

UNITED STATES PATENT OFFICE

2,652,771

APPARATUS FOR PRINTING DESIGNS ON
CYLINDRICAL BODIES

José Valiela Fernández, Buenos Aires, Argentina

Application January 18, 1951, Serial No. 206,705
In Mexico December 16, 1950

8 Claims. (Cl. 101—38)

1

This invention relates to an apparatus for printing designs on cups or other cylindrical ceramic bodies.

Heretofore, the printing of designs upon cups and the like has been effected, the printing screens have been brought in direct contact with the rough and abrasive surface of the unvarnished form and the life of the screens has been very short. Also the printing on these cylindrical objects has been difficult due to distortions and unevenness of the surface. It has never been possible to have the decoration reach the bottom of the cups or pitchers with handles.

One of the principal objects of this invention is to provide a simple and practical method of using silk screens in the decorating of round ceramic objects and to eliminate the need for having special shaped screens for the different ceramic bodies being decorated and wherein the operations of decorating the bodies can be carried out in as simple a manner as with the printing on flat surfaces such as on paper and the like.

It is another object of the invention to provide a method and apparatus for printing upon cylindrical ceramic bodies wherein the screen does not deteriorate and wherein its life is many times greater than if the decorations were effected directly from the screen and whereby to improve the detail and sharpness of the designs and to give them greater fineness and quality.

Other objects of the invention are to provide an apparatus for effecting the printing of designs upon cylindrical ceramic bodies which is of simple construction, easy to operate, consumes little space, has a minimum number of parts, is operable upon bodies even though they may have handles upon them and efficient in operation.

For other objects and for a better understanding of the invention reference may be had to the following detailed description taken in connection with the accompanying drawing, in which

Fig. 1 is a plan view of the printing apparatus embodying the features of the present invention.

Fig. 2 is a longitudinal sectional view of the apparatus taken on line 2—2 of Fig. 1 and looking in the direction of the arrows thereof.

According to the invention, the decoration or design is taken from the silk screen by a smooth, soft synthetic rubber sheet and transferred to the cylindrical body upon the passing of the rubber sheet under the body and causing the body to be rolled on its pivot supports. During this rolling process, the ceramic body through contact and adjustable pressure upon the synthetic rubber sheet bearing the impression taken

2

from the silk screen, picks up the impression evenly and with the simple movement of the carriage which supports the synthetic rubber sheets and causes their movement.

Referring now to the figures, the apparatus shows a metal plate 1 which serves as a base for all the parts that make up the apparatus except for a vacuum pump and a support for a lifter device 2 which lifts the vacuum retainers with the cups in a manner to be described. On the base 1 there is mounted a silk printing device 3 including a screen and a frame. This silk printing device is fastened with adjustable clamps 4 to metal plates 5 which in turn are mounted on four supports 6 that are sufficiently high to allow for the passage thereunder of a carriage 7. On the screen 3 there is a spatula 8 which distributes the paint over the surface of the silk screen. The carriage 7 comprises a thick metal plate 7' having four wheels, two of which are smooth, as indicated at 9, and two of which are grooved, as indicated at 10. These wheels run on two square rods 11 which serve as rails. The carriage plate 7' has a central elongated opening 1a extending along substantially its entire length so that the carriage can run without interference with an upwardly extending pipe or tube 12 secured to the base 1 and which serves to support the cups 13.

An aluminum block 14 has a smooth soft sheet of synthetic rubber, as indicated at 15. There are two of these blocks and they respectively support soft rubber transfer sheets 15. These soft rubber sheets provide the plane surface on which the screen makes the impression and act as transfer pads. This rubber sheet has the same length as the plane development or periphery of the outer surface of the cups 13. The carriage 7 is provided with a handle 16 which serves to move the same back and forth over the rods 11. The metal carriage plate 7', through its elongated opening 1a and the ends 7'' and 7''' of the opening provides stops engageable with the upwardly extending pipe 12 to limit the movement of the carriage and to arrest the same on its forward and return strokes. The pipe 12 is about two inches in diameter and has at its respective ends bushings 17 and 18 in each of which there is drilled four holes, two holes for moveable rods 19 which support the cups 13 and two for the two rubber tubes or hoses 20 and 21 by means of which a vacuum is created inside the cups in a manner to hold them in place upon the moveable rods 19. The moveable rods 19 serve as supports and are cut away at 22 to provide a semi-circular

3

section for vertical adjustment in the bushing 18 and to prevent any rotary movement of the rod and the cup relative to the pipe 12. A spring 22' serves to hold the cup 13 upon the rubber transfer sheet 15 and the tension of this spring is adjusted by means of a nut 23 threaded on the lower end of rod 19. There is one spring for each rod and they can be adjusted according to the pressure needed for the body that is to be decorated. Pipe 12 can be raised or lowered on the base 1 by means of nuts 24 and 25 threaded thereon. When the nuts are tightened, the pipe 12 will be held firmly in place upon the base. By permitting the adjustment of the pipe 12 cups or other bodies of different sizes can be printed with the same apparatus. The cup carrying vacuum retainer 26 is mounted upon the upper end of the rod 19 by means of a bushing 27 journaled on a pipe 28 extending therethrough and laterally from the upper end of the rod 19. It is through this pipe 28, rubber tube 20 or 21 and vacuum pump 30 that a vacuum is effected within the cups 13. The vacuum retainer 26 has a rubber washer 31 for effecting a sealing engagement between the edge of the cup 13 and the vacuum retainer 26. The vacuum cup retainer is centered and fitted to the bushing 27 so that it can rotate upon the pipe 28 in either direction without disturbing the vacuum produced in the cup.

The silk screen 3 has engraved designs 32 thereon which is the decoration that is to be printed on the cups 13 and of which only a portion is shown, the continuation, in broken lines, being the plate printing area or impression. Two cups 13 are printed at the same time as they are rolled by the rubber transfer sheets 15. Spatula 8 is made of aluminum and is provided with a channel into which is fitted a sheet 8' of synthetic rubber which serves to spread the paint and at the same time remove it from the whole surface of the screen except that portion of the paint which remains only in the depressions of the designs 32 cut in the screen 3. The spatula is moveable over the screen to effect this result.

While the apparatus has just been described as designed for decorating two cups 13 at one time, it will be understood that the same apparatus can, with slight modifications, be adapted to print a single larger body, such as pitchers, milk ewers, coffee pots and of which it is not practical to decorate two at a time because of their size.

In operation, the silk screen 3 with its engraved or photo engraved design is placed upon the metal plates 5 and secured by means of the clamps 4 in a proper position thereon and aligned horizontally with the rubber transfer sheets 15 on the carriage 7. The screen 3 is higher than the transfer plates 15 and therefore the rubber transfer sheets 15 and carriage move freely beneath it, the screen being approximately five millimeters higher than the rubber sheets on which the transfer is effected. The impression is made with the spatula 8 because of the pressure exerted by the latter upon the engraved silk, the silk descends until it comes in contact with the rubber sheets 15 and then upon release of the spatula it returns to its raised position and free of the rubber transfer sheets. The printing upon the rubber sheets is completed once the spatula has covered the entire area of the silk screen with paint and has thus effected the impression from the screen to the rubber transfer sheets 15. The two cups 13 are placed on the vacuum retainers 26. Handle 33 is moved down to operate a three-way valve 34 which in turn places in series the

4

vacuum pump 30 with the vacuum retainers 26 by means of the rubber tubes 20 and 21. The cups 13 are then held and since the retainers 26 rotate on the pipes 28 the cups may be rotated. The cup handles 13' are held down automatically through the action of lead counterweights, not shown, that are provided in the vacuum retainers 26.

The carriage handle 16 can be pushed or pulled to shift the carriage and upon the carriage being pulled or retracted from beneath the silk screen the printed rubber transfer sheets can be retracted so as to engage the cups 13. The rubber sheets will first contact the handles 13' of the cups to start the rotation of the cups. The engagement of the cups with the rubber sheets 15 can be controlled by the lift handle 35 that is pivoted at 36. The movement of the handle 35 is against the action of the compression spring 22'. When the printing or transferring of the decoration is started upon the cups, the handle 35 of the lift device 2 is released so that the action or pressure of the cups upon the rubber sheets 15 is effected by the springs 22'. As the carriage 7 is moved, the lift handle 35 is released so that the whole pressure of the spring 22' acts between the cup and the printing sheets 15. The carriage, when it begins to run, causes the cups to roll along the transfer sheets 15, the cups thereby taking off during their contact with the sheets all of the paint or transfer material that the screens left upon the rubber sheets. The printing carriage thus leaves the cups during this movement and the decorated cups may be removed by a reverse movement of the valve handle 33 to break the vacuum produced within the cups by the vacuum retainers 26. Before inserting two more cups, the carriage is again brought back to its position beneath the screen 3 to receive another impression. The impression is again made upon the rubber transfer sheets 15 and two new cups are inserted in the apparatus.

While various changes may be made in the manner in which the method is carried out and in the construction of the apparatus, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. In an apparatus for printing upon cylindrical ceramic cups and the like having a printing carriage with a printing transfer sheet adjustable under the ceramic cups, an article supporting device for holding the cups in printing position, comprising an elongated and horizontally extending base plate, a pipe mounted in said base plate to extend vertically therefrom, a vertically adjustable shaft mounted in said pipe, a bushing extending laterally from the upper end of said vertically extending shaft, a vacuum retaining device rotatable upon said laterally extending pipe and adapted to receive the cylindrical ceramic cup whereby to support the cup for rotation and for vertical adjustment, and spring means urging said vertically extending shaft downwardly through said pipe, said printing carriage moving under the ceramic cup and along the base to effect the printing of the cup as the latter is rotated and while at the same time being held downwardly by the shaft and by the action of the spring, and said vacuum device being operable to suck air from the laterally extending pipe on the upper end of said shaft and from the vacuum retainer.

2. In an apparatus according to claim 1, in

5

which means are provided for adjustably securing said vertically extending pipe upon said base to retain the same in different vertically adjusted positions and to adapt it for different sizes of cups, a compression spring surrounding the lower end of said vertically movable shaft reacting between the shaft and the vertically extending pipe and in which a lifter device is provided engageable with the vertically movable shaft to lift the same through the vertically extending pipe against the action of the compression spring on the lower end thereof whereby the passage of the carriage can be effected without disturbing the cup.

3. In an apparatus for printing upon cylindrical ceramic cups and the like having a printing carriage with a printing transfer sheet adjustable under the ceramic cups, an article supporting device for holding the cups in printing position, comprising a horizontally arranged base plate having an elongated opening therein, a vertically extending pipe mounted in the elongated opening of said base plate and extending upwardly from the base plate, the ends of said opening serving as stops for limiting the movement of the carriage over the base plate, two vertically extending rods mounted in said pipe for vertical adjustment therein, a pipe extending laterally outwardly from each of the respective upper ends of each of said vertically extending shafts, a vacuum retainer mounted for rotation on each laterally extending pipe, said vacuum retaining devices serving respectively to receive the cups, and spring means provided on the rods for urging said shafts downwardly and the cups against the transfer sheets as the latter are passed thereunder whereby to cause the cups to be rotated to transfer the impression to the cups, and vacuum producing means connected with the respective laterally extending pipes of the vertically extending shafts.

4. In an apparatus according to claim 3, in which lift devices are provided associated with the respective shafts and operable against the respective spring means thereupon to lift the ver-

6

tically extending shafts and the cups free of the transfer sheets of the carriage and in which means are provided for mounting said pipe on said base for vertical adjustment with respect thereto.

5. An apparatus for holding cups and like objects during the application of decorations thereon, comprising a horizontally arranged base plate on which decorating elements are adapted to be mounted, said plate having an opening therein, a vertically arranged tube secured in the opening in the plate and extending above and below the base plate, at least one rod movably mounted in the tube to extend beyond both ends thereof, a pipe extending from the upper end of the rod, means for receiving the cup to be decorated on the pipe, and vacuum producing means connected to the pipe to retain the cup on the receiving means during the decoration thereof.

6. An apparatus according to claim 5, in which means is provided to lift the tube and pipe with a cup thereon for passage of decorating means thereunder.

7. An apparatus according to claim 5, in which a bushing is provided in each end of the tube to support the rod and a part of the vacuum producing means which pass through the tube.

8. An apparatus according to claim 5, in which a bushing is provided in each end of the tube to support the rod and a part of the vacuum producing means which pass through the tube, and in which the rod and the lower bushing cooperate to prevent rotation of the rod.

JOSÉ VALIELA FERNÁNDEZ.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,029,273	Montgomery et al. ---	Jan. 28, 1936
2,144,849	Moore -----	Jan. 24, 1939
2,148,563	Kingsley -----	Feb. 28, 1939
2,180,135	Bartholomew -----	Nov. 14, 1939
2,378,989	Edels -----	June 26, 1945
2,447,521	Miller et al. -----	Aug. 24, 1948