June 29, 1937. F. SHURLEY ET AL 2,085,126

CONTINUOUS PRINTING MACHINE

Filed June 15, 1936 3 Sheets-Sheet 1

Fig. 1.

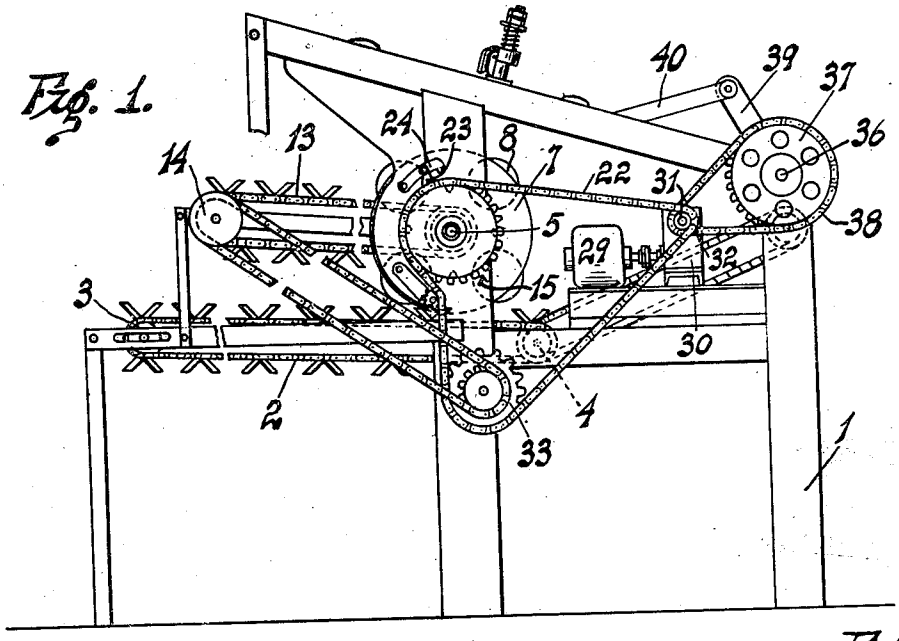


Fig. 2.

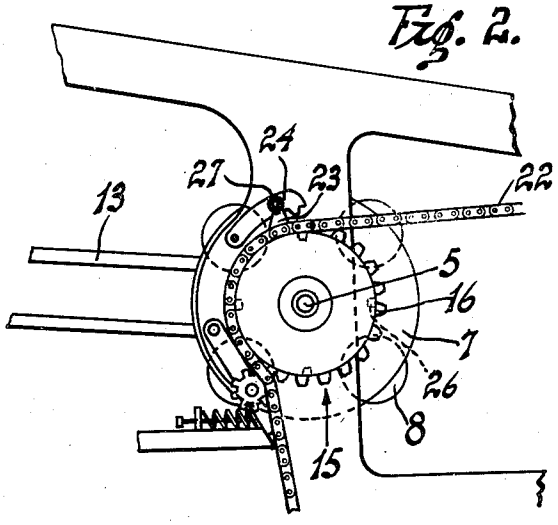
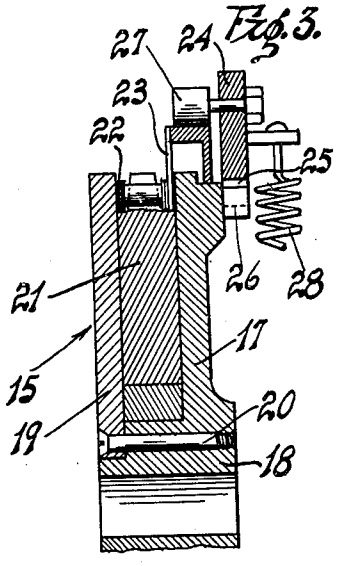


Fig. 3.



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CONTINUOUS PRINTING MACHINE

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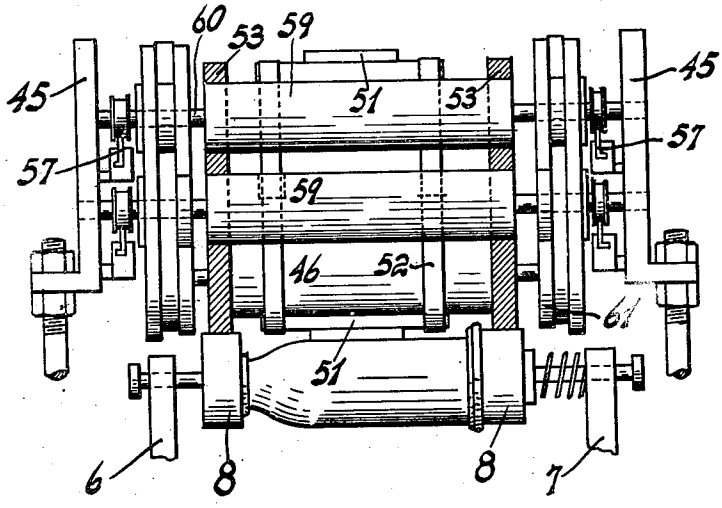


Fig. 6.

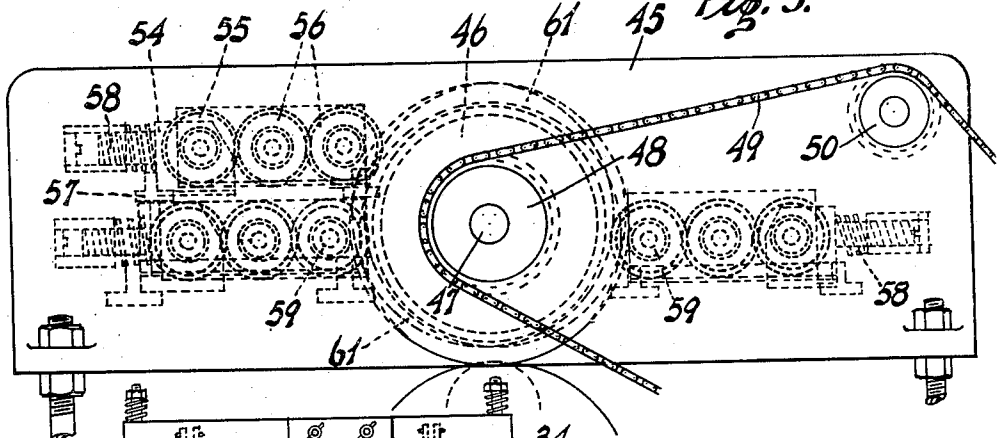


Fig. 5.

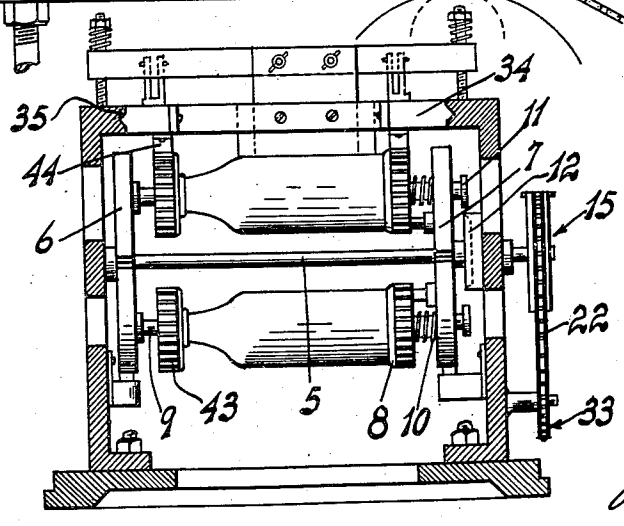


Fig. 4.

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Filed June 15, 1936 3 Sheets-Sheet 3

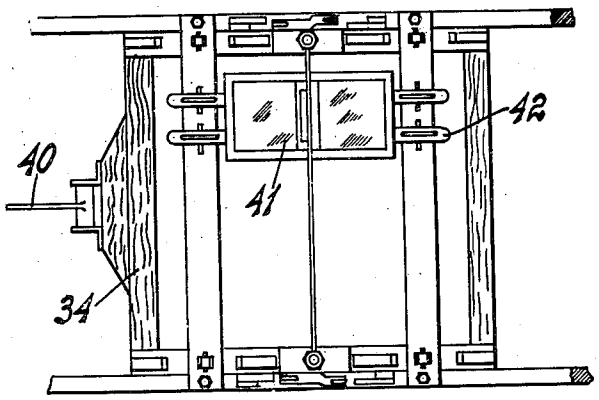


Fig. 7.

Fig. 8.

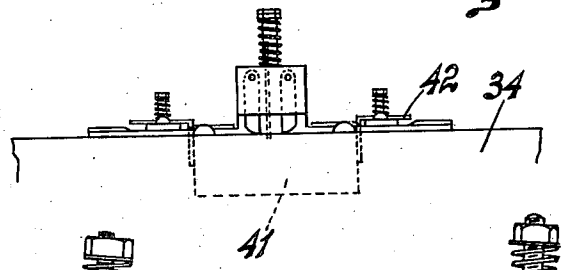


Fig. 9.

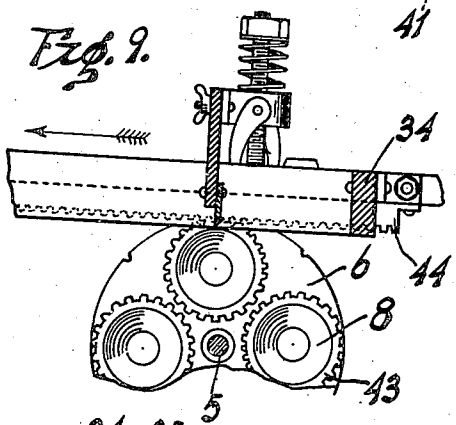
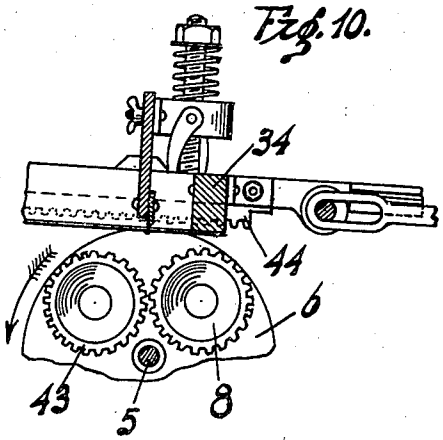


Fig. 10.



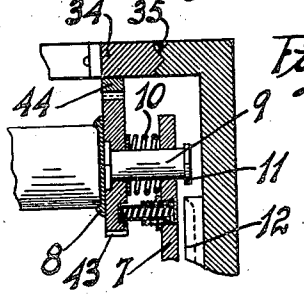


Fig. 11.

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UNITED STATES PATENT OFFICE

2,085,126

CONTINUOUS PRINTING MACHINE

Frederick Shurley and Queenie Halford Shurley,
Salt Lake City, Utah

Application June 15, 1936, Serial No. 85,280

12 Claims. (Cl. 101—40)

This invention relates to a machine for printing directly upon the surface of glassware, synthetic moulded compositions, metal, or any other hard impenetrable surface. The articles formed of such materials may be bottles, jars, tumblers, bulbs, cans, and the like, and 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 insignias are placed upon articles formed of a hard impenetrable material, without having to print labels on paper or other sheet material, and then having to affix 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; 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 object is to provide a novel means of receiving and holding the articles to be printed, 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 another 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.

Another object of our invention is to provide a multi-color printing mechanism which will be interchangeable with the stencil and squeegee device, said mechanism being constructed as a unit attachment and operated from the motive power of the machine.

In the drawings

Figure 1 is a side elevation of our continuous printing machine.

Figure 2 is an enlarged fragmentary side elevation of the intermittent time wheel.

Figure 3 is a transverse sectional view of the same.

Figure 4 is an end view of the chucks and the means to operate same.

Figure 5 is a side elevation of the multi-color printing attachment.

Figure 6 is an end view of the same.

Figure 7 is a plan view of the printing frame.

Figure 8 is a fragmentary side elevation of the same.

Figure 9 is a fragmentary side elevation of an alternative means to rotate the chucks.

Figure 10 is a further view of the same showing the chucks in the free position from the rotating means.

Figure 11 is a fragmentary cross sectional view thru one end of a chuck and the supporting frame.

This invention is a continuation in part of our copending application, Ser. No. 28,886, for Printing machine for impenetrable surfaces.

Our continuous printing machine comprises a pair of side frame members 1. The frame is preferably built up of structural members, such as structural shapes, plates, and the like. A substantially horizontal conveyor belt 2 extends over horizontal rollers 3, 4, and the articles to be printed are rolled onto the conveyor belt and then moved into the machine to be caught by an elevator or rotary conveyor, as will be subsequently described.

A horizontal shaft 5 is journaled in the frame members 1, and this shaft carries a pair of discs 6, 7 secured thereto, said discs being positioned adjacent the frame members 1. Each of the discs 6, 7 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 8 which are positioned inwardly of the discs 6, 7. The construction of all of the chucks is identical. A chuck on each of the discs 6, 7 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 discs is provided with a trunnion 9 fixedly attached thereto and journaled in the disc.

A coil spring 10 encircles the trunnion and is positioned between the disc and the chuck, thus yieldably pressing the chuck inwardly against the

end of the bottle. Each of the trunnions is formed with a head 11 on the outer end thereof and the head engages a box cam 12 as the discs rotate, thereby drawing the trunnions and the chucks outwardly to release the bottle. The bottle moves inwardly on the conveyor and since the box cam 12 terminates at the lower end of the discs so that the trunnion 9 is released when the chucks are in the lowermost position, the bottle is engaged by the chucks and carried upwardly as the discs rotate.

The cam 12 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 the discharge conveyor 13. The discharge conveyor extends around pulleys on the shaft 7 and around a pulley 14 journaled adjacent the intake end of our machine.

The shaft 5 and the discs 6 and 7 are intermittently rotated thru a Geneva gear 15 on the shaft 5. This Geneva gear comprises a timing wheel 16 having an inner disc 17 constructed integrally with the hub 18, and the outer disc 19 secured thereto by bolts 20. Between the two discs is a third or driving gear 21 which is rotatably mounted on the hub 18. This central gear 21 constitutes an idler for the chain 22. The method of driving this chain will be subsequently described.

Spaced equidistantly on the chain in predetermined positions is a number of lugs 23 which are designed to engage and swing a pawl 24 pivotally mounted on the frame 1. This pawl 24 is provided with a projection 25 which engages a notch 26 in the flange of the disc 17. A number of these notches are provided and they are spaced equidistantly around the flange to correspond with the number and position of the chucks 8.

From the foregoing it will be seen that as the chain 22 rotates, the pawl 24 will be lifted by the lug 23, thus releasing the discs 17 and 19 and permitting them to rotate with the gear 21 because of the frictional engagement of the discs and gear. The pawl is provided with a roller 27 which is mounted on a pin projecting from the pawl. This roller is engaged by the lug 23 when actuating the pawl. When the lug disengages the roller, the pawl is again brought into contact with the flange of the disc 17 by means of a spring 28 and therefore engages the next notch as the wheel rotates thereby holding the same non-rotatable until again actuated by the sequence of operation.

The chain 22 is driven from a motor 29 which drives thru a reduction gear 30 thence to a shaft 31. The chain encircles a sprocket 32 on the shaft 31 and also an idler sprocket 33. which is journaled to the frame below the Geneva gear 15.

A rectangular table 34 is reciprocally mounted between the frame members 1. This table fits in longitudinal grooves or tracks 35 in the frame. The table 34 is continuously reciprocated by the following arrangement: A shaft 36 is journaled in the frame members 1 and a sprocket 37 is attached to one end thereof. The sprocket and shaft are driven by a chain 38 which chain encircles a sprocket on the shaft 31. The shaft 36 is formed with a crank arm 39 to which a pitman 40 is journaled. The other end of the pitman is pivotally attached to the table 34. Thus, as the crank arm 39 rotates, the table 34 is reciprocated.

A printing frame 41 is adjustably mounted on the table 34 by means of a plurality of clips 42. The printing frame is adjustable both longitudinally and transversely of the machine so that the printing can be properly positioned on the bottle. The bottom of the frame 41 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 is adjustably mounted above the printing frame 41 in a manner described in our copending application.

In order that the chucks 8 will rotate at the same rate as the reciprocation of the table 34, we attach or form a gear 43 on the periphery of each of the chucks and a co-acting gear rack 44 is formed on the under side of the printing frame 34. Thus, there is a positive transmission of the movement of the printing frame to the chucks as the gears on the chuck engage the rack on the frame. As the upper bottle is being released from its engaging chucks, the bottom set of chucks is gripping another bottle. Thus a bottle is continuously engaged and carried upwardly to a printing position, is rotated while in printing position, the printing table moving over the bottle, imprinting an insignia thereon, the bottle being then released and discharged, all in continuous sequence.

The multi-color printing attachment shown in Figs. 5 and 6 comprises a printing unit mounted between two side members 45 which is designed to be bolted to the upper part of the frame 1. A drum 46 is rotatably mounted on a shaft 47 upon which a sprocket 48 is attached. The drum is rotated by means of the chain 49 which in turn is trained over an idler sprocket 50 and to the reduction gear 30 of the motor 29. A plurality of printing blocks 51 are secured on the drum by metal bands 52 in predetermined positions thereon. A different color design is embossed on each of the blocks. A rubber flange 53 is provided on each end of the drum 46 and these flanges engage the chucks 8 to rotate the same during the printing operation.

It will be seen that the blocks 51 are designed to engage the object to be printed, as shown in Fig. 6.

The colored inks are carried in reservoirs 54 in which a roller 55 rotates. This last named roller engages other rollers 56 upon which the ink is evenly distributed and conveyed to the printing blocks 51. The reservoir and rollers are reciprocally mounted on a track 57 and normally urged toward the drum by springs 58. The innermost roller is provided with a pair of rollers 59 mounted on axles 60, said rollers engaging the cam faces 61 mounted on the shaft 47. These cam surfaces are arranged in relation to the respective color printing blocks 51 in such a manner that each set of rollers 56 carrying a certain color will be permitted to engage the particular block of the same color, during which time the other rollers are held away from the drum by the cam arrangement.

It will be seen from the foregoing that the rollers cover and ink in sequence each color block which in turn impresses its design on the article to be printed.

While the preferred embodiment of the invention has been disclosed, it is understood that minor changes in the details of construction, combination and arrangement of co-operating elements may be resorted to within the scope that is claimed without departing from the spirit of the invention.

Where square or irregular shaped articles are

to be printed, and where the printing is on a flat surface, the article is brought into printing position by means of the spaced discs and the engaging chucks as previously described, and thereupon the article remains stationary. The printing frame also is stationary and the squeegee is caused to move back and forth over the bottom of the printing frame thereby causing an imprint to be made upon the article.

Having described our invention, we claim:

1. A continuous 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, gear means on the gripping means, 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, a rack on the printing frame engageable with the gear means whereby the gripping means is rotated, said gripping means releasing the articles after said articles have been printed.

2. A continuous 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, gear means on the gripping means, 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, a rack on the printing frame engageable with the gear means whereby the gripping means is rotated, said gripping means releasing the articles after said articles have been printed, and means to reciprocate said printing frame over the articles.

3. A continuous 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, gear means on the gripping means, 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, a rack on the printing frame engageable with the gear means whereby the gripping means is rotated, said gripping means releasing the articles after they have been printed, means to reciprocate said printing frame over the articles, said printing frame being adapted and arranged to print an article on both forward and backward movement of said frame.

4. A continuous 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, a gear on each of the chucks, a rack on the printing frame engageable wtih each of the gears whereby the chucks are rotated 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.

5. A continuous 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, a gear on each of the chucks, a rack on the printing frame engageable with each of the gears whereby the chucks are rotated, 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, and means to reciprocate said printing frame, said printing frame being adapted and arranged to print an article on both forward and backward movement of the frame.

6. A continuous 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, said means including a timing wheel, a ring spaced from the timing wheel, a gear frictionally engaging the wheel and ring, a drive chain engaging the gear whereby the gear is continuously rotated, a latch releasably engaging the timing wheel, and means on the chain engaging the latch whereby the latch is disengaged from the wheel thereby permitting rotation of said wheel and 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.

7. A continuous 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, said means including a timing wheel, a ring spaced from the timing wheel, a gear frictionally engaging the wheel and ring, a drive chain engaging the gear whereby the gear is continuously rotated, a latch releasably engaging the timing wheel, means on the chain engaging the latch whereby the latch is disengaged from the wheel thereby permitting rotation of said wheel and 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, a gear on each of the chucks, a rack on the printing frame engageable with each of the gears, and means to reciprocate the frame thereby rotating the chucks.

8. 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, a gear on each of the chucks, a rack on the frame, each of the gears successively engaging the rack whereby the chucks are rotated, 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.

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, said means comprising a timing wheel attached to the discs, a ring spaced from the timing wheel, a gear frictionally engaging the timing wheel, a drive chain driving the gear, a latch mounted adjacent the timing wheel, and engageable with said wheel whereby the wheel is held stationary, means on the chain adapted to engage the latch whereby the latch is disengaged from the timing wheel, permitting partial rotation of the wheel, 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.

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, said means comprising a timing wheel attached to the discs, a ring spaced from the timing wheel, a gear frictionally engaging the timing wheel, a drive chain driving the gear, a latch mounted adjacent the timing wheel and engageable with said wheel whereby the wheel is held stationary, means on the chain adapted to engage the latch whereby the latch is disengaged from the timing wheel, permitting partial rotation of the wheel, 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, a gear on each of the chucks, a rack on the printing frame, each of the gears successively engaging the rack whereby the chucks are rotated, 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 conveyor means adapted to grip and hold the articles, printing means adjacent the conveyor means, means to reciprocate the printing means over the article held in the conveyor means, said printing means being adapted and arranged to print on both the forward and backward movement of the printing frame, said means comprising a timing wheel attached to the discs, a ring spaced from the timing wheel, a gear frictionally engaging the timing wheel, a drive chain driving the gear, a latch mounted adjacent the timing wheel and engageable with said wheel whereby the wheel is held stationary, means on the chain adapted to engage the latch whereby the latch is disengaged from the timing wheel, permitting partial rotation of the wheel, said conveyor means releasing the article after said article has been printed, and means to rotate the article as the printing frame is being moved thereover.

12. 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 frames at each movement thereof, whereby an imprint is made on the articles, said gripping means releasing the articles after said articles have been printed, means to reciprocate the printing frame, said printing frame being adapted and arranged to print an article on both forward and backward movement of said frame, means to rotate the article as the printing frame is moved thereover, said last named means including a gear on each of the gripping means, a rack on the printing frame and each of the gears successively engaging the rack.

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