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E. ZIMMERMANN ET AL
SCREEN PRINTING MACHINES

2,866,403

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2 Sheets-Sheet 1

FIG. 1

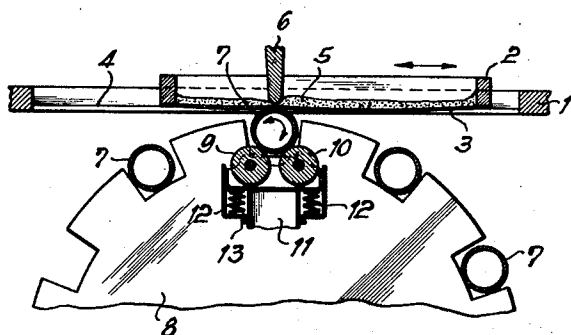
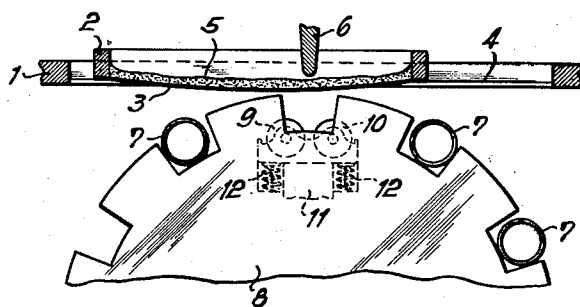


FIG. 2



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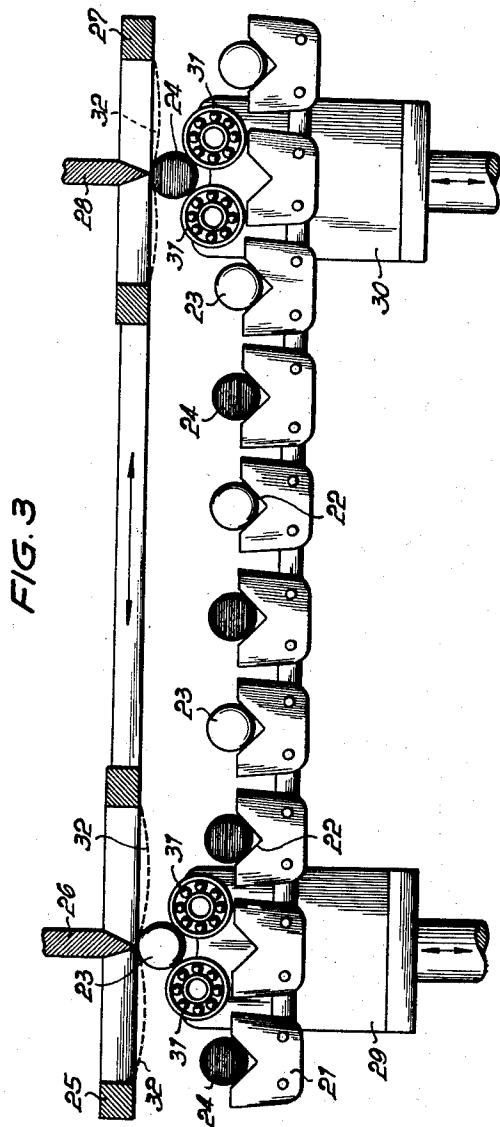


FIG. 4

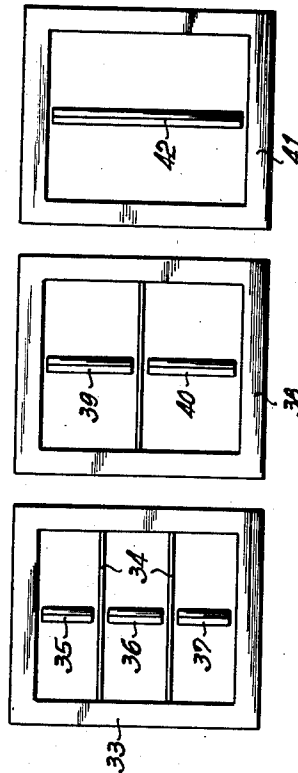


FIG. 5

FIG. 6

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SCREEN PRINTING MACHINES

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5 Claims. (Cl. 101—115)

The invention relates to improvements in a machine for the printing of objects having a surface symmetrical about an axis as for example flasks, bottles, ampoules and the like.

It is known to provide these articles with labels according to the so-called screen printing process, wherein colour in a thick layer is applied through a silk cloth or the like, which is permeable only at determined positions corresponding to the desired design, onto the article to be printed. It is known, by means of a special gearing by rods and cams or by a valve gear, to lift the spatula from the screen as soon as no workpiece is being brought to the screen, in order thereby to avoid an undesired penetration of colour. These devices are however troublesome and expensive. According to the invention the device is, instead, so constructed that the screen sags so loosely under the spatula that the engagement between spatula and screen is automatically broken, without using control devices, when a workpiece fails to arrive at the operative position.

The invention will now be illustrated by reference to the drawings wherein;

Figure 1 is a side elevation of a screen printing device according to the invention, partly in section, with a workpiece shown present in the operative position,

Figure 2 is a similar view with no workpiece present in the operative position,

Figure 3 is a cross section partly in elevation of a printing device using two groups of workpieces, and

Figures 4-6 are plan views of several clichés for three-, two- or single-colour printing.

Figure 1 shows a guide bed 1 for a screen printing stencil in the form of a rectangular frame 2 provided with silk screen 3, said stencil being displaceable to and fro in the guide 4 in the direction of the arrows.

The trough-like space created by the frame 2 and screen 3 is partly filled with a viscous colour 5. A fixed spatula 6 projects into the colour and serves as a counter-bearing during the printing process.

Workpieces 7 are brought by means of a carrier pulley 8 into operative position opposite to the spatula 6 where they are supported on rollers 9 and 10. When bringing the workpieces 7, for example, bottles or ampoules into operative position they are slightly lifted up over the roller 10 and rest in the actual operative position between the two rollers 9 and 10 in the manner shown in Figure 1. The rollers 9 and 10 are for their part carried by a piston-like guide member 11, which through the pressure of spring 12 presses the workpiece over the rollers 9 and 10 against the silk screen 3 and the spatula 6. If by means of a gear (not illustrated) the silk screen is moved from this position to the left then in this movement it carries with it the workpiece 7 which rolls on the rollers 9 and 10 whereby colour is at the same time pressed through the openings in the silk screen which correspond to the desired pattern and applied onto the workpiece 7. Thereafter the carrying device is brought into the next position of rotation in

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which the next workpiece arrives at the operative position.

In order to prevent colour being pressed through the silk screen when no workpiece arrives this screen is so loosely tensioned that in the absence of workpiece (see Figure 2) the spatula 6 as a result of the sagging of the silk screen 3 possesses a sufficient separation from the silk screen. Only when a new workpiece arrives at the operative position is the screen again pressed on, so that always only so much colour is pressed therethrough as is necessary for the printing. It is accordingly quite unimportant for the neatness or clarity of the label to be produced whether workpieces, or how many of them, fail to arrive during the continuous operation.

In order that the piston-like guide member 11 shall not force the rollers 9 and 10 too high in the absence of a workpiece, so the movement upwards can be limited by means of a stop 13.

In Figure 3, 21 represents a carrier chain with channel-shaped recesses 22 in which the individual prismatic chain members, serve for reception of the workpieces, which in the example illustrated in the drawings consist of two groups indicated respectively by clear and shaded circles 23 and 24. All clear workpieces 23 are conducted to the printing cliché 25 which cooperates with a spatula 26, all shaded workpieces 24 arriving at the printing cliché 27 with its spatula 28. In order to effect printing, lifting roller stands are provided in which one, 29, is arranged for the group 23 of workpieces and the other 30 is arranged for the other group 24 of workpieces. The roller stands carry at the top a pair of rollers 31 which here engage the workpiece from below and on lifting of the roller stand bring it into the zone of the printing clichés 25 or 27 and press it against the appropriate spatula 26 or 28. By means of the indicated silk screen 32, of the printing clichés 25 or 27, which is led between the workpiece and the spatula the workpieces are impelled or rolled, whereby the printing process is completed. Naturally the rollers 31 can also be driven by means of a synchronous transmission gear. The displacement of the workpieces is in this example equal to a double section of the prismatic chain 21.

Figures 4-6 show a few embodiments of clichés, more particularly for three-, two- or single colour printing. The cliché 33 for three-colour printing is sub-divided into three separate sections by party walls 34, these sections each having their particular spatula 35, 36 or 37. The cliché 38 carries only one party wall and two spatulas 39 and 40 so that two colours can be printed. Cliché 41 is undivided and has only one spatula 42.

With the clichés illustrated in Figures 4 and 5 the different colours can naturally be applied only side by side.

If a workpiece is to be printed with several colours one over the other, then it must be led to several different-coloured clichés disposed one behind another. In the selection of a suitable displacement for this purpose the device according to Figure 3 can for example be employed.

The cliché according to Figure 6 can also be used for printing several workpieces side by side, if it also sags sufficiently laterally and the workpieces are correspondingly small.

We claim:

1. A color screen printing machine for printing work pieces, comprising horizontally reciprocable frame, a saggable screen carried by said frame, squeegee means mounted above and associated with said screen member means in constant relative position with respect to said frame in the vertical direction, means for conveying work pieces in proximity to the said screen, the said squeegee

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means being disposed to engage the said screen when the said pieces are operably engaged with the said screen to permit the flow of color fluid therethrough and onto the said work piece, and to become disengaged from the said saggable screen in the absence of said work piece with no resulting color flow from the said screen as a result of sagging thereto.

2. A color screen printing machine for printing work pieces according to claim 1 and wherein the said saggable screen comprises a plurality of saggable screen members disposed in side-by-side relationship, and the said squeegee means comprises a plurality of squeegee members each mounted above and operable with a saggable screen member in response to the absence or presence of working pieces conveyed to the said screen members.

3. A color screen printing machine for printing work pieces according to claim 1 wherein the said saggable screen comprises a plurality of saggable screen members sequentially disposed, and the said squeegee means comprises a plurality of squeegee members each mounted above and operable with a saggable screen member in response to the absence or presence of working pieces conveyed to the said screen members, and means operable with said conveying means for sequentially positioning said work pieces in operable engagement with said sequentially disposed screen.

4. A color screen printing machine for printing work

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pieces according to claim 1 wherein the said saggable screen comprises a substantially wide screen member adapted to operably engage at least one or more work pieces in side-by-side relationship, and the said squeegee means comprises a substantially wide squeegee member mounted above and operable with said screen member in response to the presence of said work pieces in side-by-side relation.

5. A color screen printing machine for printing work pieces according to claim 1 wherein the said saggable screen comprises a plurality of spaced screen members each adapted to transmit different colors, and the said squeegee means comprising a plurality of squeegees each mounted above said screens and disposed to operably engage the said screens in response to the presence of working pieces and means for selectively conveying said pieces to selective screens to permit selective color printing of the said working pieces.

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