

July 8, 1930.

F. EBERHART

1,770,029

PRINTING MACHINE

Filed Jan. 30, 1926

5 Sheets-Sheet 1

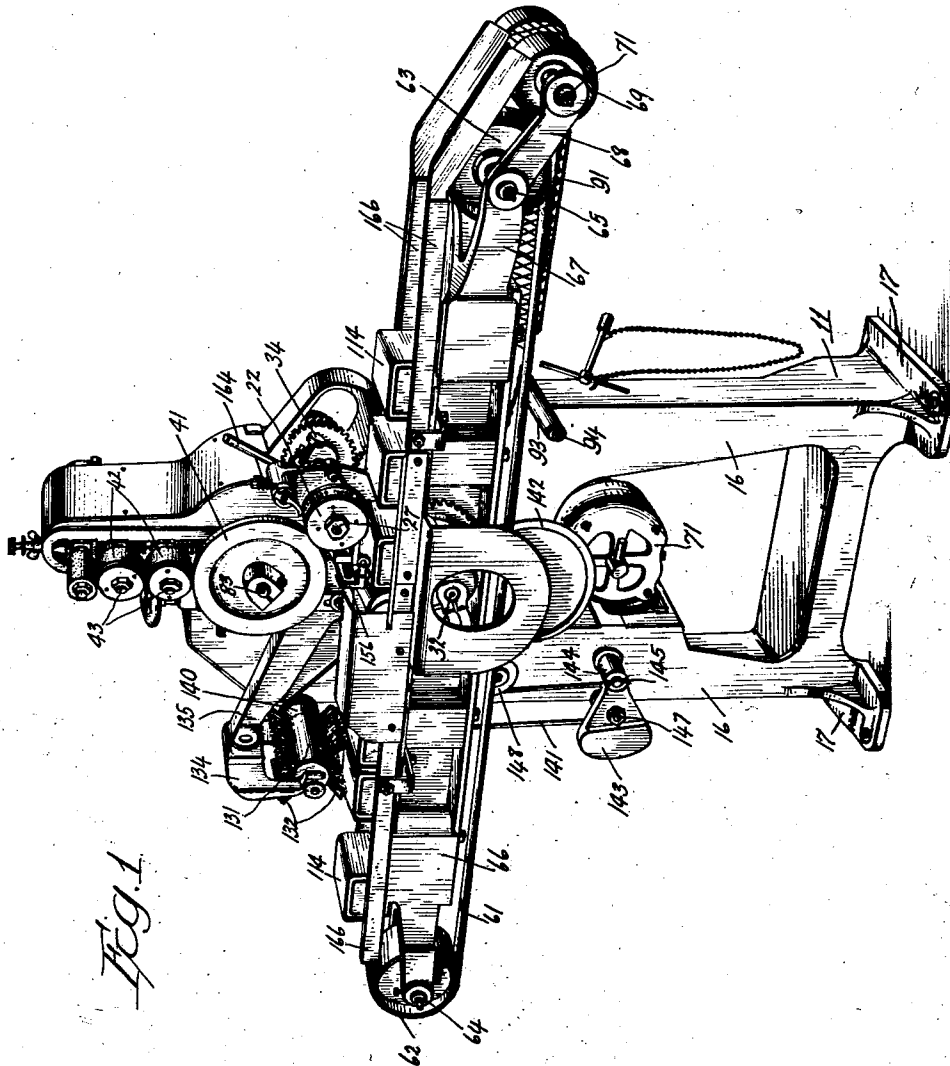


Fig. 1

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5 Sheets-Sheet 2

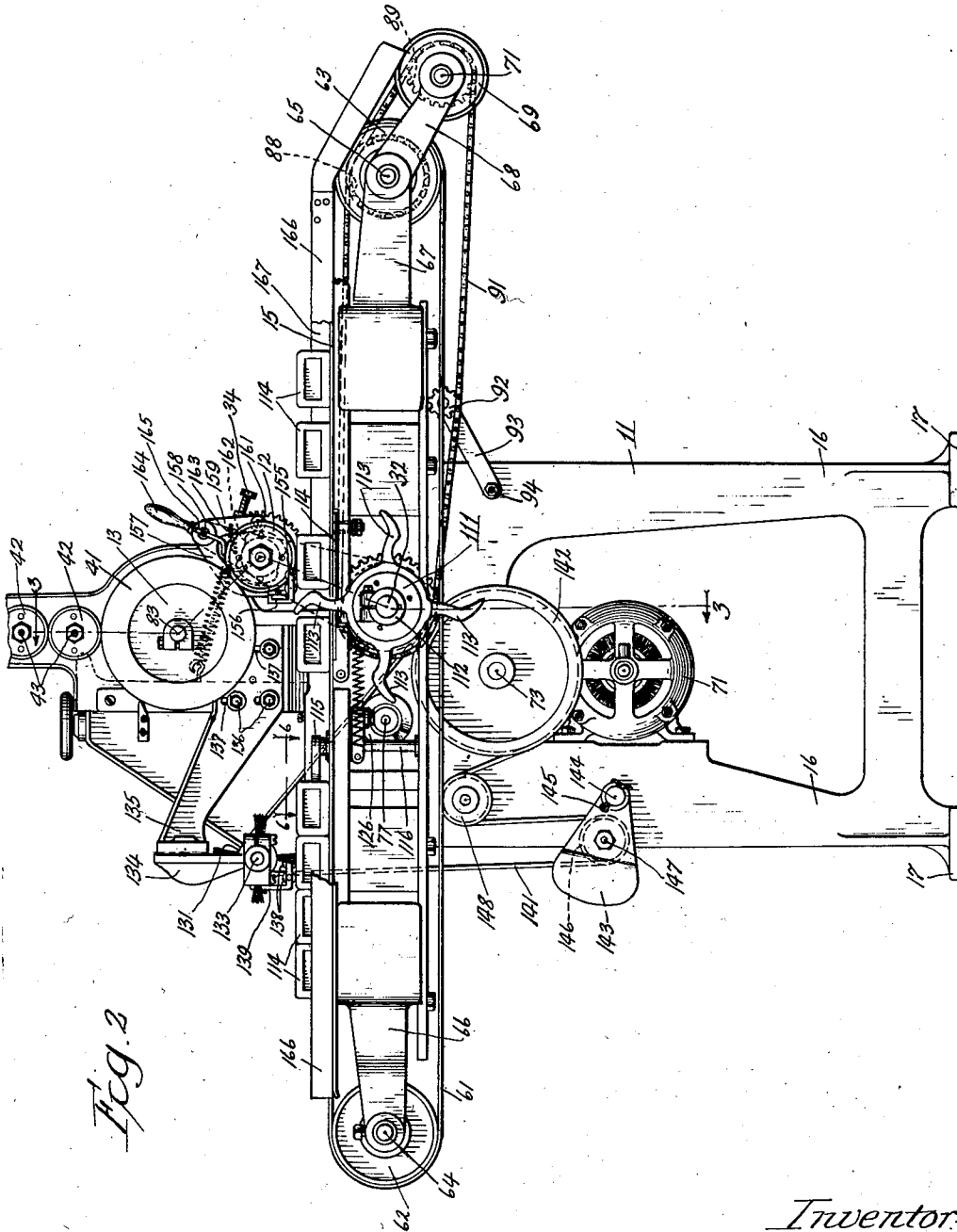


Fig. 2

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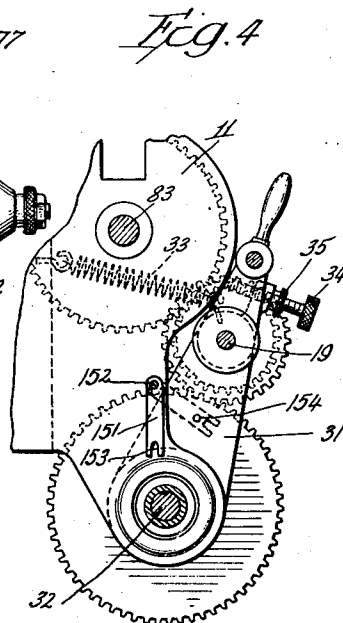
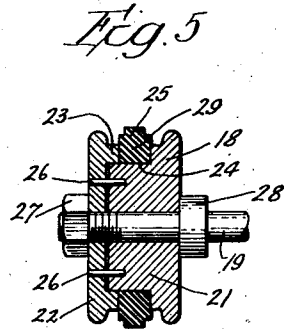
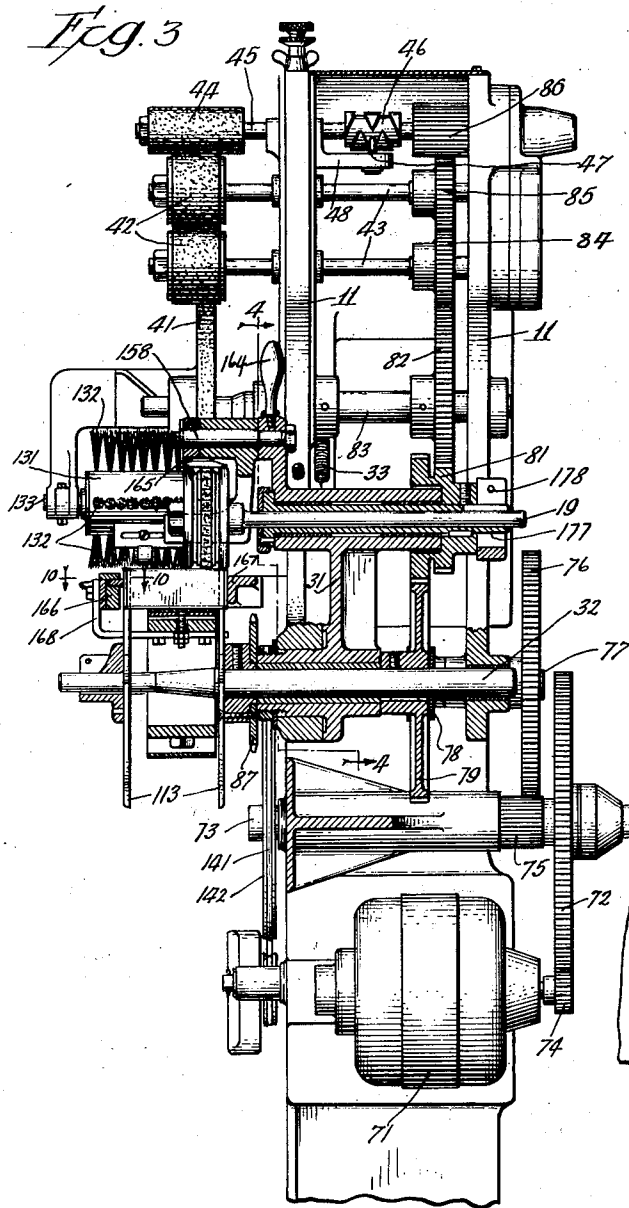
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PRINTING MACHINE

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5 Sheets-Sheet 3



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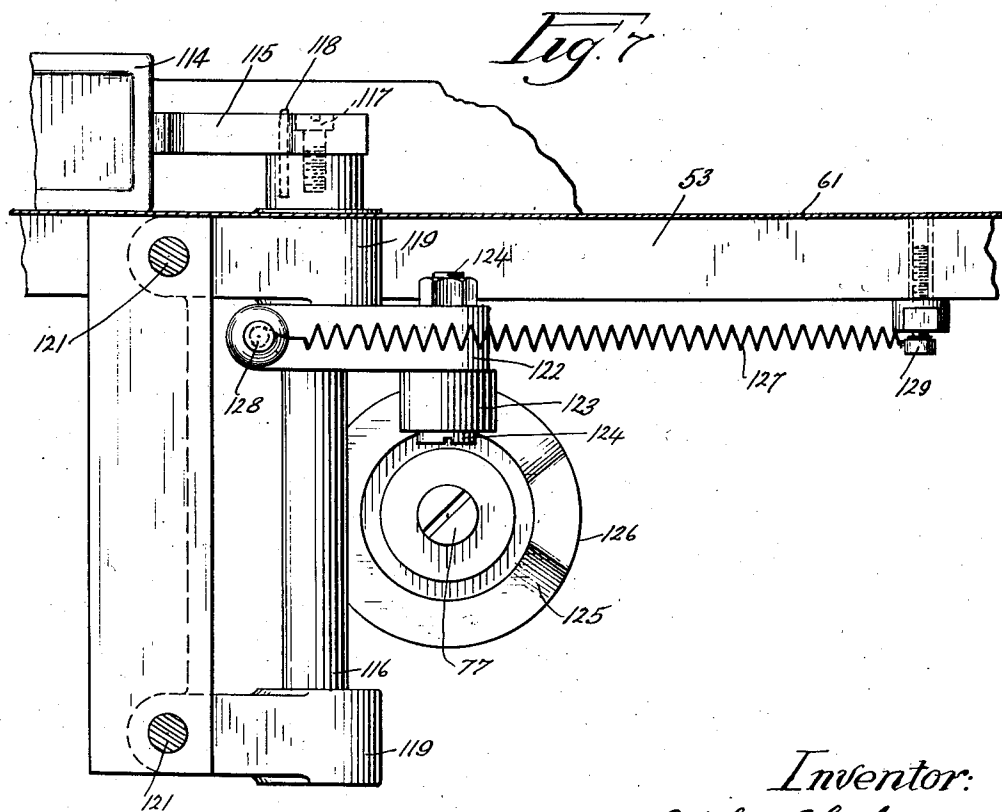
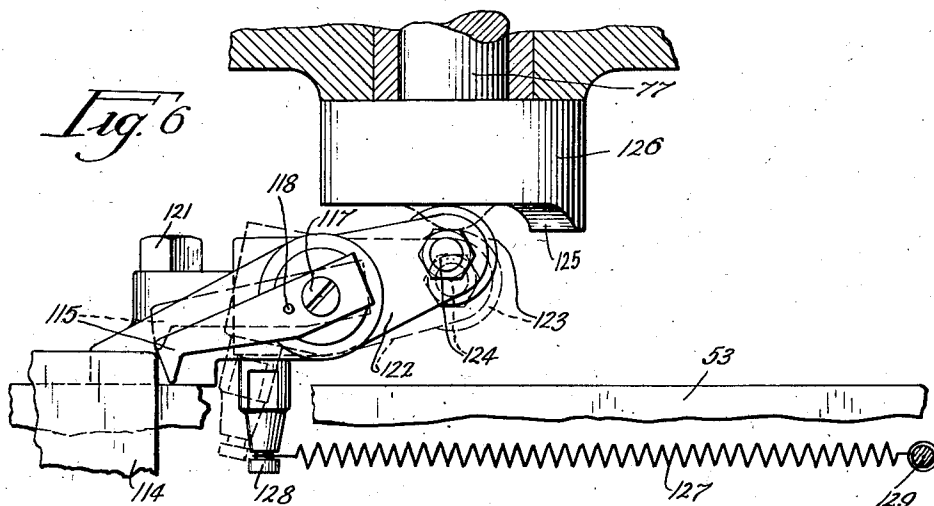
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PRINTING MACHINE

Filed Jan. 30, 1926

5 Sheets-Sheet 4



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PRINTING MACHINE
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1,770,029

5 Sheets-Sheet 5

Fig. 8

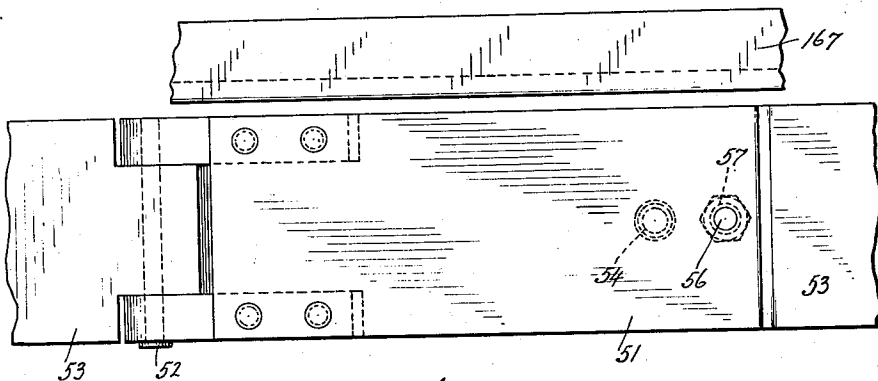


Fig. 9

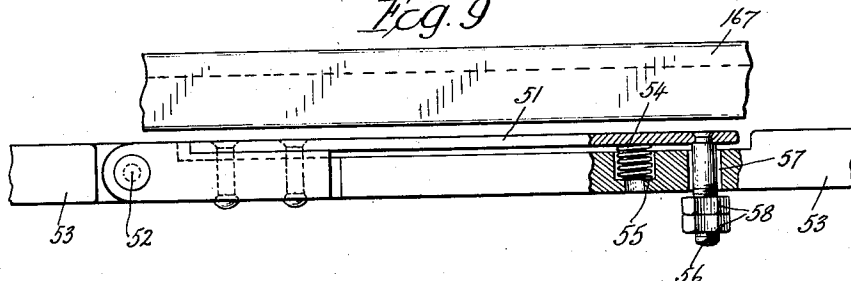
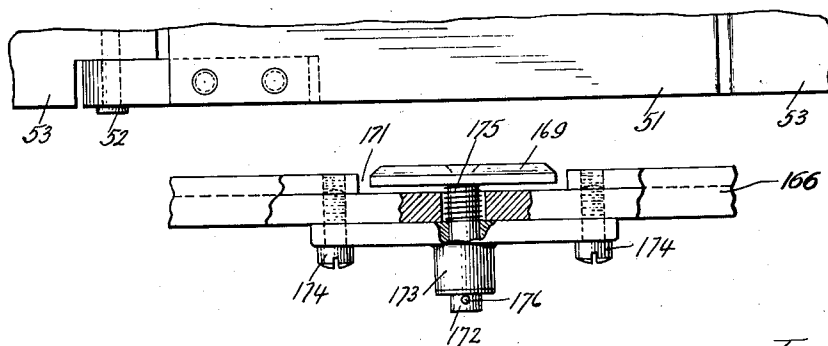


Fig. 10



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UNITED STATES PATENT OFFICE

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PRINTING MACHINE

Application filed January 30, 1926. Serial No. 84,945.

This invention relates in general to a printing machine, and more particularly to a machine for printing characters on containers for identifying the contents thereof, and to a method of marking containers to identify the contents thereof.

An important object of the invention is to provide a method of marking containers to identify the contents thereof, that will permit of the marking of the container, by the container manufacturer, with suitable characters, and other desirable designs, indicating the source of the goods, by the lithographic process, and later, such as either before or after the container is filled, printing suitable characters on the container for indicating the substance therein.

In marketing spices, fruits, vegetables, or other substances, it is desirable that each package be marked with a label that cannot be removed or that will not be accidentally removed, and that will not become soiled in handling. It is therefore desirable that the containers be labeled by the lithographic process and since a manufacturer of either or all of the above mentioned general classes of goods usually supplies several different varieties or substances under the same brand, such as in a line of spices there may be a great variety of substances that would be marketed in the same container, except for the marking as to the particular contents.

In manufacturing these containers and lithographing the entire label, that is the part indicating the source of the goods and the part indicating the substance, it is necessary to prepare plates for printing the blanks for containers for each variety of substance and it is necessary to manufacture each of these separately, which involves a considerable cost since only relatively small orders are placed for each container required. In preparing the containers in accordance with my invention, it is only necessary to prepare one plate having the major portion of the label, that is the part indicating the source of manufacture, together with any other suitable design that the manufacturer may desire to have upon the container, leaving a blank space to receive the characters for identifying the con-

tents of any of the containers, and printing these characters in this space after the container is filled. In this way it is possible for a manufacturer to order his containers in large quantities, since the same container is useful for all varieties of a given brand, and thereby receive a considerable reduction in the price of the containers and save considerable storage space, such as would be required for storing many cans with various labels. The possibility of filling a container marked for one type of goods with another type of goods is also eliminated.

Another important object is to provide an automatic machine for printing on containers that may be arranged to print any suitable characters or the like for identifying the contents of the container and such a device wherein the type may be readily substituted.

Another important object is to provide a machine that will continuously receive containers that may be either filled or empty, and will successively print labels or the like directly upon the container.

Another important object is to provide such a device, having a means for compensating for a variation in the thickness of containers, and that will clean or dust the surface to be printed upon just prior to the printing operation, so as to insure a neatly printed label.

Another important object is to provide a printing device for printing on containers, that will print a label on a container in a predetermined position and that will accomplish this while the container is moving through the machine.

Another important object is to provide such a device that will receive containers in irregular formation and automatically align the containers so as to receive an impression from the printer at a predetermined position.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings,

Fig. 1 is a perspective view of a device embodying my invention.

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Fig. 2 is an elevational view of the device shown in Fig. 1 with parts omitted and broken away to show details of construction.

Fig. 3 is a section taken substantially on line 3—3 from Figure 2.

Fig. 4 is an enlarged detail view showing a preferred form of mounting for the printer, taken on line 4—4 from Figure 3.

Fig. 5 is an enlarged sectional view of a preferred form of printer.

Fig. 6 is an enlarged plan view taken substantially on line 6—6 from Figure 2, with parts broken away and omitted to show details of construction and operation.

Fig. 7 is an enlarged elevational view of the parts shown in Fig. 6.

Fig. 8 is an enlarged detailed view showing the top surface of the yieldable bed.

Fig. 9 is a side elevation of the devices shown in Fig. 8.

Fig. 10 is an enlarged section taken substantially on line 10—10 in Fig. 3.

To illustrate my invention, I have shown a preferred embodiment thereof, which consists in a frame 11, a printer 12, an inking device 13, a bed 14, a conveyor 15, either or all of which may be of various types or forms and arranged in any suitable manner to cooperate to produce the desired result.

The frame 11 is preferably of cast metal and of suitable form to hold the various parts in their respective operating positions, and is preferably provided with suitable legs 16, having flanged portions 17, arranged to receive bolts or the like for securing the machine in operating position.

While I have shown a rotary or cylindrical printer 12, it is to be understood that a flat printer or other type of printer may be substituted therefore if desired. The printer in the present instance includes a base portion 18, which is apertured to receive a printer shaft 19. The base 18 is preferably of annular form and is formed to provide a reduced portion 21. A cap plate 22 is or may be provided, which is preferably of annular form and provided with an annular ridge or web 23, the inside diameter of which is slightly greater than the external diameter of the reduced portion 21 of the base 18, so that when the cap plate 22 is assembled over the threaded end of the shaft 19 (Fig. 5) an annular groove 24 is provided between the base 18 and the ridge 23 of the cap plate 22 in which type 25 may be positioned. A plurality of dowel pins 26 are preferably provided which extend from the base 18 through suitable apertures in the cap plate 22 to prevent rotation thereof, and the type 25 is clamped in fixed position by a nut 27 having threaded engagement with the end of the shaft 19 for clamping the entire assembly against an enlarged collar 28 on the shaft 19.

In the present instance I have shown the type 25 formed or moulded on a substantially

annular base 29. It will be understood, however, that special type blocks may be used if desired.

The printer 12, through the shaft 19, is mounted on a bracket arm 31, which is pivotally mounted on a shaft 32 and in the frame 11. (Figures 3 and 4.)

The bracket 31 is normally urged in a counter clockwise direction by a spring 33, which is suitably secured to the bracket and to the frame 11, and an adjusting screw 34 having threaded engagement in the bracket 31 and a lock nut 35 is or may be provided to limit the action of the spring 33.

The inking device 13 in the present instance, comprises, a rotatable disc 41, which may be of rubber or any other suitable material capable of holding ink and distributing ink over the printer by contact therewith, and means are or may be provided for distributing and supplying ink to the inking device. To accomplish this I have shown a pair of distributing rollers 42 suitably mounted on shafts 43, that are in turn suitably mounted in the frame 11, and an oscillating inking roll 44 which is similarly mounted on a shaft 45. The inking roll shaft 45 is provided with mechanism for causing an endwise movement thereof, which is consequently imparted to the roll 44, so as to distribute ink that may be supplied to the roll 44 by a brush or in any suitable manner. The mechanism for causing the endwise movement of the shaft 45 in the present instance includes a cam 46, having a double spiral groove and a follower 47 that is secured to a bracket 48, fixed to the frame 11. The double groove in the cam 46 and the follower 47 are of a type that is common in various arts and it is believed that a further detailed description of these devices is unnecessary.

The bed 14 is preferably yieldable and mounted on or secured to the frame 11 at a sufficient distance from the printer 12 to permit of the proper width of container to be printed upon to pass between the printer and the bed, and is yieldable to lift the can into contact with the printer during the printing operation.

To provide the yieldable bed, I have shown a bed plate 51, which is or may be pivoted at 52 to the frame 11, or to a suitable base plate 53 for the conveyor 15. The free end of the bed plate 51 is normally urged toward the printer by a spring 54 mounted in a seat 55 in the bed plate support, which in the present instance is the conveyor base plate 53. The motion of the bed plate 51 is preferably limited and to accomplish this I provide a bolt 56, which may be suitably secured to the bed plate 51 and arranged to extend through an aperture 57 in the base plate 53 and may be provided with lock nuts 58, or other suitable locking means that will permit of adjustment.

The conveyor 15 as shown includes a flexible belt 61 and suitable pulleys 62 and 63, arranged at opposite ends of the machine and mounted on suitable shafts 64 and 65, the flexible belt 61 being of sufficient length to extend around the pulleys 62 and 63 and having the ends thereof joined to provide an endless conveyor belt. The conveyor base plate 53 may be secured to the frame 11 in any suitable manner and preferably extends from adjacent the pulley 62 at one end of the machine to adjacent the pulley 63 at the other end of the machine, being uninterrupted except to provide space for the bed 14. The shafts 64 and 65 are preferably mounted in suitable bearings on yoke shaped arms 66 and 67 at opposite ends of the machine that may be secured in any suitable manner to the frame 11, the arm 67 having an extension adapted to carry an auxiliary pulley 69, mounted on a shaft 51, that is provided to operate a further conveying device upon occasion.

The power is preferably delivered to the machine by a motor unit 71, which may be mounted to the frame 11 in any suitable manner and position and the several moving parts of the machine are connected with a train of gearing or like transmission devices of suitable size and ratio to produce the proper relative operating speeds. In the present instance, I have shown a train of transmission elements including a gear 72 mounted on the shaft 73 that is driven by a motor pinion 74. The ratio of the gear 72 and the pinion 74 is determined by the operating speed of the motor 71. A pinion 75 is also secured to the shaft 73, that is mounted in the frame 11, which engages and rotates a gear 76 upon a shaft 77 suitably mounted in the frame 11. The pinion 75 and gear 76 may be of any suitable ratio and a further reduction of motor speed is possible between this gear and pinion. A pinion 78 transmits motion from the shaft 77 to a gear 79. The gear 79 is or may be secured to the shaft 32 in any suitable manner and rotates a double spur gear 81 mounted on the shaft 19, one side of which engages the gear 79 and the other side engages a gear 82 that is suitably secured to a shaft 83 suitably mounted in the frame 11. The shaft 83, it will be noted, rotates the inking disc 41 and the ink distributing rolls 42 and 44 mounted on the shaft 43 and 45 are rotated in turn by the gears 84, 85 and 86, which may be secured to the shafts 43 and 45 in any suitable manner.

The conveyor 15 is preferably driven through a sprocket 87 which is suitably secured to the shaft 32, and sprockets 88 and 89 which are or may be secured to the shafts 65 and 71 in any suitable manner so as to rotate the pulleys 63 and 69 and an endless sprocket chain 91 extending about the sprockets 87 and 89 and over the sprocket 88.

Any suitable tightening means may be provided for adjusting the chain 91 and in the present instance I have shown a small sprocket 92 mounted on an arm 93 which is or may be attached to the frame in any suitable manner such as at 94 to permit of adjustment of the arm and of securing the arm in the adjusted position.

While it is possible to convey the containers or cans past the printer with the conveyor and to regulate the movement of the container so as to produce substantially uniform printing, such an operation would be undesirable on account of the possibility of slippage or of the complicated mechanism such as would be required to prevent slippage. For this reason I prefer to provide a device 111 for insuring the movement of the containers. Such a device could be arranged to operate under various conditions and to engage the containers at any suitable point or points, and in the present instance I have shown this device substantially in the form of a wheel having a hub portion 112 which may be secured to the shaft 32 in any suitable manner and one or more arms 113. The shaft 32 is preferably mounted in the frame 11 below the conveyor belt 61 and its base plate 53, and the arms 113 that are preferably arranged in pairs, one at each side of the conveyor belt, are of sufficient length to extend above the belt and engage the containers 114. (Fig. 2.) The face of the arms 113, that is the side arranged to engage the container, is preferably formed to have a cam action on a surface of the container so that the point of engagement between the face of the arms 113 and the containers may travel forward or in the direction of movement of the conveyor at a uniform speed and in accordance with the peripheral speed of the printer 12.

Means is provided for locating the containers on the conveyor belt before they are advanced to the printer and to accomplish this I provide a device that is normally disposed in the path of the containers and that may be moved from the path of the containers periodically to permit at least one container to pass on for printing. This device may be mounted in any suitable manner or position and likewise operated to produce the desired result, and in the present instance I have shown such a device, comprising, a finger or arm 115 that is secured to a shaft 116 by means of a screw 117 and dowel pin 118. The shaft 116 is or may be mounted in a suitable bearing 119 that may be secured to the frame 11 or to the conveyor base plate 53 by means of bolts 121 or the like. A bracket 122, which is or may be suitably clamped to the shaft 116 is provided and a cam roller 123 is mounted thereon by means of a shoulder bolt 124 or the like, and arranged in position to engage a face 125 of a rotating cam

126 which is or may be suitably secured to the shaft 77. A spring 127, which is attached at one end to a pin 128 is carried by the bracket 122, and at the other end to a pin 129, which may be attached to the frame 11, or the conveyor base plate 53.

Means is provided for cleaning the surface of the container to be printed, that is arranged to clean or dust this surface just before the container is advanced for printing. While any suitable device may be provided for this purpose, such as an air nozzle, a wiping cloth, or the like, arranged in any suitable manner so as to accomplish the result, I prefer to provide a rotatable brush 131 (Figures 2 and 3) having suitable brush hair or the like arranged in one or more rows 132, and of sufficient length to engage the surface of the container in passing therebeneath. The brush 131 is mounted on an idler shaft 133 that is or may be mounted in suitable bearings in a bearing bracket 134 that is suitably secured to a bracket arm 135. The bracket arm 135 is preferably secured to the frame 11 by a plurality of bolts 136 extending through adjusting slots 137 in the bracket arm 135 and having threaded engagement in the frame 11 to permit of adjusting the brush upon occasion. One or more rollers 138 are or may be provided to hold the containers against the conveyor belt 161 during the cleaning action. These rolls may be mounted in any suitable bracket 139 arranged for attachment to the bracket 134 in any suitable manner. To rotate the brush 131 the body of the brush may be grooved at or near one end or a suitable pulley 140 may be provided and a belt 141 may be arranged over the pulley to drive the brush. The belt 141 is preferably driven by a pulley 142 suitably attached to the shaft 73. Means is preferably provided for taking up the slack in the belt 141 and to accomplish this I provide a weighted arm 143 pivoted on a stub shaft 144, mounted in and extending from the frame 11. A split cotter pin or a similar device may be provided to lock the arm 143 on the stub shaft 144. An idler pulley 146 is secured to the arm 143 by means of a shoulder bolt 147 or the like and a second idler pulley 148 is similarly secured to the frame 11, the belt being laced over these pulleys so that the weight of the arm 143 will take up the play or slack. (Fig. 2.)

In the present embodiment, the machine is arranged to be positioned at the end of a conveyor delivering the output from a can closing machine, so that the cans will be deposited from this conveyor directly into the conveyor 15 at the left end of the machine, viewing Figure 2, the containers or cans then moving to the right to receive the cleaning and printing operations and may be deposited upon another conveyor at the right end of the machine, or may be deposited in a suit-

able collector as desired. It is also possible to use the machine in other positioning however, since it is only necessary to position the cans upon the conveyor belt. The containers are conveyed through the machine by the conveyor belt 15 when such action is permitted by the finger or arm 115. This device may be for the purpose of spacing containers along the conveyor in accordance with the arrangement of the type on the plinter or may be arranged to release containers at regular intervals so that the arms 113 on the device 111 may move freely between the containers. The brush 131 is preferably arranged to rotate continuously and therefore during any movement of the containers the surface to be printed is cleaned by the brush. The printer 12 may be arranged to print on any number of containers in a single revolution so that the speed of rotation thereof may be varied at will and is preferably provided with a rubber type ring having at least two sets of characters to be printed upon the containers so that one impression may be taken during each half revolution of the printer. The device 111 may also be arranged to operate upon any number of containers by varying the number of arms 113 and its speed of revolution.

In the present embodiment the ratio between the shafts 19 and 32 is two to one so that during each half of a revolution of the device 111, two containers are advanced past the printer to receive impressions therefrom by the arms 113. The printer being mounted in the bracket 31 which is pivotally mounted on the shaft 32, permits of moving the printer in a clockwise direction about the shaft 32 and away from the inking device 13, so that when no cans are passing through the machine there will be no inking action or no ink received from the inking device.

Any suitable device may be provided for locking the printer in a position away from the inking device and to accomplish this I have shown (Figure 4) a latch 151 pivotally attached to the frame 11 as at 152 and having a notch 153 at the end thereof adapted to receive a pin 154 secured to the bracket 31. The bottom of the notch 153 and the pin 154 being located so that when the pin is in the notch the printer will be held away from the inking device. The device is arranged for manual operation, since it is not necessary to operate such a device frequently. If desired, however, this may be arranged to operate automatically upon movement of the bracket 31. The spring 33 normally urging the printer against the inking device 13 permits any desirable inking pressure which may be adjusted by means of the screw 34 previously described.

The ratio of peripheral speed between the inking disc 41 and the platen, which is controlled by the pitch diameter of the gears 81

and 82, is preferably arranged so that there will be a slight difference in the peripheral speed to obtain a slight wiping action between the type and inking device.

5 Ink may be supplied to the distributing roll 44 with a brush or the like, in any suitable manner, as previously described, and in the rotation and oscillation of this roll the ink gradually works down from one roll to the other until it is deposited upon the inking disc 41.

By the present arrangement and construction of the printer 12 and the type ring, it is only necessary for a manufacturer to carry a number of type rings having characters thereon for indicating the different substances that he intends to pack in containers, and these may be substituted on the machine by merely removing the nut 27 and the cap plate 22. It will also be noted that only one set of type rings is required and that these may be used on containers marked with several different brands or designs, if desired.

Means is or may be provided to prevent accidental slipping of the container during the printing operation. To accomplish this, one or more rolls 155 are provided, that are mounted in suitable brackets 156 and arranged in position to roll on the surface of the container during the printing action and to accurately hold the container when the same is under the control of the arms 113 of the holding device 111. The bracket 156 may be adjustably secured to the frame 11 if desired, and in the present instance I have shown this bracket secured to an arm 157 which is pivotally mounted on a stub shaft 158, having a bearing in the upper end of the bracket arm 31. The arm 157 is provided with an extension 159, extending opposite the pivot thereof and carrying a cam roller 161, that is arranged in position to roll upon a cam 162 that is or may be secured to the printer shaft in any suitable manner so as to rotate therewith. The roll 161 is held against the cam by a spring 163, which is suitably fastened to the extension 159 and to the bracket 31.

The formation of the cam 162 is such that the roller 161 will be permitted to lower twice in each revolution of the cam, the point at which the roller lowers is so arranged that this action will cause a swinging of the bracket 156 and rolls 155 in a clockwise direction about the stub shaft 158 and will be caused to return after the forward end of the next container in line is beneath the rollers, so that in the event of a variation in the height of the containers, the rollers 155 will positively engage over the container to perform their function.

A handle 164 is preferably provided on the upper end of the bracket 31 to permit of the manual operation thereof and a gauge 165 is secured to the end of the stub shaft 158 that

is formed to extend across the face of the platen (see Figures 2 and 3) to facilitate the alignment of new printing rings in the event of a substitution thereof.

To locate the containers on the conveyor, 70 suitable side rails 166 and 167 are provided, that are arranged on each side of the conveyor belt 61, and these should be of sufficient height to control containers of the maximum size. These side rails may be attached 75 to the frame 11 in any suitable manner or to the conveyor base plate 53 by means of brackets 168 as shown. (Fig. 3.)

A yieldable plate 169 is preferably mounted in the side rail 166 at the printing station 80 or adjacent to the platen. This plate is provided to hold the containers against the side rail 167 during the printing operation, or to confine the movement of the containers to a predetermined path. The plate 169 is 85 mounted in a slot 171 in the side rail 166 and is carried by a pin 172 having a sliding bearing in a bracket 173 that is attached to the side rail 166 by means of screws 174 or other suitable devices. A spring 175 is positioned 90 over the pin 172 between the plate 169 and the bracket 173, so as to normally urge the plate 169 toward the side rail 167. A cotter pin 176 or like device is provided in the pin 172 to limit the movement of the plate 169. 95 The shaft 19 is preferably mounted in a rotating bushing 177 and is securable in various positions relative thereto and to rotate therewith by means of a clamp 178. This permits of moving the shaft 19 axially so as 100 to vary the position of printing relative to the ends or opposite edges of the containers.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it 105 will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention, or sacrificing all of its material advantages, the form 110 hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A printing machine, comprising, a rotatable printer, inking means arranged to ink 115 said printer, a yieldable bed, a conveyor, supported on said bed adapted to convey containers beneath said rotatable printer to receive impressions therefrom, and means for distributing the containers along said conveyor. 120

2. A printing machine, comprising, a rotatable printer, inking means arranged to ink said printer, a yieldable bed, a conveyor over said bed adapted to convey containers beneath said rotatable printer to receive impressions therefrom, means for rotating said 125 rotatable printer, and a device for causing the containers to move beneath the printer to receive impressions therefrom, said device 130

being arranged to advance the containers at substantially the peripheral speed of the rotatable printer.

3. A printing machine, comprising, a printer, means for inking said printer, means for conveying containers to and from said printer to receive impressions therefrom, and means for locating the containers in said last mentioned means, said means comprising a finger arranged to project into the path of movement of said containers, and means for moving said finger out of the path of movement of said containers at predetermined intervals, and a series of arms engaging and movable with the containers in time with the movement of the printer.

4. A printing machine, comprising, a printer, means for inking said printer, means for conveying containers to and from said printer to receive impressions therefrom, and means for locating the containers in said last mentioned means, said means comprising, a cam operated device, periodically movable into and out of the path of movement of said containers, and a series of arms engaging and movable with the containers in time with the movement of the printer.

5. A printing machine, comprising, a rotatable printer, a yieldable bed spaced from said rotatable printer, a rotatable device for moving containers beneath said rotatable printer in accordance with the peripheral speed of said printer to receive impressions therefrom, and means for rotating said rotatable printer and said rotatable device, means for stopping the containers momentarily, and means operating said stopping means in timed relation with said rotatable moving device.

6. A printing machine, comprising in combination, a printer arranged for continuous rotation, a yieldable bed spaced from said printer, and a continuously rotating device arranged to move containers beneath said printer at a uniform speed to receive impressions therefrom, means for stopping the containers momentarily, and means operating said stopping means in timed relation with said rotatable moving device.

7. A printing machine, comprising in combination, a printer arranged for continuous rotation, a yieldable bed spaced from said printer, and a continuously rotating device arranged to move containers beneath said printer at a uniform speed to receive impressions therefrom, said device having a plurality of upwardly extending arms arranged at the side of said bed and extending radially therefrom and formed to control the movement of the containers.

8. A printing machine, comprising, a rotatable printer, a yieldable bed spaced from said printer, means for moving containers between said rotatable printer and said yieldable bed to receive impressions from the print-

er, and means associated with the printer for controlling the printing pressure, said means comprising a plurality of rollers suitably mounted and arranged to engage the surface of the container to be printed upon during the printing operation.

9. A printing machine, comprising in combination, a rotatable printer, a yieldable bed spaced from said printer, means for moving containers between said rotatable printer and said yieldable bed to receive impressions from the printer, and means associated with the printer for controlling the printing pressure, said means comprising a plurality of rollers arranged to engage the surface of the container to be printed upon and mounted for movement toward and away from a normal printing plane so as to engage the surface to be printed on of containers of various sizes and to move said surface into the printing plane.

10. A printing machine, comprising, a frame, a rotatable printer suitably mounted in said frame, a yieldable bed secured to said frame and spaced from the printer, continuous conveyor for conveying containers between said rotatable printer and said yieldable bed to receive impressions from the printer, rotatable means for inking said printer, and yieldable means for holding said rotatable printer against said inking means.

11. A printing machine, comprising, a frame, a yieldable bed secured to said frame, a continuous conveyor mounted on said frame and adapted to convey containers over said yieldable bed, a rotatable inking means mounted on said frame and spaced from said yieldable bed, and a rotatable printer arranged to print on containers carried by said conveyor, said printer being pivotally mounted in said frame for movement toward and away from said inking means.

12. A printing machine, comprising, a bed, devices for arranging containers on said bed, a printer mounted adjacent said bed for printing on the containers, and means for shifting the printer away from the inking means relative to the containers to vary the printing position.

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