin to engage one of said holes whereby said pilot pin is moved by the feeding movement of said strip, a resiliently operating gripper means located in said machine to engage a portion of said strip at a position separated from said pilot pin, said feeding means also being adapted to cause the feeding movement of said strip through said gripping means while the latter frictionally grips said strip, separate resilient means connected to the aforesaid gripping means and said pilot pin for reversely moving said pilot pin and gripping means to reversely feed said paper strip to a predetermined stop position of said pilot pin, and means for severing said strip into tag sections which are of lengths predetermined by the stop position of said pilot pin.

9. In a punching machine, in combination, a plurality of differentially positionable punch pin carrying bars, each provided with a closed slot receiving a card to be punched and each carrying opposite the slot a single punch pin and cooperating die aperture, said bars being adjacently mounted but being freely positionable, means for operating said pins to punch a card, and means for clamping said bars together prior to an operation of said last named means to

align said punch pins with the columns of the card.

10. In a punching machine, in combination, means for preventing the operation of said machine, a plurality of differentially positionable punch pin carrying bars each carrying a single punch pin and a cooperating die aperture, said bars being adjacently mounted but freely positionable manually, manually operated means for clamping said bars together prior to an operation of the machine, and means operative in response to the operation of the manually operated clamping means to clamp said bars to disable said preventing means to enable the operation of the machine.

FREDERICK L. FULLER.