April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 1

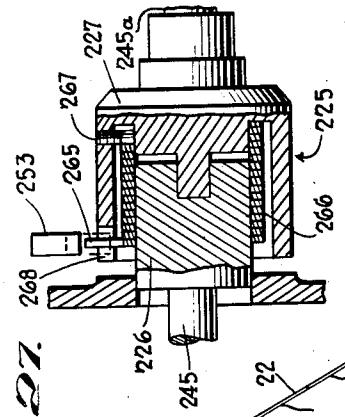


Fig. 2.

Fig. 1.

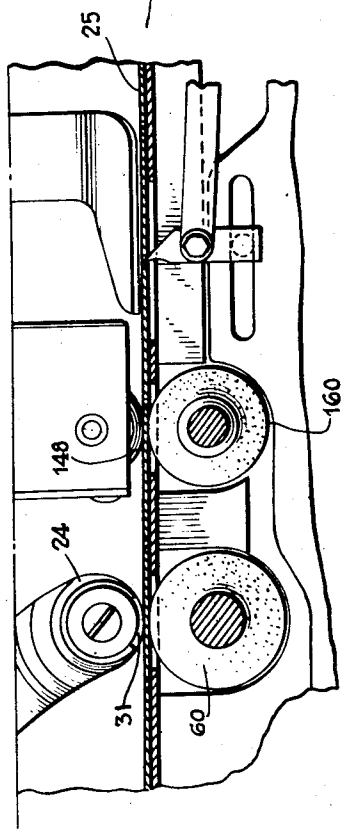


Fig. 19.

INVENTOR
EDWARD C. MARSHALL.

BY
ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 2

Fig. 3.

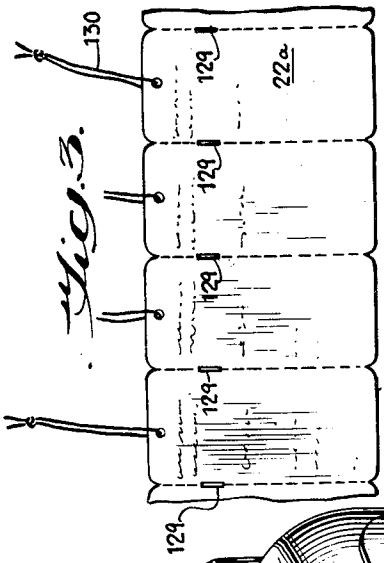


Fig. 4.

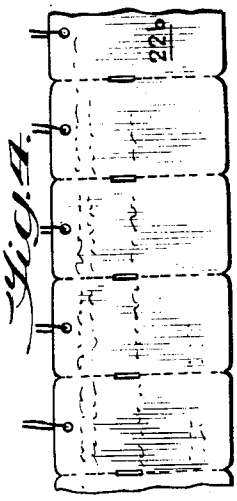


Fig. 5.

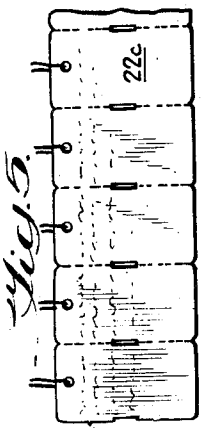


Fig. 6.

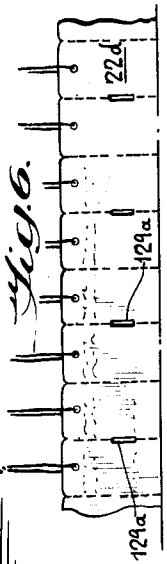
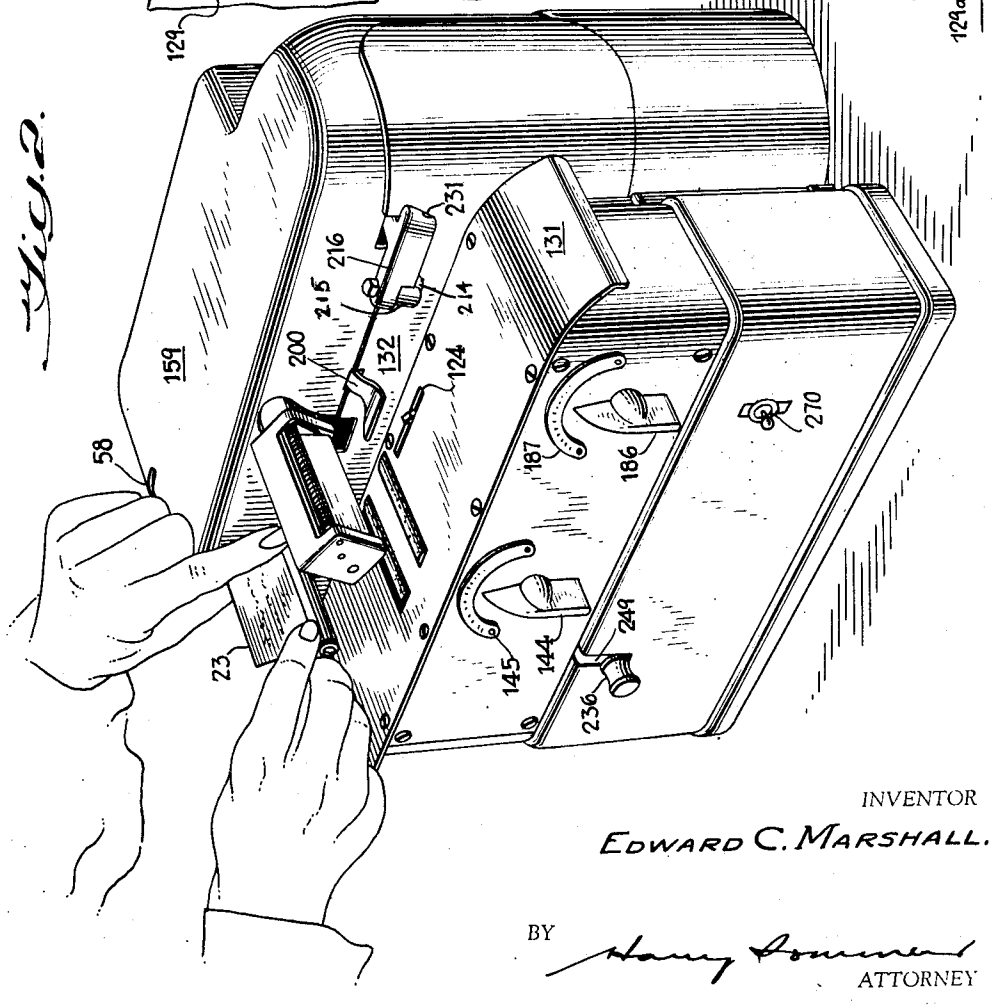


Fig. 2.



INVENTOR

EDWARD C. MARSHALL.

BY Harry Sommer

ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 3

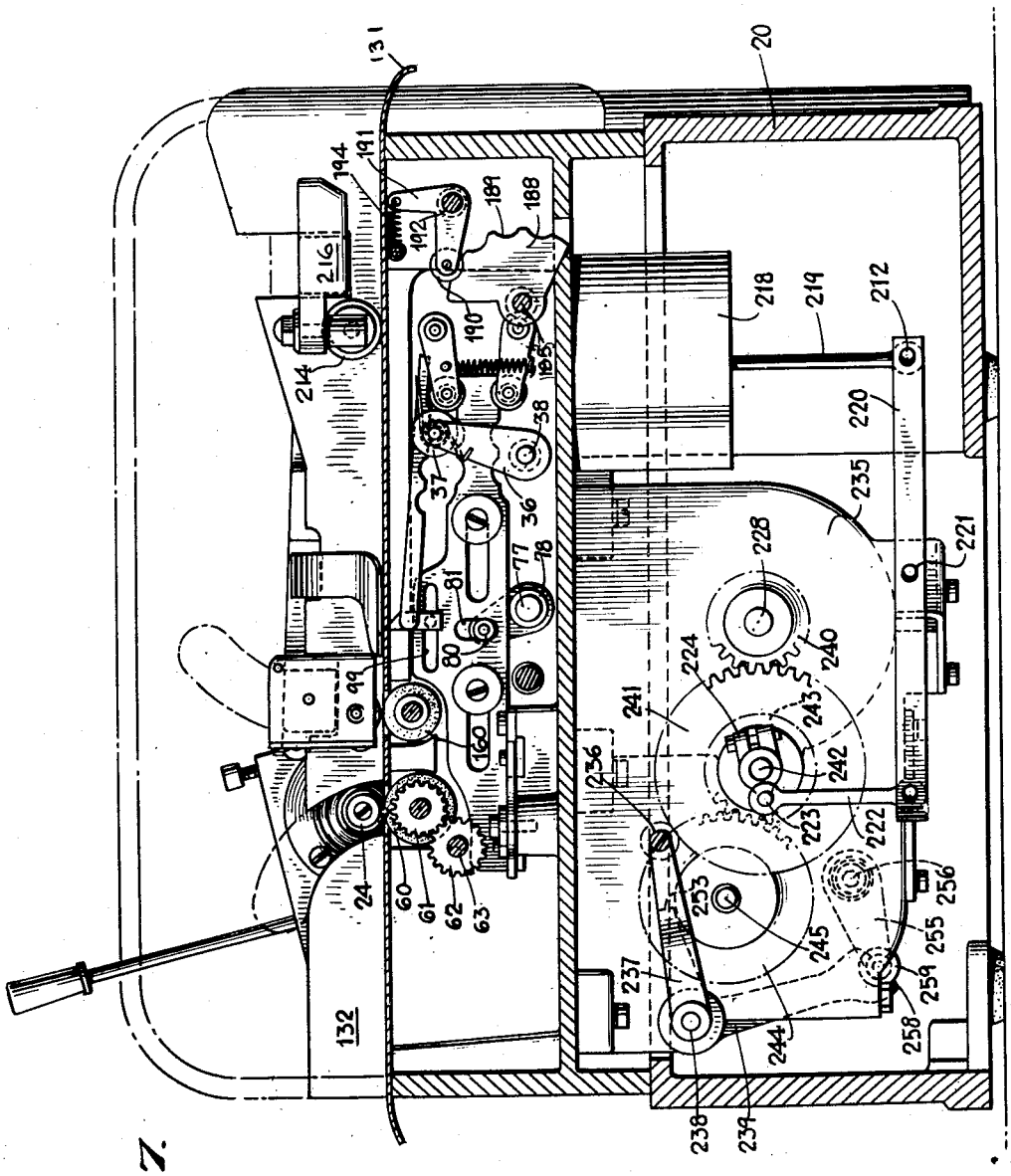


Fig. 7.

INVENTOR

EDWARD C. MARSHALL.

BY Harry Sommers

ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 4

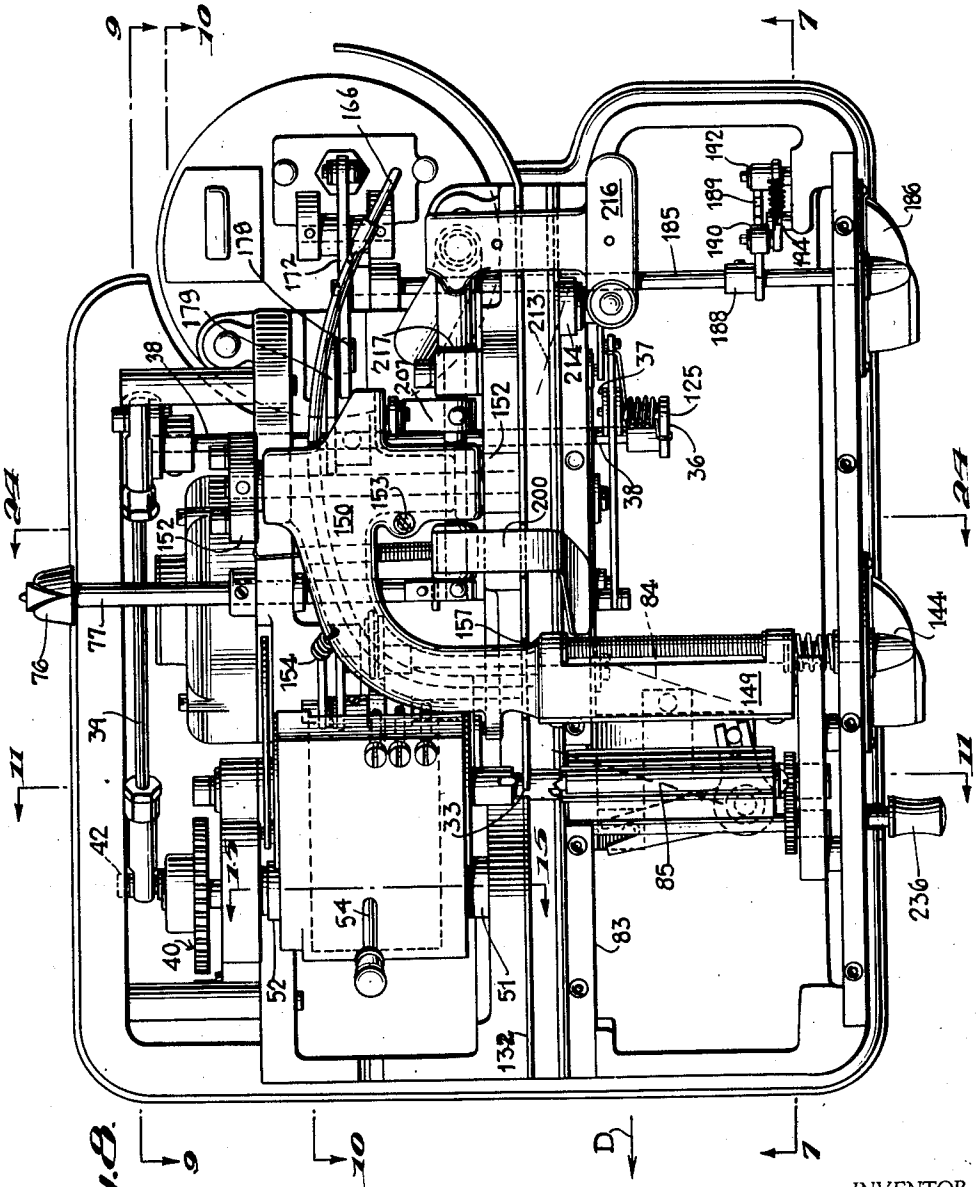


Fig. 8.

INVENTOR

EDWARD C. MARSHALL.

BY

ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA
ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 5

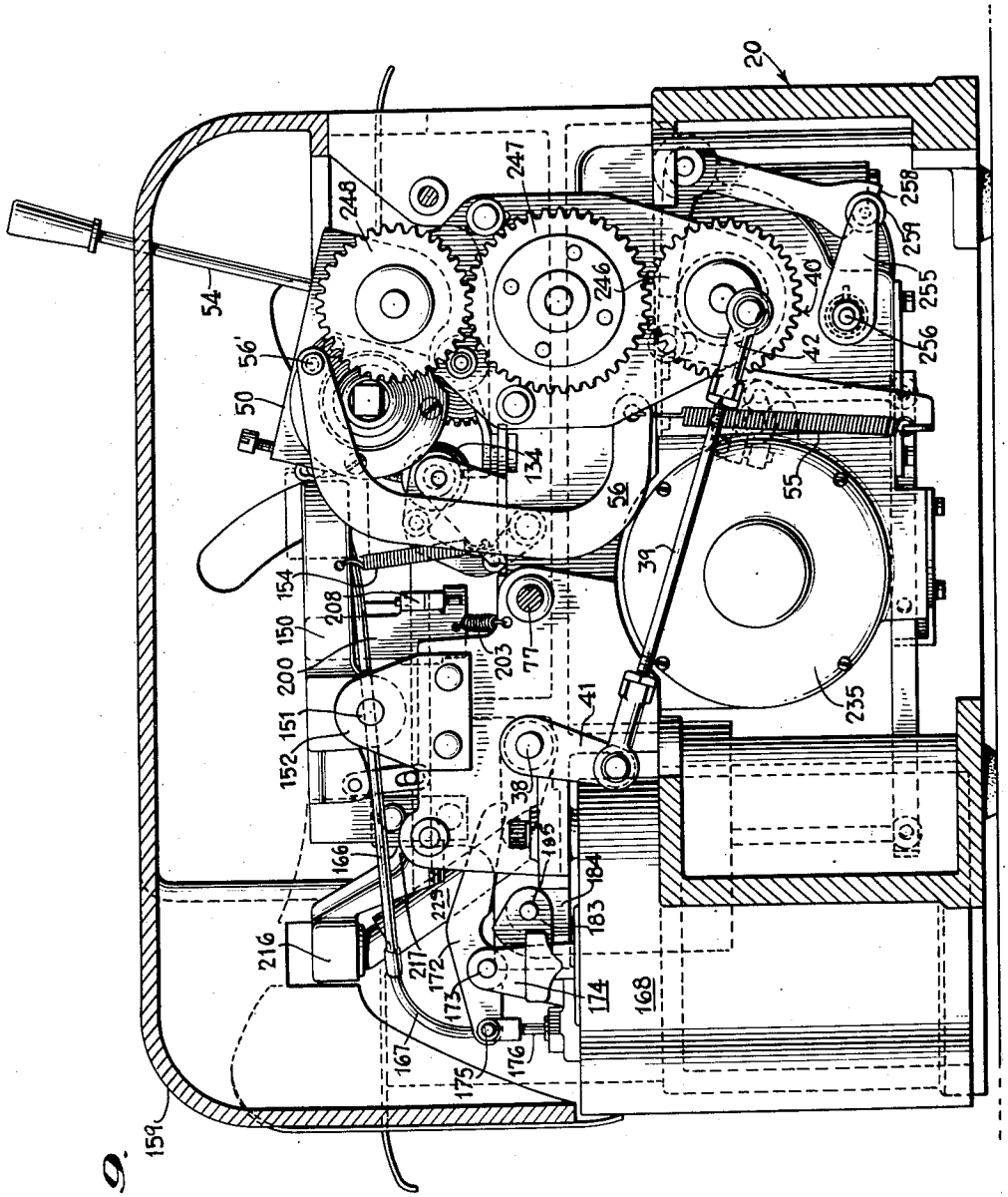


Fig. 9.

INVENTOR
EDWARD C. MARSHALL.

BY Harry Sommer
ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 6

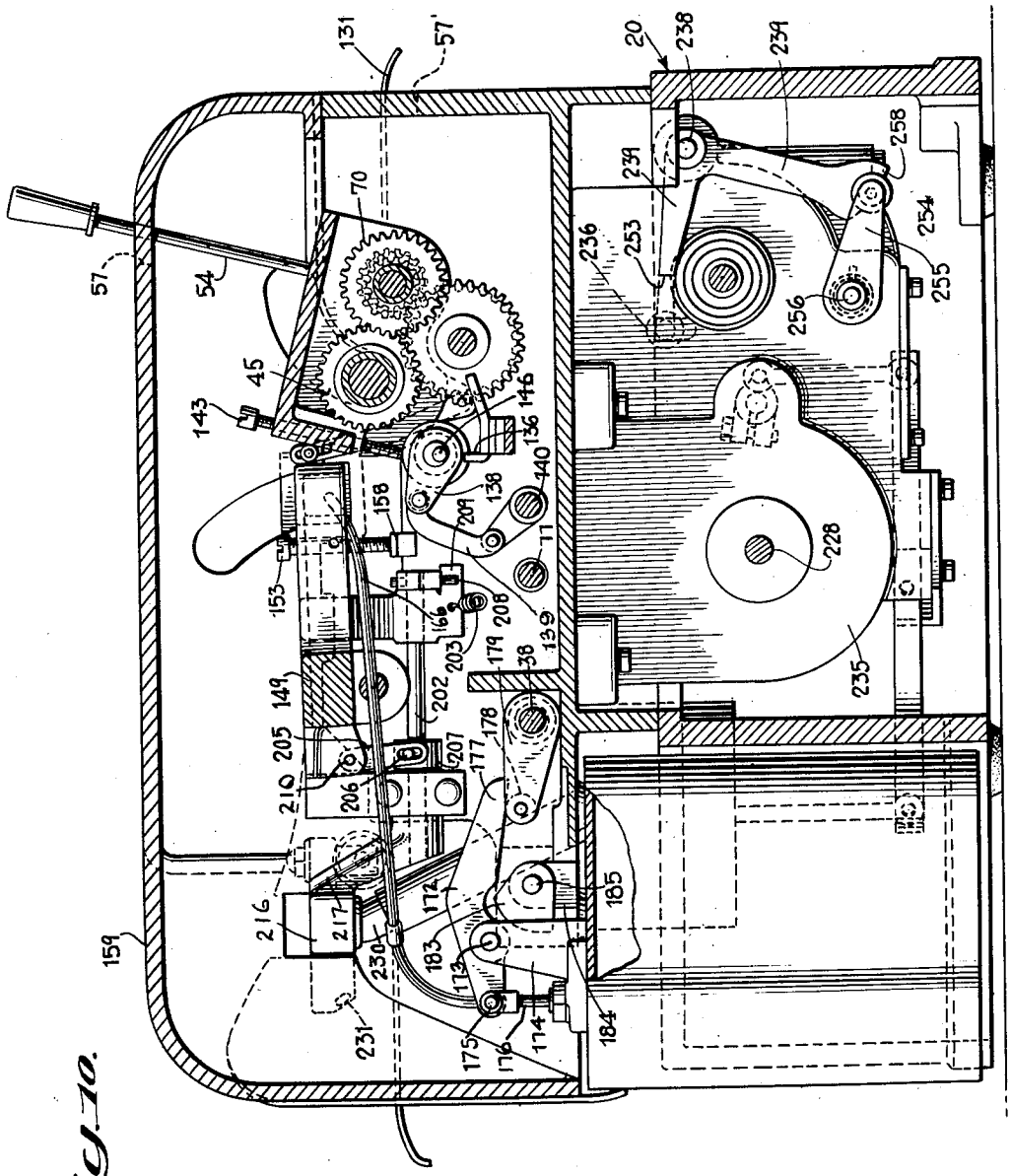


Fig. 10.

INVENTOR

EDWARD C. MARSHALL.

BY

ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 7

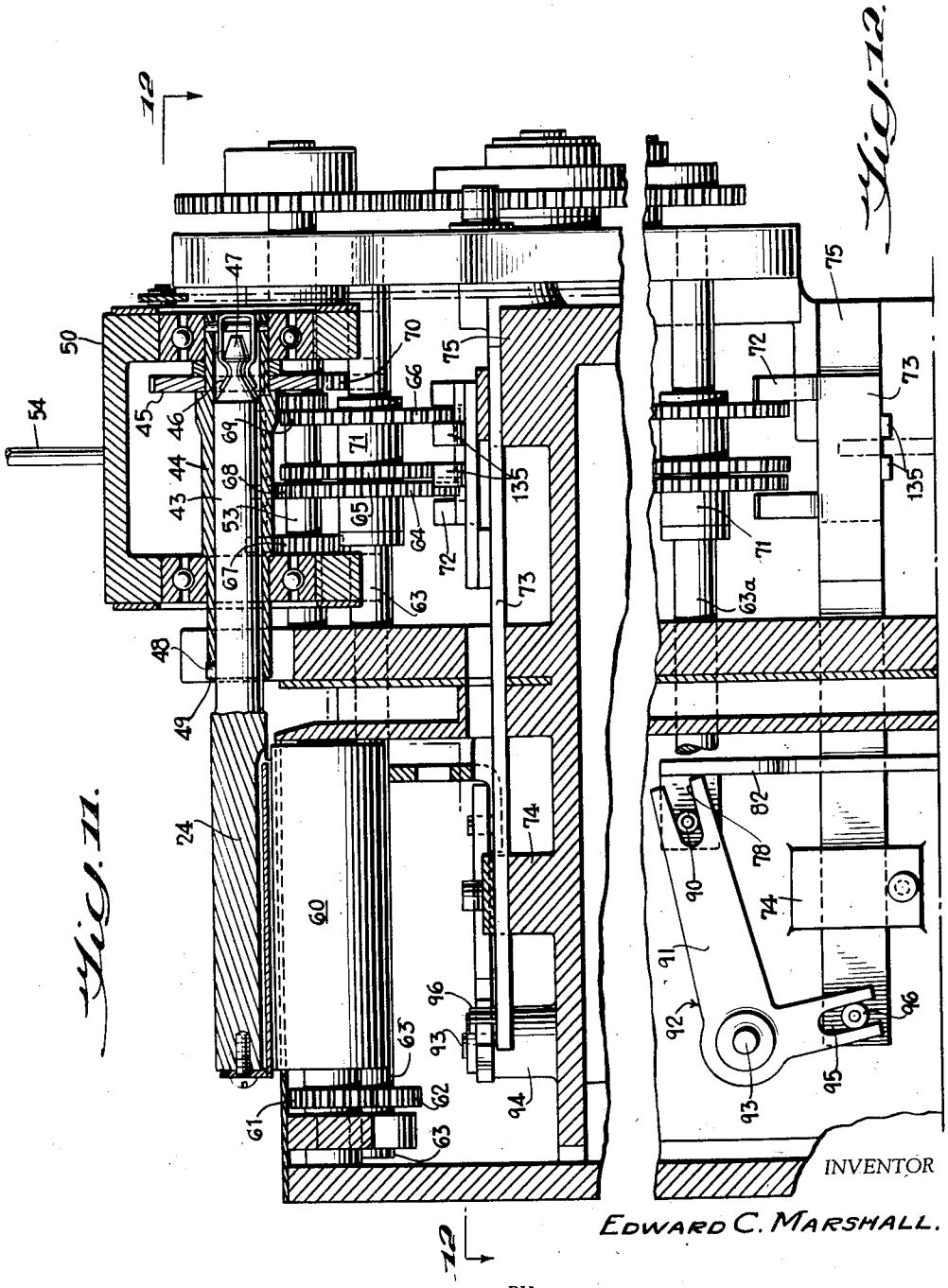


Fig. 11.

Fig. 12.

INVENTOR
EDWARD C. MARSHALL.

BY Harry Sommers
ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 8

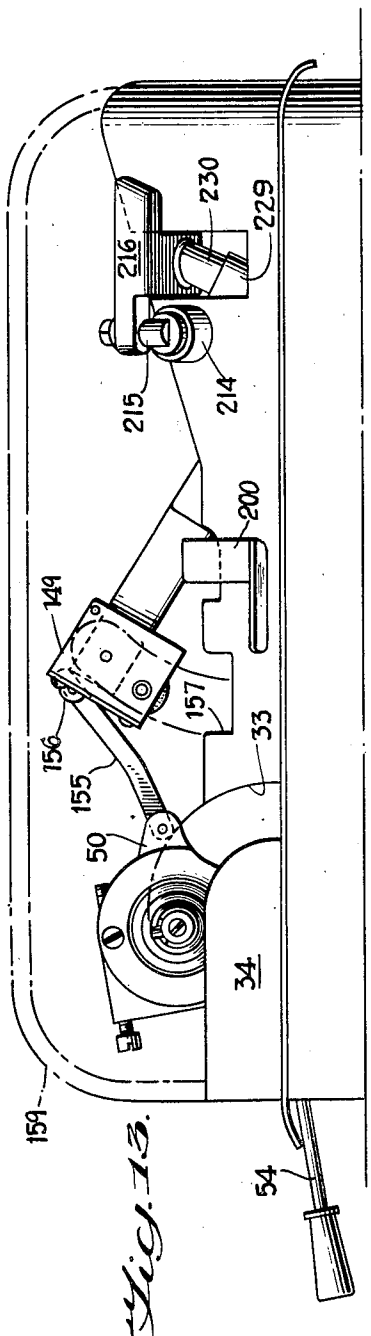


Fig. 13.

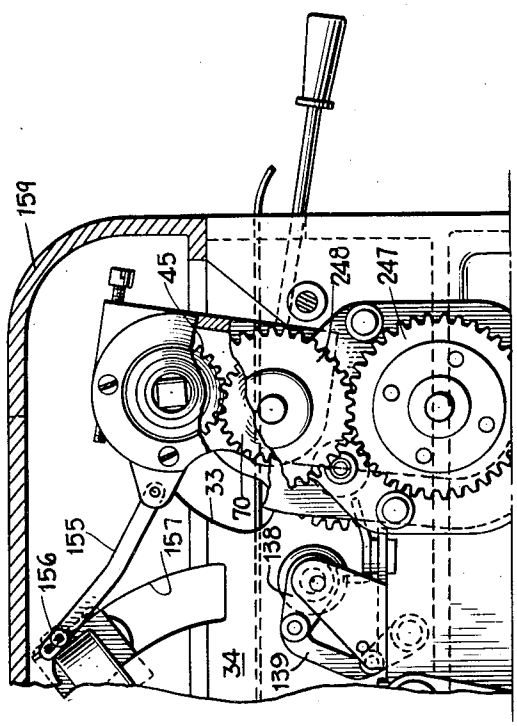


Fig. 14.

INVENTOR
EDWARD C. MARSHALL.

BY
ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 9

Fig. 15.

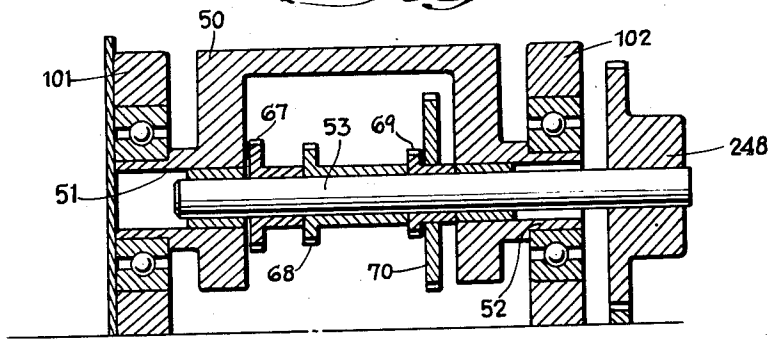


Fig. 25.

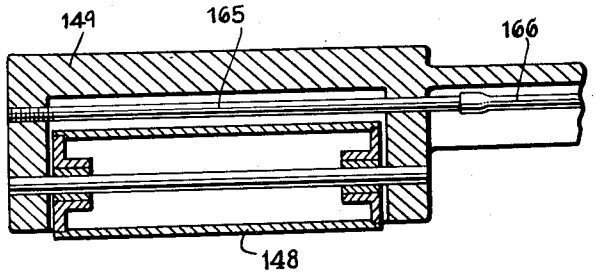


Fig. 26.

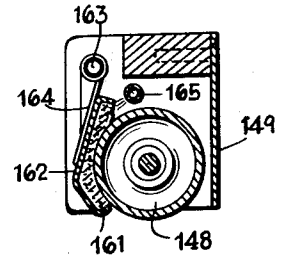


Fig. 16.

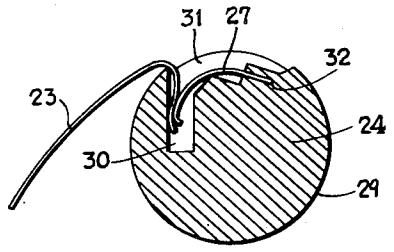


Fig. 17.

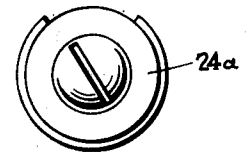
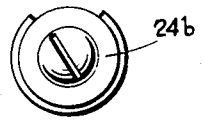


Fig. 18.



INVENTOR

EDWARD C. MARSHALL.

BY

ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 10

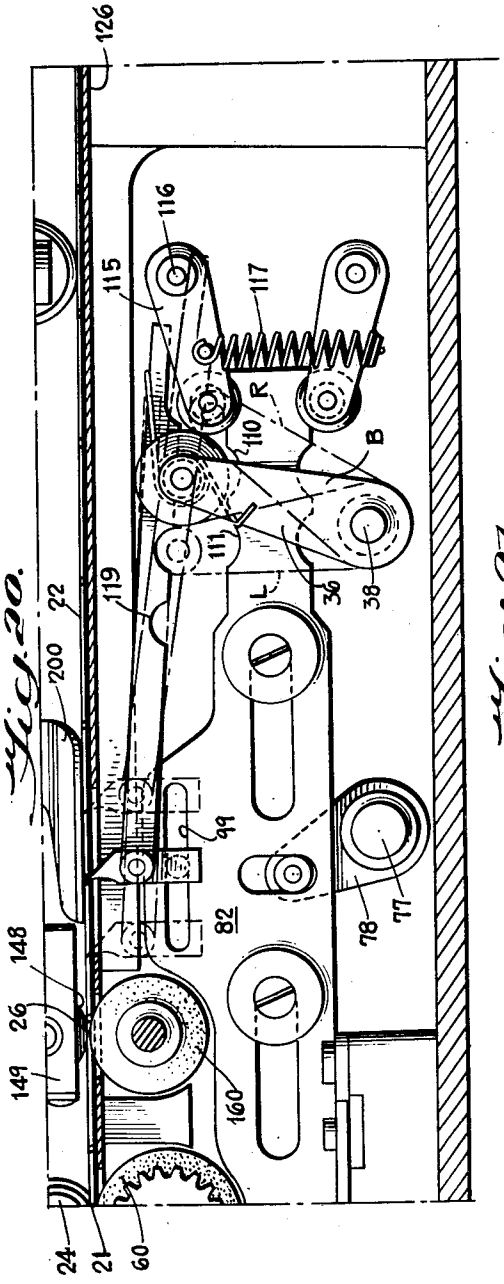


Fig. 20.

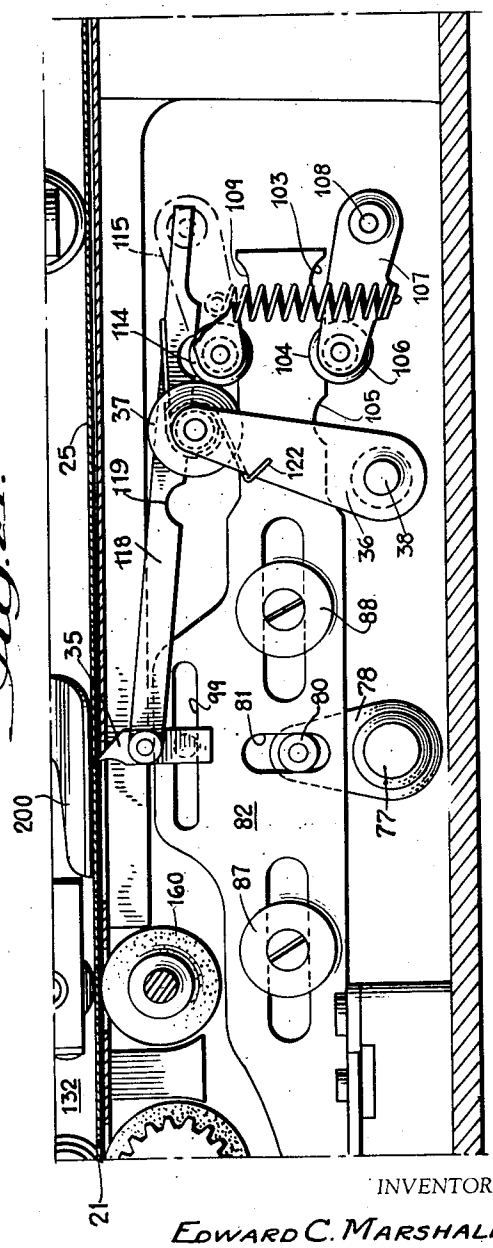


Fig. 21.

INVENTOR
EDWARD C. MARSHALL.

BY Harry Sommer
ATTORNEY

April 23, 1957 E. C. MARSHALL 2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Filed Aug. 28, 1953 11 Sheets-Sheet 11

Fig. 22.

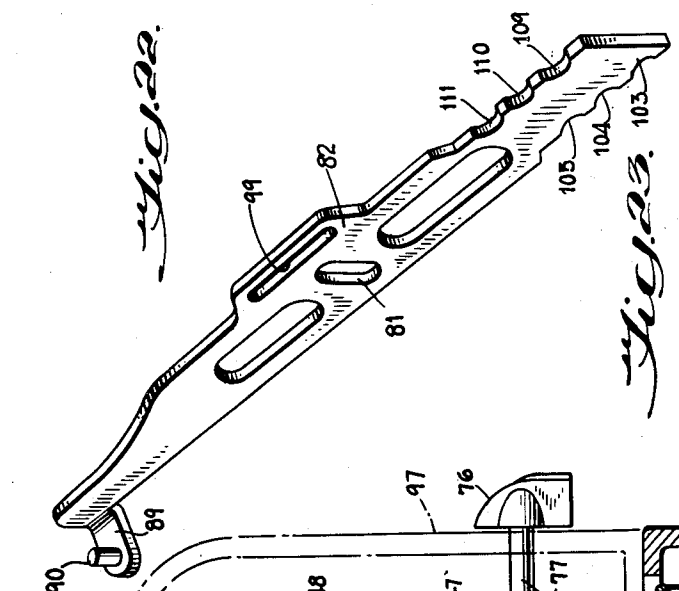


Fig. 23.

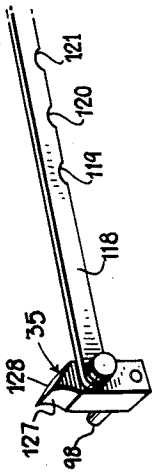
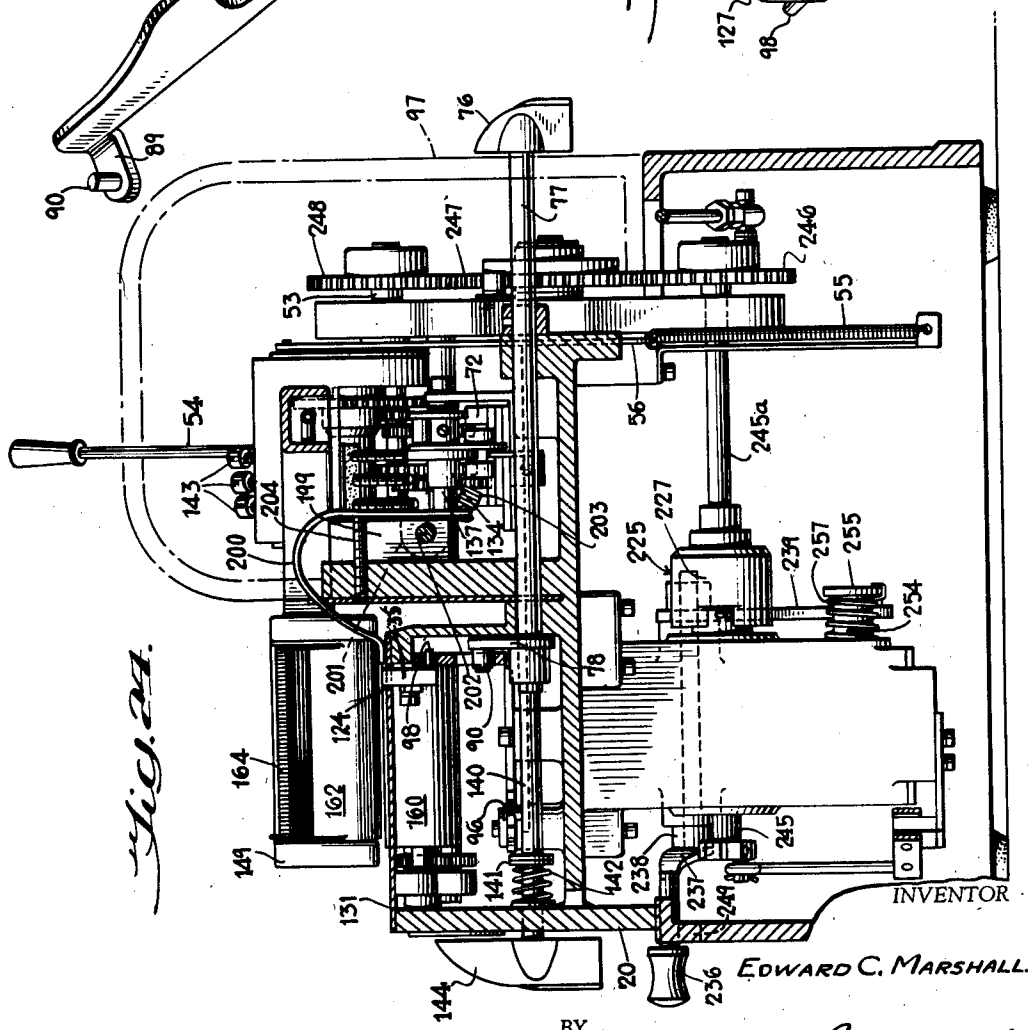


Fig. 24.



INVENTOR
EDWARD C. MARSHALL.

BY

ATTORNEY

United States Patent Office 2,789,497 Patented Apr. 23, 1957

2,789,497

APPARATUS FOR PRINTING INDICIA ON A WEB OF CONNECTED BLANKS

Edward C. Marshall, Upper Montclair, N. J., assignor to American Tag Company of New Jersey, Belleville, N. J., a corporation of New Jersey

Application August 28, 1953, Serial No. 377,131

41 Claims. (Cl. 101—132.5)

This invention is directed to a machine for printing indicia from a master copy sheet onto a continuous web of copy blanks. The machine is provided with an impression roller having means to readily secure a master copy sheet thereto. The copy may be initially impressed on the master copy sheet by any suitable means, as by inserting a carbonized tissue and the blank master copy sheet into any standard typewriter and typing the copy on the sheet. If desired, the copy may be written out in longhand on the master copy sheet. Only a fraction of the time normally required for marking purposes is required by use of this invention. Little or no special skill or experience is required for marking pursuant to this invention. Master sheets for use in connection with the invention may be provided in continuous roll form, with preprinted guide lines to assure exact positioning of copy. To change the complete copy, it is simply necessary to slip out the used master sheet and insert the master sheet carrying the new copy. Different master copy sheets may be slipped into place easily and quickly and may be filed, after use, for later use of the same copy.

In the machine of this invention an impression roller is provided which is rotary in action, increasing marking speeds far beyond the conventional stop-and-start imprinting methods, and vastly increasing the efficiency and productivity of the operation. The machine operates on a liquid duplicating principle, and does away with laborious and time-consuming hand-setting of type. Pursuant to the invention, substantially the entire surface of the tag, label or other blank may be imprinted vertically or horizontally; there is wide flexibility in the amount of copy possible as well as in the position thereof.

The master copy sheet, secured to the impression roller pursuant to the invention, is the chief means for driving the web of blanks through the machine. The impression roller is provided with a major effective, continuous circumferential portion which drives the web (registered with the indicia portion of the master copy sheet), and with a lesser, recessed, relieved circumferential portion (to which the master copy sheet is secured) which interrupts the driving action of the impression roller at intervals in the rotation thereof registered with the spacing between indicia impressions to be made on adjacent blanks. A reciprocating finger is provided to take up the web driving operation during such intervals. Movement of said finger is, pursuant to the invention, synchronized with the cycles of rotation of the impression roller, so as to supplement the driving action of the latter at the intervals mentioned, and to cooperate therewith in providing continuous movement of the web through the machine.

The invention provides novel means for moistening the surface of the web in advance of the impression roller station so that, at such station, transfer of the indicia of the master copy sheet onto the web blanks will be automatically effected.

The moistening station of the machine preferably comprises a roller supplied with a solvent for the master copy sheet indicia marking ink; said roller is preferably an idling roller rotated by contact with the web advancing through the machine, to thereby moisten the latter.

In one form of the invention, the impression roller may be removably inserted in the means for driving the same so that impression rollers of varying diameters to accommodate master copy sheets having printing portions of different widths may be used. Cycles of rotation of a backing roller which may be provided at the impression stage of the machine, may be synchronized with the diameter of the particular impression roller in use.

Pursuant to another feature of the invention, below more fully described, the means for varying the speed of rotation of the backing roller at the impression station may consist of a gear change device.

The printing operation is performed on a continuous web of connected blanks to be separated for use as tags or labels (of various shapes and sizes) passed through the machine rapidly in a horizontal plane, convenient for checking. In one form thereof, the machine is adaptable for use with various sizes of tags and labels, adjustment being attained by a single twist of an operating knob. Registration of all sizes is thus achieved readily and with accuracy.

Further features of the invention include the provision of means for driving the feed finger at one of a number of registration positions relative to the impression station—of importance where the machine is to be used for applying impressions to tags of different widths.

A further feature of the invention consists in the provision of means for mounting the impression roller in a constant-driving planetary arrangement, for purposes below explained.

The invention further provides a novel method of printing indicia from a master copy sheet onto a web of connected blanks by providing the web with equidistantly spaced registration slots, securing the master copy sheet tangentially to a rotary impression roller, rotating the impression roller continuously so that the master copy sheet will thereby be brought into driving contact with the pre-moistened web to drive and print the latter, and engaging the slots in the web of blanks at intervals in the cycles of rotation of the impression roller during which the master copy sheet does not have driving contact with the web, to take up the driving action during such intervals so that the web will be continuously driven through the machine for the repeated cycles of printing and during the intervals therebetween.

The master copy sheet may be provided with indicia for printing either a single blank or a plurality of blanks during each revolution of the impression roller, as desired. For facility of description, reference below is made to application of the indicia to each blank; such reference shall be understood to comprehend the printing on one or more blanks during each revolution of the impression roller.

These and other advantageous objects, which will appear from the drawings and description below, are accomplished by the method and apparatus of my invention, of which embodiments are illustrated in the drawings. It will be apparent, from a consideration of said drawings and the following description, that the invention may be embodied in other forms suggested thereby, which shall be deemed to be comprehended by and within the purview and scope of the invention.

In the drawings:

Fig. 1 is a front elevational view of a machine embodying the invention, showing a web of connected blanks passing therethrough, pursuant to the invention,

Fig. 2 is a perspective view of said machine, showing

the impression roller elevated out of contact with the web for facility of insertion of the master copy sheet therein,

Fig. 3 is a fragmentary plan view of a web of connected blanks of a given width, which may be printed pursuant to the invention,

Figs. 4 and 5 are similar views of webs of connected blanks of different widths,

Fig. 6 is a similar view of connected blanks which may be printed in units of two in each cycle of rotation of the impression roller,

Fig. 7 is a front elevational vertical sectional view of the front of the machine, taken on line 7—7 of Fig. 8,

Fig. 8 is a top plan view of the machine, with the cover removed,

Figs. 9 and 10 are rear vertical elevational views, taken on lines 9—9 and 10—10, respectively, of Fig. 8,

Fig. 11 is a transverse, fragmentary sectional view, taken on line 11—11 of Fig. 8,

Fig. 12 is a fragmentary horizontal sectional view, taken on line 12—12 of Fig. 11,

Fig. 13 is a fragmentary front elevational view of the upper portion of the machine, showing the various units elevated to inoperative position,

Fig. 14 is a fragmentary rear elevational view of parts shown in the same position,

Fig. 15 is a vertical sectional view of the pivotally mounted housing in which the impression roller is journalled, showing details of journalling of said housing in bearings in the machine and journalling of a shaft in the housing, taken on line 15—15 of Fig. 8,

Fig. 16 is an enlarged vertical transverse sectional view of an impression roller embodying the invention, showing the uninterrupted and relieved circumferential portions thereof, and the master copy sheet tangentially secured to the roller,

Fig. 17 is an end elevational view of an impression roller of smaller diameter,

Fig. 18 is a similar view of an impression roller of a further reduced diameter,

Fig. 19 is a fragmentary front elevational view showing the impression roller, registered backing roller, idling moistening unit, and idling backing roller, and showing also the feed finger member, guide plate therefor, and web of blanks passing through the machine under normal operating conditions,

Fig. 20 is a similar elevational view of a lower portion of the machine,

Fig. 21 is a similar view of the parts shown in Fig. 20, the guide plate for the feed finger (and thereby the feed finger) being shown in a different position relative to the impression station, to conform to use of an impression roller of different diameter,

Fig. 22 is a perspective view of the feed finger guide plate unit,

Fig. 23 is a fragmentary perspective view of the feed finger unit,

Fig. 24 is a fragmentary transverse vertical sectional view, taken on line 24—24 of Fig. 8,

Fig. 25 is a fragmentary sectional view of a form of moistening unit which may be used in carrying out the invention,

Fig. 26 is a vertical transverse sectional view thereof, and

Fig. 27 (Sheet 1) is a fragmentary sectional view of a clutch means (also shown in Fig. 24) which may be used in carrying out the invention.

Impression station 21

The web of blanks 22 (Fig. 1) may be of any desired form pre-cut to conform to the desired end use. Said blanks may, as shown in Figs. 3–6, be tags, labels or other blanks which may be connected by tear or perforation lines so that, after the printing operation, they may be readily separated for application to articles of merchandise, for example, for marking purposes. In practice (as mentioned above) the master copy sheets suitable for application to the impression roller 24 would be supplied to the user of the machine, who would, for example, insert the sheet and carbonized tissue facing said sheet into the conventional typewriter; he would then type on the master copy sheet 23 the indicia to be printed onto the web 22, or the copy may be written out in longhand. The typewritten character impressions thus initially formed on the face of the master copy sheet will have the mirror image thereof formed on the obverse side for transfer on contact with the solvent-coated web as more particularly described below. The master copy sheet is, thus, pursuant to the invention, custom-made in rapid and easy fashion by the user, and is then secured to the impression roller 24. In the form shown in Fig. 16 (one of the many means suitable to the end), a slot 30 is provided in the impression roller 24 and a spring finger or the like is secured at one end 32 to the impression roller 24, the free end of the spring finger bears against the end of the master copy sheet 23 holding same in slot 30, to thus secure the sheet tangentially to the impression roller 24, so that, as the impression roller is rotated, the copy sheet will cling to the roller 24 and thereby brought into driving contact with the web. The latter is moistened in advance of the impression roller station with a solvent for the ink-indicia marked on the copy sheet 23, so that automatic transfer of the indicia to the web (and driving of the web) occurs at the impression roller station (marked "21" in Fig. 1). The impression roller 24 is normally disposed at the impression station 21 of the machine in position to contact the web 22, to print thereon and simultaneously advance the said strip in the direction, for example, indicated by arrow D of Fig. 1 through the machine.

Moistening station 26

Pursuant to the present invention, a moistening station (26, Figs. 1 and 20) is provided in advance of the impression station 21 of the machine. The web, at the time of its arrival at the impression station, will thus have been moistened with a solvent coating so that, as the master copy sheet is brought into contact with the web 22 at station 21, transfer of the indicia will be effected onto the web. As above described and shown in Fig. 16, the master copy sheet is secured to the impression roller 24 by means 27 preferably disposed inwardly (as at 31) of the uninterrupted circumferential portion 29 of the impression roller 24.

Feed finger 35

In the normal operation of the parts, as shown, for example, in Figs. 19, 20 and 21, the printing portion of the master copy sheet 23 will be disposed on the uninterrupted circular portion (29, Fig. 16) of the roller 24 for driving contact with and printing the web at the printing station 21. The impression roller 24 is constantly rotated in the normal operation of the machine. During cycles of rotational registry of the interrupted portion 31 of the roller with the impression station 21, the impression roller 24 will not have sufficient contact with web 22 to continue to advance or drive the web 22 through the machine. During intervals in which the interrupted portion 31 of the impression roller 24 so registers with the impression station 21, an advancing finger 35 (Figs. 23, 19, 20 and 21) contacts and advances the strip of tags 22. This objective may be attained, for example, by suitable means for timing the cycles of advancing contact of the feed finger 35 with the web 22 with the cycles of non-driving contact of roller 24 with said web. A means found well suited to that end is shown in Figs. 20, 21, including a reciprocating link 36 for driving the finger 35 secured thereto at one end 37. The link 36 is reciprocated by suitable means (to thereby reciprocate the finger) as, for example, by keying said link to shaft 38 (Fig. 8) con-

nected as at 39 with the gear train mechanism for rotating the impression roller unit 24, thus synchronizing reciprocation of the link 36 with the mentioned intervals in cycles of rotation of shaft 38.

As shown in Fig. 9, the connection between gear train mechanism 40 for rotating the impression roller 24 and the shaft 38 for reciprocating the feed finger link 36, may be a crank mechanism including the rod 39 and crank 41 connecting one end of said rod to one end of the shaft 38, and the eccentric connection 42 connecting the other end of the rod 39 to the gear means 40.

From the foregoing, it will be apparent that the web of blanks, such as tags 22 inserted into the machine in line with the impression station 21, will be printed and advanced through the machine automatically and continuously by the impression roller 24 primarily and by the synchronized advancing finger 35 for the intervals in which roller 24 does not drive web 22.

Impression roller (24) and advancing finger (35) registering means

Pursuant to the present invention, means are provided whereby the operator of the machine may stop the impression roller and the advancing finger at precisely the position required to initiate the printing operation so that the web of blanks will be properly registered with the impression roller 24 and advancing finger 35. As shown in Figs. 1 and 11, rotation of impression roller 24 is preferably stopped at the point in its cycle of rotation at which the interrupted portion or recess 31 will be disposed immediately facing the tag strip. Impression roller 24 is provided with driving means 45 (Fig. 11) in constant planetary mesh with gear 70 (see also Figs. 14 and 24), gear 70 being keyed to shaft 53 which is rotatably disposed in the housing bearings 51, 52 (Fig. 15). The housing is provided with a handle 54 for rotation of the housing from the operative end 57 (Fig. 10) of the slot 58 in cover 159 (Fig. 2) to the opposite end 57' of said slot at which the housing and impression roller will be disposed at their inoperative (Figs. 13 and 14) position. On movement of the handle 54 from operative end 57 to inoperative end 57' of slot 58, housing 50 is rotated; the impression roller gear 45 will, by virtue of such rotation of housing 50, have planetary engagement with gear 70 such as to rotate impression roller 24 about 180° to the position shown in Fig. 2 at which the interrupted portion 31 of the impression roller will be facing upwardly (or away from the web 22 of blanks) for facility of insertion of master copy sheet 23 thereinto or removal therefrom. The means for registering the impression roller above-mentioned may comprise a clutch means of any convenient or desired form for control of the impression roller rotating means. One form of clutch means shown in the drawings will be presently described, without limiting the invention thereto, as obviously the clutch-registering means may assume any other form suitable for the purpose within the spirit and scope of the invention.

The impression roller 24 may be so journalled in the machine as to dispose its axis in a plane (as noted by the dotted line 85 of Fig. 8), angled toward vertical guide plate 132 so as to "crowd" the web 22 against the vertical guide plate in movement through the machine, to assure proper registration. If desired, both the impression and moistening rollers may be so angularly journalled in the machine, as shown in exaggerated form in lines 84, 85, to indicate the journalling axis of the moistening roller and of the impression roller relative to the direction of movement D of the web 22 through the machine. The impression roller 24 and its backing roller 60, moistening roller 148 and its backing roller 160 (below described) may describe a parallelogram canted toward the vertical guide plate. Axis lines 84, 85 intersect vertical guide plate 132 at an acute angle much closer to 90° than that which would be calculated on (necessarily illustratively exaggerated) dotted line showing 84, 85 in Fig. 8. In practice, the deviation need be only slightly away from a true 90° angle to plate 132 to attain the effect above mentioned.

Clutch-registering means

Any suitable friction roller, belt, pulley, or other suitable driving means may be used for rotating the impression roller 24 and for reciprocating the advancing finger 35 and for stopping the actuation thereof. One form of clutch-registering means 225 is shown in Figs. 27, 9, 10, 24 and 7, to control the driving means. As shown in Fig. 7, motor 235 is connected to the impression roller 24 by a gear train including pinion 240 keyed to the armature shaft 228 of the motor 235 and meshing with gear 241 on shaft 242. Pinion 243 keyed to shaft 242 drives gear 244 keyed to shaft 245 which (Fig. 24) is coupled by clutch 225 to shaft 245a for driving the gear 246 which in turn (see Fig. 9) is in mesh (with gear 247) and thus with the gear 248 to which is keyed the shaft 53 journalled in the housing bearings 51, 52 (Fig. 15). As above noted, the (see also Figs. 11 and 14) impression roller gear 45 has constant planetary meshing engagement with the gear 70 which in turn is keyed to shaft 53 having the driving gear 248 controlled by clutch 225.

In the form shown in the drawings, by way of example, the clutch is actuated by an arm 236 (Figs. 1 and 24). When said arm is disposed in the upper position of a slot 249 in the front wall of the machine, the clutch elements are engaged and the machine is operative. But when the arm 236 is moved to the lower end of slot 249 (Fig. 2), the clutch elements are disengaged, stopping rotation of impression roller 24 at the position shown in Fig. 19 (with the interrupted circumferential portion of roller 24 facing web 22). The driving and driven sections 226 and 227 of the clutch (Figs. 27 and 24), such as a hub and casing are keyed respectively to the shafts 245 and 245a, respectively. Clutch operating handle 236 may, as shown in Fig. 7, be secured to one end of the arm 237 which is in turn keyed to a shaft 238 (Fig. 24) journalled in the machine. A pawl 253 is also keyed to said shaft 238, said pawl having detent arm 239 (Figs. 7 and 27) for a purpose presently described; the other finger or end 258 of the pawl straddles the pin end 259 of detent 255 (Figs. 7 and 9), which is journalled in the machine as at 256. The detent is normally urged into engagement with the pawl end 258 of finger 239 by any suitable means such as the spring 257 (Fig. 24) engaging the detent and the machine at opposite ends. From an examination of Figs. 7, 9 and 24, it will be noted that when the clutch operating handle 236 is disposed at the upper extremity of slot 249 (as in Fig. 1), the pawl end 253 of finger 239 will be disposed in the full line position shown in Fig. 27, above the plane of rotation of casing 227, and, therefore, of a pin 265 positioned in a circumferentially tangential slot 268 in said casing. Pin 265 is secured to one end of a spring 266 whose other end is keyed to casing 227 as by means of key 267. The spring 266 is wound, as shown in Fig. 27, to a generally tubular form in which it constricts or tightens upon clutch hub 226 to normally drive shaft 245a. When the clutch handle 236 is moved from its upper position in slot 249, Figs. 1, 24 and 27 (which is the engaged position of the clutch) to the lower position of the slot (Fig. 2), said movement of the handle 236 to the lowermost position rotates the pawl 239 in a clockwise direction, viewing the parts as shown in Fig. 7, moving the pawl end 253 of said finger against casing 227 until the tangential slot 268 of the casing in which the pin end 265 of spring 266 is positioned rotates to registry with the finger, at which time the finger will drop into the slot 268 (dotted line position, Fig. 27) and thus move the pin end 265 of the spring 266 to the extremity of the slot 268, opening spring 266 and blocking further rotation of shaft 245a (and, therefore, stopping rotation of impression roller 24 at a precise point (Fig. 19), breaking the driving connection between parts 226 and 227 of the clutch, so that further

rotation of shaft 245 will not impart continued rotation to the shaft 245*a* or impression roller 24 driven thereby (Fig. 24).

The shank 43 of impression roller 24 may be rotatably journalled in bearings in the housing 50 (Fig. 11), said housing, in turn, having hubs 51, 52, as shown in Fig. 15, journalled in the walls 101, 102 of the machine. The housing 50 is thus pivotally mounted in the machine. Means 54 (above mentioned) fixed to the housing may be provided to facilitate rotating the housing from the operative position thereof (to move the impression roller 24 from its operative position) shown in Figs. 1, 8, 9, 10, 11, 20 and 21, to its inoperative position shown in Figs. 2, 13 and 14, for facility of insertion and removal of master copy sheets. The position of roller 24, as above explained, may be controlled by clutch means 225 or the like to stop rotation of the roller at such position as to facilitate insertion of the master copy sheet. The housing 50 may be urged to its normal operative position by means such as the spring 55 (Fig. 9) connected at one end to the machine and at the other end to a link 56 pivotally connected as at 56' to housing 50. A backing roller 60 is preferably provided at the impression station of the machine (Figs. 20, 21, 11 and 19) in registry with the impression roller 24 to serve as a backing means for the web driven at said station by said roller 24. Means may be provided for driving said backing roller 60, to thereby cooperate with impression roller 24 in driving the web of blanks through the machine.

Modification for different widths of copy blanks

Figs. 3–6 inclusive illustrate popular sizes of copy blanks. The master copy sheet 23 may be of a width suitable for printing a single blank 22*a*, 22*b* or 22*c*, or for printing on two or more copy blanks such as shown in Fig. 6 during each cycle of rotation of the impression roller 24. The machine of the present invention may be modified for use in connection with copy blanks of various widths by suitable means such as exemplified in the drawings, including use of impression rollers of different diameters (Figs. 16, 17 and 18) to hold master copy sheets of different widths, for impression of tags or indicia of different widths. For facility of reference, illustrative webs of copy blanks of different widths are shown fragmentarily in Figs. 3–6 inclusive and marked with reference characters 22*a*—22*d*. The user of the machine may be provided with a plurality of impression rollers 24, 24*a*, 24*b*, of different diameters (Figs. 16, 17 and 18), to receive master copy sheets of different widths. For that purpose, the impression roller may be provided with a shank 43 which is adapted to be slid into a hollow hub 44 (Fig. 11) to which the impression roller gear 45 is keyed. Separable means may be provided to facilitate insertion and removal of impression rollers of different diameters into a standard hub 44 to conform to the size of copy blanks or matter to be printed. In the form shown in Fig. 11, the hub 44 and shank roller 43 are provided with interengaging means—the hub 44 having a compression socket 46 and the impression roller shank being provided with a head 47 to be snapped into said socket 46. The operation of inserting and removing rollers may thus be an extremely simple one. The shank 43 and hub 44 may be provided with interengaging means to register the shank in the hub and to preclude accidental independent rotation thereof, such as (Fig. 11) a keyway 48 at the free end of the hub 44 to receive a registering pin 49 on the roller shank 43.

Backing roller 60

Backing roller 60 may be driven by any suitable means, such as shown, for example, in Figs. 11 and 7, wherein the roller 60 is shown as freely journalled in the machine and has a pinion 61 keyed thereto, meshing with gear 62 keyed to shaft 63 which may be driven in synchronism with the means for driving the impression roller 24.

For use with impression rollers of various diameters, shaft 63 for gear 62 may be provided, at a spaced portion thereof (Fig. 11), with gears 64, 65, 66 (slidably) keyed thereto for selective meshing with gears 67, 68, 69 keyed to the shaft 53 (such as 64 with 67, 65 with 68, 66 with 69). The impression roller gear (45) is in constant planetary mesh with the gear 70 keyed to shaft 53, as above noted. Shaft 53, as just noted, also has keyed thereto gears 67, 68, 69.

Gears 64, 65, 66 are keyed to sleeve 71 which is slidably splined on shaft 63. Suitable means are provided for shifting sleeve 71 on shaft 63 to selectively mesh the gear 64 with gear 67 or gear 65 with gear 68, or gear 66 with gear 69, to thus vary the number of revolutions of the backing roller 60 for each revolution of the impression roller 24. Thus rollers 24 and 60 may be readily synchronized for uniform driving speed contact with the faces of the web 22 passing therebetween and advanced thereby. Means for so shifting the sleeve 71 may, as shown in Figs. 11 and 24, comprise a yoke 72 to engage the edges of the end gears 64, 66 of the sleeve 71 (without interfering with rotation of said gears). The yoke 72 extends from a yoke plate 73 slidably mounted in bearings 74 and 75 of the machine. Plate 73 is laterally shifted by suitable means—for example, a knob 76 keyed to one end of a shaft 77 journalled in the machine (Figs. 24, 7 and 21), the other end of shaft 77 having keyed thereto a link 78 having a roller 90 received in a vertical slot 81 of slide plate 82. The slide plate 82 is shown in perspective in Fig. 22 from which it will be noted that said plate has an offset finger 89 provided with a pin 90. The plate is shown in top plan view in Fig. 12, from which it will be noted that the pin 90 is received in the slotted end 78 of the arm 91 of bell crank 92 which is pivotally secured as at 93 to a standard 94 in the casing (Fig. 11). The slotted end 95 of the other arm of the bell crank receives the pin 96 on the plate 73. The rear face 97 of the machine (Fig. 24) may have a scale thereon with markings, for example, three in number (not shown), with which the knob 76 may be selectively registered by the user to thereby "set" the knob for any of three different positions. It will readily be appreciated that a greater or lesser number of positions might be provided by use of the same or similar means. One operation of rotating and thus "setting" the knob 76 will accordingly shift the position of the gear unit 71 and thereby effect the desired ratio of rotation of shaft 63 to cycles of rotation of the impression roller 24. This single operation also effects corresponding registry of the finger 35 relative to the impression station so that said finger will be properly located to advance the web 22 during the cycles of registry of the interrupted portion 31 of the impression roller 24 with said impression station 21 (Fig. 19). Means 36, 37, for reciprocating the finger 35 for that purpose, previously generally described, will now be specifically described. The finger 35 is provided with a pin 98 for registry thereof with the guide slot 99 in the plate 82 (Figs. 22–24). As shown in the drawings, novel means are provided for translating the single operation of rotating the knob 76 into a shifting of the gear unit 71 and simultaneously shifting the finger 35 to the correspondingly required different position relative to the impression station 21. To hold the plate in registered position and against accidental displacement, the plate 82 may be provided with registry recesses 103, 104, 105, to be selectively engaged by means (Figs. 20 and 21) such as the spring-urged roller 106 carried by an arm 107 pivoted as at 108 to the machine. If desired, a duplicate set of registry recesses 109, 110, 111, may be provided in the plate for selective engagement by a roller 114 carried by a second arm 115 pivoted as at 116 to the machine.

Means 117, such as a spring, may be provided to normally urge the rollers into engagement with the plate recesses. On shifting the plate 82, for example from the position shown in Fig. 20 to the position shown in Fig. 21, the rollers will be displaced from the recesses 103 and 109 and will then enter the medial recesses 104 and 110. The position of the parts shown in Fig. 21 might, for example, be that at which the gear 65 meshes with the gear 68, in the medial position of the knob 76. In the Fig. 20 position of the parts, the plate 82 has been shifted so that the recesses 103 and 109 thereof are engaged by the rollers 106 and 114, and gear 66 will be meshed with gear 69.

For the purpose of effecting a movement of the finger 35 relative to the impression station 21 (to conform to changes in diameter of the particular impression roller 24 in use and change in gear ratio for driving the backing roller 60), the finger 35 is provided with an extended shank 118 with which end 37 of the reciprocating link 36 is adjustably connected (Fig. 21). Link 36 is keyed to shaft 38 of crank means 41 (Fig. 9) so that said link is reciprocated in timed relation to the rotation of impression roller 24. The precise point of connection between the end 37 of link 36 and the shank 118 of finger 35 is adjustable to conform to the disposition of the plate 82 in the machine relative to the impression station as follows: The shank 118 is provided with a plurality of registry recesses 119, 120, 121 (Figs. 23 and 21) with which the end 37 of link 36 is adapted to be selectively engaged. The link 36 may be further connected to the shank 118 of finger 35 by spring 122 (Fig. 21), the arrangement of the parts being fully shown in Fig. 8 from which it will be noted that the member 37 is preferably a roller having two parallel straight flanges adapted to receive shank 118 between them, said roller being rotatably mounted on a stub shaft 125 fixed to the link 36. The spring 122 is wound around said stub shaft; the free ends of said spring are positioned against the link 36 and the shank 118. Thus the link and shank are frictionally connected together. When the plate 82 is shifted responsive to movement of the knob 76, the end 37 of link 36 will be registered with the recesses 119, 120 or 121 of the shank 118 required to locate the finger 35 at the (then) particular position of the guide slot 99 of plate 82. As the link 36 reciprocates, finger pin 98 will be moved to the ends of slot 99; when the finger pin strikes the right-hand end of the slot, if, at that time, the plate 82 is so located that the right-hand end of slot 99 does not permit the finger to move further to the right although so urged by the link 36, this will cause the end 37 of said link to move out of the medial recess 120 and into the right-hand end recess 121 of finger shank 118, as shown in the full line showing B of Fig. 20 and in Fig. 7. Likewise, movement of the plate 82 in the opposite direction so that the rollers 106, 114 engage the left-hand recesses 105, 111 of the plate will cause the roller 37 of link 36 to engage the left-hand recess 119 of the shank 118. The broken lines "L" and "R" indicate the extremities of the operating stroke, when in one shift position.

The machine is preferably provided with a horizontal guide plate 131 over which the web 22 slides as it is driven through the machine, said plate having a slot (124, Fig. 2) through which the finger projects for reciprocating movement in operation of the device.

The finger 35 is made of such outline that when moved in the desired direction of movement of the web 22 through the machine, said finger will engage with said web blanks, and, when moved in the reverse direction, will return to its starting position. The wall of the finger facing the impression station is preferably formed in a vertical or slightly arcuate vertical plane 127 (Fig. 23); the opposite side of the finger is preferably disposed at acute angular plane 128. To facilitate engagement of the finger with web 22 to be advanced through the machine thereby during the interval in which the impression roller has non-driving contact with the web, the latter may be provided with registering apertures 129 (Fig. 3) spaced apart the width of a blank, or, as shown at 129*a*, Fig. 6, the width of more than one blank. Fig. 19 shows the finger projecting through the slot 124 of plate 131 and through a blank aperture 129 to advance the web during registry of the interrupted portion 31 of the impression roller with the impression station 21 (Fig. 1). The outline of the finger above mentioned facilitates its initial entry into a web aperture to advance the web, and movement in the opposite direction without obstructing the continued advance of the web.

The impression roller is normally urged downwardly responsive not only to the weight of the casing 50 in which the roller is journalled (and associated parts in said casing) but also responsive to the spring 55 (Figs. 9 and 24). Stop means may be provided to limit the extent of contact of the impression roller 24 with the web 22 and to predetermine the degree of impression of the indicia onto the blanks 22. Such means may be adjustable, as shown in Figs. 24, 8, 10, to comprise a stop collar 134 slidably mounted on shaft 137 (Fig. 24) and stop screws 143 to abut or engage the stop collar. The shaft 137 carrying the collar may comprise eccentric pins 146 at both its ends, journalled in the machine. The collar is shiftable on shaft 137 with yoke 72 whose finger 136 may engage the coller to shift same with yoke 72. The shaft 137 with eccentric ends 146 is connected by crank-linkage means 138, 139 with shaft 140, whereby rotation of the latter will cause rotation of shaft 137, which rotation, due to the eccentric mounting, will produce a small vertical displacement of the shaft and its collar. Through coaction of the stop collar with the stop screw under which it is positioned, a fine adjustment of the operating position of the housing 50 is secured, as required by blanks of different thicknesses. The arrangement of the plurality of adjustable stop screws 143 under which stop collar 134 may be selectively aligned in unison with yoke 72 responsive to movement of the knob 144, permits the broad adjustment of the operating position of the housing 50 which is required when changing from an impression roller of one diameter to one of another diameter. Thus an approximate adjustment of the operating position of housing 50 may be selectively pre-set for impression rollers of different diameters by means of stop screws 143, the selection of the appropriate stop screw being secured by rotating knob 76. Further, a fine adjustment of the operating position of housing 50 may be secured while the machine is in operation by rotating shaft 140 by knob 144. Control knob 144 may have registered therewith a scale 145 (Fig. 2) with markings to indicate impression increments attainable by rotating knob 144. Thus, by rotating the knob 144 at the front of the machine (Fig. 2), the position of the housing 50 and, therefore, the position of the impression roller 24 (and degree of impression of the indicia onto the web) in the machine may be adjusted.

Moistening station 26

As above noted, the station 26 (Fig. 20) is provided in advance of the impression station 21 in the path of movement of the web 22 through the machine so as to pre-moisten the web so that when it is contacted by the impression roller, transfer of the indicia of the master copy sheet to said web will be effected. The moistening station shown in Figs. 24, 26, 26, 7, 13 and 14, comprises a moistening roller 148 (preferably an idling roller) freely rotatably journalled in the machine. As shown in Figs. 25 and 26, it is preferably journalled in a housing 149 which is pivotally mounted in the machine, as, for example, by mounting an extended arm 150 of the housing (Figs. 8 and 9) pivotally on a shaft 151 fixed to bearings 152 of the machine. A spring 154 (Fig. 9) is secured at opposite ends to the housing

149 and machine so as to normally urge the housing downwardly, to thereby normally urge the idling moistening roller 148 into position for engagement by the moving web (Figs. 20 and 21). The housing may be provided (Fig. 8) with stop means as shown in the modification of Figs. 8 and 10 (or other means suited to the same end), such as a stop screw 153 passing through the housing or through an extension thereof and adjustable therein and adapted to contact a stop plate 158 on the machine (Fig. 10) to limit downward movement of the housing responsive to spring 154. The stop screw 153 may be so adjusted that when a web of blanks is in place the stop screw will not make contact with stop plate 158, and the moistening roller will be held against the blanks by means of spring 154, Fig. 9. When there are no blanks in the machine, stop screw 153 will contact stop plate 158 preventing forceful contact of moistening roller 148 with backing roller 160 which would result in damage to the latter during prolonged idler periods. Means may be provided for connecting the moistening roller housing 149 with the impression roller housing 50 so that, by a single movement of the handle 54 keyed to the impression roller housing 50, both the impression roller housing 50 and moistening roller housing 149 will be elevated to inoperative position (Figs. 13 and 14). For that purpose, the housing 50 for the impression roller 24 may have pivotally connected thereto the link 155 which may have a lost motion pin and slot connection (indicated at 156) with the housing 149 for the moistening roller 148.

The impression roller 24 is movable (in the movement of its housing 50 (through a slot 33 in a vertical guide plate 132 (Fig. 8) of the machine. The moistening roller 148 is likewise movable through a slot 157 in said plate. A cover 159 may be provided for the machine 20 (shown dotted in Fig. 13 and in full lines in Figs. 10 and 14). A backing roller 160 is preferably provided at the moistening station in registry with the moistening roller 148 (Figs. 19, 7, 20 and 21).

The invention is not limited to the convenient means for applying a solvent to the moistening roller 148 presently described. An absorbent pad 161 (Fig. 26) is secured to a plate 162; the latter is pivoted as at 163 to the housing 149. A spring 164 may be disposed on the pivot pin 163, the opposite ends of the spring bearing against the housing and plate to normally urge the plate into contact with the roller 148. A solvent supply pipe 165 has one end thereof fixed to the housing 149 (Fig. 25) and is connected, as, for example, by a flexible tube 166 (Fig. 9) with a pipe 167 connected to a solvent reservoir 168. In the operation of the device, pump means 171 for said reservoir would be actuated to pump the solvent from the reservoir 168 through the pipes 167 and 166 to pipe 165, and thence through apertures in pipe 165 onto the absorbent pad 161 (Fig. 26). The movement of the web blank 22 through the machine and in contact with the moistening roller 148 will rotate said roller against the pad 161 to thereby coat the roller with a film of solvent, which is thus deposited onto the web.

Solvent pump

Figs. 9 and 10 illustrate a pump means, one of the many forms which may be used, comprising a link or arm 172 pivoted as at 173 on a standard 174 of the machine 20. One end of the link 172 is pivotally connected as shown at 175 to the solvent reservoir piston 176. The free end 177 of the arm bears against the roller 178 of a finger 179 keyed to the shaft 38 (Fig. 8) to which the member 36 is also keyed, said shaft being reciprocated responsive to rotation of the gear train for driving the impression roller 24. Means may be provided for regulating the extent of the stroke of the pump and thereby regulating the moistening coating applied to the moving web 22. Said means may, as shown in Figs. 9 and 10, be a plate cam 183 journalled in a bearing 184 on the machine and keyed to a shaft 185 journalled in said bearing and also journalled in the front wall of the machine (Fig. 8). A control knob 186 is keyed to said shaft and is disposed at the front of the machine (see Figs. 8 and 2). A scale 187 for said knob may be mounted on the front of the machine (Fig. 2). In Figs. 9 and 10 of the drawings, the cam is shown moved to its inoperative position, which would be effected by rotation of knob 186 in a clockwise direction viewing the parts as shown in Fig. 2 of the drawings to the extreme right-hand limit of the scale 187. This would permit the end 177 of the arm 172 to be vertically reciprocated to the full extent permitted by engagement of roller 178 of finger 179 therewith. To reduce the quantity of fluid pump, the knob 186 would be rotated in the other direction (counterclockwise when viewed in the position of the parts shown in Fig. 2) thus rotating the cam 183 into contact with the free end 177 of the arm 172 to thereby limit the reciprocation of said arm, thus limiting the fluid-pumping action and predetermining the thickness of the moistening coating applied to the moving web 22.

Means may be provided to secure the "impression" and "moistening" knobs 144 and 186 against free movement or accidental displacement. Said means may, as shown in Fig. 24, be a ring or rings 141 keyed to the shaft 140 or seated in a slot therein and spring 142 bearing at opposite ends against said ring and the inner face of the front wall of the machine 20. In the case of the knob 186, said means is known in Figs. 7 and 8 to comprise a segment 188 keyed to the knob shaft 185 and having edgewise disposed recesses 189. A spring-urged bellcrank 191 is pivoted as at 192 to the machine, and is provided with a roller 190 at one end which is urged into contact with the edgewise recesses 189 of segment 188 by spring 194 which is secured, at opposite ends, to said bellcrank and to the machine housing. Control knob 186 may be rotated into positions corresponding with markings on the scale 187 (Fig. 2). Either of said knob-securing means may be used in place of the other to preclude accidental displacement, and other means suited to the same end may be substituted therefor within the scope and purview of the present invention.

Pressure foot 200 (Figs. 8, 24, 1, 20, 21)

A pressure foot 200 may be provided for engagement with the web 22 to hold the same on the horizontal guide plate 131. As shown in Figs. 20 and 24, said pressure foot is preferably disposed in registry with and laterally adjacent the slot 124 in plate 131 through which the feed finger 35 reciprocates. The pressure foot is preferably pivotally mounted on the machine as shown in Fig. 24, as by being provided with offset ears 201 journalled on a shaft 202 which is rotatably disposed in a part 199 of the machine. The pressure foot 200 may be normally urged in one direction to engage the web 22 by a spring 203 (Fig. 24) and may be limited in its movement in that direction by a stop pin 204 which is preferably adjustably disposed in the wall of said machine to thereby provide an adjustable stop for the foot 200. The shaft 202 which, as above noted, is rotatable in the machine, is connected by suitable linkage, as by bracket 207 (Fig. 10) keyed to the shaft and having a pin 206 received in a slot in link 205 pivotally connected to housing arm 150 as at 210 to provide a lost motion connection of shaft 202 with the extended arm 150 of moistening roller housing 149. The shaft 202 is provided at a point past the ears 201 of pressure foot 200 with a pin 208 keyed thereto, which, in the normal disposition of the parts (Figs. 10 and 24), would not only be spaced from but also out of engagement with a nosing 209 at the lower end of the pressure foot 200. When, however, the housings 149 for the moistening roller and 50 for the impression roller are raised from their normal position by the handle 54, the shaft 202 will be rotated by the linkage 205, 206,

to thereby rotate the pin **208** into contact with the nosing **209** and elevate the pressure foot **200** away from the guide plate **131** (Fig. 2) against the tension of spring **203**. Thus, in a single movement of the handle **54**, the impression and moistening rollers and the pressure foot are elevated simultaneously clear of the normal path of the web **22** through the machine, to facilitate insertion or removal or for other purposes.

If desired, a further means may be povided for engaging the web **22** to hold the same onto the guide plate **131**; said means (Figs. 9, 13, 2) may comprise an idler roller **214** rotatably mounted as at **215** on a bracket **216** having an arm **217** keyed to shaft **202**. Thus, the roller **214**, together with the impression and moistening rollers and pressure foot **200**, in a single operation, will be carried out of the path of the web **22** (Fig. 2) on movement of the handle **54**. Said roller **214** may be canted (as at **213**, Fig. 8) so as to be angularly inclined toward the vertical guide plate **132** in the direction D of movement of the web **22** through the machine.

Means may be provided for blowing strings **130** (Fig. 3) of the blanks substantially flat, in advance of the other stations of the machine above described. Said means may comprise a compressed air line **229** (Fig. 9) connected at one end with an air pump **218** (Fig. 7) whose piston rod **219** is connected as at **212** with a bar **220** pivotally mounted on the machine as at **221**. Bar **220** is moved by link **222** of the driving mechanism above described. Suitable switch or other control means **270** (Fig. 1) for the motor **235** may be provided. The other end of the compressed air line **229** is connected as at **230** (Fig. 13) with bracket **216**. The bracket **216** is provided with a passage therein connecting said compressed air line inlet **230** with a downwardly inclined face of said bracket having a discharge opening **231** (Fig. 2) to blow a stream of compressed air onto the string ends **130** of the blanks so as to dispose said strings clear of the web printing area.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a machine for printing indicia impressions from a master copy sheet bearing ink indicia onto a continuous web of copy blanks, an impression roller journalled at a station in the machine, means in said roller to secure the copy sheet thereto, driving means engaging said roller to rotate the same in contact with the web of copy blanks, means to moisten the web in advance of the impression roller station with a solvent for said ink, said impression roller having a continuous transverse circumferential portion which constitutes a contacting impression, web-driving portion, and having a lower circumferential portion relieving said continuous circumferential portion and constituting a non-contacting, non-impression, non-driving portion whereby contact of the roller with the web will impress the latter with the indicia of the copy sheet and will drive the web through the machine during contact of said continuous circumferential portion of the impression roller with the web, and feed means in said machine to contact the web of blanks in timed relation to the cycles of disposition of the lower circumferential portion of the impression roller at the impression station over the web, contacting said web and continuing to drive the same through said station while the impression roller non-driving portion is disposed over the web of blanks in non-driving relation thereto.

2. In a printing machine as set forth in claim 1, said web of copy blanks being provided with feed slots therealong, said feed means comprising a finger having an end disposed at a plane substantially perpendicular to the plane of movement of the web through the machine, and means engaging said feed finger to move it in one direction into the slot for driving the web, and to move it in another direction out of the slot, said slots being so spaced to conform to the driving means so that the finger means will enter the slots and continue to drive the web intermediate the cycles of driving contact of the impression roller therewith.

3. In a printing machine as set forth in claim 2, means yieldably engaging the web and exerting pressure thereon to resist displacement of said web from its intended path of movement through the machine.

4. In a printing machine as set forth in claim 2, a vertical guide plate registered with the impression station, to edgewise guide the web of copy blanks as said web is driven by contact of the impression roller therewith, said impression roller being journalled at an axial angle to the plane of said vertical guide plate to feed the web of copy blanks toward the vertical guide plate on contact of the impression roller therewith, to assure registry of the web with said vertical guide plate in movement through the machine.

5. In a printing machine as set forth in claim 2, a backing roller rotatably disposed in said machine in registry with said impression station, whereby the web may move intermediate said backing roller and impression roller as it is contacted by the impression roller.

6. In a printing machine as set forth in claim 2, a friction contact backing roller rotatably disposed in said machine in registry with said impression station, whereby the web of blanks may move intermediate said backing roller and impression roller as it is contacted by the impression roller, and means for driving the backing roller in timed relation to cycles of rotation of the impression roller so that the backing roller will also contact the web and cooperate with the impression roller in driving the web.

7. In a printing machine for printing indicia impressions from a master copy sheet onto a continuous web of copy blanks, means for journalling an impression roller at a station in the machine, the means for journalling the impression roller at a station in the machine comprising a shaft rotatably journalled in the machine, a housing pivotally journalled on said shaft, the impression roller being rotatably journalled in the housing at a plane spaced from the plane of said shaft, a gear keyed to the impression roller, a gear keyed to said shaft on which the housing is journalled, said gears having meshing engagement, and means to drive the gear keyed to said shaft on which the housing is journalled, said housing being pivotally movable in one direction to dispose the impression roller at the impression station of the machine and in the opposite direction to displace the impression roller from said station, said means to drive the gear keyed to said shaft including a clutch member for stopping rotation of said gear at such point that the impression roller in mesh therewith will be disposed with the transverse circumferential relieved portion thereof facing the web at the impression station, whereby rotation of the housing in which the impression roller is journalled will effect rotation of the impression roller to dispose said relieved portion thereof upwardly for facility of insertion or removal of the master copy sheet.

8. In a printing machine for printing indicia impressions from a master copy sheet onto a continuous web of copy blanks, means for journalling an impression roller at a station in the machine, the means for journalling the impression roller at a station in the machine comprising a shaft rotatably journalled in the machine, a housing pivotally journalled on said shaft, the impression roller being rotatably journalled in the housing at a plane spaced from the plane of said shaft, a gear keyed to the impression roller, a gear keyed to said shaft on which the housing is journalled, said gears having meshing engagement, and means to drive the gear keyed to said shaft, said housing being pivotally movable in one direction to dispose the impression roller at the impression station of the machine and in the opposite direction to displace the impression roller from said station, said means to drive the gear keyed to said shaft including means for stopping rotation of the gear keyed to the

shaft on which said housing is pivotally journalled at such point that, on rotation of the housing in which the impression roller is journalled, the relieved portion of the impression roller will be disposed upwardly for facility of insertion or removal of the master copy sheet.

9. In a printing machine as set forth in claim 1, said means to drive the roller comprising two shafts axially disposed in spaced direct line relation, separable means connecting said shafts for rotation unitarily, and means engaging said separable means for separating the same, to thereby interrupt the driving of the roller such that rotation of the roller will be stopped at the point at which the relieved portion of the impression roller faces the web at the impression station.

10. In a printing machine as set forth in claim 1, the means for journalling the impression roller at a station in the machine comprising a shaft rotatably journalled in the machine, a housing pivotally journalled on said shaft, the impression roller being rotatably journalled in the housing at a plane spaced from the plane of said shaft, a gear keyed to the impression roller, a gear keyed to said shaft on which the housing is journalled, said gears having meshing engagement, and means to drive the gear keyed to said shaft, said housing being pivotally movable in one direction to dispose the impression roller at the impression station of the machine and in the opposite direction to displace the impression roller from said station, and means to limit movement of the housing in both directions.

11. In a printing machine as set forth in claim 1, the means for journalling the impression roller at a station in the machine comprising a shaft rotatably journalled in the machine, a housing pivotally journalled on said shaft, the impression roller being rotatably journalled in the housing at a plane spaced from the plane of said shaft, a gear keyed to the impression roller, a gear keyed to said shaft on which the housing is journalled, said gears having meshing engagement, and means to drive the gear keyed to said shaft, said housing being pivotally movable in one direction to dispose the impression roller at the impression station of the machine and in the opposite direction to displace the impression roller from said station, and spring means engaging the housing and machine and normally urging the housing in the direction in which the impression roller is disposed at the impression station.

12. In a printing machine as set forth in claim 1, said impression roller having a slot opening onto said lower circumferential portion, said slot being disposed on the axis of chord intersecting the continuous transverse circumferential portion and spring means in said impression roller fixed to said roller at one end and having a free end extending into said slot tensioned toward one wall of said slot so as to engage an edge of the master copy sheet to frictionally secure the copy sheet to the roller.

13. In a printing machine as set forth in claim 1, said means to dispose said roller in the machine including a sleeve fixed to the impression roller driving means, complementary means on the sleeve and impression roller to key the sleeve and impression roller against rotational displacement and spring latch means connecting the impression roller to the sleeve.

14. In a printing machine as set forth in claim 2, the means for journalling the impression roller at a station in the machine comprising a shaft rotatably journalled in the machine, a housing pivotally journalled on the shaft, a sleeve rotatably journalled in the housing at a plane spaced from the plane of said shaft, a gear keyed to said sleeve, a gear keyed to said shaft with which the impression roller gear has meshing engagement, means to drive the gear keyed to said shaft, said housing being pivotally movable in one direction to dispose the impression roller at the impression station of the machine and in the opposite direction to displace the impression roller from said station, a hub on said impression roller, complementary friction means on said hub and sleeve to latch the impression roller to said sleeve, and complementary registering keying means on the impression roller hub and sleeve to key the same against relative independent rotation.

15. In a printing machine as set forth in claim 1, a backing roller rotatably journalled in said machine in registry with said impression station, the means for journalling the impression roller at a station in the machine comprising a shaft journalled in the machine, a housing pivotally journalled on the shaft, the impression roller being rotatably journalled in the housing at a plane spaced from the plane of said shaft, complementary engaging driving means on the shaft on which the housing is journalled and on the impression roller shaft, a shaft journalled in said machine spaced from said shaft on which the housing is journalled, complementary variable speed means on the two last-mentioned shafts, and means for adjusting said variable speed means to conform to the diameter of the impression roller.

16. In a printing machine as set forth in claim 15, said complementary variable speed means comprising said shaft journalled in said machine spaced from said shaft on which the housing is journalled having a keyway, a sleeve having two or more gears of different value slidably disposed in said keyway, means for sliding said sleeve, and gears of different value keyed to said shaft to which the housing is journalled for selective meshing engagement with the gears on said sleeve to thereby control the speed of rotation of the friction contact backing roller.

17. In a printing machine for printing indicia impressions from a master copy sheet onto a continuous web of copy blanks, means for journalling an impression roller at a station in the machine, said means for disposing said impression roller at a station in the machine including separable means to facilitate insertion and removal of impression rollers of different diameters to conform to the size of blanks to be printed and matter to be printed thereon, a backing roller rotatably disposed in said machine in registry with said station on which the blank, when disposed at said station, may rest, means to freely journal said roller in said machine at said station, means for attaining relative spatial movement between the impression and backing rollers, a pinion keyed to said backing roller, a driving gear journalled in said machine and keyed to said pinion, and variable gear means connecting the impression roller driving means with said journalled driving gear to rotate the backing roller in timed relation to the rotation of the particular impression roller disposed in said machine.

18. In a printing machine as set forth in claim 1, said means to secure the copy sheet to the roller comprising a slot opening into said lower circumferential portion and a spring plate fixed at one end to said roller and projecting into said slot to secure the copy sheet therein.

19. In a printing machine as set forth in claim 1, said means to moisten the web comprising a housing disposed in said machine at a station in advance of the impression roller station, an idling roller journalled in said housing in position to contact the moving web and to be rotated thereby, an absorbent sheet disposed in said casing, means for urging said sheet into contact with the idling roller, and means for moistening said sheet so that as the idling roller is rotated by said moving web, a moistening film will thereby be transferred to said web.

20. In a printing machine as set forth in claim 1, said impression roller being so journalled by disposing the same in a housing pivotally mounted on said machine, said moistening means including a housing pivotally disposed in said machine in advance of the impression roller station an idling roller journalled in said last metioned housing to normally dispose the idling roller in position to contact the moving web and be rotated thereby, means for moistening said roller so that as it is rotated by said moving web, it will transfer a moistening film to said web, and means connecting said moistening roller housing with the impression roller housing, whereby, on pivotal movement of the latter to move the impression roller away from its normal station, the moistening roller will

likewise be moved away from its normal station and the web.

21. In a printing machine as set forth in claim 1, an idling roller disposed in said machine at a station in advance of the impression roller station in position to contact the moving web and to be rotated thereby, means for moistening said roller so that as it is rotated by said moving web, it will transfer a moistening film to said web, means urging said moistening roller in one direction into contact with the web, and means to limit movement of said moistening roller in said direction.

22. In a printing machine as set forth in claim 21, a second idling roller disposed in said machine in registry with the idling moistening roller to receive the web therebetween, said second idling roller serving as a backing roller for the web contacting the moistening roller.

23. In a printing machine for printing on a web comprising a plurality of blanks in connected strip form from a master copy sheet having a printing portion bearing the indicia with which said blanks are to be printed, an impression roller for holding said master copy sheet, means for disposing said roller at a station in the machine and for rotating said roller in a given direction, said roller having an uninterrupted circumferential portion to which the master copy sheet indicia area may be secured and having a relieved, interrupted circumferential portion recessed inwardly, means for securing the master copy sheet to said roller with the printing portion of said sheet on said uninterrupted portion of the roller, a backing roller disposed in said machine in registry with said impression roller, means urging the impression roller toward the backing roller so that as said impression roller is rotated the uninterrupted circular portion thereof will print the web and advance the same past the printing station, a finger member disposed in said machine and means to move the finger in one direction into engagement with the web, so that said finger will continue to drive the web past the impression roller station while the interrupted portion of the roller rotates at said station in non-driving relation thereto.

24. In a printing machine as set forth in claim 23, said web having spaced slots provided therein, and said finger member being of an outline predetermined for engagement in said slots when the finger member is moved in said one direction and for disengagement therefrom when the finger member is moved in a reverse direction.

25. In a printing machine as set forth in claim 24, a pin on said finger member, a plate, means to secure the plate to said machine, said plate having a slot to receive said pin for guiding the finger in the movement thereof, and means for reciprocating said finger to move it in said one direction to advance the web and to retract it by movement in the opposite direction after so advancing the web, and means engaging the impression roller rotating means and the finger reciprocating means for synchronizing cycles of movement of said finger with cycles of rotation of the impression roller.

26. In a printing machine as set forth in claim 25, the means to secure the plate to the machine including complementary means on the plate and machine to slidably position the plate in the machine relative to the impression roller station, and complementary means on the machine and plate to latch the plate in one of two or more positions relative to the impression roller station, to thereby predetermine the location of the plate slot and thereby the spacing of the finger relative to said impression roller station, to conform the point of engagement of the finger with the web to the registry of the interrupted portion of the impression roller at said station, according to the diameter of the roller or the extent of the uninterrupted impression area thereof.

27. In a printing machine as set forth in claim 23, a plate, means to secure the plate to said machine, complementary means on the finger and plate for guiding the finger in movement thereof, and means in said machine engaging the plate to adjust the position of the latter relative to the impression roller station.

28. In a printing machine as set forth in claim 23, means engaging the finger for said movement thereof, said means engaging the plate at two or more registration portions thereof relative to the impression roller station, to thereby predetermine the spacing of the finger to the impression roller station.

29. In a printing machine as set forth in claim 23, said finger member disposed in said machine having two or more registration positions relative to the impression roller station, and means for engaging said finger selectively at one of said positions to thereby predetermine the spacing of the finger relative to the impression roller station.

30. In a printing machine as set forth in claim 23, means to secure the plate to said machine, complementary means on the plate and finger to guide and limit movement of the finger, two or more registration portions on the finger relative to the impression roller station, means for engaging one of said portions to reciprocate the finger member, to thereby predetermine the spacing of the finger relative to the impression roller station, two or more registration portions on the plate relative to the impression roller station, and means for engaging one of said portions to fix the position of the plate member relative to the impression roller station, and complementary means holding the finger member to the plate member, whereby, by first fixing the position of the plate member relative to the impression roller station, the means engaging the finger member will shift to engagement with the registration portion conforming to the position of the plate member.

31. In a printing machine as set forth in claim 23, an extended shank portion on said finger member, said extended shank portion having two or more spaced recesses, a crank arm mounted in said machine and connected to the impression roller rotating means for movement thereof in synchronized relation, a channelled member on said crank arm engaging one of said spaced recesses of the finger shank, and spring means securing the channelled member and the shank of the finger together to hold the crank engaged with the recess under tension while permitting its displacement for engagement with another recess.

32. In a printing machine as set forth in claim 31, means in said machine and engaging said finger for displacing the channelled member from one recess of the finger shank and moving the same into another of said recesses.

33. In a printing machine as set forth in claim 2, a vertical guide plate registered with the impression station, to edgewise guide the web of copy blanks as said web is driven by contact of the impression roller therewith, said impression roller being journalled at an acute angle to the plane of said vertical guide plate to feed the web of copy blanks toward the vertical guide plate on contact of the impression roller therewith, to assure registry of the web with said vertical guide plate in movement through the machine.

34. In a printing machine as set forth in claim 1, means for directing a gaseous stream onto the web in advance of the impression roller station, to thereby move any string members attached to the web clear of the web printing area.

35. In a printing machine for printing indicia impressions from a master copy sheet onto a continuous web of copy blanks, an impression roller mounted on a pivot arm for movement in said machine toward the web, said impression roller being designed for driving contact with the web during only part of the cycle of rotation of said roller, a moistening roller pivotally mounted for movement in said machine into contact with the web in said machine, feed finger means in said machine for contacting said web, and means engaging the impression roller and

the finger means to actuate the latter into contact with the web only at intervals in the cycles of rotation of the impression roller during which the impression roller does not have driving contact with the web said finger means continuing to drive the web while the impression roller non-driving portion is disposed over the web in non-driving relation thereto.

36. In a printing machine as set forth in claim 35, means coupling said impression roller and moistening roller for movement in unison into normal position of contact with the web and into inoperative position of non-contact therewith.

37. The method of printing indicia from a master copy sheet onto a web of connected blanks having spaced slots which consists of securing said master copy sheet to a roller, rotating said roller, positioning said web in said machine so that it will be contacted by the master copy sheet, moistening said web in advance of its contact with said master copy sheet so that on contact by the latter the indicia thereof will be transferred to said web and the web will be driven by said contact of the master copy sheet therewith the entire distance between adjacent slots less an interval of non-driving contact of the master copy sheet therewith, and engaging the slots at intervals in the cycles of rotation of the roller during which the master copy sheet does not have driving contact with the web to drive the latter during such intervals so that the web will be continuously driven through the machine for repeated cycles of printing and during intervals therebetween.

38. In the method of printing set forth in claim 37, the added step which consists prior to positioning said web in said machine of impressing said slots in the web spaced apart to approximately coincide with the circumference of the roller.

39. In the method of printing set forth in claim 38, the added step which consists of providing the roller with a major continuous circumferential portion to press the master copy sheet against and drive the web during the major portion of each cycle of rotation of the roller,

and with a lesser, relieved, non-continuous circumferential portion which will not so press and drive the master copy sheet.

40. In the method of printing set forth in claim 37, the added step of guiding the web into registration with the master copy sheet in its movement through the machine.

41. In a printing machine for printing indicia impressions from a master copy sheet onto a continuous web of copy blanks, a shaft rotatably journalled in the machine, a housing pivotally journalled on said shaft, a second shaft journalled in said machine spaced from the housing shaft, means to removably secure the impression roller to said second shaft whereby impression rollers of different diameter may be secured to said second shaft, gears keyed to said shafts, and means for adjusting the relative speed of rotation of said gears to conform to the surface speeds of said rollers.

References Cited in the file of this patent

UNITED STATES PATENTS

1,019,107	White	Mar. 5, 1912
1,089,453	Wood	Mar. 10, 1914
1,497,766	Balkwill	June 17, 1924
2,024,354	Gurwick	Dec. 17, 1935
2,093,385	Storck	Sept. 14, 1937
2,102,895	Hasbrouck et al.	Dec. 21, 1937
2,121,195	Harrold et al.	June 21, 1938
2,132,403	Davis et al.	Oct. 11, 1938
2,238,359	Copeland et al.	Apr. 15, 1941
2,364,942	Bradt	Dec. 12, 1944
2,417,572	Storck et al.	Mar. 18, 1947
2,425,327	Janke	Aug. 12, 1947
2,570,045	Bojanower et al.	Oct. 2, 1951
2,599,278	Osgood	June 3, 1952
2,622,519	Keil	Dec. 23, 1952
2,694,974	Briggs	Nov. 23, 1954