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ADHESIVE DISPENSING APPARATUS

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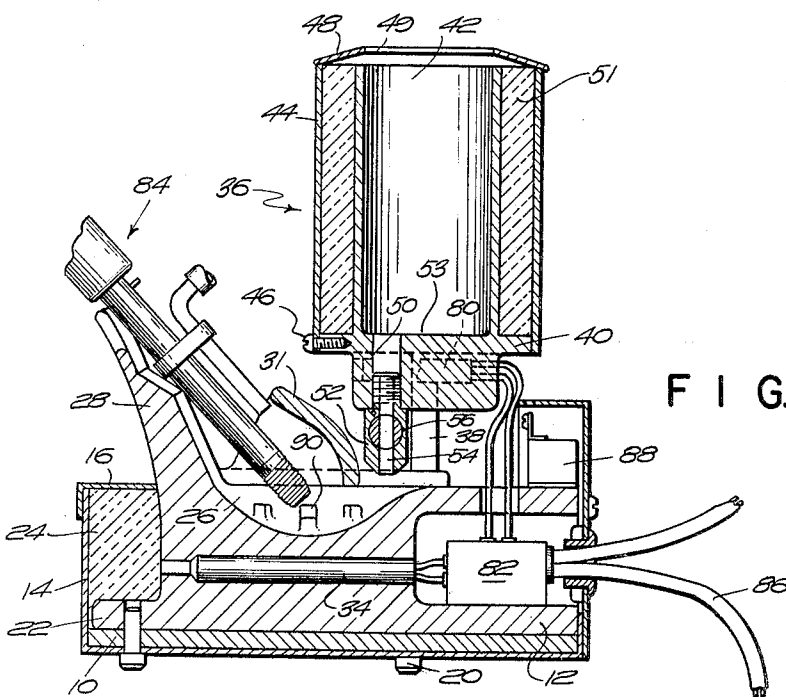


FIG. 1

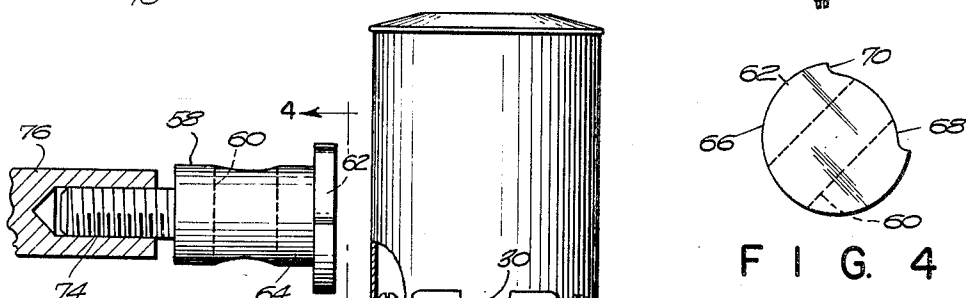


FIG. 3

FIG. 4

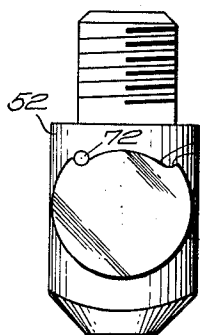


FIG. 5

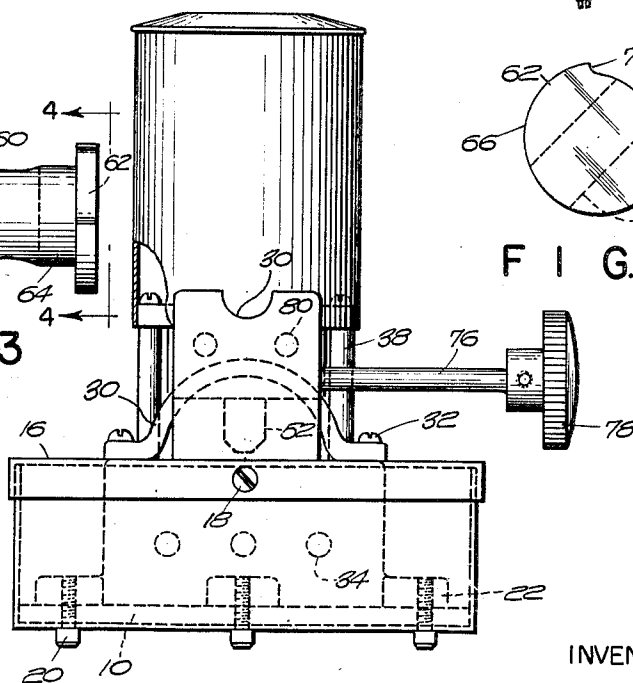


FIG. 2

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1

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ADHESIVE DISPENSING APPARATUS

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2 Claims. (Cl. 126—343.5)

This invention relates to apparatus for providing a supply of molten thermoplastic adhesive to a receptacle in which an applicator may be thrust to pick up a quantity of molten adhesive.

The principal objects of the invention are to provide an apparatus in which a body of molten adhesive may be kept ready for instant use, to provide an apparatus which will supply molten adhesive to an applicator at a temperature sufficient to maintain desired working viscosity of the adhesive, and to provide an apparatus which will melt the adhesive from the solid state and supply the molten adhesive to the applicator at a rate commensurate with the rate at which the applicator picks up the molten adhesive.

As herein disclosed, the apparatus comprises a receptacle having a shallow bowl for retaining a supply of adhesive. The receptacle has heating elements positioned beneath the bowl for maintaining the adhesive in the bowl molten. A container for a solid block of adhesive is positioned above the receptacle, and a conduit is provided that extends from the bottom wall of the container towards the bowl. A valve is positioned in the conduit intermediate the ends thereof to regulate the flow of molten adhesive through the conduit and heating elements are provided between the bottom wall of the container and the valve for melting the block of adhesive from its bottom and keeping the adhesive molten as it gravitates down the conduit and through the valve.

An applicator having a tip is provided for picking up a quantity of adhesive from the bowl and transporting it to a work piece to be bonded. By regulating the flow of adhesive through the conduit, one can ensure that the molten adhesive is supplied to the bowl at a rate commensurate with the rate that the applicator picks up adhesive from the bowl.

This invention will now be described in greater detail with reference to the accompanying drawing wherein:

FIG. 1 is a vertical view, partly in section, of the apparatus;

FIG. 2 is a front elevation of the apparatus;

FIG. 3 is a view partly in section on an enlarged scale of the valve and the control rod therefor;

FIG. 4 is a view taken along line 4—4 of FIG. 3; and

FIG. 5 is a view on an enlarged scale of the conduit and valve.

Referring to the drawing the apparatus has a base 10 underlying a receptacle 12. A housing 14, preferably of sheet metal, is positioned beneath the base and extends upwardly from its sides. A cover plate 16, also preferably of sheet metal, is positioned above the base and is secured to the housing 14 by screws 18. The receptacle 12, base 10, and housing 14 are secured to each other by headed bolts 20 that extend through aligned openings in the housing and base and are screwed into threaded openings in feet 22 of the receptacle 12. The heads of the bolts 20 serve as feet to support the apparatus. Insulating material 24, such as Fiberglas, is provided in the space between the base 10, receptacle 22, housing 14 and cover plate 16.

The upper surface of the receptacle 12 has a shallow bowl 26 therein for retaining molten adhesive. The portion 28 of the receptacle extending forwardly of the bowl is raised and has a notch 30 therein for supporting an applicator thrust into the bowl. An opening is pro-

2

vided in the cover plate 16 to accommodate the upper portions of the receptacle 12 including the bowl 26 and the portion 28. A hood 31, secured to the receptacle by screws 32, is positioned over the bowl. The hood serves to keep dirt out of the bowl and to act as an insulator for the molten adhesive in the bowl. Three electrically operated heating elements 34 are positioned in the receptacle below the bowl 26.

A container 36 is mounted above the receptacle on a pair of legs 38, the lower ends of said legs being screwed into the receptacle. The container comprises a frame 40 having a cavity 42. The cavity is cylindrical in form and is adapted to retain a cylindrical block of solid adhesive. A lining 44, preferably of sheet metal, is secured to frame 40 by screws 46. The lining is cylindrical in form, extends upwardly from the frame, and is concentric, to, but of a larger diameter than, the cylindrical wall of the cavity. The upper portion 48 of the lining overlies the frame and has an opening 49 aligned with the cavity 42. Insulating material 51, such as Fiberglas, is inserted between the cylindrical walls of the cavity and the lining.

A hole 50 extends from the bottom wall 53 of the cavity 42 to the bottom of the frame 40. A valve housing 52 is threaded into the lower end of the hole 50, said valve housing having a hole 54 extending therethrough. The lower end of the hole 54 is positioned above the bowl 26.

An opening 56, transverse to and intersecting the hole 54, is provided in the valve housing 52. A valve 58 is rotatably mounted in the opening 56. The valve 58 has a hole 60 extending therethrough which in one position of adjustment is aligned with the hole 54 and in a second position of adjustment is transverse to the hole 54, thus enabling the valve to block the hole 54. The valve has a flange 62 at one end, which is of greater diameter than the main valve portion 64. The flange has a peripheral portion 66 of relatively large diameter and a peripheral portion 68 of relatively small diameter, both peripheral portions being segments of circles. Abutments 70 are formed at the intersection of peripheral portions 66 and 68. A pin 72 is secured to the valve housing 52 in such a position that it can ride on the peripheral portion 68 when the valve is rotated. The valve has a stud 74 extending outwardly therefrom at the end remote from the flange 62. A rod 76, having a knob 78 fastened thereto, is threaded on to the stud 74.

A pair of electrically operated heating elements 80 are located in holes extending through the frame 40 on opposite sides of the hole 50. The heating elements 80 and the aforementioned heating elements 34 are electrically connected to a junction box 82 located in an opening in the receptacle 12. An adhesive applicator 84 for picking up a quantity of molten adhesive from the bowl 26 is also electrically connected to the junction box. The applicator may be of the type disclosed in application Serial Number 20,461 filed April 6, 1960. A line 86 extends from the junction box 82 to the source of power. Optionally, a temperature responsive switch 88 may be provided to control the heating elements.

The apparatus is intended to supply molten adhesive to the receptacle so that the molten adhesive may be picked up by the applicator and applied to the parts of a workpiece, such as a shoe, as a part of the process of adhesively bonding the parts together. Reference is made to application Serial Number 28,408 filed May 11, 1960, for an example of such a process. The adhesives currently used for this purpose are relatively quick setting, that is a relatively small change in temperature will cause the molten adhesive to transform into the solid state. However, should the molten adhesive be exposed to the atmosphere, or remain molten at a rela-

tively high temperature for a relatively long period, it is subject to thermal decomposition and oxidation which causes the adherent qualities of the adhesive to deteriorate. On the other hand, the adhesive must be at a relatively high temperature when it is applied to the work parts to have the desired working viscosity.

In using the apparatus, a block of solid adhesive is placed in the cavity 42. The block is preferably cylindrical in form and of a diameter corresponding to the diameter of the cavity. The heating elements 80 melt the block of adhesive from the bottom and the molten adhesive gravitates down the conduit formed by the holes 50 and 54 into the bowl 26. The adhesive collected in the bowl is heated by heating elements 34 to cause it to remain molten, the adhesive being kept hot enough to enable it to retain the desired working viscosity. The applicator 84 is normally resting in notch 30 with the tip 90 of the applicator supported by the bottom of bowl 26 and immersed in the molten adhesive in the bowl. When adhesive is to be applied to the work, the operator lifts up the applicator, whereby the applicator tip picks up a quantity of adhesive, carries the applicator to the work and rubs the applicator tip along the work, thereby depositing a quantity of adhesive on the work.

As set forth above, if the molten adhesive remains in the bowl too long, it tends to deteriorate. To prevent this, the operator can adjust the valve 58 so that molten adhesive gravitates into the bowl at approximately the same rate as it is picked up by the applicator tip. By manipulating knob 78, the valve can be rotated from the position shown in FIGS. 1 and 5 where pin 72 is in engagement with left abutment 70 (FIG. 5) and hole 60 is aligned with hole 54 to a position where the pin 72 is in engagement with the right abutment 70, the hole 60 is horizontal and the hole 54 is blocked by the valve 58. The valve can, of course, be adjusted by the manipulation of the knob 78 between the two extremes of full flow of adhesive and no flow of adhesive to set the adhesive flow at the desired rate. The location of the heating elements 80 between the bottom wall of the cavity 42 and the valve 58 causes the block of adhesive in the cavity to be melted from the bottom and causes the heat to be applied to the valve and to the hole 54, thereby ensuring that the adhesive will not solidify during its passage through the holes 50, 54 and 60.

Ideally, heating elements 80 give off enough heat to melt the adhesive and maintain it in its molten condition during its passage through holes 50, 54 and 60, and heating elements 34 give off enough heat to maintain the adhesive in the bowl 26 at the higher temperature which is sufficient to give the adhesive the desired working viscosity. One or more temperature responsive switches 88 may be provided for this purpose.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications that come within the scope of the appended claims.

I claim:

1. An adhesive dispensing apparatus comprising: a re-

ceptacle; a bowl in the upper surface of the receptacle for retaining a supply of molten adhesive, and from which a quantity of the molten adhesive may be picked up by an applicator; first heating means located in the receptacle adjacent the bowl for maintaining the adhesive in the bowl molten; a container for a quantity of solid adhesive positioned above the receptacle, said container including a cavity having a bottom wall; a conduit extending downwardly from the bottom wall toward the bowl for conducting molten adhesive from the cavity to the bowl; adjustable valve means in the conduit for regulating the rate of flow of molten adhesive therethrough; and second heating means positioned below said bottom wall and adjacent said valve means for melting the solid adhesive in the cavity from the bottom and maintaining the adhesive molten during its passage through the conduit.

2. An adhesive dispensing apparatus comprising: a receptacle; a bowl in the upper surface of the receptacle for retaining a supply of molten adhesive and from which a quantity of the molten adhesive may be picked up by an applicator; a raised portion on said receptacle extending upwardly of the bowl adjacent the bowl and having a notch adapted to support the applicator; at least one heating element positioned in the receptacle beneath the bowl for maintaining the adhesive in the bowl molten; a frame positioned above the receptacle, said frame including a cavity having a bottom wall; a hole extending through the frame from the bottom wall to the bottom of the frame; a valve housing secured to the frame, said valve housing having a hole extending therethrough in alignment with the hole in the frame, the valve housing being so located that its lower end is positioned above the bowl; a valve rotatably mounted in the valve housing, said valve having a hole extending therethrough so that in one extreme position of valve adjustment the hole in the valve is in alignment with the holes in the frame and the valve housing, in a second extreme position of valve adjustment the valve blocks the hole in the valve housing, and in a median position of valve adjustment intermediate said extreme positions the valve partially blocks the hole in the valve housing; and at least one heating element positioned in said frame between said bottom wall and said valve for melting a quantity of solid adhesive positioned in the cavity from the bottom and maintaining the adhesive molten during its passage through said holes into the bowl.

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