

April 21, 1953

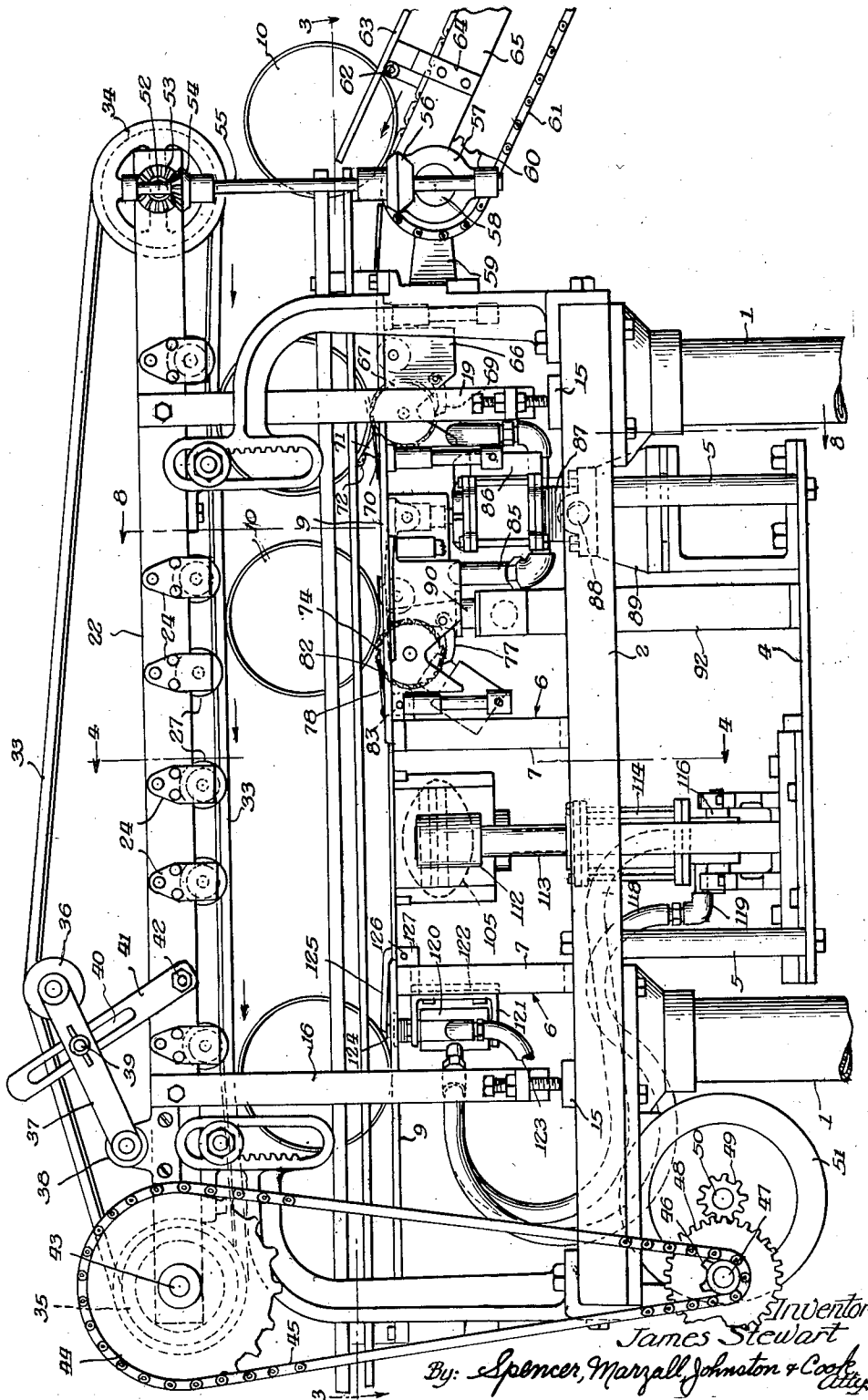
J. STEWART
CONTAINER IMPRINTER

2,635,533

Filed April 28, 1949

9 Sheets-Sheet 1

Fig. 1.



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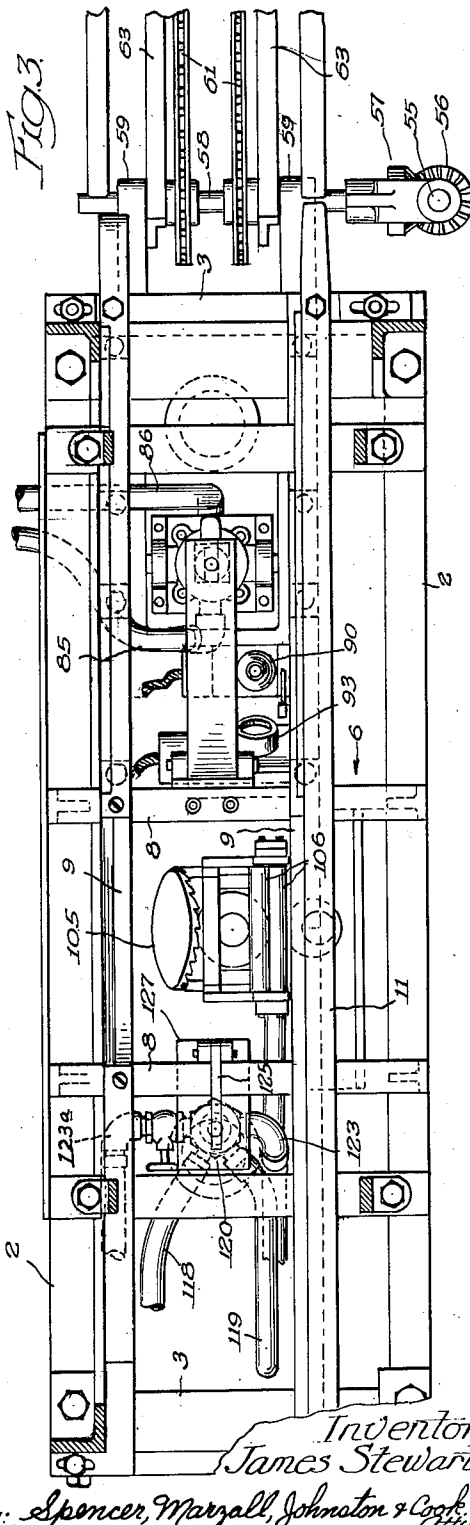
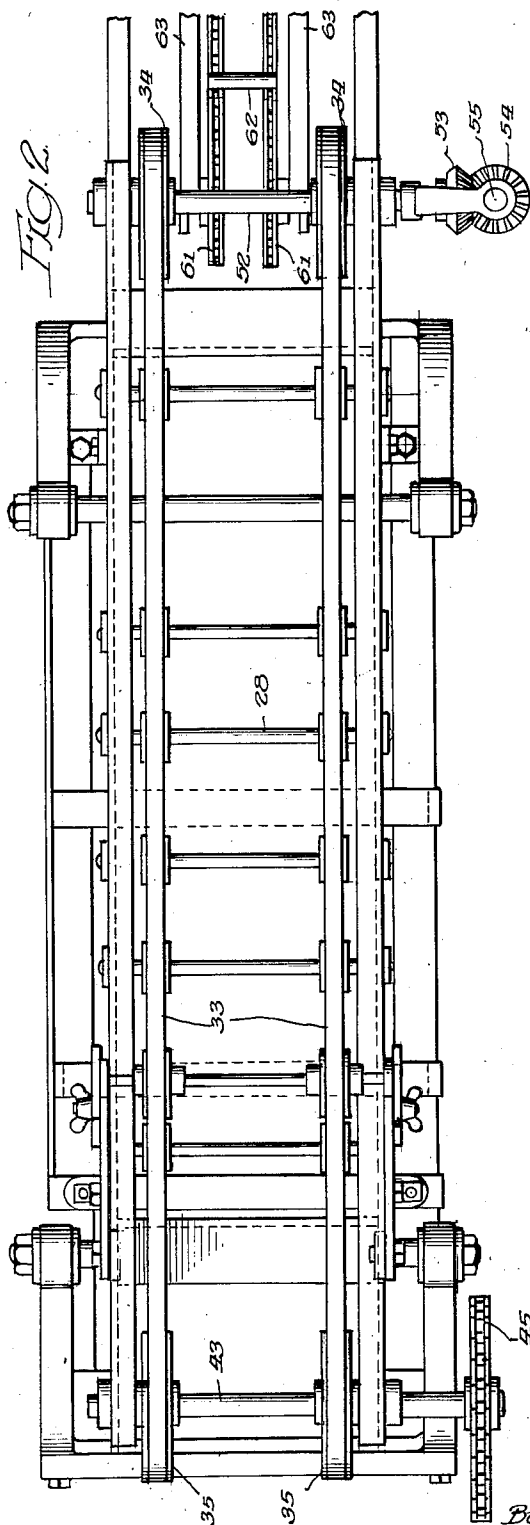
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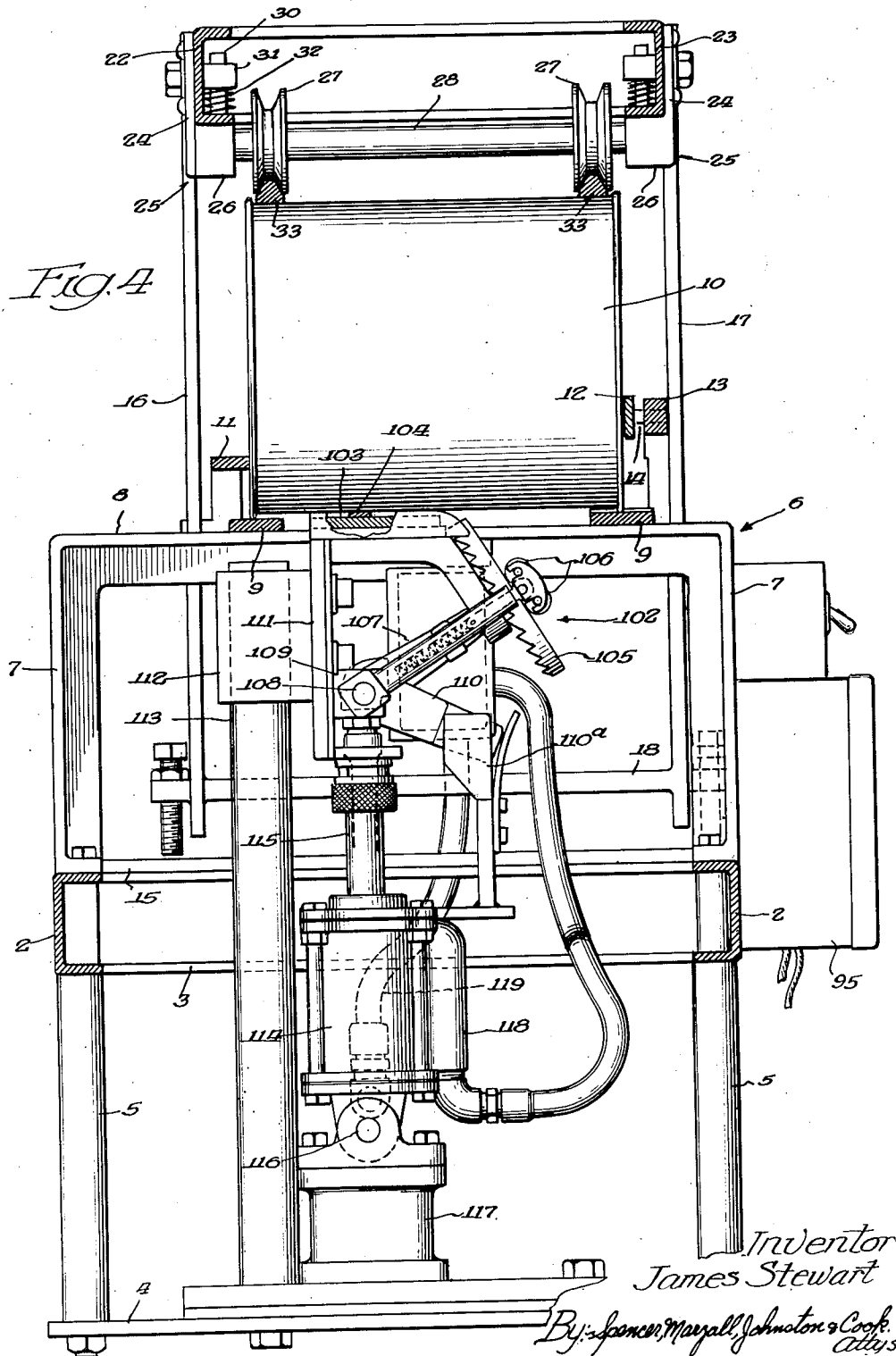
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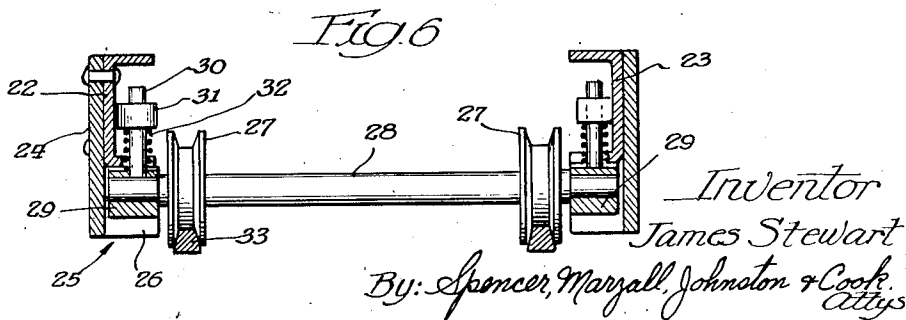
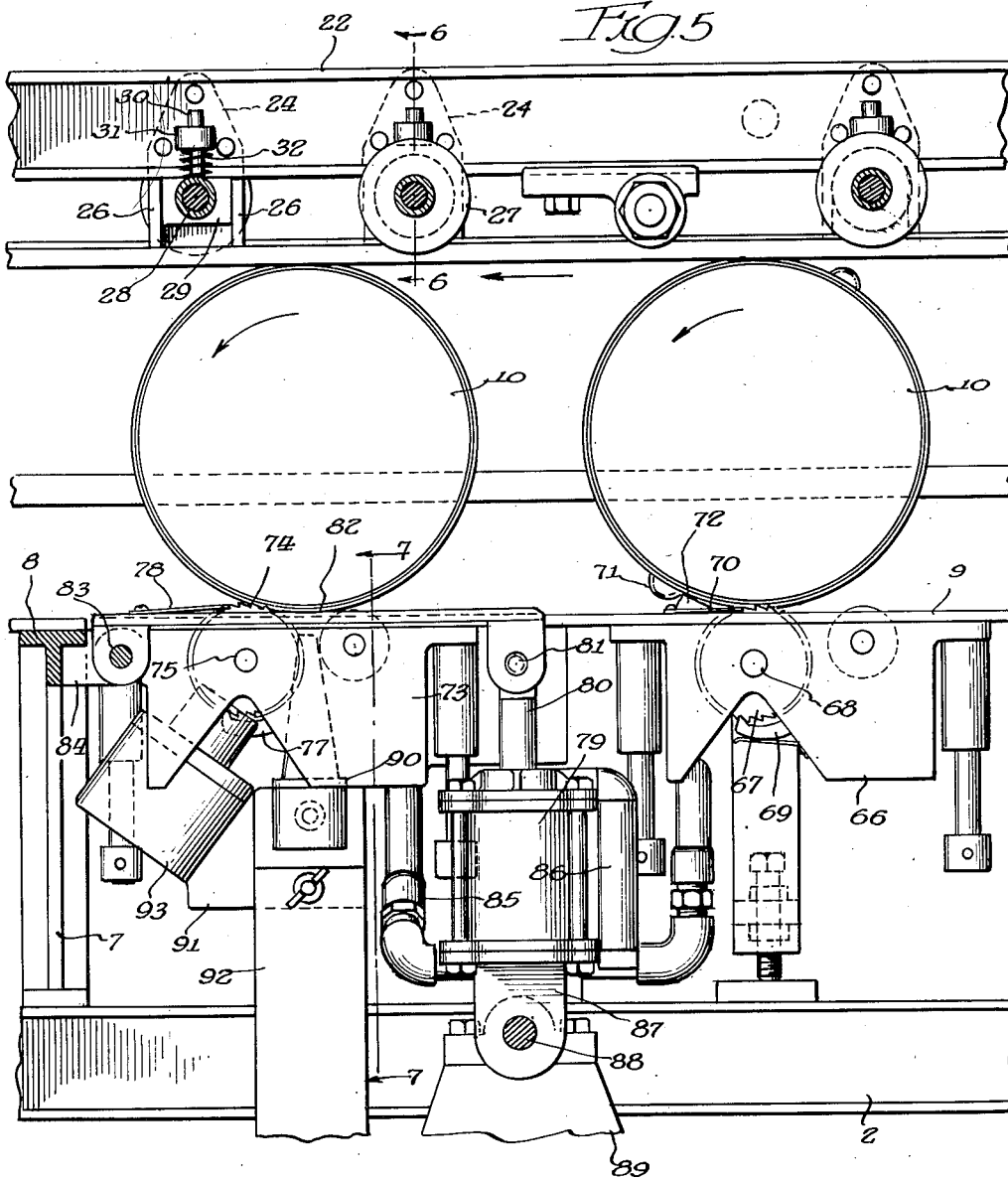
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9 Sheets-Sheet 4



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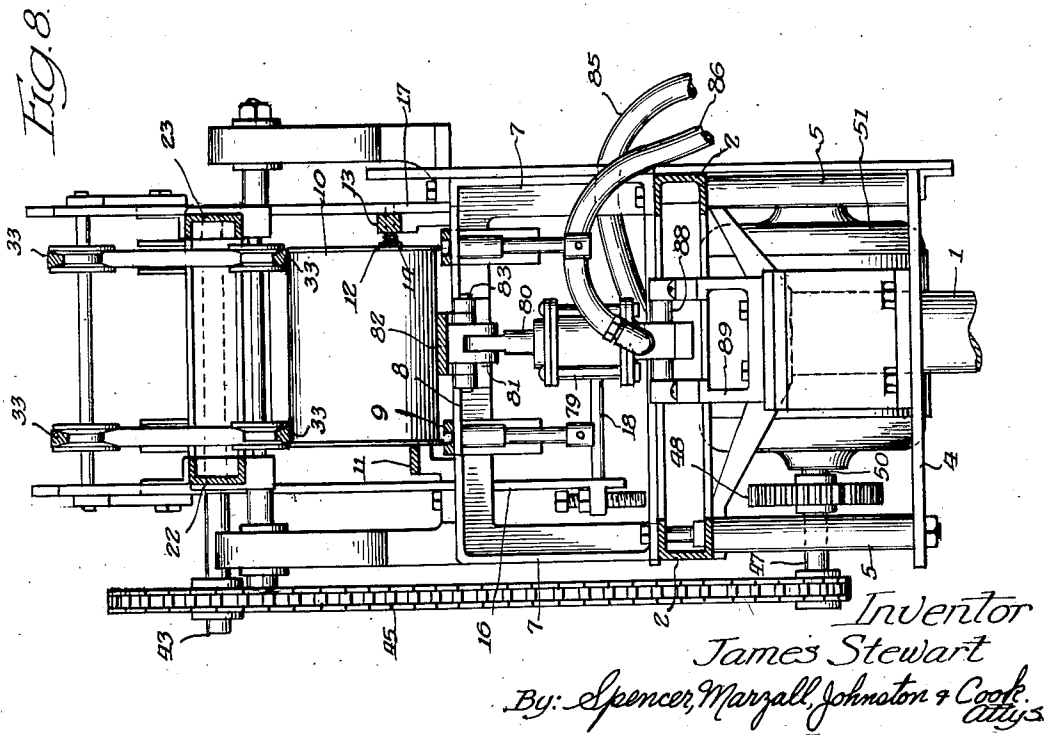
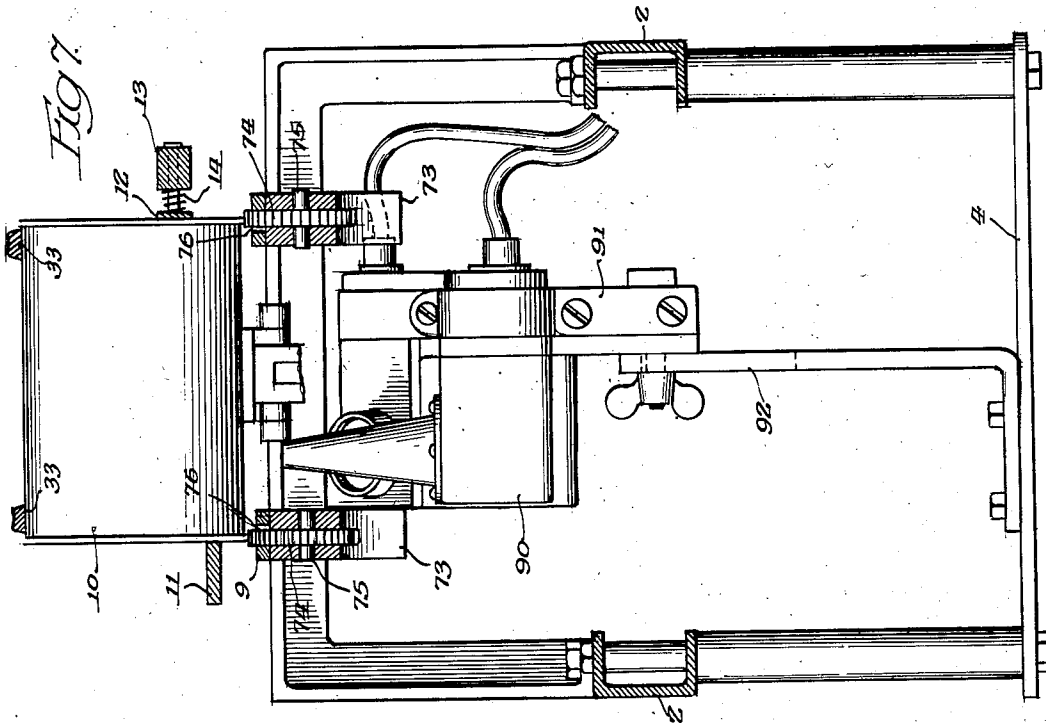
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J. STEWART
CONTAINER IMPRINTER

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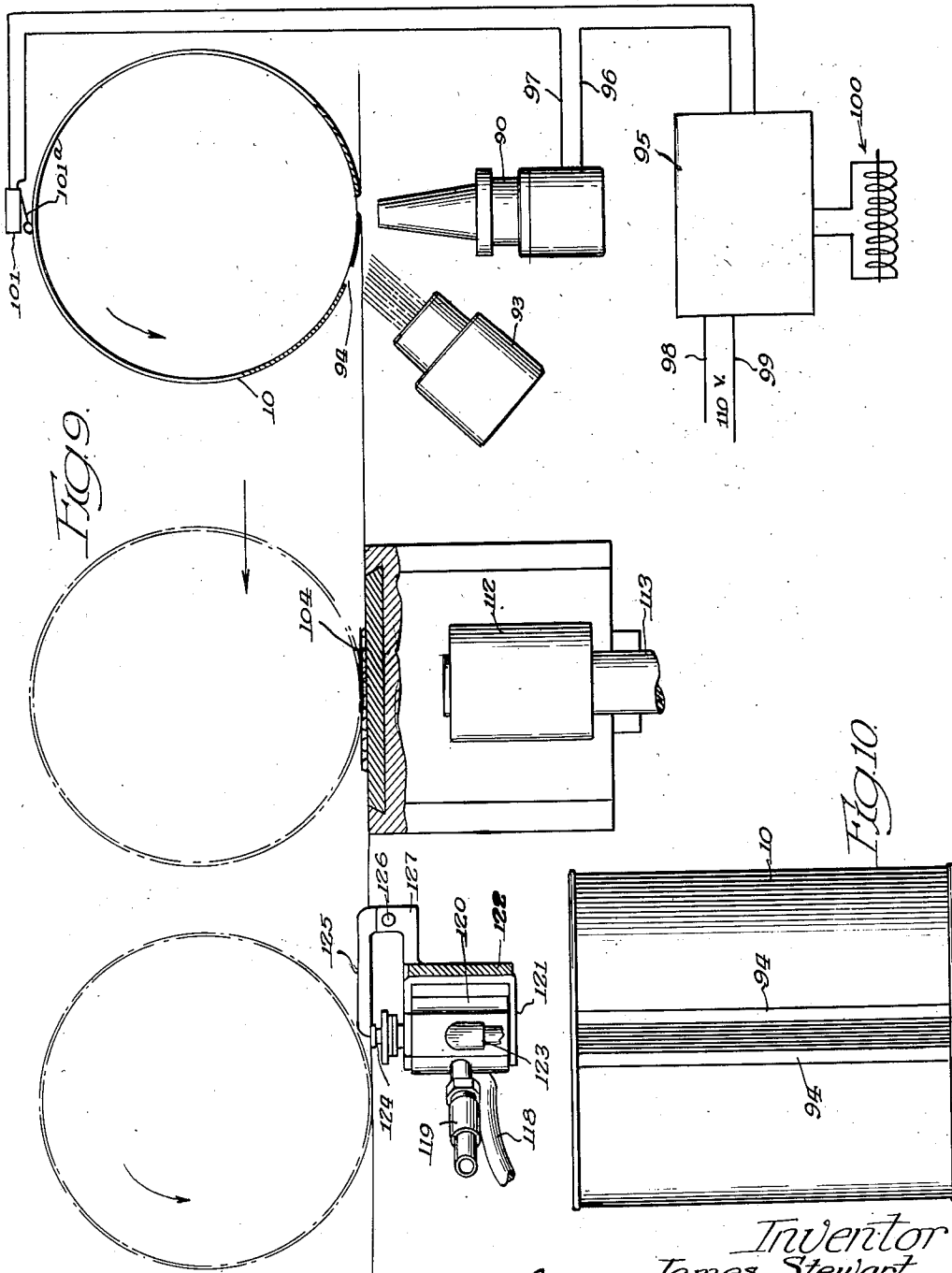
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9 Sheets-Sheet 6



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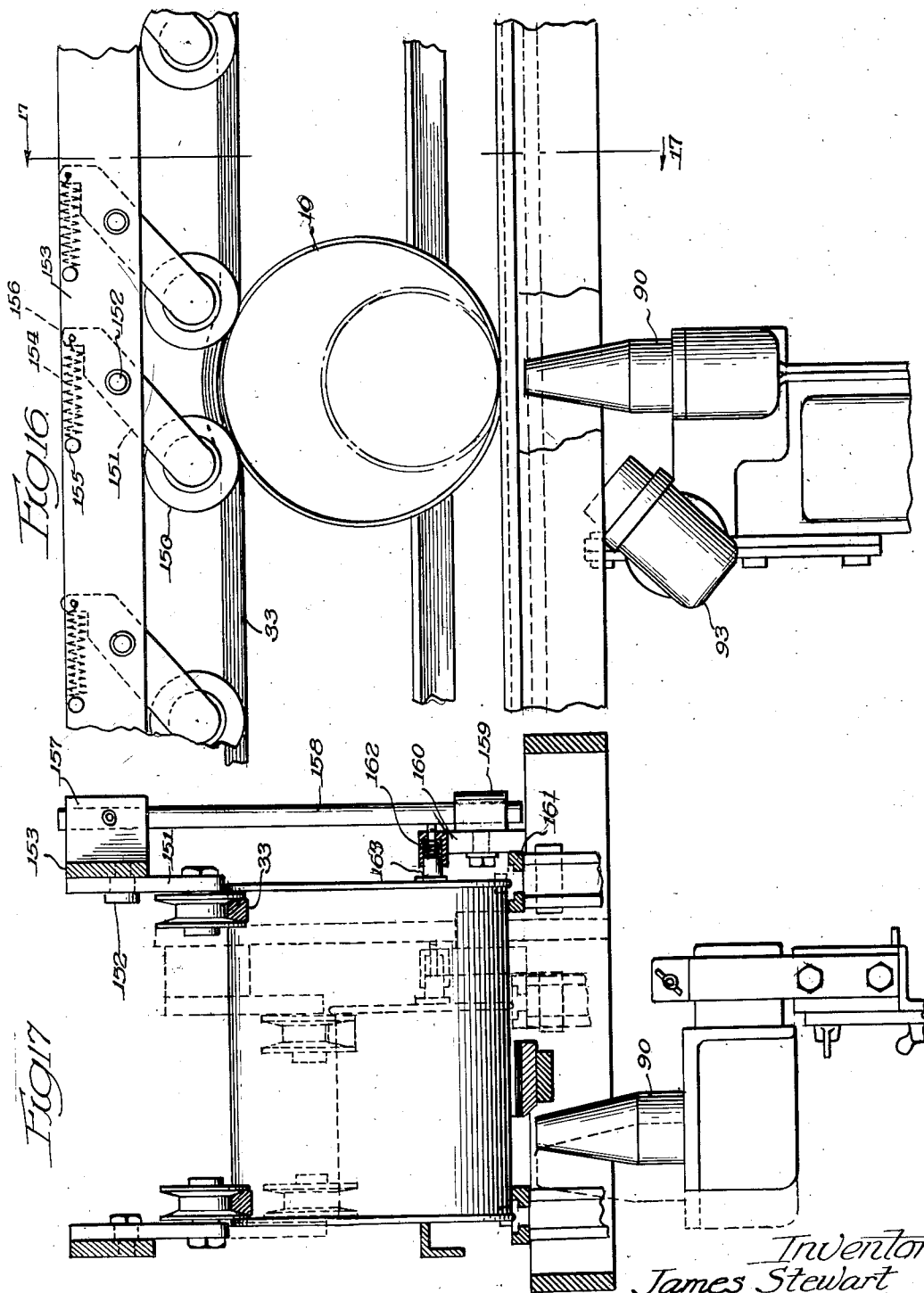
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9 Sheets-Sheet 8



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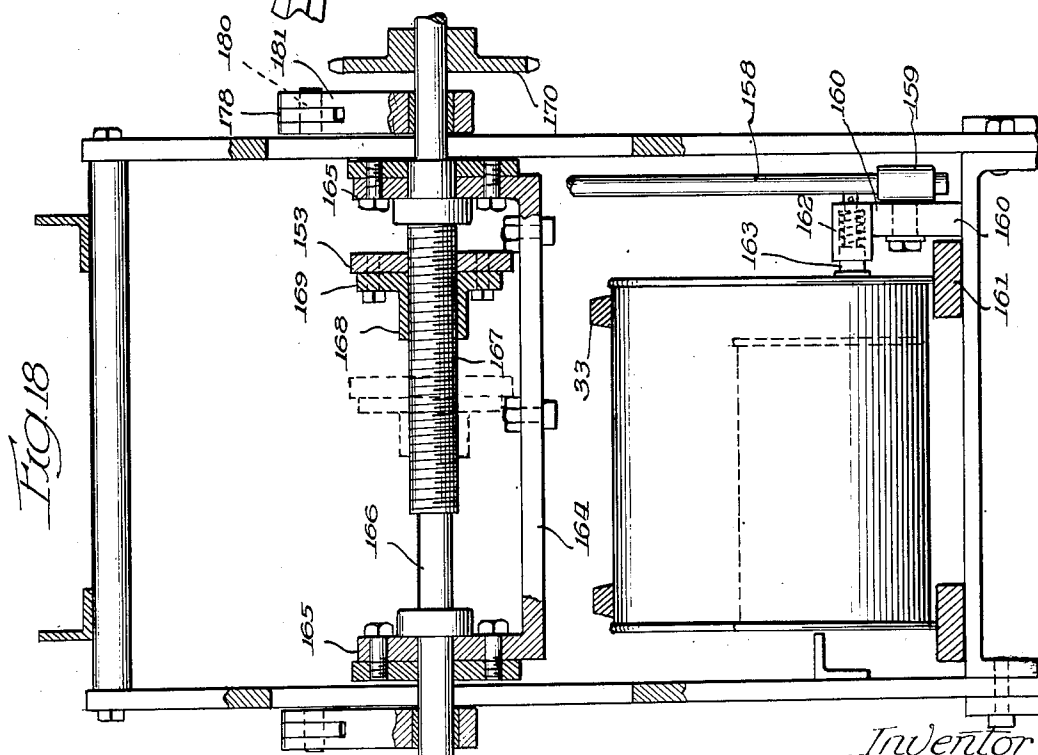
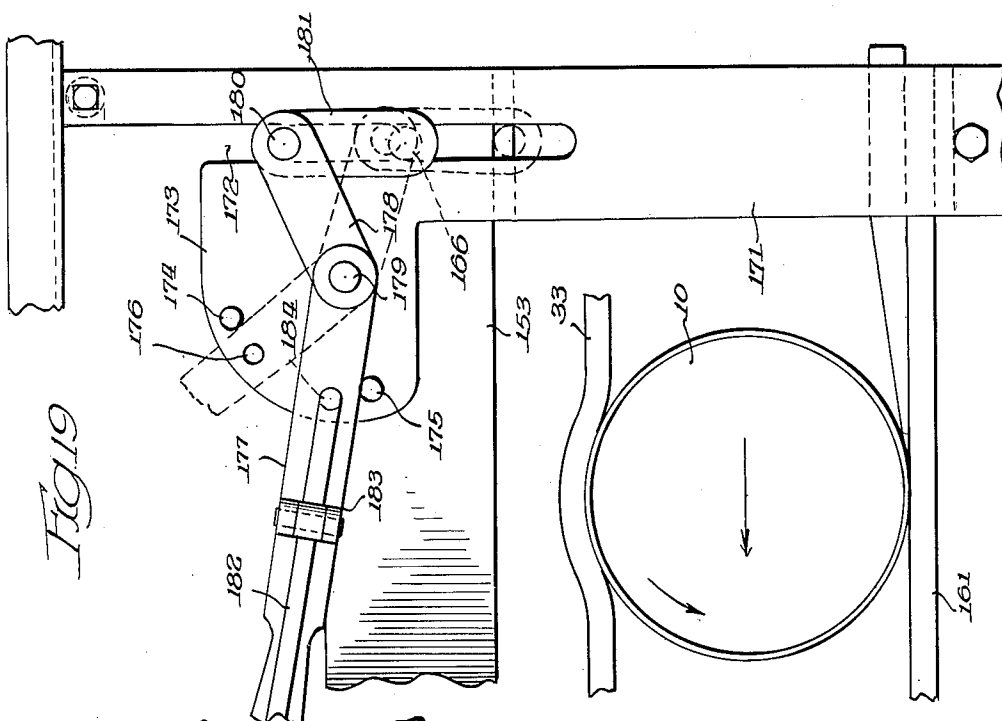
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9 Sheets-Sheet 9



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UNITED STATES PATENT OFFICE

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CONTAINER IMPRINTER

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Application April 28, 1949, Serial No. 90,112

15 Claims. (Cl. 101-40)

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This invention relates in general to the art of imprinting on containers, and more particularly to a machine and method for imprinting on containers having a generally cylindrical shape.

While the invention in its broader aspects may be utilized for imprinting any desired indicia on such containers, the present machine and method has been designed primarily for imprinting a color designation on containers carrying paints, enamels, lacquers and the like to indicate the color therein.

It has been the practice in the past in the paint industry to place around the containers, such as the gallon, half-gallon and quart sizes, a paper label which had printed thereon all of the necessary information including the color designation. When this was done, the containers were made up in the customary way and a great number of printed labels could be stored in a relatively small amount of space, and thereafter placed around the container when ready for use. A great number of labels could be made up in advance bearing all of the various color designations so that these labels would be available for use at a later date. The matter of storage for these labels presented no problem.

The advent of the lithographing method of printing labels directly on metal containers before the container was formed, thereupon presented such storage problems when the color designation of the contents was imprinted on the containers at the same time. The labels on all of the containers, regardless of the color of the paint or enamel within the container, are substantially all alike. It is necessary, however, that each container bear thereon indicia for the purpose of informing the ultimate purchaser as to the color of the paint or enamel therein. It was found that if the color designation were to be imprinted on the container at the same time the label was printed thereon, a tremendous inventory would have to be maintained because of the storage space required for the empty containers.

It was then decided that if some effective way could be arrived at for later applying the color designation, if it were omitted at the time the label was printed directly on the container, the inventory could be considerably reduced, thus obviating the necessity for a large storage space.

The problem may be better understood when it is recognized that there is customarily a predetermined location on the container at which the color designation appears. Due to the fact that the label is multicolored and carries a design as well as certain printed matter, the color des-

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ignation must be placed thereon at a location suitable therefor and which must be determined in advance.

It is, therefore, the principal object of the present invention to provide a machine for imprinting indicia on a container at a predetermined location thereon.

Another object of the invention is to provide a machine adapted to automatically print indicia on a substantially cylindrical container at a predetermined location thereon.

A further object of the invention is to provide a machine wherein a novel form of positioning means is actuated for positioning a predetermined point on the container, whereby suitable indicia may thereafter be imprinted at a predetermined location on the container.

Still another object of the invention is to provide a machine for imprinting indicia on containers wherein a positioning station and a printing station are located.

A still further object of the invention is to provide in a container imprinting machine a positioning station and a printing station together with means at the positioning station to automatically position a container with respect to the printing station, whereby the container may thereafter be conveyed to the printing station and have indicia printed on the container at a predetermined location thereon.

Still another and more specific object of the invention is to provide a container imprinting machine having a positioning station and a printing station, wherein means are provided which are actuated in response to certain means on the container to position a point on the container with respect to the printing station, whereby the container may thereafter be conveyed to the printing station and have indicia printed thereon at a predetermined location.

A further object of the invention is to provide a container imprinting machine having a positioning station and a printing station, wherein means at the positioning station will cause the container to rotate until a certain point on the container reaches a predetermined position with respect to the printing station, whereupon the container may be conveyed to the printing station and have indicia imprinted thereon at a predetermined location.

Still another object of the invention is to provide a container imprinting machine having a positioning station and a printing station therein and wherein rotary means at the positioning station will rotate the container on the spot until

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a point on the container reaches a predetermined position with respect to the printing station. After the point on the container reaches this predetermined position, suitable means are provided which are actuated in response to the point on the container which will stop rotation thereof, whereupon the container may be conveyed to the printing station and have indicia imprinted on the container at a predetermined location thereon.

A still further object of the invention is to provide a method of imprinting indicia on a substantially cylindrical container, whereby the indicia will appear at a predetermined location on the container.

Other objects and advantages of the invention will become apparent upon reading the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevational view of one form of machine for carrying out the invention;

Fig. 2 is a top plan view of the machine shown in Fig. 1 with certain of the operating parts omitted for the sake of clarity;

Fig. 3 is a horizontal sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a somewhat enlarged vertical sectional view along the line 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary side elevational view illustrating the positioning station;

Fig. 6 is a fragmentary vertical sectional view along the line 6—6 of Fig. 5;

Fig. 7 is a vertical sectional view taken along the line 7—7 of Fig. 5;

Fig. 8 is a vertical sectional view taken along the line 8—8 of Fig. 1;

Fig. 9 is a somewhat enlarged and diagrammatic illustration showing the positioning and printing stations as well as the switch means for actuating the inking rollers, together with a wiring diagram illustrating the operation of one means of positioning the container;

Fig. 10 is an elevational view of a container showing one of the means thereon which may be utilized to actuate the switch of the positioning means;

Fig. 11 diagrammatically illustrates a container and a wiring diagram for a modified form of the invention;

Fig. 12 is a top plan view of the modified form of container shown in Fig. 11;

Fig. 13 is a fragmentary plan view of a container showing a further modification;

Fig. 14 is an elevational view of a container and wiring diagram therefor illustrating a still further modified form for carrying out the invention;

Fig. 15 is a top plan view of the container shown in Fig. 14;

Fig. 16 is an enlarged fragmentary side elevational view of a modified form of machine at the positioning station;

Fig. 17 is a vertical sectional view along the line 17—17 of Fig. 16 illustrating in dotted lines the manner of adjusting the machine for different sized containers;

Fig. 18 is a vertical sectional view adjacent one end of the modified form of machine showing the means for adjusting the machine to accommodate containers of different sizes; and

Fig. 19 is a fragmentary side elevational view at one end of the modified machine illustrating the means for adjusting the machine to accommodate containers of different sizes.

In accordance with the present invention; it

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is contemplated that cylindrical containers, either filled or empty, be fed into the machine at one end thereof and then conveyed to a positioning station. Means are employed at the positioning station to rotate the container so that it will assume a position with respect to the printing station such that, when the container is released from the positioning station and rolled to the printing station, the correct location on the container will present itself to the printing mechanism, whereby the indicia will be imprinted on the container at the pre-selected location.

It is important that the printing on the container take place so that the indicia appears at the desired location thereon. In order to assure this, it is necessary to properly position the container before it reaches the printing mechanism. As the containers are fed into the machine, the relative position of the containers will vary considerably, and various means have been provided to properly position the containers for printing thereon.

Any suitable means may be provided to be actuated in response to something on the surface of the container itself to carry out the positioning step. In the preferred form of the invention illustrated herein, photosensitive means are utilized to act as the positioning means. In determining the proper position of the container, it will depend upon the circumference of the container and the distance between the positioning and printing stations. The location on the container where the printing is to take place is first determined, and then the container is positioned in such manner at the positioning station so that, when the container rolls along its circumference to the printing station, this predetermined location where the printing is to take place will properly present itself to the printing mechanism.

The term "spot rotating" will be used throughout the specification and claims herein to indicate that the container is rolled to the positioning station, at which station the container then stops its rolling action along the tracks and is rapidly rotated while in that position. This term is used to distinguish between a rolling action where the axis of the container moves, and the rotating action where the axis of the container remains stationary relative to the machine.

The photosensitive means are utilized for the purpose of stopping the spot rotation of the container when the predetermined location on the container which is to receive the printing reaches a predetermined position with respect to the printing station.

The printing mechanism utilized may consist of a miniature type of printing press having a type form therein, a pair of inking rollers and an inking disc. After each impression the rollers will roll over the inking disc to gather additional ink and apply it to the type. This operation must, of course, take place in timed relation with the movement of the containers from the positioning station to the printing station. The particular means disclosed herein for carrying out this part of the procedure includes switch means actuated by the movement of a container which has just been printed to cause the printing mechanism to ink the type before the next succeeding container reaches the printing station.

In some instances it may be desirable, though not necessary, to have a pre-positioning station to thus doubly insure the proper positioning of the container at the printing station. This pre-positioning step may be dispensed with, but is il-

illustrated herein as a part of the present invention if it is desired to use this feature.

Referring now more particularly to the drawings, and especially to Figs. 1 to 4, inclusive, the machine is composed of any suitable supporting framework which in the illustrated embodiment of the invention comprises a pair of supporting columns 1, adapted to support a lower frame consisting of the spaced side members 2 and end members 3. A small shelf 4 may be supported below this framework by means of the supporting members 5 and this shelf may be utilized for mounting some of the operating mechanism of the machine.

Above this framework there is a superstructure which supports the cylindrical containers as they are moved through the machine. A plurality of spaced supporting members 6 have the form of an inverted U with vertically extending side members 7 connected by means of a horizontally extending top member 8. The containers are caused to roll along a pair of spaced track members 9 supported by the horizontal members 8 of the supports 6. The containers are indicated by the numeral 10 and these are caused to move successively through the machine from one end thereof to the other first to a positioning station and then to a printing station where the color designation is imprinted thereon.

The containers are caused to roll on the tracks 9 and are guided at one side of the machine by a stationary guide member 11 extending substantially throughout the length of the machine. The opposite end of each container is guided in its rolling movement through the machine by the member 12 yieldably mounted in supports 13 by means of spring members 14 (Fig. 4).

Supporting members 15 are located one adjacent each end of the machine and extend across transversely of the machine supported by the side members 2. These members 15 support frame members at one end of the machine consisting of vertically extending sides 16 and 17 having a connecting horizontal cross member 18 at the bottom thereof. A similar frame at the other end of the machine includes the vertical members 19. Both frames are identical and are adapted to support at their upper ends the longitudinal channel members 22 and 23 which extend along each side of the machine and form supports for the pulleys which urge the endless conveyor belts downwardly against the containers to roll them through the machine.

There are a plurality of these pulley devices on each of the channels 22 and 23 spaced apart throughout the length thereof and the construction of all of these is the same, so that the description of one will suffice for all.

Reference is now made more particularly to Figs. 4, 5 and 6 where the pulley construction is illustrated and it may be pointed out that the pulleys are mounted yieldably so that they will normally urge the conveyor belts downwardly against the containers, but may be permitted to move upwardly a slight distance if necessary. Any suitable yieldable mounting for the pulley mechanisms may be used. The one shown herein consists of a plate member 24 secured to the outer flat surface of the supporting channel. The bottom of the plate 24 is provided with a guide portion 25 consisting of vertically extending spaced apart sides 26. The pulleys 27 are mounted for rotation on a shaft 28, the ends of which are journaled in bearing blocks 29 located within the sides 26 of the guide portions 25. Each bear-

ing block 29 is thus capable of movement vertically between the sides 26. Each bearing block 29 has a vertically extending pin 30 passing through an opening in the member 31 mounted on the inner side of the channel member. A coiled compression spring 32 surrounds the pin 30 so that the spring will bear upwardly at one end against the member 31 and downwardly at its other end against the bearing block 29. The lower run of each of the endless conveyor belts 33 is received by the pulleys 27 on each side of the machine. These lower runs of the conveyor belts serve to support the pulleys 27 while at the same time the springs 32 are urging the pulleys downwardly against the belt.

There are two of these conveyor belts 33, one at each side of the machine, each of which is adapted to bear downwardly against a container 10 causing the container to roll through the machine. The conveyor belts 33 are each driven by pulleys 34 and 35 at opposite ends of the machine. Any suitable mechanism may be used for tensioning the belts 33 and one form of such tensioning means is illustrated in Fig. 1 wherein a pulley 36 is rotatably mounted on the end of an arm 37, which arm in turn is pivotally mounted at its opposite end to a support 38. Intermediate the ends of the arm 37 there is a pin 39 received by a slot 40 in another arm 41 extending at an angle with respect to the arm 37. The arm 41 is pivotally mounted at one end thereof as at 42 to a channel member 22. The pin 39 may take the form of a threaded member which may be tightened to hold the two arms 37 and 41 in any position to which adjusted, thereby urging the pulley 36 upwardly against the upper run of the belt 33 for tensioning purposes. One of these tensioning devices is located at each side of the machine, one for each belt.

A drive shaft 43 extends between the channel members 22 and 23 at one end of the machine on which the pulleys 35 are mounted. A sprocket 44 is also mounted on one end of the shaft 43 around which a sprocket chain 45 passes in driving engagement therewith. The chain 45 is also in engagement with another sprocket wheel 46 adjacent the bottom of the machine, which wheel is mounted on a shaft 47 (Figs. 1 and 8). The shaft 47 has mounted thereon a gear 48 in engagement with a pinion 49 mounted on the motor shaft 50 connected with the motor 51. Operation of the motor will thereby cause movement of the conveyor belts 33 through the gears 49 and 48 and the sprocket drive just described.

The other pulleys 34 are mounted at the opposite end of the machine on a shaft 52 also extending between the ends of the channel members 22 and 23 (Figs. 1, 2 and 3). A bevel gear 53 is mounted at one end of the shaft 52 and is in engagement with a bevel gear 54 mounted on the vertical shaft 55. This vertical shaft extends downwardly and has mounted thereon adjacent its lower end a bevel gear 56 in engagement with a bevel gear 57 mounted on the horizontal shaft 58 journaled in bearings 59 extending outwardly from the framework at one end of the machine.

While the containers may be fed into the machine by hand, if so desired, it is more practical from a commercial standpoint to have conveyor means for continuously feeding the containers. Any suitable conveyor means for this purpose may be used, and in the present form of the machine it consists of spaced sprocket wheels 60 also mounted on the horizontal shaft 58, each of which has a sprocket chain 61 passing there-

around suitably mounted at their other ends on similar sprockets (not shown). Feeding members in the form of cross members 62 are suitably spaced throughout the length of the sprocket chains 61 and serve to feed the containers successively into the machine. Fig. 1 illustrates the operation of this mechanism wherein it will be seen that as a container 10 is moved toward the machine by the sprocket chains 61, they are picked up by the lower runs of the conveyor belts 33 which are urged downwardly against the containers and cause them to roll along the tracks 9. Spaced guide members 63 mounted adjacent the chains 61 on the supports 64 serve to keep the containers in line and prevent any side movement thereof as they are being fed into the machine. Suitable members 65 are located on each side of the chains 61 on which the supporting members 64 are mounted.

In some instances, it may be desirable, though not necessary, to have a pre-positioning station, as an assurance that the container will arrive at the positioning station in proper position. This is more apt to be true in the case of gallon containers than where a smaller container is used. Gallon containers customarily have a handle thereon to facilitate carrying, which handle is supported at each end by outwardly extending lugs on the container. This feature is utilized in the pre-positioning mechanism illustrated in Figs. 1 and 5. A bracket 66 is located at each side of the machine and extends downwardly from the lower sides of each track 9. A ratchet wheel 67 is mounted on each of the brackets 66 on a stub shaft 68. An opening in the adjacent track 9 permits a portion of the ratchet wheel 67 to extend upwardly there-through for engagement with the container as it is being rolled along the track 9 by means of the lower run of the conveyor belts 33. A suitable pawl 69 may engage the ratchet wheel at the lower side thereof and a similar spring arm or pawl 70 may engage the ratchet wheel at its upper side to prevent any rotation of the ratchet wheel in the wrong direction.

As a container 10 is being rolled into the machine, it is rotated in a counterclockwise direction. It continues to move until it engages the ratchet wheels 67 whereupon the container is held in this position, but continues to rotate in what may be termed "spot rotation." The rotation of the container will cause a rotation of the ratchet wheels 67, the function of which is to hold the container from continued movement through the machine although permitting it to continue to rotate. The spot rotation of the container will continue until one of the lugs 71 on the container strikes an arm 72 which thereupon causes the container 10 to be rolled free of the ratchet wheels 67 for continued rolling movement to the next positioning station. The location of the ratchet wheels 67 with respect to the next positioning station and to the printing station will be dependent upon the size of the container and the location thereon at which the indicia is to be printed. The location of these wheels is such that continued rolling of the container will properly position the location on the container where the printing is to take place.

This pre-positioning station may be dispensed with if desired and use may be made only of the positioning station now about to be described.

Reference is now made to Figs. 1, 5 and 7 where it will be seen that brackets 73 extend downwardly from each of the tracks 9 and rotatably support

ratchet wheels 74 on the pins or shafts 75. Each bracket 73 has a recess therein formed between the sides thereof to receive the ratchet wheels 74. The upper part of each ratchet wheel 74 extends upwardly through an opening 76 in each of the track members 9 so that a container 10 rolling through the machine may contact the ratchet wheels, whereupon it will be held against further rolling movement along the tracks but may continue to rotate "on the spot" as previously described.

A pawl 77 engages the bottom part of each ratchet wheel 74 and a spring arm or pawl 78 likewise engages the upper part of each wheel to prevent rotation thereof in one direction, and to permit rotation thereof in a clockwise direction, which rotation is caused by engagement with the rotating container.

When the container 10 reaches a predetermined position in its spot rotation at the positioning station, it is then caused to roll off of the ratchet wheels 74 and to continue to roll to the printing station. It was noted that in the pre-positioning of the container, it was caused to move out of engagement with the ratchet wheels by a lug on the container. More accurate means however have been devised for causing disengagement of the container and ratchet wheels at the positioning station, whereby the container is caused to roll on to the printing station. In the present instance suitable fluid control means have been devised consisting of an air cylinder 79 having a plunger or piston rod 80 extending through the top thereof which is actuated by air pressure on either side of the piston within the cylinder. The construction of this mechanism, while shown in Fig. 1, is also illustrated more clearly in Figs. 5 and 8. The upper end of the piston rod 80 is pivotally connected as at 81 to a horizontal arm 82. This arm extends below the container and between the tracks 9. The opposite end of the arm 82 is pivoted as at 83 to a support 84 on one of the cross members 8. Movement upwardly of the piston rod 80 will thereupon elevate the container 10 to disengage it from the ratchet wheels 74 and thereby permit the container to continue to roll toward the printing station. Suitable air inlets 85 and 86 are provided, one of which directs air into the bottom of the cylinder 79 and the other of which directs air into the top of the cylinder 79. The cylinder 79 is suitably mounted at its lower end by means of a bracket 87 mounted for pivotal or rotative movement about a pivot pin 88 secured between the sides of a bracket member 89. In actual operation of the machine the positioning station is located a predetermined distance from the printing station depending upon the size of the container. When the point on the container on which the printing is to take place reaches a predetermined position with respect to the printing station, then suitable electrical means may be provided to actuate the air control and direct air into the bottom of cylinder 79, thereupon causing the arm 82 to be elevated and disengage the container from the ratchet wheels 74. The conveyor belts 33 are moving continually so that as soon as disengagement is effected, the belts will cause the containers to roll on to the printing station.

Various mechanisms may be utilized for causing actuation of the arm 82, but it has been found that electrical means to accomplish this purpose has been most satisfactory. The preferred form of the invention utilizes photosensitive means in the form of a photoelectric cell and a light

source. The photoelectric cell is indicated by the numeral 90 in Figs. 1, 5 and 7 and is suitably mounted on a bracket 91 secured to a vertical support 92 mounted on the shelf 4. The light source is indicated at 93 and is caused to direct a beam of light against the container, which light is reflected and received by the cell 90.

The photosensitive means may be caused to be actuated by any suitable situation which may include an interruption of the light beam or a difference in the reflectivity thereof. In actual practice the reflectivity has been used successfully because the label on the container has been found suitable for this purpose. Referring now to Figs. 9 and 10, the label on the container extends substantially around the container except for a short distance where the seam of the container appears. The actual label on the container may be of any suitable color having a border therearound of a different color. Actually if the label is printed primarily with yellow, then there may be a border line of blue. Such blue lines extending vertically of the container are indicated by the numeral 94 in Figs. 9 and 10.

It is known that yellow reflects a greater amount of light than blue. Therefore the positioning station is located with respect to the printing station so that the location on the container where the printing is to be done will be properly positioned when the blue line on the label of the container reaches the position where the light source will strike it and thus decrease the reflectivity received by the photoelectric cell. This decrease in reflectivity causes the photoelectric cell to energize an electric circuit which actuates a relay or solenoid to cause the operation of a suitable valve and direct air through the air passage 35 into the bottom of the cylinder 79. At this point actuation of the piston rod 80 will elevate the arm 32 and disengage the container from the ratchet wheels 74.

Any suitable and well known relay mechanism may be utilized in connection with the photosensitive means. Such mechanism is indicated by the numeral 95, the details of which have been omitted because such a relay mechanism is commercially available and may be of the character usually employed with photoelectric cells. The cell 90 may be connected to one side of the relay mechanism 95 by the lines 96 and 97. Power lines 98 and 99 are connected at the opposite side of the relay mechanism from any suitable source of power. The mechanism is such that when the photoelectric cell is activated, it will close a switch across the lines 98 and 99 through the coil or solenoid 100. Energization of the solenoid 100 will actuate an air valve of any commercial and well known type (not shown) to cut off the air from the passage 86 and direct air into the passage 85 for elevating the piston rod 80 and arm 32 to disengage the container from the ratchet wheels 74.

The photoelectric cell may be activated either on light increase or light decrease. It is not desirable to activate the cell on light increase in this particular instance because any increase in light would thereupon actuate the machine even if there were no containers passing through. To further insure the proper positioning of the container when the cell is activated by light decrease, an additional switch 101 may be inserted in one of the lines such as the line 97, if desired, having a switch arm 101a thereon. It is important that some rotation of the container take place at the positioning station regardless of how little. The

switch 101 is placed at a proper location to prevent a container from moving into the positioning station and being immediately disengaged from the ratchet wheels without any rotation whatsoever. The photoelectric cell is connected to ground so that it will energize the electrical circuit only when the circuit to ground is broken. This is the purpose of the normally closed switch 101 which is opened by the container at the moment the container begins to rotate at the positioning station. Thus, if one of the blue lines 94 happens to be directly in line with the eye of the photoelectric cell at the moment the container moves into position, it will move past that line to the next blue line before the circuit to the relay will become energized.

It will be obvious that the particular colors such as yellow and blue mentioned herein are not to be construed as limiting in any way. Any interruption of the light beam or any increase or decrease in the reflectivity thereof sufficient to cause the photoelectric cell to energize the electrical circuit to the solenoid 100 will be sufficient for the proper functioning of the device.

After the container has been properly positioned at the positioning station and is released or disengaged from the ratchet wheels 74, the container then continues to be rolled along the tracks 9 by the conveyor belts to the printing station where a printing mechanism 102 is located (Figs. 1, 3 and 4). This printing mechanism is preferably in the form of a miniature platen printing press consisting of a horizontally positioned type bed 103 having suitable type 104 thereon. An inking disc 105 receives the ink which is distributed over the type 104 by means of the rollers 106 mounted on the ends of arms 107. The arms 107 are pivotally mounted on a pin 108 located in a bearing member 109. An arm 110 is also secured to the pivot pin 108 and is pivotally mounted to a bracket 110a secured to the air cylinder. The bearing 109 is mounted on a plate 111 which is, in turn, mounted on a sliding bearing 112 adapted to slide longitudinally along the vertical rod 113.

The printing mechanism is actuated pneumatically by admitting air to the air cylinder 114. This cylinder has the usual piston therein and a piston rod 115 extending through the upper end thereof, which piston rod is secured to the pivot pin 108, or may be fastened directly to the plate 111. The lower end of the cylinder 114 is pivotally mounted as at 116 on a support 117. Air is admitted into the top of the cylinder by means of the air passage 118 and into the bottom of the cylinder by the air passage 119.

Suitable mechanism is provided to actuate the piston rod 115 in timed relation with movement of the containers through the machine for the purpose of inking the type between each printing operation so that the type will be freshly inked and will present itself to each succeeding container as it is rolled to the printing station from the positioning station. In operation, air is admitted to the top of the cylinder through the passageway 118 to cause the piston rod 115 to be moved downwardly from its normal position shown in Fig. 4. This movement of the piston rod will carry with it the entire printing mechanism including the pivot pin 108, bearing 109, plate 111, and bearing 112, as well as the printing disc 105 and type bed 103 with the type 104 thereon. When this occurs and the pivot pin 108 is lowered, the end of the arm 110 mounted on the pivot pin 108 will also move downwardly, but since the outer end thereof is pivoted to the

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bracket 110a, this outer end will remain in the same position. This will therefore cause the pivot pin 108 to rotate in a counterclockwise direction as viewed in Fig. 4 as it is moved downwardly. This rotation of the pivot pin to which the arms 107 and inking rollers 106 are connected will cause the rollers 106 to move over the inking disc 105 and onto the type 104. This action takes place relatively fast and occurs after each printing operation to permit the type to be freshly inked before each impression.

The actuation of the piston rod 115 is caused by movement of a container which has just received an impression. This mechanism is illustrated in Figs. 1 and 9. An air valve 120 is suitably mounted on a bracket 121 secured to a cross member 122 between the tracks 9 and located therebelow. An air supply conduit or passageway 123, and air exhaust 123a, as well as the air conduits 118 and 119 are connected to the valve 120 which has a suitable valve mechanism therein (not shown). The valve may be operated by any suitable and well known means (either electrical or pneumatic). In the illustrated form the operation is pneumatic and consists of a plunger 124 adapted to be actuated by an arm 125 pivotally mounted at 126 to a bracket 127 mounted on the cross member 122. The arm 125 is positioned between the tracks 9 and the upper surface thereof is located a sufficient distance above the tracks to be contacted by a rolling container and to be depressed thereby and to actuate the member 124. The rolling of the container over the arm 125 will depress the plunger 124 to open the port to the conduit 118 and direct air through the conduit 118 to the top of the cylinder 114 and actuate the printing mechanism. As soon as the container has moved off of the arm 125, the arm will return to its normal position to actuate the valve and direct air through the conduit 119 to the bottom of the cylinder 114 thus holding and maintaining the type in its printing position.

From the foregoing description it will be evident that a novel and improved form of machine for imprinting indicia such as color designations on cylindrical containers has been provided. The operation of the machine may be briefly summarized as follows:

The containers may be either filled or empty, and if the container has paint therein which is white, then the printing mechanism will be set up so that the word "White" appears on the type bed. The containers are then placed in the feeding conveyor where they are fed one at a time into the machine. As stated before, the machine may or may not have the pre-positioning station, and it may preferably be dispensed with if the container does not have thereon a lug for supporting handles. In the case of gallon cans, the pre-positioning station may be used in the manner above described to prevent the indexing means on the container from actuating the relay immediately upon the container entering the positioning station thereby increasing the accuracy of the location of the imprint.

The container then moves to the positioning station by rolling the container along the tracks 9, which rolling is caused by the contact of the lower runs of the conveyor belts 33 on the container. When the container reaches the ratchet wheels 74, it will be held against rolling movement along the tracks, but will be rotated "on the spot" until a predetermined point on the container, such as the blue line border around the label, is caught by the light beam. The decrease

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in reflectivity causes the photosensitive means to energize an electrical circuit for actuation of the pneumatic system which thereupon causes the arm 82 to elevate the container and disengage it from the ratchet wheels 74 for continued rolling movement to the printing station. At the printing station the type with the proper color designation thereon will present itself to the container which continues to roll over the type and have the color designation imprinted thereon at the position on the container which has been predetermined and positioned by the positioning mechanism. After the impression, the container continues to roll out of the machine, but in this rolling movement it will roll over the arm 125 which actuates the pneumatic system for causing the inking rollers to distribute a fresh supply of ink over the type in readiness for the next succeeding container. The container with the printing thereon thereafter moves out of the machine where it may be packed for shipment. The machine has proved to be speedy and very satisfactory in actual practice and has been run at speeds sufficient to print 60 containers per minute.

Figs. 11 to 14, inclusive, illustrate modified forms of electrical devices which may be used at the positioning station for energizing an electrical circuit to actuate the pneumatic system and disengage the container from the ratchet wheels. The electrical system may be the same in all cases, but the means for energizing the circuit may be specifically different. For example, in Fig. 11 there is shown a container 10a having a dimple or slight indentation 130 therein at a predetermined location thereon. In this case the photosensitive means may be dispensed with and in the place thereof a micro switch 131 may be utilized having a switch arm therein which will energize the electrical circuit when closed.

An arm 132 may be connected to the blade of the switch 131 and have a roller 133 supported at its outer end adapted to bear against the surface of the container 10a as it rotates. When the depression or dimple 130 contacts the roller 133, it will allow the arm 132 to move in a direction to close the switch and energize the circuit. The electrical circuits are similar in all respects. In this case the power lines 134 and 135 are connected to the relay mechanism 136 which has therein a solenoid 137 adapted to actuate and close a switch 138 when energized. There are two circuits connected in parallel so that when the micro switch 131 is closed, the circuit will be completed through the solenoid 137 to close the switch 138. Thereupon the circuit will be completed from the power source through the solenoid 139 which performs the same function as the solenoid 100 shown in Fig. 9. The function of this solenoid 139 is to actuate an air valve to direct air into the bottom of cylinder 79 to free the container from the ratchet wheels at the moment the container is positioned properly for printing.

This same mechanism may be used in reverse. That is to say, instead of a dimple 130 in the container, it may have a different type of deformation such as a protuberance 130a. In this case the roller 133 bearing against the container will be moved in the opposite direction to close the switch and energize the electrical circuit which actuates the pneumatic system for releasing the container from the ratchet wheels.

Figs. 14 and 15 illustrate a still further modification where one end of the container 10b is grounded and a metal roller is caused to strike

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a bare spot on the container for completing a circuit, thus actuating the pneumatic system. The bare point on the metal container may be the bare soldered seam 140. The roller 141 is suitably mounted to bear against the container as it rotates so that when the roller contacts the bare soldered seam the circuit will be completed through the ground at the opposite end of the container.

The roller 141 is connected by the line 142 to the relay mechanism 143 having the solenoid 144 therein. The power lines 145 and 146 are also connected into the relay mechanism 143. One side of the line 145 may be connected to the solenoid 144 and the other side of the line 146 may be connected to ground. When the roller 141 contacts a bare part of the container 100, the circuit will be completed through the solenoid 144 to actuate the switch 147, whereupon the circuit will be completed from the power lines through the solenoid 148. This solenoid 148 performs the same function of actuating an air valve to cause operation of the piston 80 and arm 82 to disengage the container from the ratchet wheels at the proper time.

These various illustrations merely show the different ways in which electrical circuits may be employed to position properly a container at the positioning station for imprinting indicia thereon at the printing station in a predetermined location on the container.

Another feature of the machine resides in the provision of means for adjusting the machine to accommodate containers of different sizes. This involves movement downwardly and inwardly of a part of the machine because containers such as pints and quarts are smaller than gallon containers both with respect to circumference and length. Figs. 16 to 19, inclusive, illustrate a preferred form of mechanism for making such an adjustment possible.

The embodiment of the invention illustrated in Figs. 16 and 17 shows a slightly different form of mounting for the pulleys, although the resultant effect thereof will be substantially the same. In this case the pulleys are identified by the numeral 150 and are mounted for rotation on the lower end of an arm 151 pivotally mounted as at 152 to a horizontal bar 153 extending longitudinally of the machine at each side thereof. A coiled tension spring 154 is secured at one end to a pin 155 on the bar 153 and at its other end to a pin 156 on the upper end of the arm 151. Viewing the pulley mountings in Fig. 16, each of the springs 154 will tend to rotate the arm 151 associated therewith in a counterclockwise direction thereby urging the pulleys 150 downwardly against the lower run of the conveyor belt 33. This forms the necessary structure for rolling the containers through the machine.

The manner in which the structure at one side of the machine is mounted for adjustment may be seen in Fig. 17 where it will be noted that the bar 153 has a member 157 extending outwardly therefrom and receives a vertical rod 158. This vertical rod 158 is mounted for sliding movement in a bearing member 159 adjacent the lower end of the rod, which bearing is secured to a supporting member 160 affixed to the outer side of one of the tracks 161. A horizontally positioned tubular supporting member 162 is mounted on the upper side of the member 160 and provides a supporting means for yieldably urging the guide member 163 against one end of the container as it is caused to roll through the machine. This

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entire mechanism is caused to move inwardly to the position illustrated in dotted lines in Fig. 17 when the machine is being adjusted for imprinting on a smaller container.

The adjusting mechanism for causing this horizontal movement is illustrated in Fig. 18 and comprises a U-shaped frame member 164 at each end of the machine having upwardly extending end members 165 at each end thereof. A horizontal shaft 166 having a threaded portion 167 thereon extends between the sides of the machine and through the ends 165 of the frame member to support the frame and permit a vertical movement thereof in a manner which will be presently described.

The horizontal bar 153 at one side of the machine on which the pulleys 150 are mounted is attached at each end thereof to an internally threaded bearing member 168 by means of suitable bolts passing through a flange 169 thereon. One end of the shaft 166 may have a sprocket wheel 170 affixed thereto to accommodate a sprocket chain which passes around a similar wheel on the shaft at the opposite end of the machine. Any suitable means such as a crank (not shown) may be applied to one end of either shaft 166 so that when the crank is rotated to rotate the shaft 166 to which it is connected, the sprocket and chain arrangement will cause a similar rotation of both shafts 166 to move the bar 153 and all of its connected mechanism inwardly or outwardly to accommodate containers of different sizes.

Fig. 19 illustrates a preferred form of adjusting mechanism which may be utilized to raise and lower the bar 153 and its connected parts as shown in Figs. 16 and 17. Four upright members 171 are affixed to the machine, one at each corner thereof. The two vertical members at one end of the machine cooperate to guide the raising and lowering of one end of the movable frame, and the two corresponding vertical members at the opposite end of the machine act in the same manner. Only one such adjusting device is illustrated in Fig. 19, but since they are all identical, a description of one will suffice for all.

The vertical member 171 has a vertical slot 172 therein and an outwardly extending plate portion 173. This plate 173 is provided with an upper stop 174 and a lower stop 175. There is a hole adjacent each of the stops 174 and 175 adapted to receive a pin on a lever arm for holding the frame in any position to which it may be adjusted. The lower hole is not visible in Fig. 19, but the upper hole is indicated by the numeral 176.

The lever arm includes a handle portion 177 and an integral link portion 178 extending angularly therefrom. The lever is pivoted as at 179 to the plate 173 at the juncture of the two portions 177 and 178. The outer end of the portion 178 has a pivot pin 180 thereon and is adapted to be received by and pivotally connected to the upper end of a link 181. The lower end of link 181 is mounted on the shaft 166 and supports the shaft so that it may be moved in a vertical plane longitudinally of the slot 172.

The handle portion 177 of the lever may have an arm 182 pivotally mounted thereon as at 183 intermediate its ends. One end of arm 182 has a pin 184 thereon adapted to pass through an opening in the handle portion 177 and to be received by one of the holes in the plate 173. Any suitable spring means (not shown) may be

supplied to normally urge the pin 184 into engagement with one of the holes.

The frame is in its elevated position as shown in Fig. 19. When it becomes necessary to lower the frame to accommodate smaller containers, the handle portion 177 at each side of the machine at one end thereof may be manipulated to free the pin 184 from its associated hole and then moved upwardly so that the pin 184 will be received by the upper hole 176. In this position the lever will come against the stop 174. This movement of the lever will cause the link 181 and the shaft 166 supported thereby to be moved downwardly and the parts will assume substantially the position illustrated in dotted lines in Fig. 19. The same procedure may then be carried out at the opposite end of the machine, after which the two shafts 166 may be rotated to move the pulley devices and the guide structure inwardly a sufficient distance to accommodate the smaller size container.

There may be other specific devices which may be used to carry out the adjustment feature of the machine, but the one illustrated herein and just described has been found in practice to operate satisfactorily and may be the preferred structure.

From the foregoing description it will be evident that a novel machine has been devised for imprinting indicia on a container at a predetermined location thereon. The machine is capable of accommodating containers of various sizes by suitable adjusting mechanism. The machine is entirely automatic in its operation after a container has once entered the machine. The container may be any suitable shape which is capable of being rolled on tracks through the machine. Since the printing is to be done and must be done at a predetermined location on the container, it is necessary that the container be positioned properly before it reaches the printing station. To do this, the container is caused to rotate "on the spot" until the predetermined location on the container has reached a predetermined position with respect to the printing station, at which time the container is permitted to continue its rolling movement toward and past the printing station to receive the printing thereon. The pre-positioning station does not have to be located on the machine, but could be placed at a suitable location on the incoming conveyor if desired.

Novel electrical means have been provided to automatically position the container in its proper relationship with the printing station. Novel means have also been provided, actuated by the container itself as it reaches the end of the machine, to automatically, and in timed relation with the next succeeding container, cause the inking mechanism to ink the type between each impression.

Changes may be made in the form, construction and arrangement of parts from that disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, continuously moving conveyor means at said positioning station for moving a container to a predetermined position relative to said printing station and for rolling the container after

proper positioning from said positioning station to said printing station, and means at said printing station to imprint indicia at a predetermined location on the container determined by the position thereof at the positioning station.

2. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means at said positioning station for rotating a container until a predetermined point thereon reaches a predetermined position relative to said printing station, continuously moving conveyor means for rolling the container after proper positioning from said positioning station to said printing station, and means at said printing station to imprint indicia at a predetermined location on the container determined by the position thereof at the positioning station.

3. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, continuously moving conveyor means for moving a container from said positioning station to said printing station, means at said positioning station for rendering said conveyor means inoperative for moving the container through the machine, but permitting spot rotation of the container to a predetermined position relative to said printing station, means for again rendering said conveyor means operative on the container after proper positioning thereof, thereby to move the container to said printing station, and means at said printing station to imprint indicia at a location on the container determined by the position thereof at said positioning station.

4. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means for feeding containers to said positioning station, continuously moving conveyor means and roller means at said positioning station to rotate each container individually as it is fed thereto until a predetermined point on the container reaches a predetermined position relative to said printing station, said conveyor means being adapted to roll the container after proper positioning from said positioning station to and past said printing station, and means operative to imprint on the container as it is being rolled past said printing station.

5. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means including a conveyor and roller means for spot rotating a container at said positioning station, means operable in response to indexing means on the container for rendering said spot rotating means inoperative when said indexing means reaches a predetermined position relative to said printing station, means at said printing station to imprint indicia on the container, means for rendering said roller means inoperative whereby said conveyor will move the container from said positioning station to said printing station to imprint indicia thereon at a location determined by the positioning of the indexing means.

6. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means including a conveyor and roller means for spot rotating a container at said positioning station, electrical means operable in response to the position of indexing means on the container for rendering said roller means inop-

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erative when said indexing means reaches a predetermined position relative to said printing station, and means at said printing station to imprint indicia on the container, and said conveyor being adapted to move the container from said positioning station to said printing station to imprint thereon at a location determined by the positioning of said indexing means when said roller means become inoperative.

7. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means including a conveyor and roller means for spot rotating a container at said positioning station, an electrical circuit operable when energized to render said roller means inoperative, means operable in response to the position of indexing means on the container for energizing said circuit to render said roller means inoperative when said indexing means reaches a predetermined position relative to said printing station, and means at said printing station to imprint indicia on the container, said conveyor being adapted to move the container from said positioning station to said printing station to imprint thereon at a location determined by the positioning of said indexing means when said roller means become inoperative.

8. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means including a conveyor and roller means for spot rotating a container at said positioning station, an electric circuit operable when energized to render said roller means inoperative, photosensitive means adapted to be activated by the positioning of indexing means on the container, switch means operable in response to the activation of said photosensitive means to energize said circuit, means actuated by the energization of said circuit to disengage the container from said roller means, and means at said printing station to imprint indicia on the container, said conveyor being adapted to move the container from said positioning station to said printing station to imprint thereon at a location determined by the positioning of said indexing means when said roller means become inoperative.

9. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, supporting means to support the container as it is moved through the machine, continuously moving conveyor means adapted to contact the container for rolling the container along said supporting means, stop means at said positioning station preventing the container from rolling along said supporting means but permitting continued rotation of the container, means operable in response to the position of indexing means on the container relative to said printing station to render said stop means inoperative, thereby permitting said conveyor means to convey the container to said printing station, and printing means at said printing station adapted to imprint indicia on the container at said predetermined location thereon.

10. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, supporting means to support the container as it is moved through the machine, continuously moving conveyor means adapted to contact the container for rolling the container along said supporting means, stop means at said

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positioning station preventing the container from rolling along said supporting means, but permitting continued rotation of the container, photosensitive means adapted to be activated by the positioning of indexing means on the container, means operable in response to the activation of said photosensitive means to render said stop means inoperative, thereby permitting said conveyor means to convey the container to said printing station, and printing means at said printing station adapted to imprint indicia on the container at said predetermined location thereon.

11. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, supporting means to support the container as it is moved through the machine, continuously moving conveyor means adapted to contact the container for rolling the container along said supporting means, ratchet wheels rotatably mounted below said supporting means and extending thereabove adapted to be contacted by the container thereby preventing the container from rolling along said supporting means but permitting continued rotation of the container, means operable in response to the position of indexing means on the container relative to said printing station to disengage the container from said ratchet wheels, thereby permitting said conveyor means to convey the container to said printing station, and printing means at said printing station adapted to imprint indicia on the container at said predetermined location thereon.

12. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means at said positioning station including a conveyor and roller means for spot rotating a container, an electric circuit operable when energized to render said roller means inoperative, switch means operable in response to contact with a deformation in the surface of the container to energize said electric circuit, means actuated by the energization of said circuit to disengage the container from said roller means, means at said printing station to imprint indicia on the container, said conveyor being adapted to move the container from said positioning station to said printing station to imprint indicia thereon at a location determined by the positioning of said deformation when said roller means become inoperative.

13. A machine for imprinting indicia at a predetermined location on a cylindrical metallic container having a bare area thereon in a predetermined location, including a positioning station and a printing station, spot rotating means including a continuously moving conveyor and stop means at said positioning station for spot rotating the container, an electric circuit operable when energized to render said spot rotating means inoperative, means in said circuit grounding the container at the positioning station, a contact member also in said circuit and adapted to energize the circuit when in contact with the bare area on the container, whereby said spot rotating means becomes inoperative when the predetermined location for imprinting on the container reaches a predetermined position relative to the printing station, means at said printing station to imprint indicia on the container, said continuously moving conveyor being adapted to convey the container from the positioning

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station to the printing station when said spot rotating means becomes inoperative.

14. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means at said positioning station including a continuously moving conveyor and cooperating stop means for rotating a container to a predetermined position relative to said printing station movable toward and away from the container, means at said printing station to print indicia at a predetermined location on the container determined by the position thereof at the positioning station, means for inking said printing means at predetermined intervals while it is in a position away from the container, said continuously moving conveyor being adapted to move the container after proper positioning from said positioning station to said printing station, and means for moving said printing means from non-printing position away from the container to printing position toward the container so as to reach printing position when the container reaches the printing station.

15. A machine for imprinting indicia at a predetermined location on a cylindrical container, including a positioning station and a printing station, means at said positioning station in-

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cluding a continuously moving conveyor and cooperating stop means for rotating a container to a predetermined position relative to said printing station, means at said printing station to print indicia at a predetermined location on the container determined by the position thereof at the positioning station, means for inking said printing means after each printing operation, said conveyor being adapted to roll the container after proper positioning from said positioning station to and past said printing station, and means operable in response to movement of the container after passing the printing station to actuate said inking means.

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