A. H. RAY.

PRINTING MACHINE.

APPLICATION FILED APR. 24, 1912.

1,104,829.

Patented July 28, 1914.

5 SHEETS—SHEET 1.

Fig. 1.

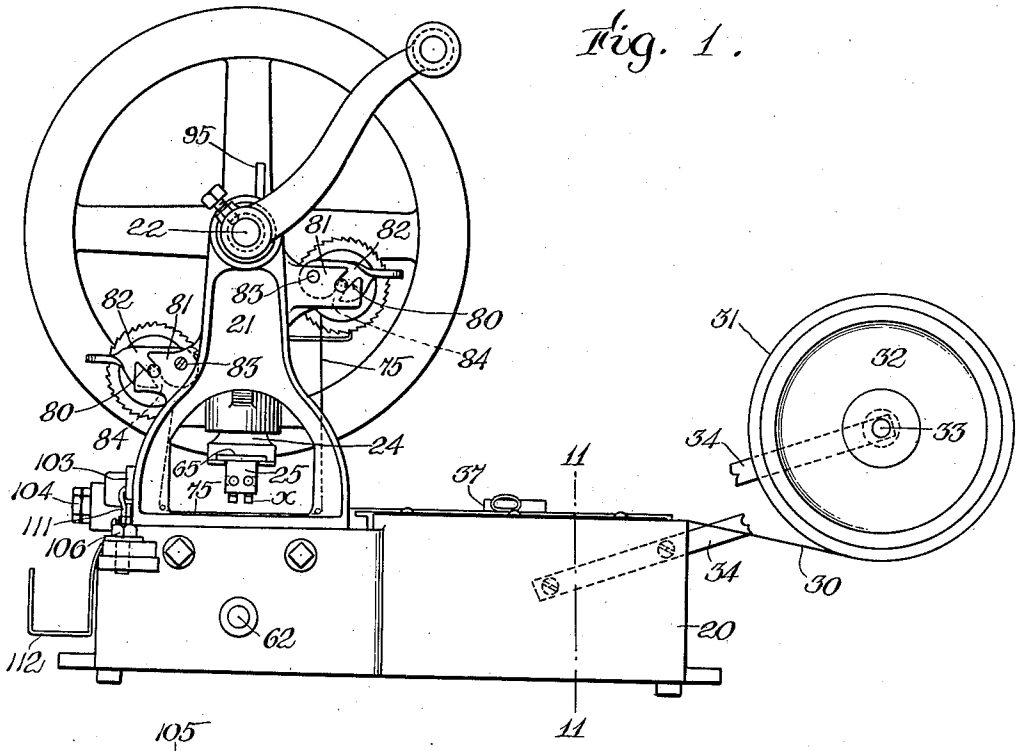

Fig. 2.

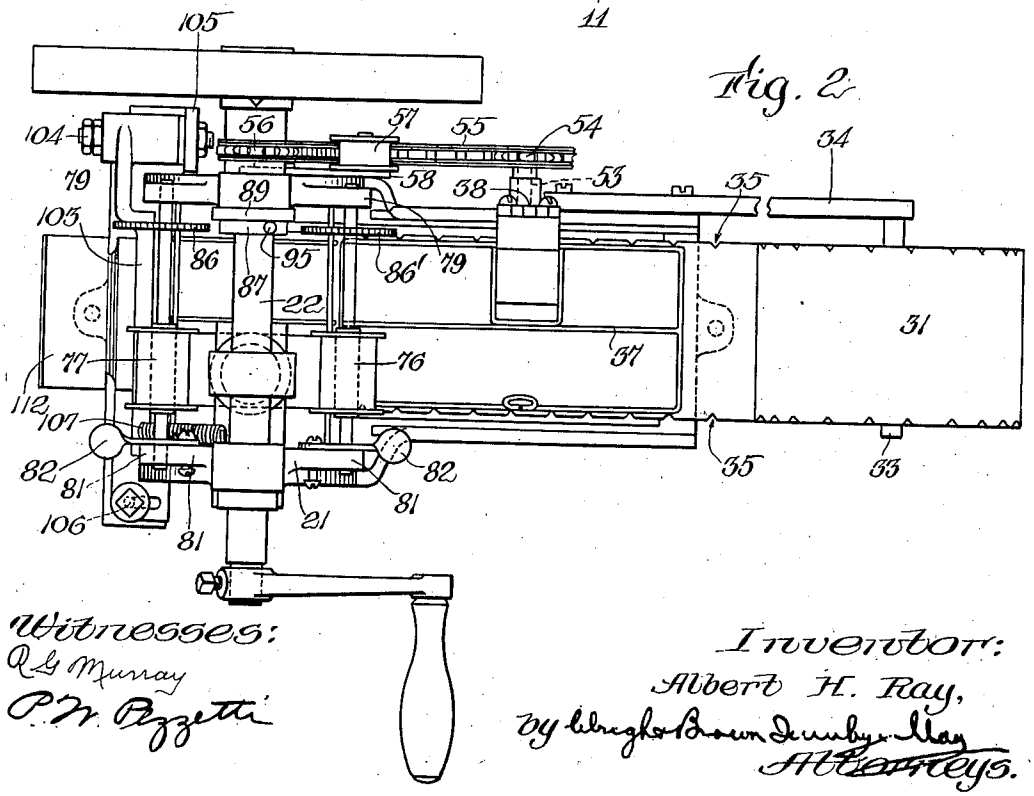

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Fig. 3.

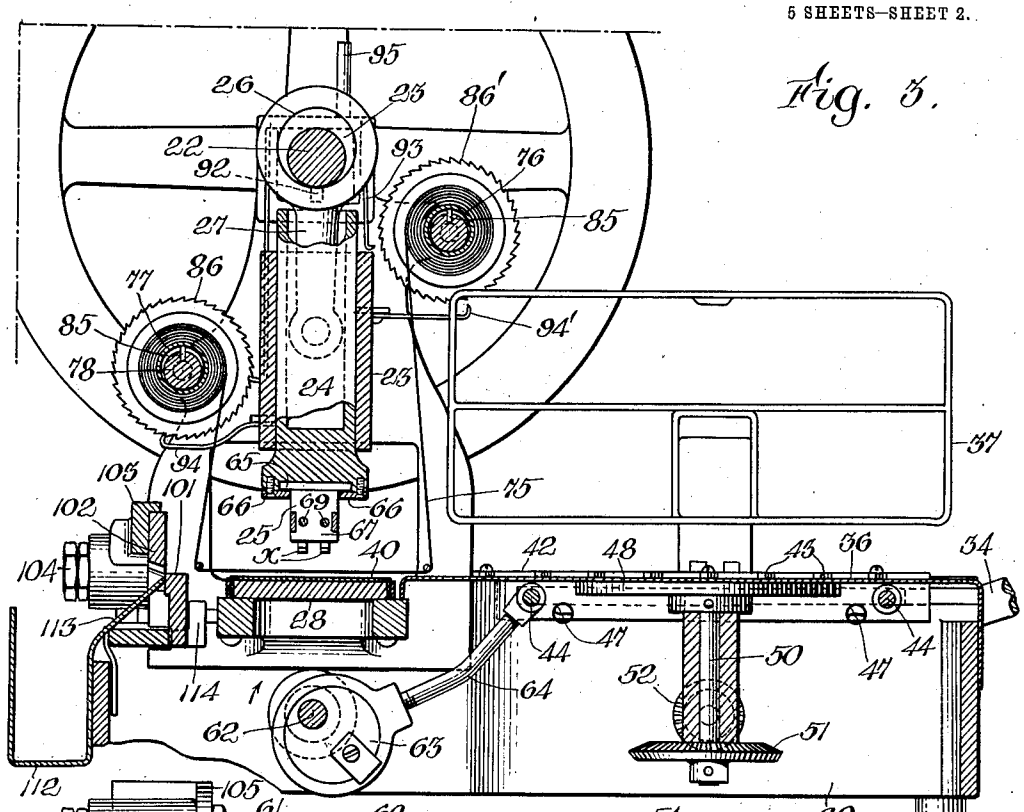
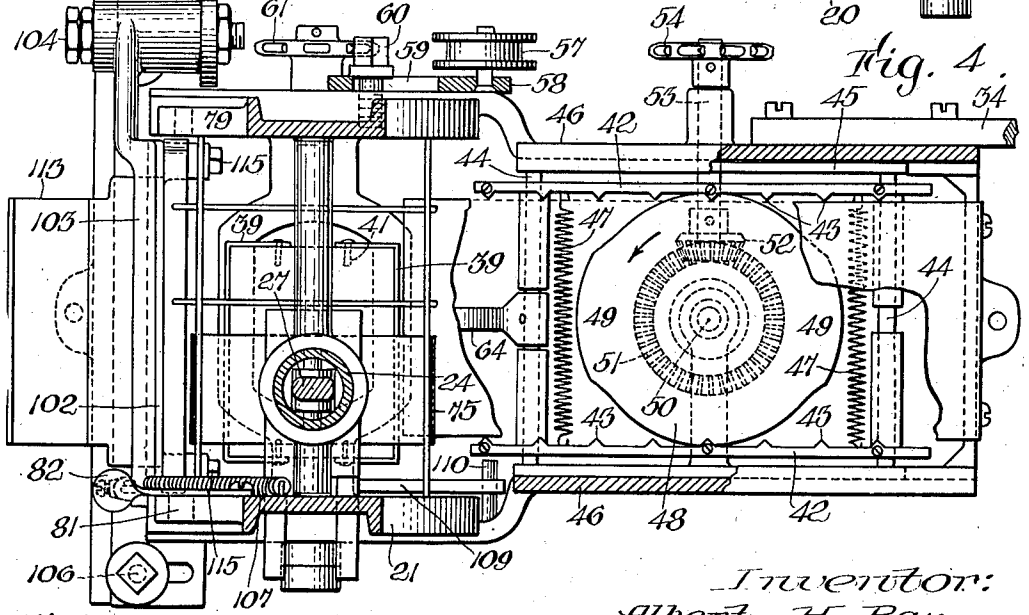


Fig. 4.



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5 SHEETS—SHEET 3.

Fig. 7.

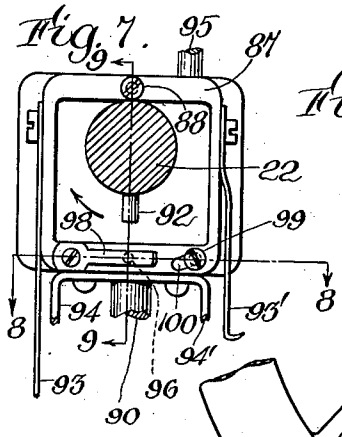


Fig. 6.

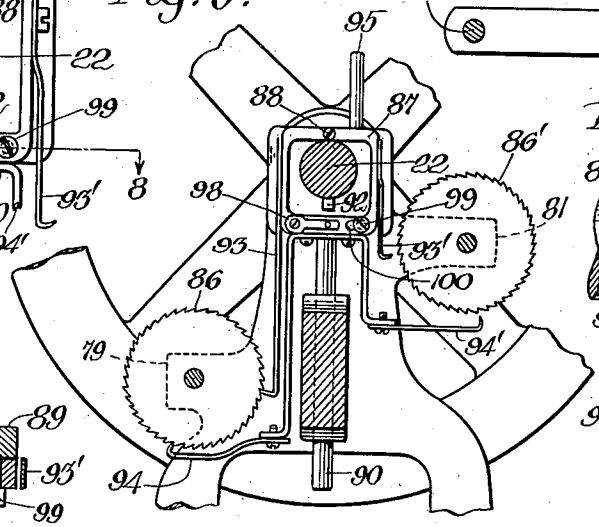


Fig. 10.

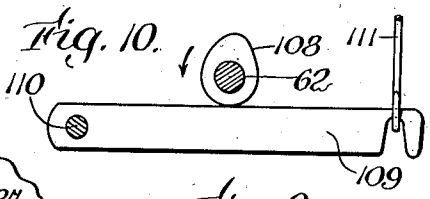


Fig. 9.

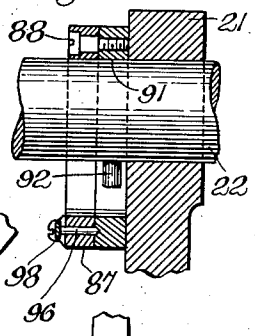


Fig. 8.

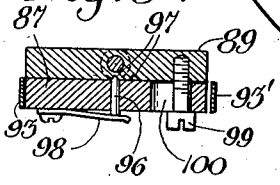
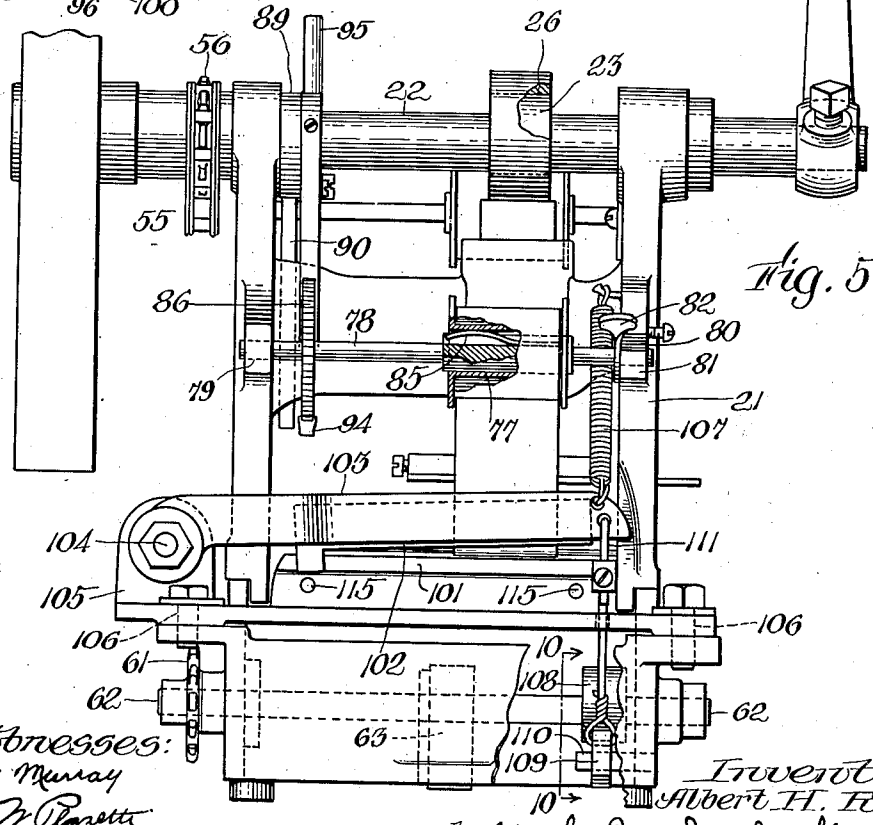


Fig. 5.



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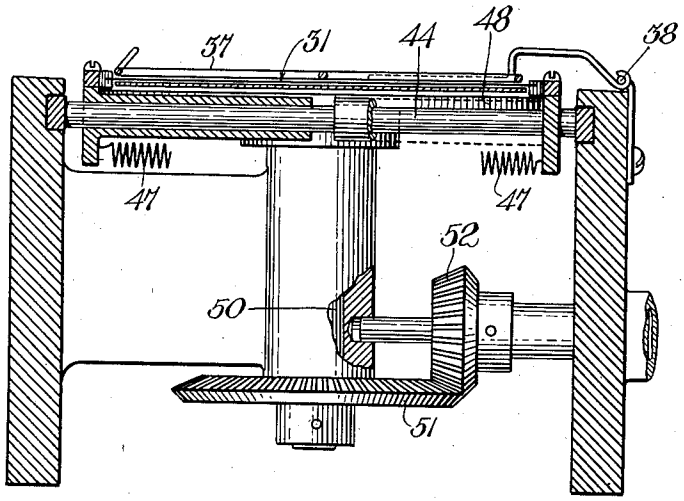
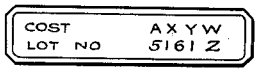


Fig. 11.

Fig. 15.



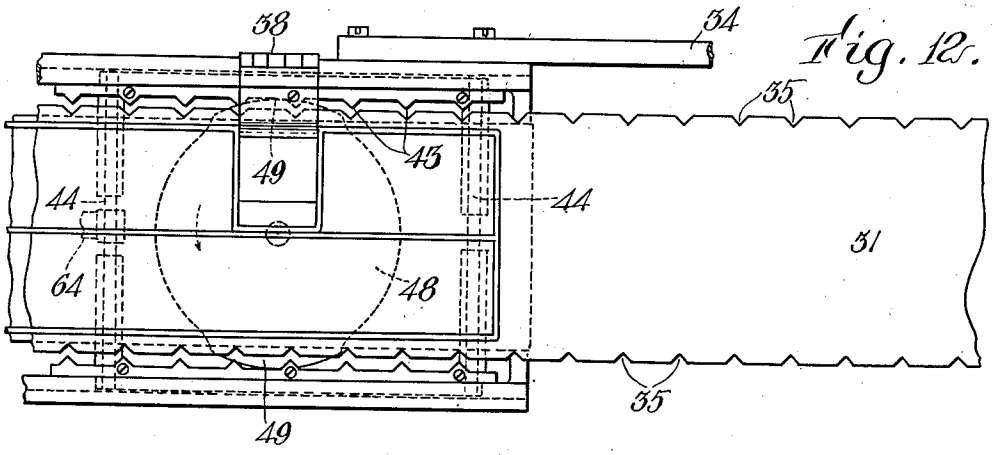


Fig. 12.

Fig. 13.

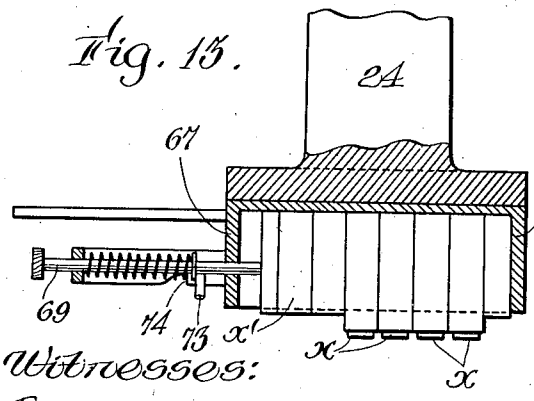
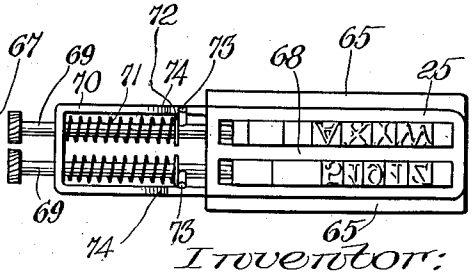


Fig. 14.



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5 SHEETS—SHEET 5.

Fig. 16.

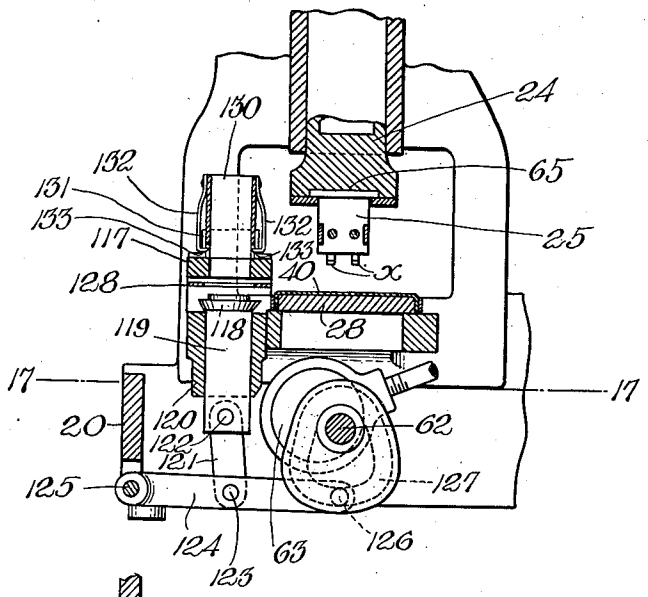


Fig. 17.

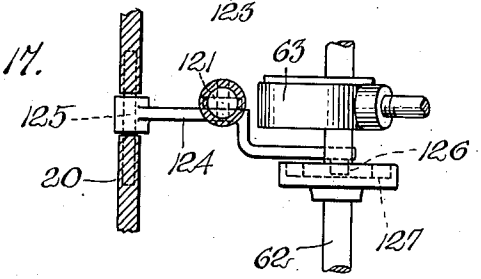


Fig. 19.

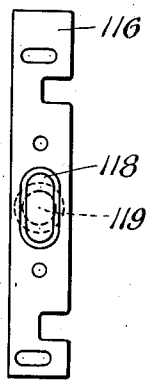
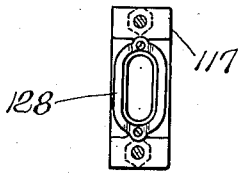


Fig. 18.



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UNITED STATES PATENT OFFICE.

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PRINTING-MACHINE.

1,104,829. Specification of Letters Patent. Patented July 28, 1914.

Application filed April 24, 1912. Serial No. 692,854.

To all whom it may concern:

Be it known that I, ALBERT H. RAY, a citizen of the United States, and resident of Ashland, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

This invention relates to printing machines, and its object is to provide a small portable machine adapted to print rapidly and legibly. It comprises in combination with the printing elements, means for intermittently feeding a long strip or web and means for severing the web into pieces of the desired size for the production of labels, the printing elements being operated to print upon the web at such intervals as to cause the printed matter to lie within the area which is severed.

Of the accompanying drawings which illustrate the invention: Figure 1 represents a side elevation of a machine for printing and cutting labels. Fig. 2 represents a top plan view thereof. Fig. 3 represents on a larger scale a longitudinal vertical section, portions of the machine being broken away. Fig. 4 represents a horizontal section, portions of the machine being broken away. Fig. 5 represents an end elevation, partly broken away, of the delivery end of the machine. Fig. 6 represents a view, partly in longitudinal vertical section and partly in elevation, of reversible mechanism for feeding an inking ribbon. Fig. 7 represents an elevation, partly in section, of a portion of the mechanism included in Fig. 6. Fig. 8 represents a horizontal section in the plane indicated by line 8—8 of Fig. 7. Fig. 9 represents a vertical section in the plane indicated by line 9—9 of Fig. 7. Fig. 10 represents a sectional view of mechanism for operating a knife, the plane of the section being indicated by line 10—10 of Fig. 5. Fig. 11 represents a transverse vertical section in the plane indicated by line 11—11 of Fig. 1. Fig. 12 represents a top plan view of the mechanism for feeding the web from which the labels are cut, the position of said mechanism being different from that shown by Fig. 2. Fig. 13 represents a vertical cross section of the printing type and its carrier. Fig. 14 represents an inverted plan view of the printing chase. Fig. 15 represents an elevation of a label. Fig. 16 represents a longitudinal vertical section of a portion of the machine embodying a modification in which a punch and die are substituted for the severing knife. Fig. 17 represents a horizontal section indicated by line 17—17 of Fig. 16. Fig. 18 represents an inverted plan view of the die shown by Fig. 16. Fig. 19 represents a plan view of the punch shown by Fig. 16.

The same reference characters indicate the same parts wherever they occur.

Before describing in detail the mechanism of the present invention, a brief general description will be given. The movable printing element is of the reciprocatory type, as distinguished from the rotary. In the present instance the printing chase is reciprocated and the platen remains stationary. The strip or web from which the labels are cut is fed step by step in one direction to the printing elements. This web is provided with notches in its side edges, the notches in one edge being in transverse alinement with the notches in the opposite edge and formed at intervals corresponding to the desired size of the labels. The notches are provided for two reasons: first, for the purpose of providing substantially transverse edges whereby the web-feeding mechanism may engage the web to feed it; and, second, for the purpose of avoiding sharp pointed corners on the labels which are afterward cut, this latter feature appertaining to the use of a knife rather than a punch and die for severing the web on a transverse line intersecting two oppositely disposed notches. The provision of the notches, of course, has nothing to do with the shape of the labels when a punch and die are used instead of the knife.

The feeding mechanism for feeding the web to the printing elements comprises two oppositely disposed feed bars or jaws each of which has a series of teeth spaced in accordance with the notches in the web. These jaws are actuated in such manner as to feed the web step by step, while the printing elements are operated to act while the web is stationary. The printed portions pass from the printing elements to the cutting elements whereby the printed labels are severed from the web.

The frame or base of the machine is indicated at 20. Two upright frame members 21 afford bearings for the power shaft 22 and afford a bearing 23 for a vertically movable plunger 24 which carries the print-

ing chase 25. An eccentric 26 on the shaft 22 is connected by an eccentric rod 27 to the plunger to operate the latter. The platen with which the types coöperate is indicated at 28 and is detachably mounted upon a portion of the base 20. The web which is printed and afterward cut to form labels is indicated at 30. Inasmuch as the web may be of indeterminate length, it may be supplied in the form of a roll, and is shown in that form by Figs. 1 and 2, the roll being indicated at 31. A spool for the roll is indicated at 32, the spool being mounted upon a spindle 33 one end of which is affixed to a bracket 34 which in turn is affixed to the base 20. The spool may be readily placed upon the spindle without disturbing any of the parts of the machine.

The side edges of the web 30 are provided with notches 35, each edge having a series of such notches. The notches are equidistantly spaced from each other, and the notches in one edge are in transverse alinement with the notches in the other edge. As the web passes from the spool to the platen it is supported by a stationary plate 36 which rests upon the base 20. A guard 37 of light construction is provided for preventing the web from buckling or otherwise rising from the supporting plate. This guard is movable for the purpose of facilitating the placing of the strip in operative position, but is connected to the base by a hinge 38. (See Figs. 2 and 11.)

The platen 28 is provided with two clamping members 39 whereby one or more filling pieces 40 may be held upon its upper surface to cause the type to act with the desired pressure. The clamping members are connected to the platen by pivot pins 41 about which they are adapted to swing to release the filling pieces. When the clamping members are in the position shown they coöperate with the edges of the platen to clamp the filling pieces.

The mechanism for feeding the web to the platen comprises two oppositely disposed feed bars or jaws 42 arranged one at each side of the web. These jaws are movable toward and from each other and are provided with teeth 43 which are substantially the same shape as the notches 35 in the web and which are spaced apart the same distance from each other as the said notches. Each jaw is provided with a plurality of teeth, in the present instance the number of teeth on each jaw being eight, but this number may be varied if desired. The reason for providing so many teeth is to enable the jaws to feed a web of very thin material without injuring the same. Each feed jaw has a 4-way movement, and the feed jaws are operated in unison so that they will first move toward each other to operatively engage the web, then move forward in unison to impart a feeding movement, then recede from each other to disengage the web, and finally to return to their initial position ready to engage the web at another position. The feed jaws are mounted upon transverse rods or guides 44 which rigidly connect two parallel slides 45. The members 44 and 45 collectively constitute a feed carriage which is movable toward and from the platen in guides 46 on the base 20. The feed jaws are movable toward and from each other on the rods 44 and are normally drawn toward each other by springs 47. A cam 48 interposed between the feed jaws engages both jaws and holds them apart against the tension of the springs. The cam has two raised portions 49 which are diametrically opposite each other. The outer surfaces of the raised portions are concentric, and the outer surfaces between the raised portions are also concentric except at the points where the concentric surfaces are joined by inclined surfaces. The cam is affixed to a vertical shaft 50 which is mounted in a bearing in a portion of the base 20. A bevel gear 51 at the lower end of the shaft is driven by a bevel pinion 52. This pinion is affixed to a shaft 53 to which motion is transmitted by a sprocket wheel 54, chain 55, and sprocket wheel 56. The sprocket wheel 56 is carried by the main shaft 22. An idle roll 57 guides one of the stretches of the chain and is mounted so as to be adjustable for the purpose of taking up slack in the chain. The idle roll is carried by a bracket 58 which has a slot 59. The bracket is clamped against one side of the base by a clamping screw 60 which extends through the slot 59 and allows for adjustment of the bracket for the purpose stated. The chain 55 passes over a third sprocket, indicated at 61. This sprocket drives a shaft 62 which transmits motion to the feed carriage 45 and which operates the cutter hereinafter described.

The cam 48 is driven continuously in one direction, thus opening and closing the jaws 42 and permitting them to remain stationary, so far as lateral movement is concerned, for a brief period when open and when closed. Longitudinal reciprocating movement is imparted to the feed carriage to effect the forward and backward movement of the feed jaws. This movement is transmitted from the shaft 62 by an eccentric 63 and an eccentric rod 64. The rod is pivotally connected to the feed carriage by engagement with one of the rods 44. Each raised portion 49 of the cam coacts first with one of the feed jaws and then with the other feed jaw, thus causing a double action or two opening movements and two closing movements for each rotation of the cam. For this reason the cam is driven at half the speed of the main shaft 22, the speed reduction in the present instance being the re-

sult of making the diameter of the gear 51 twice as great as the diameter of the pinion 52.

From the foregoing description, it is apparent that thin paper may be kept in proper alinement and fed accurately. The feeding members and their associated parts constitute non-pressural means for laterally and longitudinally adjusting the web, with reference to the printing mechanism. That is, while one or the other of the feeding members effects a lateral adjustment of the web, they are spaced apart by the cam so that they exert no compression on the web, and hence there is no danger of a thin web bending or buckling, as it would if the members were drawn together by yielding means, and there were nothing but the web to resist the spring pressure. It will be further observed that, by reason of the construction and arrangement of the feeding mechanism, the web may be fed in either direction, according to the direction of rotation of the main shaft 22. Inasmuch as it is frequently desirable to operate the machine by hand instead of by power, the ability of the feed mechanism to be operated reversely is advantageous, as it precludes the possibility of breakage of parts, particularly when inexperienced operators are employed.

The printing chase is shown in detail by Figs. 13 and 14. It is provided with flanges 65 which are adapted to slide in guides 66 at the lower end of the plunger 24. The chase may be readily withdrawn and inserted by sliding movement in the guides 66, and it may be turned about end for end so as to print in one position or in the opposite position. The types indicated at x are interposed between end walls 67. In this instance the chase is formed for the reception of two series of types, as shown by Fig. 14, a partition 68 being provided to separate one series from the other. Two spring plungers 69 are provided for clamping the types in the chase. Each spring plunger is adapted to slide longitudinally in bearings one of which is in the chase and the other in a bracket 70 affixed to the chase. The plungers are pressed toward the types by helical compression springs 71 which are compressed between the outer end of the bracket 70 and collars 72 on the plungers. The effective range of the plungers is limited and for this reason filling pieces x' are supplied as required to fill up the space in the chase and transmit the pressure from the plungers to the types. Each plunger is provided with a pin 73 which projects laterally. When the plungers are retracted to release the type, the pins may be placed behind shoulders 74 formed on the bracket 70 for the purpose of holding the plungers in retracted position.

An inking ribbon is provided for inking the impression made upon the web. This ribbon is indicated at 75. It is taken from one spool and rolled upon another, the two spools being indicated at 76 and 77. The spools are mounted upon shafts 78 whose ends bear in the upright pieces 21. One end of each shaft is journaled in an ear 79 at one side of the base. The other end of each shaft is placed in a notch 80 in an ear 81 at the other side of the base. Retaining latches 82 are pivotally connected to the ears 81 by pivot members 83. These latches are formed with notches 84 which are substantially concentric with relation to the pivots 83 and are adapted to receive the ends of the shafts 78 as shown by Fig. 1. The latches are adapted to hold the shafts in the ears 81 and to permit quick detachment of the shafts by lifting the latches 82 about their pivots. The ends of the shafts 78 are of relatively small diameter, but the intermediate portions upon which the spools are mounted are of larger diameter. The larger portion of each shaft is recessed for the reception of a leaf spring 85. The purpose of the springs is to maintain sufficient friction between the spools and their shafts to drive the spool.

One shaft 78 is provided with a ratchet 86 and the other is provided with a ratchet 86′. The teeth of one ratchet are pitched oppositely with relation to the teeth of the other ratchet, and the inking ribbon may be taken from one spool and wound upon the other by driving one ratchet, and may be reversed by driving the other ratchet. The mechanism for feeding the ribbon is shown by Figs. 6 to 9 inclusive. A pawl carrier is indicated at 87. This carrier is formed with a central opening through which the main shaft 22 extends, the opening being considerably larger than the shaft in order to permit the desired movement of the carrier. The carrier is pivotally connected by a pivot member 88 to a vertically movable member 89. The member 89 has a stem 90 which extends downwardly and has a sliding bearing in the stationary frame. The surface 91 of the member 89 normally rests upon the shaft 22. A pin 92 projecting laterally from the shaft is arranged to engage the surface 91 to lift the member 89 and thus lift the pawl carrier. The pawl carrier is provided with two feeding pawls and with two retaining pawls, the feeding pawls being indicated respectively at 93, 93′, and the retaining pawls at 94, 94′. These pawls are all made of flexible spring metal which permits them to ride over the teeth of the ratchet when they are moved downwardly. Figs. 3 and 6 show the feed pawl 93 in operative relation to the ratchet 86. The feed pawl 93′ is retracted from operative relation to the ratchet 86′. The retaining pawl 94 is also shown in engagement with the ratchet 86. When the

pin 92 lifts the member 89, the pawl 93 acts upon the ratchet 86 to turn the same a short distance, slightly more than the distance between the teeth of the ratchet. The pressure of the pawl 94 against the ratchet 86 prevents the ratchet from racing when a feeding movement is imparted to it. The weight of the structure carried by the member 89 is sufficient to carry the pawl downwardly when the lifting pin 92 passes from the surface 91, and the pawl carrier is thus reciprocated vertically and imparts step-by-step rotation to the ratchet which is operatively engaged by its feed pawl. The retaining pawl 94′, although out of engagement with the ratchet 86′ when the parts are in the position shown by Fig. 6, is nevertheless moved into engagement with the ratchet 86′ when the pawl carrier is lifted, thus preventing racing of the spool from which the ribbon is being drawn.

The pawl carrier is adapted to be shifted about its pivot pin 88 so as to retract the feed pawl 93 from the ratchet 86 and place the feed pawl 93′ in operative position to act upon the ratchet 86′. For this purpose the pawl carrier is provided with a pin or handle 95 whereby the carrier may be rocked about its pivot. The carrier is provided with a retaining pin 96 (see Fig. 8) whose inner end is pointed and adapted to occupy one of two notches 97 formed in the member 89. This pin is held against the member 89 by a leaf spring 98. The notches 97 are so arranged as to hold the pawl carrier in either of its two operative positions. In order to place the feed pawl 93′ in position to act upon the ratchet 86′ the pin or handle 95 is pressed to the left with reference to Fig. 6. This movement no longer places the pawl 93′ in engagement with the ratchet 86′, but it retracts the pawls 93 and 94 from engagement with the ratchet 86 and also places the pawl 94′ in engagement with the ratchet 86′. When this shift has been made, the pawl 94 is adapted to engage the ratchet 86 intermittently to prevent racing of the ratchet. The rocking movement of the pawl carrier about its pivot 88 is limited by a screw 99 which is threaded in the member 88 and which extends through a slot 100 in the pawl carrier.

The cutting mechanism shown by Figs. 1 to 5 inclusive is adapted to shear the web on a straight line intersecting two opposite notches 35. This cutting mechanism comprises a fixed shear 101 and a movable shear 102. The top of the fixed shear is substantially in the plane of the top of the platen, so that the web is adapted to pass over it. The movable shear is carried by an arm 103 which is pivotally mounted upon a stud 104 at one side of the base 20. The stud is mounted in a detachable holder 105, the holder being secured to the base by any suitable means, such as bolts 106. A helical tension spring 107 is connected to the arm 103 and to a suitable fixture on one of the upright frame members 21. The spring normally raises the arm 103 to separate the shears, and it is inclined in such manner as to draw the movable shear against the stationary shear to insure the desired action of the shearing jaws. The line of the shearing edges is located with reference to the teeth 43 of the feed jaws, so that the transverse line of two opposite notches in the web will coincide with the shearing edges when the web is stationary. When the movable shear is operated, the web is severed on such line and a label such as that shown by Fig. 15 is formed. The shape of the label at the corners is thus determined by the shape of the notches in the web.

The shearing arm 103 is drawn down against the tension of the spring 107 by a cam 108. (See Fig. 10). This cam is affixed to the shaft 62 and engages the upper edge of an arm 109. One end of the arm is pivotally mounted upon a pivot pin 110, and the other end is connected by a link 111 to the free end of the arm 103, as shown by Fig. 5. As the labels are severed they are discharged into a receiver 112 where they become stacked one upon another. The receiver is formed with an inclined portion 113 whereby the labels are conducted from the shears to the bottom of the receiver, or to the labels which have already been deposited in the receiver.

Figs. 16 to 19 illustrate a punch and die which may be substituted for the shears 101 and 102. The holder 105 which has already been mentioned as the holder for the movable shear serves also to hold the stationary shear so that the shears may be attached or removed as a unit. The provisions for holding the stationary shear comprise abutments 114 and clamping screws 115, both of which are carried by the holder 105. In order to remove the shears it is only necessary to remove the attaching bolts 106, after which the holder 105, with both shears, may be removed.

The punch and die hereinafter described are likewise mounted in a holder which can be attached like the holder 105 by means of the bolts 106. The holder for the punch and die is indicated at 116. The die is indicated at 117, and the punch is indicated at 118. The punch is disposed below the die and is operated to sever a label when moved upwardly. The die is affixed upon the upper end of a plunger 119 which has a sliding bearing in a boss 120 formed on the holder 116. A link 121 is pivotally connected at 122 to the lower end of the plunger and is pivotally connected at 123 to an operating arm 124. One end of the arm is pivotally mounted upon a pivot stud 125 which is

supported by the base. The other end of the arm carries a cam roll 126 which co-operates with a path cam 127. The path cam is adapted to be affixed to the shaft 62 in substitution for the cam 108. A stripper 128 is provided for stripping the web 30 from the punch when the punch is moved downwardly, for the purpose of freeing the web so that it may be fed. The web passes between the stripper and the die 117. The stripper is formed with an opening capable of admitting the punch so that there will be no interference between the punch and the stripper when the punch approaches the die.

Fig. 16 includes a tubular receiver for the labels which are pressed up through the die 117. This receiver is indicated at 130. It rests upon the die and is held in the desired lateral position by flanges such as that indicated at 131. The receiver is provided with oppositely disposed spring members 132 whose lower ends are turned inwardly to form hooks 133. The upper ends of the members 132 are soldered or otherwise secured upon the exterior of the receiver. The lower ends occupy suitable notches formed in the lower end of the receiver for their reception, and they normally stand outside the interior surface of the receiver so that they do not interfere with the passage of the labels into the receiver. The receiver, of course, may be made of any desired depth to hold the desired number of labels. When removing the receiver, the members 132 may be grasped and pressed toward each other, thus causing the lower ends 133 to approach each other and retain the labels in the receiver. The receiver is removed by lifting it sufficiently to clear the upper edge of the flanges 131. This use of a receiver is made possible by arranging the punch and die in the relation shown, that is, with the punch below the die so that it is adapted to press the labels upwardly.

It is obvious that the machine may be used for printing without using either the straight shears or the punch and die. Under some circumstances this may be desirable. For example, if it is desired to print with more than one color, the web may be passed through one machine which will print with one color, and may be taken from such machine without having severed the web. The web is thus left in condition to be operated upon by another machine and may be put through as many printing operations as desired without being severed. The machine which is used to perform the final printing operation will have the desired cutting mechanism whereby the labels will be severed ready for use. A series of printing operations may be performed with the greatest accuracy of register, because the web, having notches in its edges, is registered with the printing elements of each machine by the feeding teeth which set into the notches. When a series of printing operations are to be performed, several machines may, if desired, be arranged in a series and the web drawn through the series at one and the same time, provided they are driven at the same rate of speed.

While there are many uses to which the present machine may be put, its greatest utility may be in marking labels for merchandise. In department stores it is customary to put labels on a majority of the articles or upon small pasteboard boxes in which the articles are kept upon the shelves or counters. Hitherto it has been customary to provide printed labels which have blank spaces for the selling price or for the number of the lot of merchandise, and it has been necessary to use a hand stamp or a lead pencil or pen and ink to supply the special figures or characters desired in the blank spaces. This, of course, is a slow process at best, and is especially slow if the labels are gummed upon one side, because gummed labels are more or less curled. In preparing a web for the present machine it is proposed to print thereon the desired conventional matter prior to printing the special matter and severing the labels from the web. The type in the chase may be set up to print the selling price, the lot number, or any other designation in the blank space or spaces provided for the purpose. The web from which the labels are cut may be previously coated on one side with suitable gum which may be rendered adhesive by being moistened; and the feeding mechanism, the printing mechanism and label-severing mechanism are all adapted to operate upon a web which has been previously gummed upon one side.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all the forms in which it may be made or all the modes of its use, what I claim is:

1. A machine of the character described, comprising a printing mechanism including a platen and a movable chase for printing upon a continuous notched web, a cutting mechanism for separating the printed portion of said web, mechanism including jaw members each bearing a plurality of teeth for feeding a notched strip step by step by its notches to the printing and cutting mechanisms and positioning it laterally with respect to said printing mechanism, and driving mechanism for operating the first-mentioned mechanisms to feed, print and cut the web in the order named.

2. A machine for operating upon a continuous web having notches in its side edges, comprising a platen and a reciprocatory chase for printing upon successive portions of said web, a feeding mechanism having

means for a non-pressural engagement of the web by its notches, feeding it step by step longitudinally and positioning it laterally on said platen.

3. A machine for operating upon a continuous web having regularly spaced notches in its edges, comprising a platen and a reciprocatory chase for printing upon successive portions of the web; cutting mechanism for separating the printed portions from the web; and feeding mechanism comprising members bearing a plurality of teeth for engaging the notches in the web, and means for imparting a four-motion feeding movement to said members to feed the web to the printing and cutting mechanism and laterally position it with respect to the printing mechanism.

4. A machine for operating upon a continuous web having regularly spaced notches in its edges, comprising a platen and a reciprocatory chase for printing upon successive portions of the web; cutting mechanism for separating the printed portions from the web; and feeding mechanism comprising members bearing a plurality of teeth for engaging the notches in the web, and instrumentalities for moving said members in opposite directions to engage and release the notched edges of the web without compressing it and for reciprocating said members longitudinally of the web to feed it to the printing and cutting mechanisms.

5. A machine for operating upon a continuous web having notches in its side edges, comprising a platen and a reciprocatory chase for printing upon successive portions of said web, and a feeding mechanism comprising members bearing a plurality of teeth for engaging non-pressurally the notches in the web, and instrumentalities for reciprocating the said members longitudinally of said web and for moving the members toward and from the web to engage it during the forward feeding movement of said members and to release it during the receding movement of said members.

6. In a machine for operating upon a continuous web having notches at its side edges, feeding means comprising coöperative feed members bearing a plurality of teeth adapted to engage the web in said notches, said members being disposed at opposite sides of the web, means for moving them toward and from each other, and means for reciprocating them longitudinally of the web to feed the same step by step in either direction.

7. In a machine for operating upon a continuous web having notches in its side edges, feeding means comprising a carriage, means for reciprocating the same longitudinally of the web, coöperative feed members carried by said carriage, said members being adapted to engage the sides of the web in said notches, and means for moving said feed members toward and from each other to engage the web when said carriage moves forward and to disengage the web when said carriage moves backward.

8. In a machine for operating upon a continuous web having notches in its side edges, feeding means comprising a carriage, means for reciprocating the same longitudinally of the web, coöperative feed members mounted upon said carriage so as to partake of movement of the carriage and to be movable toward and from each other, said feed members being adapted to engage the sides of the web in said notches, spring-tension means for moving said feed members toward each other, and driven means between said feed members for forcing them apart periodically.

9. In a machine for operating upon a continuous web having notches in its side edges, feeding means comprising a carriage, means for reciprocating the same longitudinally of the web, coöperative feed members mounted upon said carriage so as to partake of movement of the carriage and to be movable toward and from each other, said feed members being adapted to engage the sides of the web in said notches, spring-tension means for moving said feed members toward each other, and a rotative cam interposed between said feed members and engaging the same, said cam having diametrically opposite portions adapted to simultaneously force said feed members apart.

10. A machine for operating upon a continuous web having notches in its side edges, comprising means for marking upon said web, means for separating the marked portions therefrom, and reciprocatory nonpressural means for laterally and forwardly adjusting said web by its notches relative to said marking and separating means.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ALBERT H. RAY

Witnesses:
WALTER P. ABELL,
P. W. PEZZETTI.