

Nov. 10, 1936.

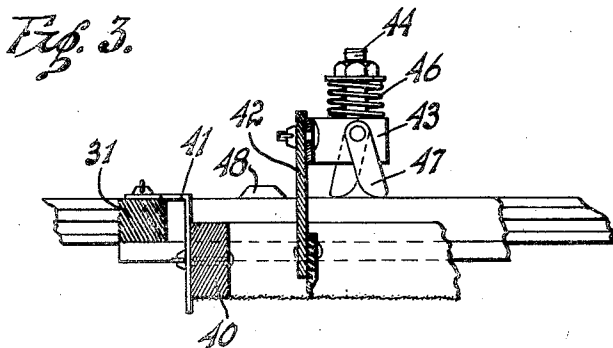
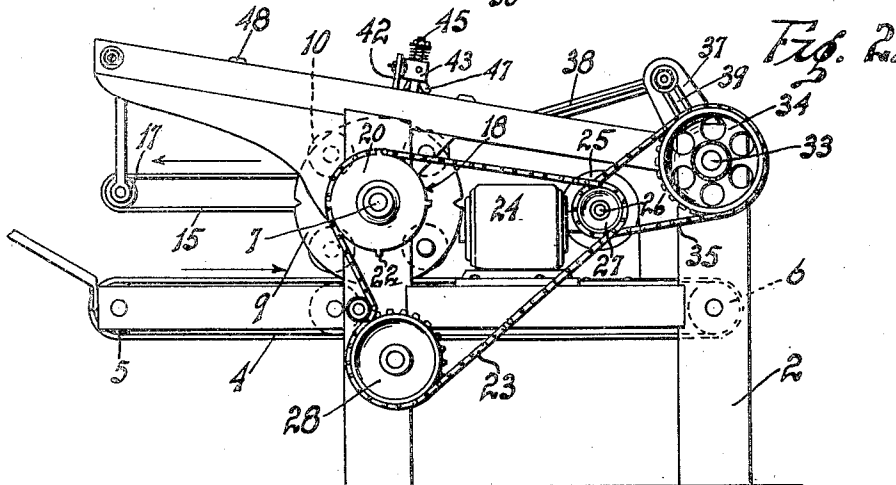
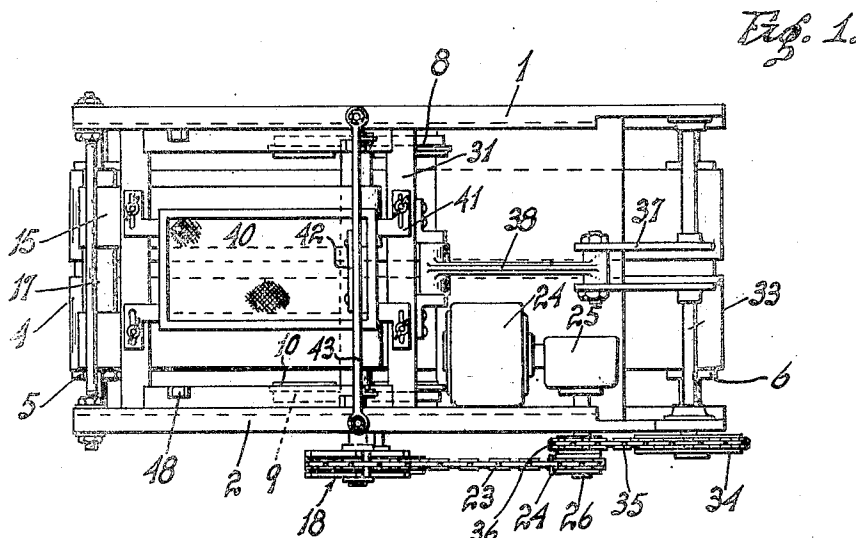
F. SHURLEY ET AL

2,060,385

PRINTING MACHINE FOR IMPENETRABLE SURFACES

Filed June 28, 1935

3 Sheets-Sheet 1



INVENTORS.

FREDERICK SHURLEY.

Q. H. SHURLEY.

BY.

K. R. Duckman

ATTORNEY.

Nov. 10, 1936.

F. SHURLEY ET AL

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3 Sheets-Sheet 2

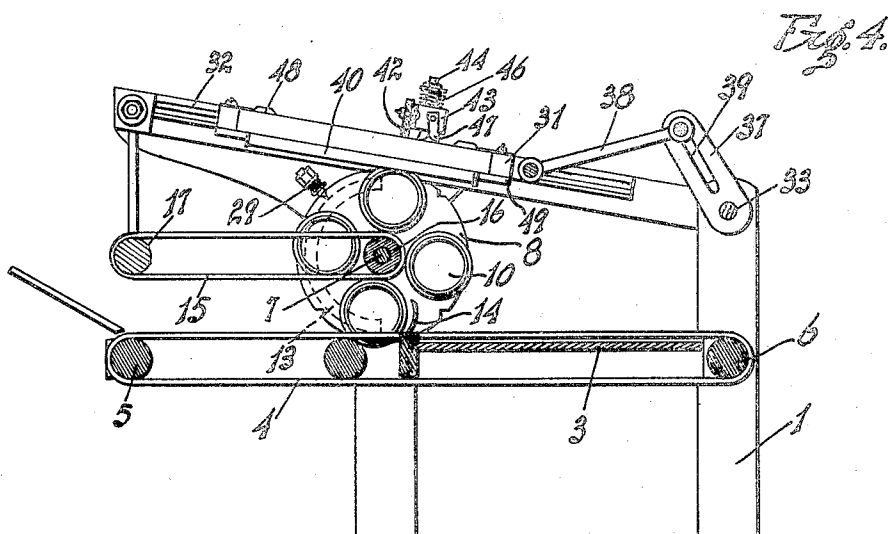


Fig. 5.

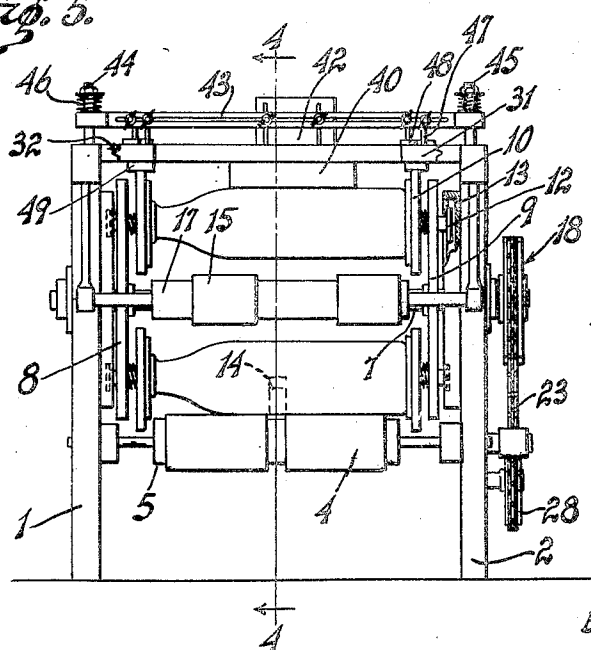
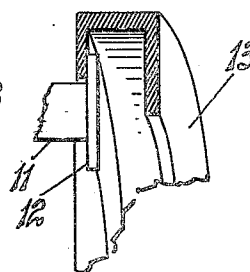


Fig. 6.



INVENTORS.
FREDERICK SHURLEY.
Q. H. SHURLEY.

BY.

H. R. Duckman

ATTORNEY.

Nov. 10, 1936.

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3 Sheets-Sheet 3

Fig. 7.

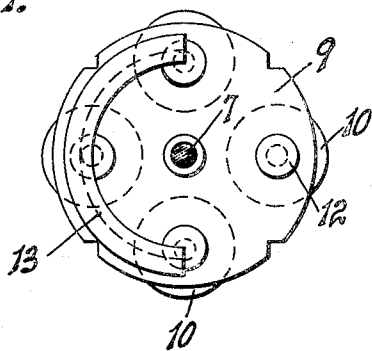


Fig. 8.

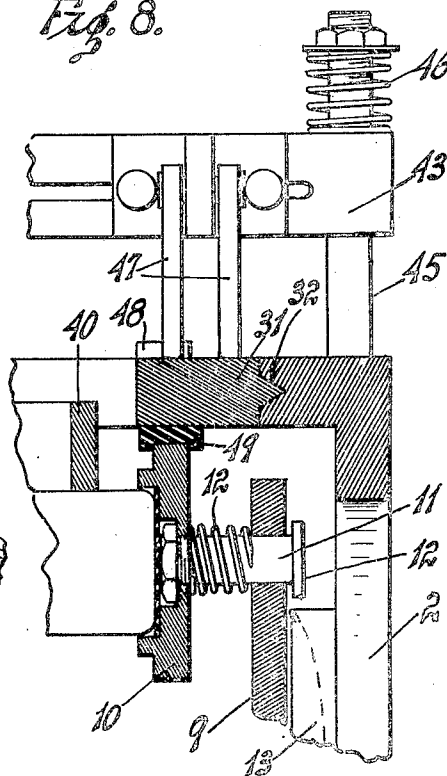


Fig. 9.

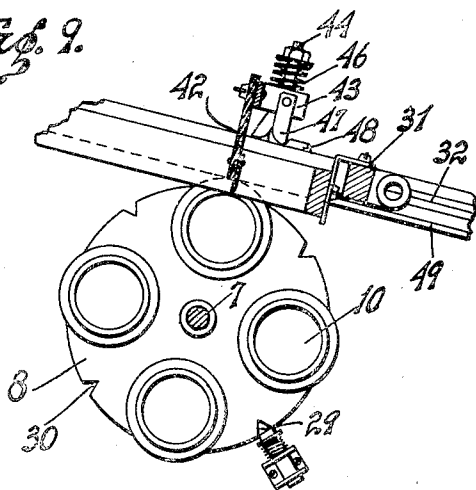


Fig. 11.

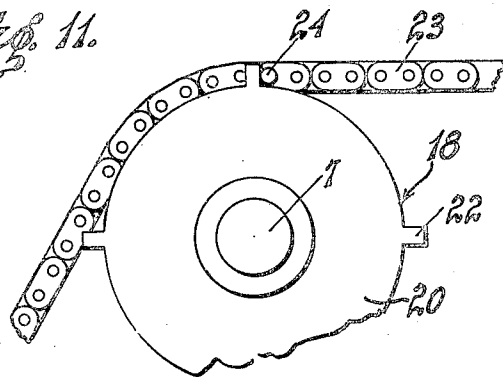
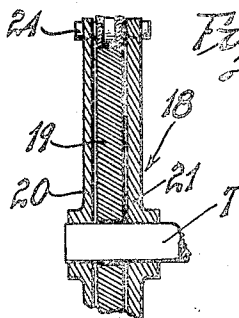


Fig. 10.



INVENTORS.
FREDERICK SHURLEY.
Q. H. SHURLEY.
BY
H. A. Dickman
ATTORNEY.

UNITED STATES PATENT OFFICE

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PRINTING MACHINE FOR IMPENETRABLE SURFACES

Frederick Shurley and Queenie Halford Shurley,
Huntington Park, Calif.

Application June 28, 1935, Serial No. 28,886

15 Claims. (Cl. 101—124)

This invention relates to a machine for printing directly upon the surface of glassware, "bak-o-lite," metal, or any other hard impenetrable surface. The articles formed of such material may be bottles, jars, tumblers, bulbs, cans, and the like. These articles formed of the materials suggested, are supplied with a design, trade-mark, or other insignia, which will be permanent, or substantially so. The usefulness of the articles will thus be materially increased and the insignia thereon may be printed in one or more colors.

An object of our invention is to provide a machine of the character stated, in which insignia are placed upon articles formed of a hard impenetrable material, without having to print labels on paper or other sheet material, and then affixing the labels to the articles.

Another object is to provide a novel machine for printing on hard surfaced articles, said machine receiving, holding and printing one or more of these articles, and said receiving, holding and printing being done automatically, accurately and with great rapidity.

A feature of our machine is a revolving carrier in which the articles are received, a movable printing frame in which the dies, cuts or stencils are held, the articles being moved into engagement with the printing frame and subsequently printed.

Another feature of our machine is to provide a printing frame which will print upon the articles in both directions of its reciprocal movement.

Still another feature is to provide a novel means of operating a squeegee whereby the ink is distributed upon the printing frame in both directions of the movement of said frame.

Another object is to provide a novel means of receiving, and holding the articles to be printed, and revolving said articles—if they are round—said revolving of the articles being synchronous with the movement of the printing frame. Thus, the printing is accomplished during the movement of the printing frame and the revolving of the articles.

A further feature of our invention is to provide a novel means of discharging the articles after they have been printed, upon a conveyor whereby the articles are moved away from printing position.

Still a further object is to provide a novel conveyor for the articles, which conveyor moves intermittently and carries the articles in proper position to be printed upon.

In the drawings,

Figure 1 is a top plan view of our machine.

Figure 2 is a side elevation of the same.

Figure 3 is a fragmentary longitudinal sectional view of the printing frame and the squeegee.

Figure 4 is a sectional view taken on line 4—4 of Fig. 5.

Figure 5 is an end view of our machine.

Figure 6 is a fragmentary transverse sectional view of the retracting cam.

Figure 7 is a face view of one of the conveyor discs showing the position of the retracting cam.

Figure 8 is an enlarged fragmentary transverse sectional view of our machine showing portions of the printing frame and the article conveyor.

Figure 9 is a fragmentary longitudinal sectional view of the printing frame and the article conveyor.

Figure 10 is a fragmentary transverse sectional view of the Geneva gear.

Figure 11 is a fragmentary face view of the Geneva gear.

Referring more particularly to the drawings, our printing machine comprises a pair of side frame members 1, 2. A transverse bed 3 extends between the frame members 1, 2. The frame is built up of structural members, such as structural shapes, plates, and the like.

A substantially horizontal conveyor belt 4 extends over horizontal rollers 5, 6 and the articles to be printed are rolled onto the conveyor belt, and then move into the machine to be caught by an elevator or rotary conveyor, as will be subsequently described.

A horizontal shaft 7 is journaled in the frame members 1, 2, and this shaft carries a pair of discs 8, 9, secured thereto, said discs being positioned adjacent the frame members 1, 2, respectively. Each of the discs 8, 9 is provided with means to engage and hold the articles to be printed, and in the present instance, this article will be considered to be a bottle.

Each of the discs carries a plurality of chucks 10 which are positioned inwardly of the discs 8, 9. The construction of all of the chucks is identical. Therefore, only one will be described in detail. A chuck on each of the discs 8, 9 is yieldably pressed inwardly against the ends of the bottle, thus holding the bottle in a horizontal position and conveying said bottle upwardly as the discs rotate, as will be further described.

Each of the chucks is provided with a trunnion 11 fixedly attached thereto and journaled in the disc. A coil spring 12 encircles the trunnion and is positioned between the disc and the chuck, thus yieldably pressing the chuck outwardly against the end of the bottle. Each of the trunnions is

formed with a head 12 on the outer end thereof and the head engages a box cam 13 as the discs rotate, thereby drawing the trunnions and the chucks outwardly to release the bottle. The bottle moves inwardly on the conveyor 4 and is halted by a spring stop finger 14. The box cam 13 terminates at the lower end of the discs so that the trunnion 11 is released when the chucks 10 are in the lowermost position. When the trunnion is released, the chucks spring inwardly and hold the bottle which is resting against the stop 14. As the discs rotate, the spring stop 14 yields and permits the bottle to move upwardly past the stop. The cam 13 starts adjacent the uppermost position of the bottle so that continued movement of the discs will retract the chucks and permit the bottle to drop upon a discharge conveyor 15. The discharge conveyor extends around the pulley 16 attached to the shaft 7, and around an idler pulley 17 journaled adjacent the intake end of our machine.

The shaft 7 and the discs 8, 9 are intermittently rotated thru a Geneva gear 18 on the shaft. This gear consists of a sprocket 19 which is freely rotatable on the shaft 7. A pair of plates 20, 21 are mounted, one on each side of the sprocket 19, and these plates are attached to the shaft 7. Each of the plates 20, 21 is provided with a plurality of outwardly extending pins 22. A chain 23 is formed with a plurality of spaced pins 24 along the length thereof and these last named pins engage the pins 22, thereby rotating the plates 20, 21 and the shaft 7. The chain 23 partly encircles the sprocket 19, and therefore, the plates 20, 21 are only rotated a partial revolution. As the chain 23 leaves the sprocket, the pins 24 will disengage the pins 22 and the plates 20, 21 will then remain stationary.

The chain 23 is driven from a motor 24 which drives thru a reduction gear 25 and thence to a shaft 26. The chain 23 encircles a sprocket 27 on the shaft 26 and also an idler sprocket 28. The idler sprocket is journaled to the frame member 2 below the Geneva gear 18.

The Geneva gear 18 is only rotated when the pin 24 engages the pins 22, and during the idle period of the shaft 7, the discs 8, 9 are held against accidental rotation by a spring-pressed pawl 29. The pawl drops into one of the notches 30 which notches are properly spaced so that the discs are held stationary when the bottle is in the uppermost position and is being printed.

A rectangular table 31 is reciprocally mounted between the frame members 1, 2. This table fits in longitudinal grooves or tracks 32 in the frame. The table 31 is continuously reciprocated by the following arrangement: A shaft 33 is journaled in the frame members 1, 2 and the sprocket 34 is attached to one end thereof. The sprocket and the shaft are driven by a chain 35 which chain also encircles a sprocket 36 on the shaft 26. The shaft 33 is formed with a crank arm 37. A pitman 38 is journaled on the crank arm and to the table 31. Thus, as the crank arm 37 rotates, the table 31 is reciprocated. The crank arm 37 is slotted as shown at 39 so that the pitman 38 can be adjusted on the arm, thereby varying the reciprocal movement of the table 31.

A printing frame 40 is adjustably mounted on the table 31 by means of a plurality of clips 41. The printing frame is adjustable both vertically and transversely of the machine so that the printing can be properly positioned on the bottle. The bottom of the frame 40 is made of cloth, fine mesh wire, or the like, and the stencil or

pattern is attached to the bottom of the printing frame, all of which is usual and well known in the art.

A squeegee 42 is adjustably attached to a transverse bar 43 which bar is slidably mounted on a pair of posts 44, 45, said posts being secured in the frame members 1, 2.

Coil springs 46, 46 press against the top of the bar 43, thus yieldably urging the bar downwardly and the squeegee against the bottom of the printing frame.

A pair of fingers 47 are pivotally attached to the bar 43 and these fingers are engaged by cams 48 on the table 31. As the table reciprocates, the cam 48 engages one of the fingers 47 and raises the squeegee. This raising operation occurs adjacent the end of each stroke of the table. After the cam passes under the table, the squeegee again drops on the bottom of the printing frame and the ink is then transferred from one side to the other of the squeegee so that said ink is evenly distributed on both the up and down strokes of the table.

As the table 31 reciprocates, the chucks 10 are rotated by yieldable strips 49 which are secured to the bottom of the table 31, and the strips 49 press against the chucks when said chucks reach the top of their movement. Thus, the bottle is rotated at the same rate as the reciprocation of the table 31, and the printing operation from the frame 40 is effectively accomplished. It may be desirable to have the stencil slip with respect to the bottle under certain conditions. The flange, while illustrated as being larger than the bottle, might be smaller than the circumference of the bottle. Any slippage that may take place will not in any way cause smearing of the painting material that is applied to the bottle. The squeegee 42 spreads the ink over the stencil and the ink is then transferred thru the stencil to the surface of the bottle. Printing is accomplished on both the forward and backward strokes of the table, and the discs 8, 9 are so timed that a bottle is always in proper position to be worked upon by the printing frame.

As soon as the bottle has been printed, the discs 8, 9 start to rotate, whereupon the trunnions 11 engage the box cam 13 which cam retracts the chucks 10, and the bottle is then released and drops upon the discharge conveyor 15, as previously described.

At the time the upper bottle is being released from the upper chucks, the bottom set of chucks are released from the cam 13 and spring inwardly to grip another bottle. Thus, bottles are continuously engaged and carried upwardly to a printing position, are rotated while in printing position, the printing table moves over the bottle imprinting the insignia thereon and the bottle is released and discharged—all in continuous sequence.

Having described our invention, we claim:

1. A printing machine for articles having an impenetrable surface, comprising a pair of spaced discs, means intermittently rotating said discs, gripping means on the discs adapted and arranged to hold the articles, a printing frame adjacent the top of the discs, said discs carrying the articles into engagement with the printing frame, whereby an imprint is made on the articles, and means releasing said gripping means after said articles have been printed, the imprint on the article being made while the discs are stationary.

2. A printing machine for articles having an

impenetrable surface, comprising a pair of spaced discs, means intermittently rotating said discs, gripping means on the discs adapted and arranged to hold the articles, a printing frame adjacent the top of the discs, said discs carrying the articles into engagement with the printing frame, whereby an imprint is made on the articles, and means releasing said gripping means after said articles have been printed, and means to reciprocate the printing frame, said discs carrying the articles into engagement with the frame prior to each movement of the frame, and between movements of the printing frame, said printing frame being adapted and arranged to print an article on either the forward or backward movement of said frame.

3. A printing machine for articles having an impenetrable surface, comprising a pair of spaced discs, a plurality of chucks on the discs, means yieldably pressing the chucks inwardly against the articles held between the chucks, means to rotate the discs, a printing frame adjacent the top of the discs, means to release the chucks after the articles are carried past the printing frame, means to reciprocate said printing frame, said discs carrying the articles into engagement with the frame prior to each movement of the frame, and between movements of the printing frame, said printing frame being adapted and arranged to print an article on either the forward or backward movement of the frame.

4. A printing machine for articles having an impenetrable surface, comprising a pair of spaced discs, a plurality of chucks on the discs, means yieldably pressing the chucks inwardly against the articles held between the chucks, means to intermittently rotate the discs, a printing frame adjacent the top of the discs, and means to release the chucks after the articles are carried past the printing frame, said discs carrying the articles against the printing frame whereby they are printed, the imprint on the article being made while the discs are stationary.

5. A printing machine for articles having an impenetrable surface, comprising a feed conveyor, a pair of spaced discs rotatably mounted above the conveyor, means to rotate said discs, a plurality of chucks mounted on the discs, said chucks being yieldably pressed inwardly against an article held therebetween, a printing frame reciprocally mounted adjacent the top of the discs, drive means for said printing frame, said discs carrying the articles into engagement with the frame prior to each movement of the frame, and between movements of the printing frame, said printing frame being adapted and arranged to print on either the forward or backward movement thereof.

6. A printing machine for articles having an impenetrable surface, comprising a reciprocally mounted printing frame including a stencil, a squeegee cooperating with the stencil, means to drive the printing frame, means engaging the squeegee, whereby it is raised adjacent the end of the forward and backward stroke of the printing frame, a conveyor means engaging the articles, said conveyor means conducting the articles against the bottom of the printing frame, whereby an imprint is made on the article.

7. A printing machine for articles having an impenetrable surface, comprising a reciprocally mounted printing frame including a stencil, a squeegee cooperating with the stencil, means to drive the printing frame, means engaging the squeegee, whereby it is raised adjacent the end

of the forward and backward stroke of the printing frame, a pair of spaced discs, means to rotate the discs, a plurality of chucks on each of the discs, said chucks being adapted and arranged to engage and hold the articles and to convey said articles against the bottom of the printing frame.

8. A printing machine for articles having an impenetrable surface, comprising a reciprocally mounted printing frame including a stencil, a squeegee cooperating with the stencil whereby ink is spread over the stencil, means to drive the printing frame, means engaging the squeegee, whereby it is raised adjacent the end of the forward and backward stroke of the printing frame, a pair of spaced discs, means to rotate the discs, a plurality of chucks on each of the discs, said chucks being adapted and arranged to engage and hold the articles and to convey said articles against the bottom of the printing frame, and means releasing the chucks from the articles after said articles have been printed.

9. A printing machine for articles having an impenetrable surface, comprising an intake conveyor, a pair of spaced discs rotatably mounted above the conveyor, means to intermittently rotate said discs, a plurality of chucks on each of the discs, said chucks being adapted and arranged to engage and hold the articles between the discs, a printing frame reciprocally mounted adjacent the top of the discs, means to reciprocate the printing frame, said discs carrying articles against the bottom of the printing frame whereby an imprint is made on the articles, and means releasing the chucks after the articles have been printed, and a discharge conveyor adapted to receive the articles after they have been printed.

10. A printing machine for articles having an impenetrable surface, comprising an intake conveyor, a pair of spaced discs rotatably mounted above the conveyor, means to intermittently rotate said discs, a plurality of chucks on each of the discs, said chucks being adapted and arranged to engage and hold the articles between the discs, a printing frame including a stencil reciprocally mounted adjacent the top of the discs, means to reciprocate the printing frame, said discs carrying articles against the bottom of the printing frame whereby an imprint is made on the articles, means releasing the chucks after the articles have been printed, a discharge conveyor adapted to receive the articles after they have been printed, a squeegee pressing against the bottom of the printing frame, means engaging the squeegee whereby said squeegee is raised at both the forward and backward stroke of the printing frame.

11. A printing machine for articles having an impenetrable surface, comprising a pair of spaced discs, means intermittently rotating said discs, gripping means on the discs adapted and arranged to hold the articles, a printing frame adjacent the top of the discs, said discs carrying the articles into engagement with the printing frame, whereby an imprint is made on the articles, and means releasing said gripping means after said articles have been printed, means to reciprocate the printing frame, said discs carrying the articles into engagement with the frame prior to each movement of the frame, and between movements of the printing frame, said printing frame being adapted and arranged to print an article on either the forward or backward movement of said frame, and means to rotate the article as the printing frame is moved thereover.

12. A printing machine for articles having an

impenetrable surface, comprising vertically rotatable conveyor means, releasable gripping means on the conveyor means adapted and arranged to releasably hold said articles, a printing frame, means to reciprocate said printing frame over the articles held by the conveyor means, said conveyor means moving a different article into engagement with the printing frame prior to each movement of the frame, said article being rotatable when held in the conveyor means, and means releasing the gripping means after the article is printed.

13. A printing machine for articles having an impenetrable surface, comprising vertically rotatable conveyor means, releasable gripping means on the conveyor means adapted and arranged to releasably hold said articles, a printing frame, means to reciprocate said printing frame over the articles held by the conveyor means, said conveyor means moving a different article into engagement with the printing frame prior to each movement of the frame, said article being rotatable when held in the conveyor means, means releasing the gripping means after the article is printed, a stencil in the printing frame, a squeegee movable over the stencil, and means intermittently rotating the conveyor means.

14. A printing machine for articles having an

impenetrable surface, comprising conveyor means adapted to grip and hold the articles, printing means, mechanism for reciprocating the printing means, said conveyor means adapted to move a different article into engagement with the printing means prior to each stroke of the latter; and between movements of the printing means, said printing means being adapted to print on an article only during one stroke of its movement and additional means for releasing the gripping means after the article has been printed.

15. A printing machine for articles having an impenetrable surface, comprising conveyor means adapted to grip and hold the articles, printing means, mechanism for reciprocating the printing means, said conveyor means adapted to move a different article into engagement with the printing means prior to each stroke of the latter, and between movements of the printing means, said printing means being adapted to print on an article only during one stroke of its movement, additional means for releasing the gripping means after the article has been printed, and means to rotate the article as the printing means is moved thereover.

FREDERICK SHURLEY.

QUEENIE HALFORD SHURLEY.