March 20, 1956 J. H. BEDDOES ET AL 2,738,607

APPARATUS FOR ACID STAMPING GLASSWARE

Filed April 29, 1954 3 Sheets-Sheet 1

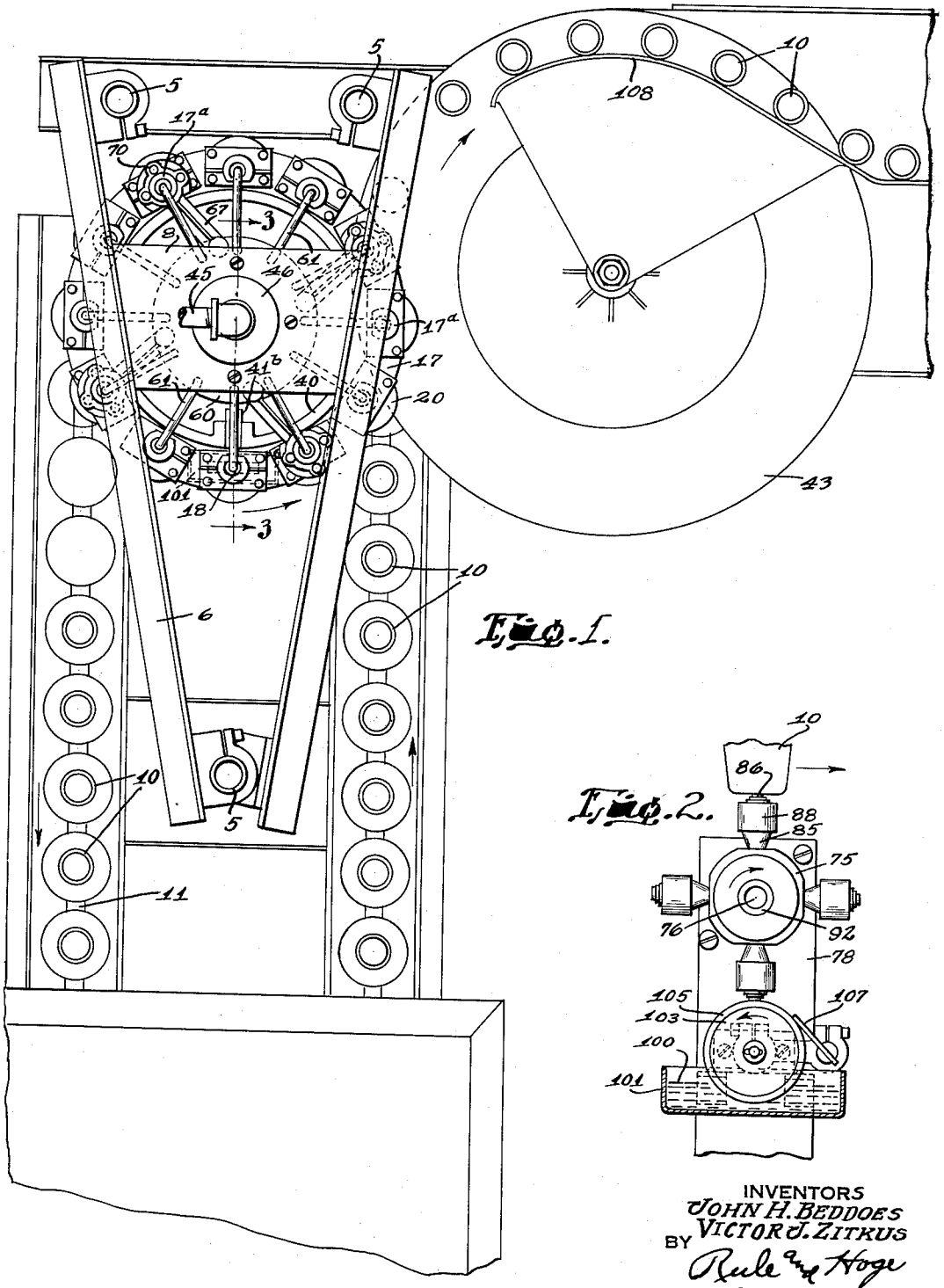


Fig. 1.

Fig. 2.

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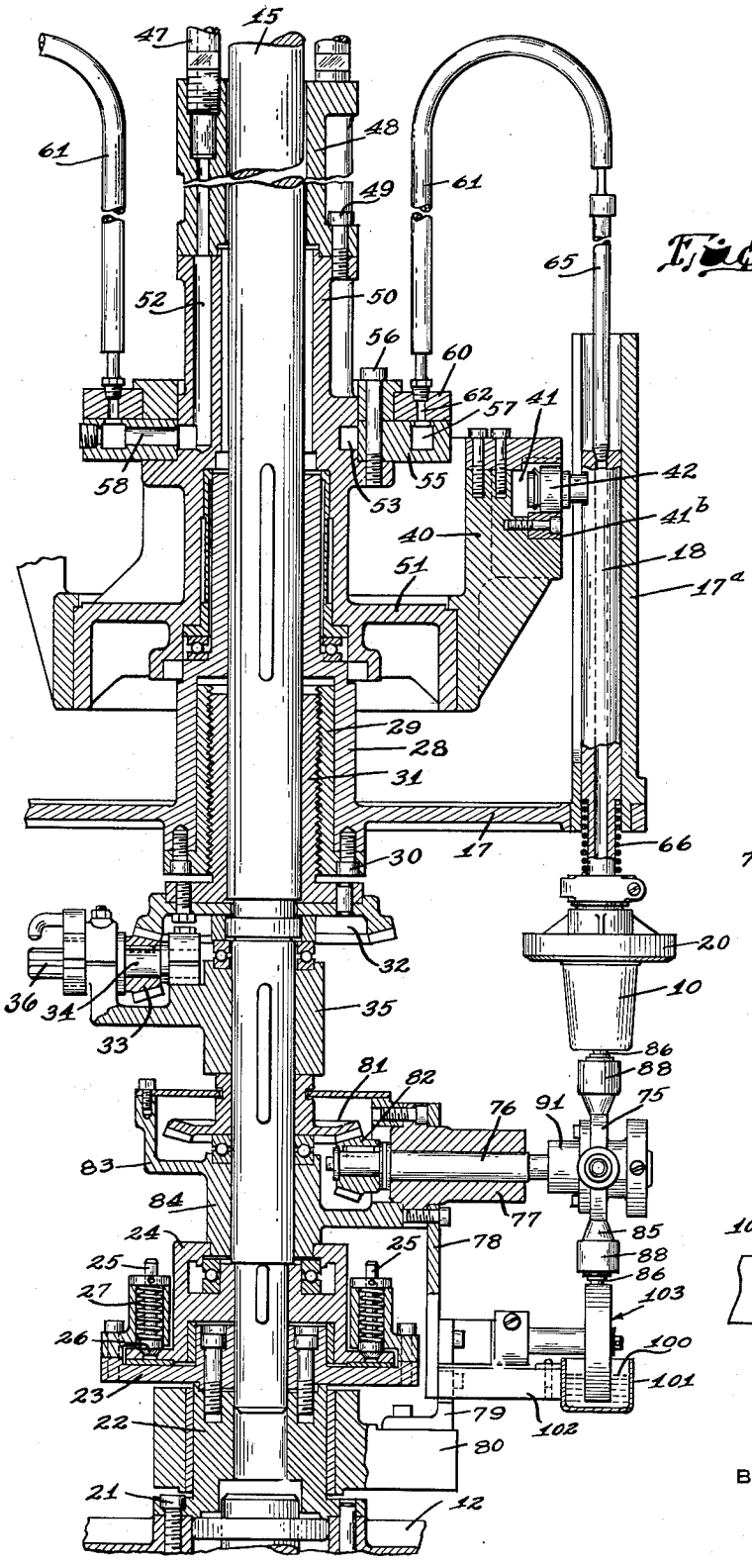


Fig. 3.

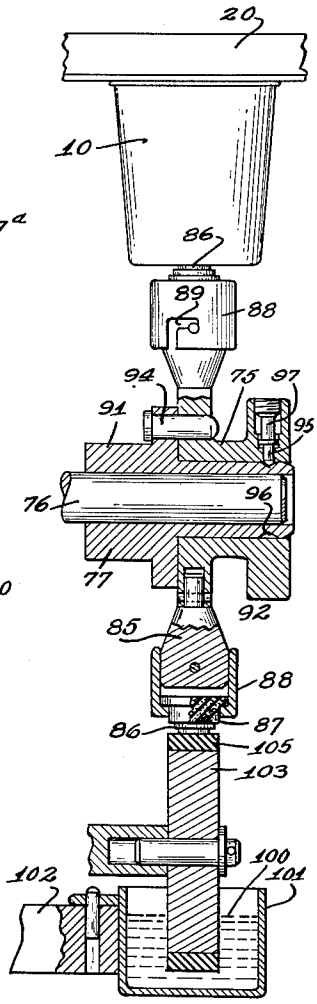


Fig. 4.

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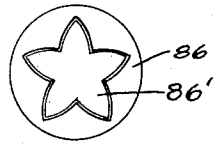


Fig. 8.

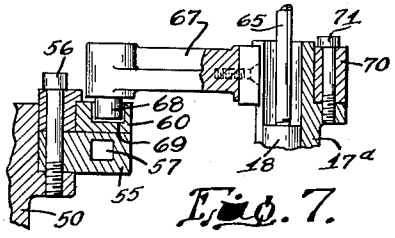


Fig. 7.

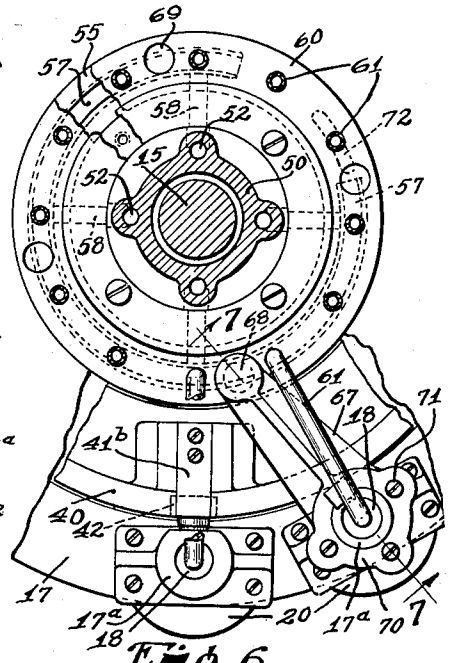


Fig. 6.

Fig. 5.

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APPARATUS FOR ACID STAMPING GLASSWARE

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Application April 29, 1954, Serial No. 426,502

15 Claims. (Cl. 41—9)

Our invention relates to apparatus for transferring articles from one position or carrier to another and for stamping or applying surface markings to the articles at an intermediate position during the transfer, such markings comprising lettering, decorations, trade-marks or other insignia. The invention in the form herein illustrated is particularly adapted for acid stamping glassware with a trade-mark or other mark, decoration, lettering or design.

The apparatus in the form herein shown, provides automatic means for taking glass articles, such as tumblers, from a heat treating apparatus, stamping them or etching them with acid in a particular design, such as a letter or trade-mark, and transferring them to a conveyor or the like. An object of the invention is to thereby eliminate the usual hand labor involved in applying a marking of this character. Such hand labor comprises removing the tumblers by hand from the heat treating apparatus, inverting the tumblers by hand, applying or stamping the acid mark to the inverted tumblers, and re-inverting them to upright position, all by hand.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings which illustrate a preferred embodiment of our invention:

Fig. 1 is a partly diagrammatic plan view of the apparatus;

Fig. 2 is a part-sectional elevational view of the stamping assembly;

Fig. 3 is a sectional elevation at the line 3—3 on Fig. 1, on a comparatively large scale;

Fig. 4 is a part-sectional elevational view of the stamping assembly, viewed in a direction at right angles to that of Fig. 2 and on a larger scale;

Fig. 5 is an elevational view of the apparatus;

Fig. 6 is a sectional plan view at the line 6—6 on Fig. 5, with parts broken away;

Fig. 7 is a sectional elevation at the line 7—7 on Fig. 6; and

Fig. 8 is a bottom plan view showing a design on the stamping die.

The apparatus in the form illustrated is designed and adapted for applying markings or designs on the bottoms of tumblers 10 by an acid stamping or etching method. The apparatus comprises a set of lifting spindles carrying suction heads 20 which lift the hot tumblers from a heat treating apparatus and transfer them to a position at which the stamping dies apply the design to the bottom surfaces of the tumblers. The heat treating apparatus comprises a horizontally traveling endless conveyor 11 which is trained over a sprocket wheel 12 (Fig. 5). The conveyor 11 is driven continuously. It carries vertical spindles 14 on which the tumblers 10 are supported.

A vertical shaft 15 is connected for continuous rotation with the sprocket wheel 12 as presently described. A turret or carriage 17 is connected for rotation with the shaft 15, as hereinafter described, and carries an annular series of vertical spindle guides 17a. Spindles 18 are mounted for vertical movement in the guides 17a and

carry suction heads 20 adapted to pick up the tumblers from the conveyor 11 and transfer them to position for receiving the markings from the stamping dies.

A framework, comprising vertical posts 5 and horizontal angle bars 6, provides an overhead support for the drive shaft 15 which is journalled in a bearing head 7 attached to the under side of a plate 8 extending between the bars 6.

As shown in Fig. 3, the sprocket wheel 12 is connected by screw bolts 21 to a tubular member 22 into which the lower end of the shaft 15 extends. A safety clutch device is provided between the shaft 15 and its driving means. Said device includes a disk 23 bolted to the member 22 and an annular member 24 keyed to the shaft 15. The member 24 carries clutch pins 25, formed with tapered heads 26 which seat in tapered openings in the member 24. The clutch pins are held seated by springs 27 under compression.

The spindle carrying turret or carriage 17, mounted to rotate with the shaft 15, is manually adjustable up and down relative to the shaft to accommodate the suction heads 20 to articles of different heights. The turret 17 is formed with a hub 28 within which is a sleeve 29 attached thereto by bolts 30. The sleeve 29 is formed with screw threads on its inner surface to engage a screw-threaded sleeve or shaft 31 on the shaft 15. Means for rotating the sleeve 31 comprises a gear 32 journalled for rotation on the shaft 15 and keyed to the sleeve 29. A pinion 33 in mesh with the gear 32 is keyed to a stud shaft 34 journalled in a carrying member 35 which is keyed to the shaft 15. The end 36 of the shaft 34 is squared or shaped to receive a hand crank for rotating the shaft and through the intermeshing gears rotating the screw-threaded shaft 31, thereby moving the turret 17 up or down to any desired position.

The spindles 18 are moved up and down during the rotation of the carriage 17 and their position controlled by a stationary cam 40 formed with an endless cam track 41 surrounding the center shaft 15. Each spindle carries a cam follower 42 running on the cam track. The cam track is shaped to lower the spindles in succession into position to bring the suction heads 20 into engagement with the tumblers 10 on the conveyor 11. Suction is then applied for attaching the tumblers and carrying them with the spindles into position for cooperation with the stamping dies and thereafter delivering the tumblers to a takeout device 43 (Figs. 1 and 5). The takeout device comprises a horizontal disk 43 rotated about its axis.

The vacuum system by which the vacuum or suction is applied to the tumblers, comprises a suction pipe 45 through which the air is exhausted by any suitable means (not shown), said pipe connected to a suction drum 46 in communication with suction pipes 47 connected to a sleeve member 48 surrounding the center shaft 15. The sleeve member 48 is connected by bolts 49 to a stationary member 50 forming part of the vacuum distributing head. The member 50 extends downwardly below the distributing head and is formed with a head 51 at its lower end on which the cam 40 is mounted.

The suction pipes 47 are in communication with the distributing head through vertical channels 52 which open at their lower end into an annular channel 53 formed in the member 50. The distributing head includes a ring 55 attached by bolts 56 to the member 50. The ring 55 is formed with an arc-shaped channel or passageway 57 (Figs. 3 and 6) concentric with the shaft 15 and in communication with the channel 53 through radial channels 58 formed in the ring 55. The distributing head includes a ring 60 which seats on the stationary member 55 and is connected, as presently described, to the turret 17 for rotation therewith. The suction lines, extending from the distributing head to the suction heads 20, in-

clude flexible pipes 61 connected to the ring 60 and communicating through openings 62 with the channel 57. The pipes 61 are connected at their outer ends to vertical pipes 65 attached at their lower ends to the spindle tubes 18. The suction heads 20 are connected to the tubes 18 for up-and-down movement thereon and yieldingly held in their lowered position by compression springs 66.

The means connecting the distributing ring 60 for rotation with the carriage comprises radially disposed arms 67 (Figs. 6 and 7), each connected at its inner end to the ring 60 by a lug 68 seated in an opening 69 formed in the ring 60. The outer end of each arm 67 is formed with a collar 70 surrounding the spindle guide 17^a and attached thereto by bolts 71.

The arc-shaped vacuum distributing channel 57, as shown by dotted lines in Fig. 6, extends the greater portion of the circumference of ring 55 for holding the tumblers from the time they are picked up from the spindles 14 until they reach a discharge position. The channel 57 terminates over the disk 43. A short channel 72 located just beyond the end of the channel 57 (Fig. 6) is open to the atmosphere and dissipates the vacuum as the suction is cut off from the spindle at the discharge position.

The stamping mechanism includes a stamping head 75 mounted on a horizontal shaft 76 for rotation therewith. The shaft is journalled for rotation in a stationary bearing member 77 attached to a vertical plate 78 mounted on a bracket 79, the latter carried on a stationary support 80 surrounding the driving member 22. The shaft 76 is driven from the drive shaft 15 operating through a gear 81 keyed to the shaft 15, and a pinion 82 keyed to the shaft 76. A gear housing 83 is formed with a hub 84 through which the shaft 15 extends and to which the plate 78 and bearing member 77 are bolted.

The stamping dies are carried on heads 85 attached to the member 75 and extending radially therefrom. Each stamping unit includes a die 86 with a design 86' (Fig. 8). The die may consist of hard rubber or rubber composition attached to a block 87 consisting of rubber or the like, said block being mounted in a thimble 88 which is removably attached to the head 85 by a bayonet slot and pin connection 89. The die carrying member or head 75 is removably attached to a tubular member 91 fixed to the shaft 76 and formed with a tubular extension 92 which provides a bearing for the member 75. A pin 94 locks the members 91 and 75 together. A detent 95 mounted in the member 75 engages an annular groove 96 and is yieldingly held therein by a rubber plug 97. This construction permits the head 75 to be dismounted when desired.

The stamping or marking material 100, which for stamping glassware comprises hydrofluoric acid, is supplied from a well 101 mounted on an arm 102 connected to the plate 78. This etching acid is transferred to the stamping dies 86 by an acid pick-up wheel or disk 103 journalled for free rotation about its axis. A band 105 of rubber or the like is mounted on the disk 103. The disk is intermittently rotated by frictional engagement with the dies 86, thereby transferring the acid and applying it to the dies. A wiper 107 (Fig. 2) wipes the excess acid off the disk. The gears rotate the dies at the same peripheral speed as that at which the suction heads 20 and tumblers 10 are moving during the stamping operation, thus avoiding any smudging of the etching acid or other marking material.

The tumbler-carrying spindles 14 are spaced at equal distances along the conveyor or carrier 11. The chuck carrying spindles 18 are spaced the same distance apart as the spindles 14. The spindles 18 are also directly over and in vertical alignment with the spindles 14 as the latter travel around the axis of the turret 17.

The operation will be understood from the preceding description, but may be summarized as follows:

The spindle carriage 17 rotating continuously at a constant speed brings the suction heads 20 in succession into register with the tumblers 10 as the latter are carried forward on the spindles 14. Each of the spindles 18 is lowered by an inclined section of the cam track 41 to bring the suction head down into contact with the traveling tumbler directly therebeneath. Immediately after the suction head 20 is seated on the tumbler, the suction line extending to said head is opened to the arc-shaped channel 57 in the distributing head so that the tumbler is held by suction and carried to a position directly over the stamping die which is rotating in a vertical plane and thereby brought beneath and in register with the horizontally traveling tumbler. At this point a dip section 41^b of the cam track permits a sudden lowering and lifting of the spindle by which the die 86 is pressed against the bottom of the tumbler and immediately withdrawn, thereby impressing the acid design onto the tumbler. The continued advance of the suction head and spindle brings the suction pipe 61 to the end of the channel 57, with the tumbler over the discharge disk 43 so that the tumbler is dropped on the disk and carried along the guide rail 108 and discharged.

Modifications may be resorted to within the spirit and scope of our invention.

We claim:

1. Apparatus for stamping designs on articles, said apparatus comprising a stamping head mounted for rotation about a horizontal axis, a plurality of angularly spaced stamping dies carried on said head, means for unidirectionally rotating said head about its axis and thereby bringing the dies in succession to a stamping position, means for bringing the articles in succession to said stamping position and then into temporary register with said dies, and means for successively applying a marking material to the dies at a position angularly displaced from said stamping position.

2. The apparatus defined in claim 1, said apparatus including a reservoir positioned beneath the stamping head and containing a stamping fluid, and means for transferring the fluid to the dies in succession.

3. The apparatus defined in claim 2, said transfer means comprising a transfer wheel mounted for rotation about a horizontal axis and positioned between said reservoir and the path of rotation of the stamping dies and running in said fluid.

4. Apparatus for transferring articles from one position to another and stamping designs on the articles during the transfer, said apparatus comprising a turret mounted for rotation about a vertical axis, vertical spindles mounted for rotation with the turret and movable up and down thereon, gripping devices carried by said spindles, means for bringing articles in succession into a position beneath and in register with said gripping devices, means for lowering the spindles and causing the gripping devices to engage and grip said articles and thereby causing the articles to be carried with the spindles, stamping dies having said designs, means for applying a stamping material to the dies, said dies being mounted separately from the carriage for movement in succession to a transfer station, gearing interconnecting the turret and the dies for moving the dies in synchronism with the movements of the spindles and articles thereon and thereby bringing the dies into register with the said articles in succession at said transfer station, and means for bringing the dies into contact with said articles at said station for transferring the designs to said articles.

5. The apparatus defined in claim 4, said apparatus including a die head on which the dies are mounted, said interconnecting gearing comprising a horizontal shaft carrying said die head and intermeshing gears connected respectively to said shaft and to the turret for rotation therewith and by which the dies are brought to a stamping position beneath the articles as the dies reach their uppermost position.

6. The apparatus defined in claim 5, said apparatus including a reservoir positioned beneath the stamping

dies and a transfer wheel mounted for three rotation about an axis for carrying the marking fluid to the dies and positioned to be engaged by the dies when the latter are in their lowered position during their rotation.

7. Apparatus for etching designs on glass articles, said apparatus comprising a stamping head mounted for rotation about a horizontal axis, stamping dies mounted on said head for rotation therewith in the same circular path concentric with said axis, means for rotating the stamping head about said axis and thereby bringing the dies singly and in succession to a stamping position, means for continuously moving glass articles in succession through said stamping position over and in register with one of said rotating dies, means for effecting a relative up-and-down movement of the articles and stamping head while at said registered position and thereby bring the articles in succession into contact with the dies in succession for stamping a design on the articles, and means for successively applying an etching fluid to the dies.

8. The apparatus defined in claim 7, the means for applying the etching fluid comprising a reservoir for the fluid positioned beneath the rotary path of the dies, and a transfer wheel interposed between the dies and said reservoir and running in said fluid, said transfer wheel being positioned to contact the dies successively during their rotation with the stamping head.

9. Apparatus for transferring articles and stamping designs thereon, said apparatus comprising a carriage, means for rotating the carriage about an axis, gripping devices mounted for rotation with the carriage in a circular path, a traveling conveyor, article supports on the conveyor for said articles, means for guiding the conveyor in a path comprising an arc-shaped portion concentric with the said axis and with said supports and the articles thereon in register with the gripping devices while the articles are advancing along said arc-shaped portion, means for bringing the gripping devices in succession into engagement with the said articles and causing them to grip the articles, stamping means for stamping a design on the articles, said stamping means including a stamping die, and means for bringing the die into contact with the said articles singly and in succession during the travel of the articles through said arc-shaped portion of their path and while the articles are held by the said gripping devices.

10. The apparatus defined in claim 9, said gripping devices comprising suction heads, and vacuum lines through which air is exhausted from said heads, thereby causing them to grip and hold said articles by suction.

11. Mechanism for transferring glass tumblers and similar articles from one position to another, and applying designs to the articles during the transfer, said mechanism comprising a carriage mounted for rotation about a vertical axis, a vertical spindle mounted at one side of the said axis for up-and-down movement on the carriage and for rotation with the carriage, means for guiding and holding the spindle vertical throughout its movements, a suction head mounted on the spindle at the lower end thereof, means for continuously rotating the carriage about its axis, means for conveying said articles in a path below the spindle and thereby bringing an article beneath and in vertical register with the spindle, means for lowering the spindle and thereby bringing the suction head into engagement with the article, means for applying suction through the spindles to the suction head and thereby causing the latter to grip the article and hold it by suction, a stamping die positioned beneath the path of the article, means for contacting said die with the bottom surface of the suspended article while the spindle and suction head are in their lowered position and for advancing the die with the suspended article while in contact therewith and thereby applying a design to the article, a stationary cam, operating connections between the cam and said spindle for lifting the spindle and the said article after the said application of the design to the article, and means for thereafter releasing the article from the suction head.

12. The combination of a carriage, means for rotating it about a vertical axis, an annular series of vertical spindles mounted on the carriage for rotation therewith and for up-and-down movement on the carriage, means for guiding the spindles and holding them vertical throughout their movements, article gripping heads mounted on the lower ends of the spindles, a horizontal conveyor spaced below the gripping heads and comprising means for holding articles and conveying them in a horizontal arc-shaped path beneath and concentric with the path of the spindles and thereby bringing the articles in succession into vertical register with the spindles and gripping heads, a stationary cam track, cam follower rolls on the spindles and running on said track, said track being shaped to lower the spindles and bring the gripping heads into gripping engagement with the articles therebeneath and then lift the articles, means for stamping designs on the bottom surfaces of said articles while the latter are held by said gripping heads, and means for thereafter releasing the articles from the gripping heads.

13. The apparatus defined in claim 12, the said gripping means comprising suction heads carried by the spindles, suction lines extending from said heads through which the air is exhausted, a distributing head mounted concentric with the axis of the carriage and controlling the application of suction to said suction heads.

14. The combination of a carriage mounted for rotation about a vertical axis, an annular series of vertical spindles mounted on the carriage for rotation therewith, the spindles being spaced radially from the said axis at equal distances for rotation in the same circular path concentric with said axis, means for continuously rotating the carriage and spindles about said axis, gripping devices individual to said spindles and mounted on the lower ends thereof for travel in a circular path, an article conveyor, article holders on the conveyor, means for driving the conveyor in a path extending around said axis of the carriage and with a portion of said path extending in an arc concentric with said axis, said conveyor being positioned below the path of the said gripping devices and arranged to bring the said article holders and articles thereon in succession directly beneath and in register with the gripping devices, means for lowering the spindles and bringing the gripping devices in succession into gripping engagement with the articles on said carrier and then lifting the gripping devices with the articles gripped thereby and suspended therefrom, a die head mounted for rotation about a horizontal axis radial to the said axis of the carriage, stamping dies mounted on said head and extending radially from said horizontal axis, said dies carrying designs rotatable with said head in a vertical plane, gearing interconnecting said die head and carriage for rotating the die head in synchronism with the rotation of the carriage, said dies and designs thereon being spaced from the axis of the carriage a distance equal to the spacing of the gripping devices from the axis of the carriage, said gearing being proportioned to move said designs at the same speed as that of the gripping devices and bring the dies into contact with the articles held by the gripping devices, with the said designs and articles moving horizontally in the same direction during said contact and thereby stamping the design on the said articles.

15. The apparatus defined in claim 14, including a stationary cam controlling the said lowering and lifting of the spindles, the cam including a dip section shaped and positioned to permit a rapid down-and-up movement of each spindle and the article carried thereby while in register with the die, and spring means for effecting said rapid downward movement.

References Cited in the file of this patent

UNITED STATES PATENTS

2,543,186	Miller	Feb. 27, 1951
2,647,337	Martin	Aug. 4, 1953