July 27, 1937. J. H. FRIDEN 2,088,196

MACHINE FOR PRINTING ON BOTTLES

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Fig. 1

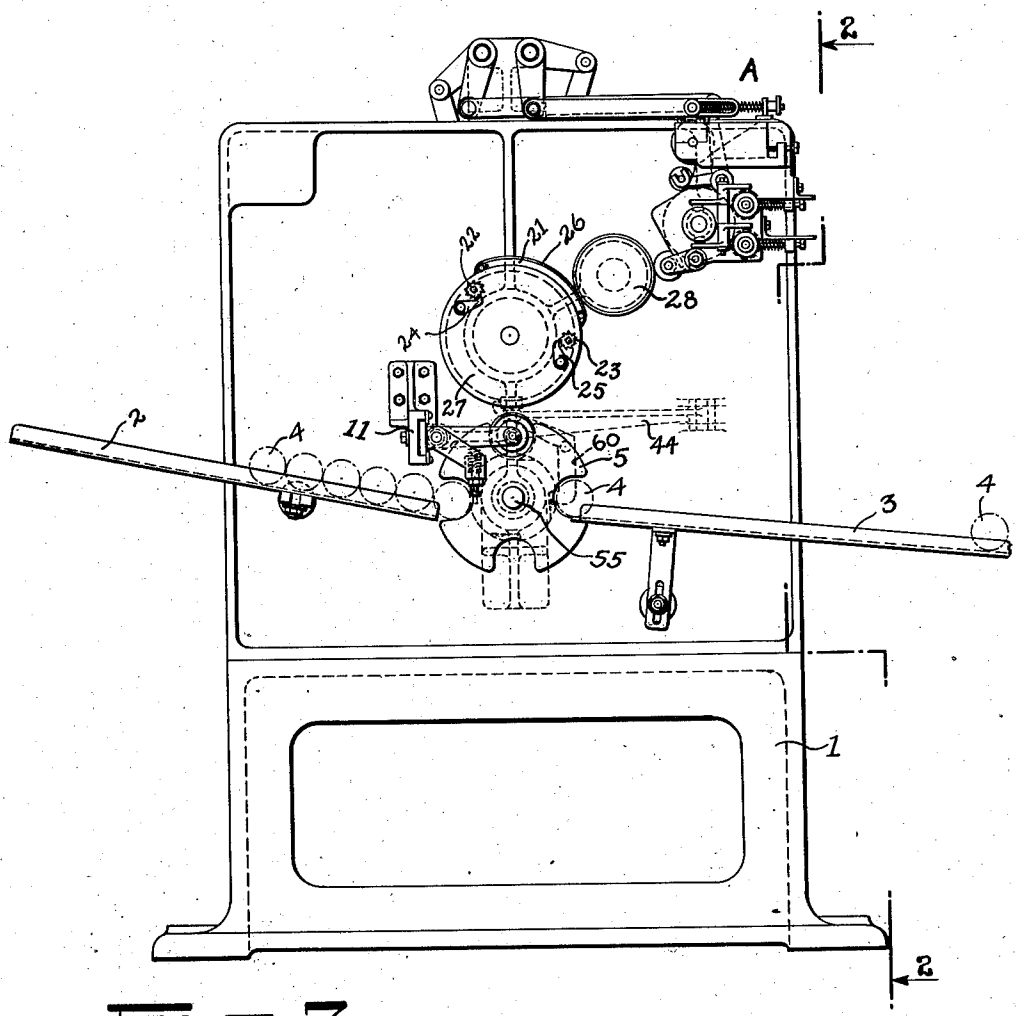
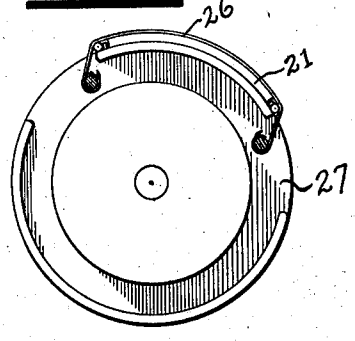


Fig. 7



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Fig. 2

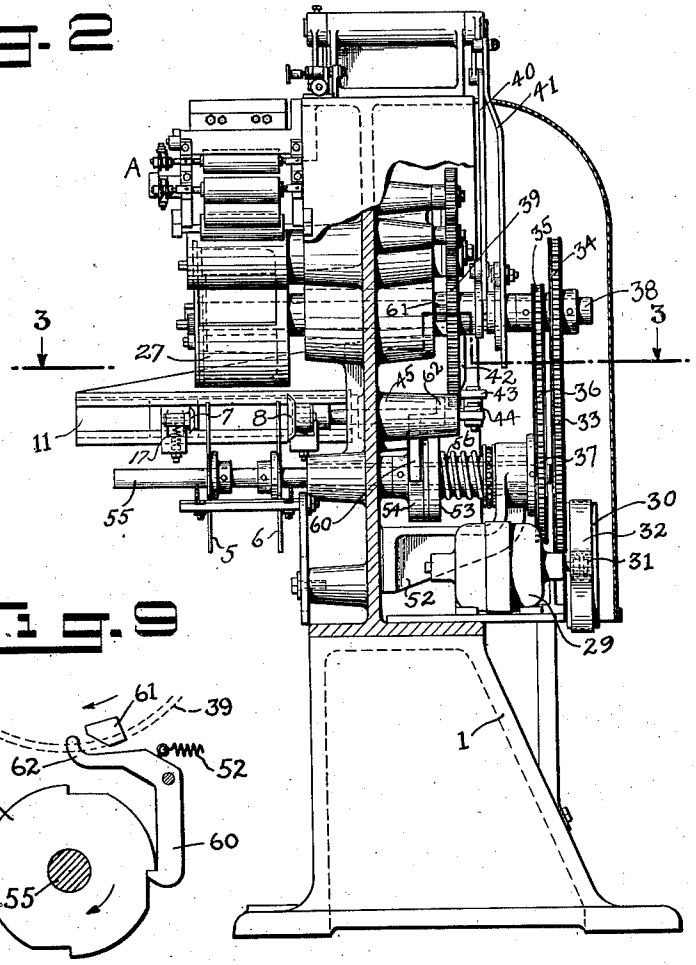


Fig. 9

Fig. 6

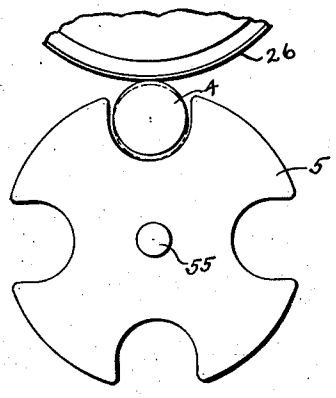
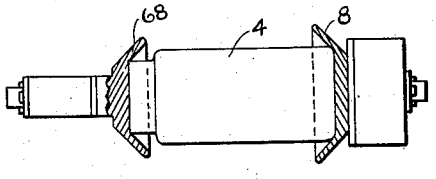


Fig. 10



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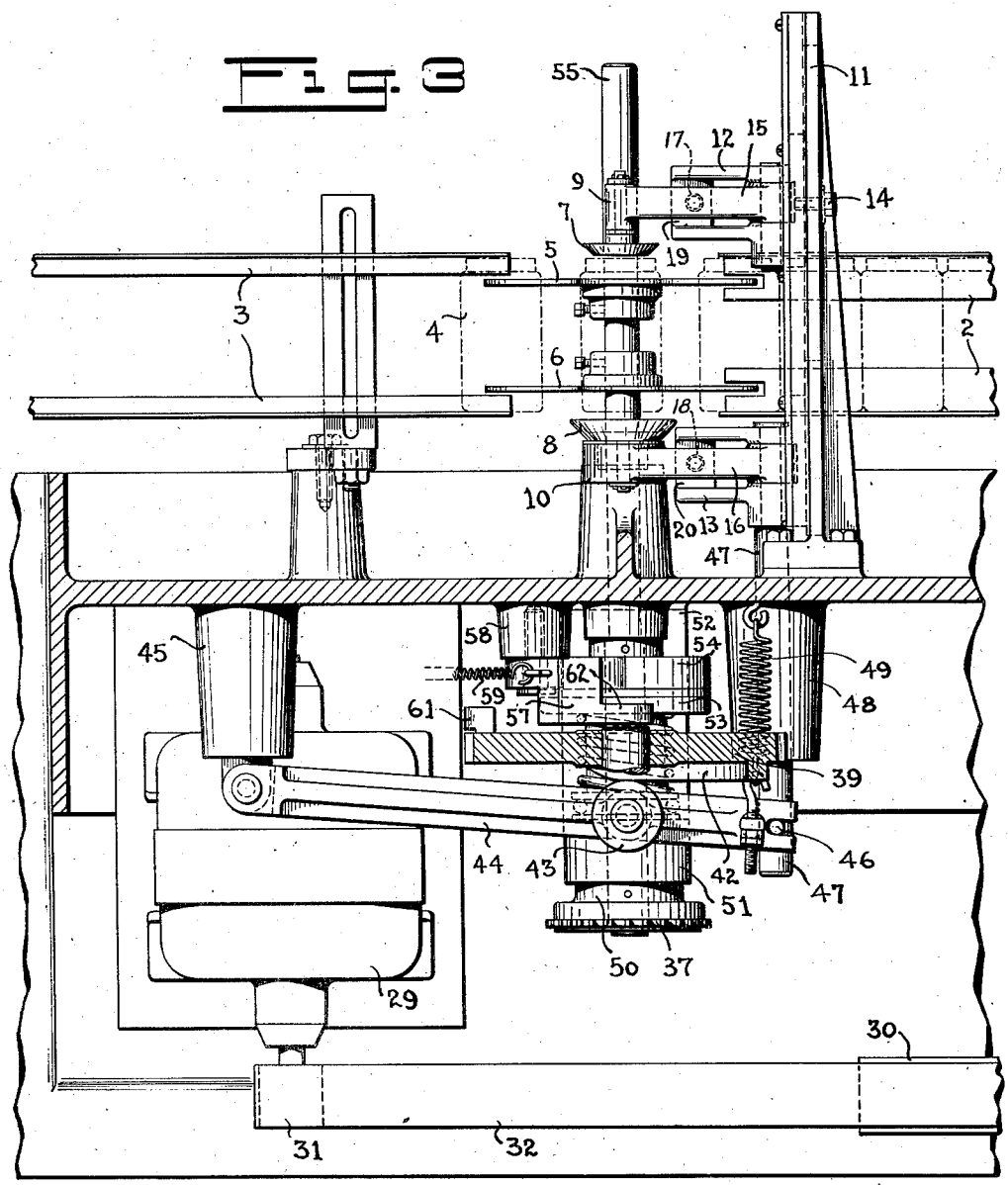
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MACHINE FOR PRINTING ON BOTTLES

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Fig. 3



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MACHINE FOR PRINTING ON BOTTLES

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Fig. 4

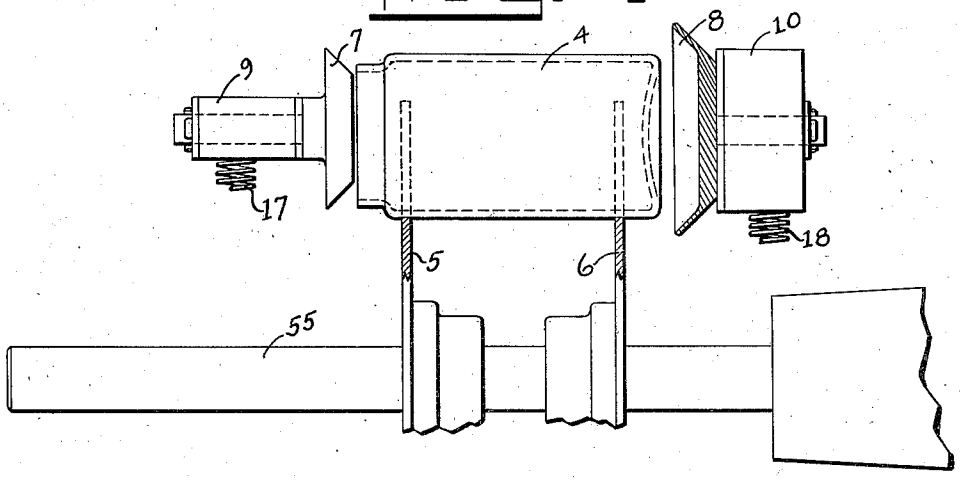


Fig. 5

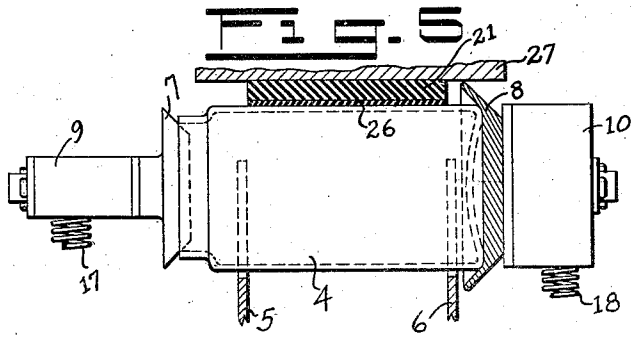
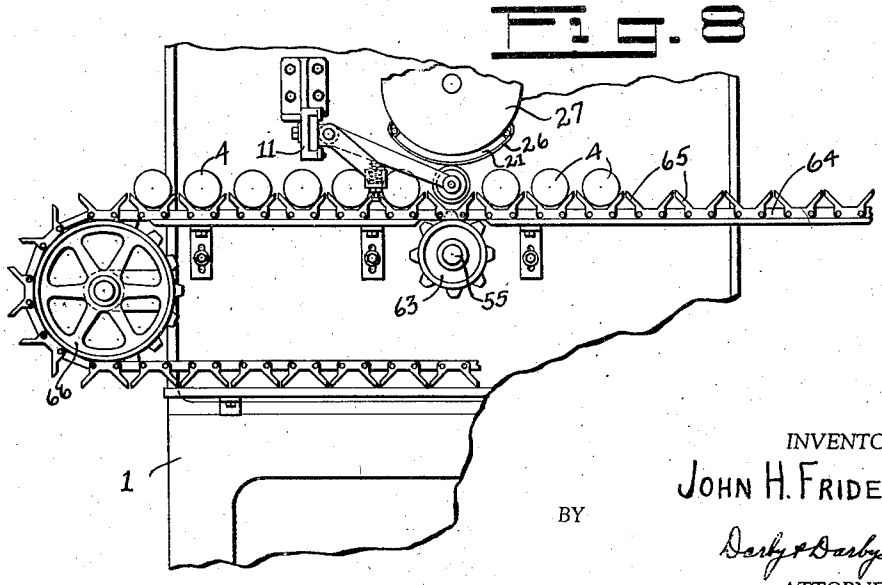


Fig. 8



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UNITED STATES PATENT OFFICE

2,088,196

MACHINE FOR PRINTING ON BOTTLES

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Application February 20, 1935, Serial No. 7,344

12 Claims. (Cl. 101—40)

This invention relates to a new and useful improvement in a printing press, and particularly a printing press to be used for printing on a hard, uneven surface, such as a glass bottle. The machine may, of course, be used for printing on other surfaces, but is particularly adapted to use in printing on a surface which is more or less uneven and generally of a curved shape, and more particularly on a cylindrical surface.

The particular object of the invention is to provide a machine which may be used to print on glass bottles, which are continuously and rapidly fed through the machine, with one or more colors, by the offset method of printing.

If the surface of an ordinary glass bottle, such as is used in commerce for a large variety of commodities, such as beer or milk, for example, is examined carefully, it will be noted that the surface instead of being smooth and regular, as appears from a casual inspection, is actually quite uneven and irregular. In order to print evenly on such a surface it is, therefore, necessary to provide means for overcoming the irregularity of the surface itself. In a glass bottle the hardness of the surface presents an additional problem in this respect.

A feature of my invention is the provision of means for overcoming the irregularities in a surface particularly the surface of a cylindrical or curved object, so that a legend or label may be printed thereon evenly, smoothly, and clearly.

Another feature of my invention is the provision of springs which hold an object, such as a bottle, in resilient engagement with the platen of an offset printing press.

Another feature of my invention is the provision of a rubber blanket mounted on the platen roller of an offset printing press, beneath the rubber platen, in order to provide a resilient engagement with the object on which the printing is to be impressed.

Another feature of my invention is the provision of means for feeding a bottle or similar object to an offset printing press in such a manner that the feeding mechanism is stopped during the printing operation to permit the printing to be done, and then during a portion of the revolution of the platen operation of the feeding mechanism is resumed for removing the bottle which has been printed and for feeding a new bottle to the printing position.

Still another feature of my invention is the provision of mechanism for intermittently feeding a succession of bottles or similar objects to an offset printing press, combined with means for stopping said mechanism without damage to the mechanism or the bottle when the bottles become jammed, or for any other reason damage would result if the mechanism were not stopped.

Another feature of my invention is the provision of a pair of jaws for gripping a bottle or similar object, said jaws being resiliently mounted and having tapered sides for centering the bottle and lifting it clear of the feeding mechanism.

A further feature of my invention is the provision of a pair of jaws as just described combined with suitable mechanism for moving one jaw towards and away from the other in timed relation with the rotation of the feeding mechanism and the platen of an offset printing press.

In the drawings,

Figure 1 is a front view of my new machine as adapted to effect single color printing on bottles or similar objects;

Fig. 2 is a sectional view along the lines 2—2 of Figure 1, looking in the direction of the arrows;

Fig. 3 is a sectional view along the lines 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is an enlarged partial view of the mechanism for feeding the bottle to the machine and for gripping the bottle, centering it, and lifting it clear of the feeding mechanism, while permitting its rotation;

Fig. 5 is a view of a portion of the apparatus shown in Fig. 4 showing the position of the apparatus when the bottle has been gripped and lifted by the jaws and the platen has come into engagement with the bottle;

Fig. 6 is a side view of a portion of the apparatus in Fig. 5, looking from the left, showing the position of the bottle with respect to the feeding mechanism while the printing is being impressed thereon;

Fig. 7 is an enlarged view of the platen roller with the cover removed and shows the rubber blanket and platen over the blanket;

Fig. 8 is a partial front view of a machine having a modified form of feeding mechanism;

Fig. 9 is a partial view of the face of disc 54, looking from the left in Fig. 2, and associated mechanism; and

Fig. 10 is a view of an alternative shape of self-centering jaws.

Similar reference numerals refer to similar parts throughout.

A suitable frame work 1 is provided, to which the apparatus of the machine is attached. A slide 2 is mounted on the front of the machine and tilted at an angle such that the bottles 4 will be fed to the machine by gravity. A second slide

3 is mounted on the other side of the machine and tilted at an angle such that the bottles 4 delivered from the machine will be removed from it by gravity. The bottles are fed to a spider consisting of a pair of discs 5, 6, having semi-cylindrical grooves in their peripheries. The spider is rotated until it reaches the position shown in Figs. 1, 4, 5 and 6, when it is momentarily stopped. A bottle is then in position to be grabbed by the self-centering jaws 7 and 8. The jaw 8 moves to the left, Figs. 2, and 4 (up Fig. 3), so that the bottle is grabbed between the two jaws, as shown in Fig. 5. The jaw 7 will ordinarily engage the open end of the bottle while the jaw 8 will engage the closed end.

As may be seen from Figs. 4 and 5, the sides of these jaws are beveled so that when they approach one another the bottle will be lifted clear of the spider and centered between the jaws, as indicated in Fig. 5 and in the full lines of Fig. 6. The jaws 7 and 8 are mounted in suitable bushings 9 and 10 so they are free to rotate. The jaws may alternatively take the form indicated in Fig. 10, in which the left jaw is numbered 68, or any other suitable form to lift the bottle clear of the spider.

As the bottle is being fed to the machine and the jaws are picking it up, the platen roller is rotated so that when the bottle is in position the platen has come to a point where printing is to commence. The platen then engages the bottle and, as it is free to rotate, rotates the bottle with the platen and the impression is printed on the bottle. The jaws then release the bottle to the spider which moves on and delivers the bottle to the slide 3.

An arm 11 (Figs. 2 and 3) is provided to which brackets 12 and 13 may be secured. The position of the bracket 12 may be adjusted along the arm 11 by means of nut 14. Arms 15 and 16 are loosely mounted in the brackets 12 and 13 and are supported by springs 17 and 18 which engage the bases 19 and 20 of the brackets. The arms 15 and 16 terminate in the bushings 9, 10 in which the jaws 7, 8 are mounted. When the bottles are engaged by the jaws and lifted clear from engagement with the spider they are therefore resiliently held against downward displacement by the springs 17 and 18 which provide sufficient pressure against the rubber platen 26 to maintain a strong pressure of the bottle against the platen, and permit sufficient downward movement to overcome the irregularities in the surface of the bottle. Additional means for overcoming these irregularities is provided by a rubber blanket 21 (Figs. 1 and 7) which is placed on the platen roller 27 and held in position by the rubber platen 26 which is placed thereover and tightened and held firmly by means of ratchets 22 and 23 and pawls 24 and 25. The machine is provided with suitable ink feeding mechanism, indicated generally at A, and an impression cylinder 28 for supplying the ink to the rubber platen in accordance with the usual practice of the prior art.

The motive power for the machine is provided by a motor 29, Figs. 2 and 3, which drives a pulley 30 by means of a pulley 31 and belt 32. Pulley 30 is keyed to a shaft, not shown, on which is also mounted a sprocket, not shown, which is engaged by chain 33, Fig. 2. Chain 33 engages sprocket 34 keyed to a shaft 38 to which is also keyed a sprocket 35 which is engaged by a second chain 36 to rotate another sprocket 37. The platen roller 27 is also keyed to shaft 38. This shaft, and consequently the platen roller, will be in continuous rotation during the operation of the machine. Keyed to the same shaft is a gear 39 which engages directly or indirectly additional gears to operate the distribution rollers and the impression cylinder of the ink feeding mechanism, indicated at A. The shaft 38 also has suitable cam surfaces for engaging arms 40 and 41 to feed the ink to the rollers in accordance with the usual practice of the prior art.

It is obvious, of course, that additional colors may be supplied by providing additional impression cylinders, distribution rollers, ink supply etc., similar to that shown, in accordance with the usual practice of the prior art.

Mounted on the outer or right hand surface of the gear 39, Figs. 2 and 3, is a cam 42 which is engaged by a follower 43 mounted on an arm 44. The arm 44 is pivoted on a support 45 and terminates in a fork which engages a pin 46 on connecting rod 47 which is journaled for reciprocating movement in a bushing 48. The rod 47 is secured to bracket 13 which is slidingly mounted on arm 11. A spring 49, which is secured to the frame 1, pulls the arm 44 toward the machine, or upwardly in Fig. 3, whenever the follower 43 is not engaged by the cam 42.

After the printing has been completed on one bottle, the follower 43 engages cam 42 and moves the forked end of arm 44 to the right in Fig. 2. This moves the rod 47 to the right and moves the bracket 13 and consequently the jaw 8 to the right. The bottle which has been removed from engagement with the spider for the printing operation is thus released by the jaws, returns to the spider, and is delivered from the machine by the spider to the slide 3.

The sprocket 37 is keyed to a shaft 50 which is journaled in bushing 51 mounted on a support 52. A disc 53 is mounted on the other end of shaft 50 and engages by friction a second disc 54 to form a friction clutch. The disc 54 is mounted on a shaft 55, on which is also mounted the spider which feeds the bottles to the platen roller. A spring 56 surrounds the shaft 50 between the bushing 51 and disc 53 to provide the force necessary to maintain the friction discs 53 and 54 in contact. A bell crank lever 57 is pivoted in a support 58. Disc 54 is provided with a number of notches, equal in number to the number of grooves in the discs 5 and 6 which constitute the spider.

Tension spring 59 holds the finger on the lower arm 60 of the bell crank 57 in engagement with one of these notches to prevent movement of the spider. Gear 39 has on its left face a finger 61, Fig. 3. The upper arm of the bell crank lever 57 terminates in a finger 62. Once for each revolution of the sprocket 29, and consequently once for each revolution of platen roller 27, the finger 61 engages the finger 62 and removes the finger at the end of arm 60 from engagement with a notch on disc 54. When the finger is removed from disc 54 the shaft 55 is permitted to turn by engagement of the friction disc 53 with disc 54. The operation is as follows:

A bottle is fed to the position to be picked up by the spider, is picked up by the spider, and moved to position to be engaged by the jaws. When it arrives at this position the finger on the end of arm 60 engages a notch in disc 54 and stops the spider at this position. As the spider has been moving the bottle to this position, follower 44 has been in engagement with cam 42. When the spider is stopped at this position the follower 44 has reached the end of the cam surface and spring 49 pulls the arm 44 to the left, Fig.

3, consequently moving the jaw 8 to the left, causing the jaws 7 and 8 to engage the bottle and lift it clear of the spider. The platen roller has now turned to the position shown in Fig. 5, such that the rubber platen engages the bottle and impresses printing thereon.

After the platen roller has turned sufficiently that the platen 26 leaves its engagement with the bottle, follower 43 again engages cam 42, moving jaw 8 to the right, causing the jaws 7 and 8 to release the bottle and return it to the spider. After it has been returned to the spider, finger 61 engages finger 62, causing the finger at the end of arm 60 to leave its engagement with a notch on disc 54 and permit friction disc 53 to turn disc 54, and consequently to turn shaft 55 and the spider to deliver the printed bottle to the delivery slide 3 and to pick up another bottle from the feeding slide 2 and move it to the position at which it is to be engaged by the jaws and printed upon by the platen.

Fig. 8 shows an alternative feeding mechanism in which a sprocket 63 is mounted on shaft 55 instead of the spider being mounted thereon. This sprocket engages a chain 64 which has a plurality of brackets 65, each adapted to hold a bottle or other object to be printed. The chain 64 rotates around a pair of idler wheels 66, only one of which is shown. As the sprocket 63 is mounted on the shaft 55, the chain 64 will move until a bottle is placed in position to be grabbed by the jaws 7 and 8. At this point, the shaft 65 will stop long enough to permit the jaws to grab the bottle, raise it to position, engage the platen, and return it to the bracket. The shaft 55 will then move as before until the next bottle is in position.

It has been stated above that it is obvious that additional colors may be added to the machine by simply providing additional ink supply and mechanism similar to that shown at A. It will be also noted that the machine is capable of a variety of adjustments. The jaw 7 may be adjusted for different size bottles by simply moving it to a new position along arm 11. The jaw 8 may also be adjusted to print on a portion of the bottle which is closer to or farther from the bottom thereof by adjusting the position of jaw 8 along shaft 47. The springs 17 and 18 may be made adjustable, if desired, to provide a different degree of resiliency against the platen roller. The rubber blanket 21 being of soft rubber is also capable of a quite precise adjustment as to resiliency by regulating the degree of tension of the rubber platen over the blanket. The spider may, of course, have grooves of any configuration to take care of different shapes and sizes of bottles and the jaws may also take a variety of shapes and positions for the same purpose.

In the event a bottle becomes lodged, or in any way the spider becomes jammed, the jamming will have the same effect upon the disc 54 as would the engagement of a groove in that disc by the finger on the end of arm 60. That is, the shaft 55 being moved by friction, when the friction becomes sufficiently great the spider will no longer turn, and consequently will be stopped before any damage is done.

The springs 17 and 18 and the rubber blanket 21, as well as the rubber platen 26, all contribute to provide the necessary flexibility to overcome the unevenness of the surface of a bottle.

As has been indicated above, this application is particularly designed for use in printing on bottles and is thus related to co-pending application Serial No. 704,456, of Donald W. Knaggs, filed December 29, 1933.

From the above description it will be apparent that this invention involves certain principles of construction and operation which may be embodied in other physical forms. I do not, therefore, desire to be strictly limited to this disclosure as given for purposes of illustration, but rather to the scope of the appended claims.

What is claimed is:

1. A printing machine comprising means for feeding an object to be printed into alignment with a pair of jaws, means for causing said jaws to engage and center said object for the printing operation and resilient supporting means for said jaws to provide proper printing pressure.

2. A printing machine comprising means for feeding an object to be printed into alignment with a pair of jaws, means for causing said jaws to engage said object, said jaws having beveled edges which cause them to lift the object clear of the feeding mechanism, and means for resiliently supporting said jaws.

3. A printing machine comprising a frame, an arm attached to said frame, a pair of jaws mounted on said arm, a pair of brackets mounted on said arm beneath said jaws, a pair of springs, one on each bracket supporting said jaws, and means for reciprocating one of said jaws to cause the jaws to grasp and release an object to be printed.

4. A printing machine comprising feeding and delivering mechanism, a spider for receiving an object to be printed from said feeding mechanism, bringing it into position to be moved into engagement with the platen of the machine and delivering it to the delivery mechanism, a platen roller, means for rotating said platen roller, means for causing said spider to rotate in steps, one step for each revolution of the platen roller, in order to permit the object to be stopped at printing position long enough for the printing operation to be performed, and means for lifting said object clear of said spider during the printing operation.

5. In a printing machine, feeding mechanism, delivery mechanism, a spider for receiving an object to be printed from the feeding mechanism, bringing it to printing position and delivering it to the delivery mechanism, means for causing intermittent rotative movement of said spider, and means for lifting said object clear of said spider while at printing position.

6. A printing machine comprising a platen roller, a pair of jaws mounted in spaced relation with said roller, means for periodically varying the space between said jaws in synchronism with the rotation of said roller, whereby an object to be printed may be engaged by said roller while held by said jaws, and resilient means supporting said jaws to press the object to be printed against said roller.

7. In a printing machine a shaft, a platen roller keyed to said shaft, a gear wheel also keyed to said shaft, a cam surface on one side of said gear wheel, a finger on the other side of said gear wheel, an arm having a cam follower for engagement with said cam surface, a reciprocating shaft actuated by said arm in response to the engagement of said follower by said cam, a jaw secured to the other end of said reciprocating shaft, a bell crank, the upper arm of said bell crank being positioned for engagement by said finger, a second shaft, a disc keyed to said

second shaft, a plurality of notches in said disc, a second disc, means for driving said second shaft by frictional engagement of said second disc with said disc, a finger on the lower arm of said bell crank for engaging successive notches in said disc to prevent rotation thereof, whereby said second shaft is rotated in steps, successive steps being permitted by the engagement of said sprocket finger with the upper arm of the bell crank to remove the bell crank finger from successive notches in said disc in which it has lodged and a spider secured to said second shaft for feeding objects to be printed.

8. In a printing machine, means for feeding objects to be printed to said machine, a spider for moving said objects to printing position, a pair of jaws, means to actuate said jaws to cause them to grab said object, lift it clear of the spider, hold it in resilient engagement with the printing roller, and then return it to the spider, and means for further actuating said spider to cause it to deliver said object from the machine.

9. A machine for printing on bottles comprising an endless chain feeding and delivering mechanism, a plurality of brackets mounted on said chain for holding the bottles, means for moving said chain so that successive bottles come to printing position, means for stopping said chain, a resiliently supported pair of jaws, means to actuate said jaws to cause them to engage one of said bottles at each actuation to lift said bottle clear of said chain, hold it in resilient engagement for printing, and then return it to said chain, and means for again actuating said chain to remove the printed bottle from the printing position and to move the next bottle into printing position.

10. In a printing machine, an endless chain feeding and delivering mechanism, said mechanism comprising brackets on said chain for holding articles, a platen roller, means for rotating said platen roller, means for causing step by step movement of said mechanism, one step for each revolution of said platen roller, in order to permit an article to be placed in position beneath said platen roller and the preceding article to be removed from such position, and means for lifting the article from said mechanism and holding it in resilient engagement with said platen roller during the printing operation.

11. In a printing machine, a shaft, a platen roller keyed to said shaft, a gear wheel also keyed to said shaft, a cam surface on one side of said gear wheel, a finger on the other side of said gear wheel, an arm having a cam follower for engagement with said cam surface, a reciprocating shaft actuated by said arm in response to the engagement of said follower by said cam, a jaw secured to the other end of said reciprocating shaft, a bell crank, the upper arm of said bell crank being positioned for engagement by said finger, a second shaft, a disc keyed to said second shaft, a plurality of notches in said disc, a second disc, means for driving said second shaft by frictional engagement of said second disc with said disc, a finger on the lower arm of said bell crank for engaging successive notches in said disc to prevent rotation thereof, whereby said second shaft is rotated in steps, successive steps being permitted by the engagement of said sprocket finger with the upper arm of the bell crank to remove the bell crank finger from successive notches in said disc in which it has lodged, and a sprocket secured to said second shaft for driving a mechanism for feeding the articles to be printed.

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