Nov. 15, 1960 I. N. WADE 2,960,025

DRUM PRINTING ASSEMBLY

Filed Dec. 11, 1956 2 Sheets-Sheet 1

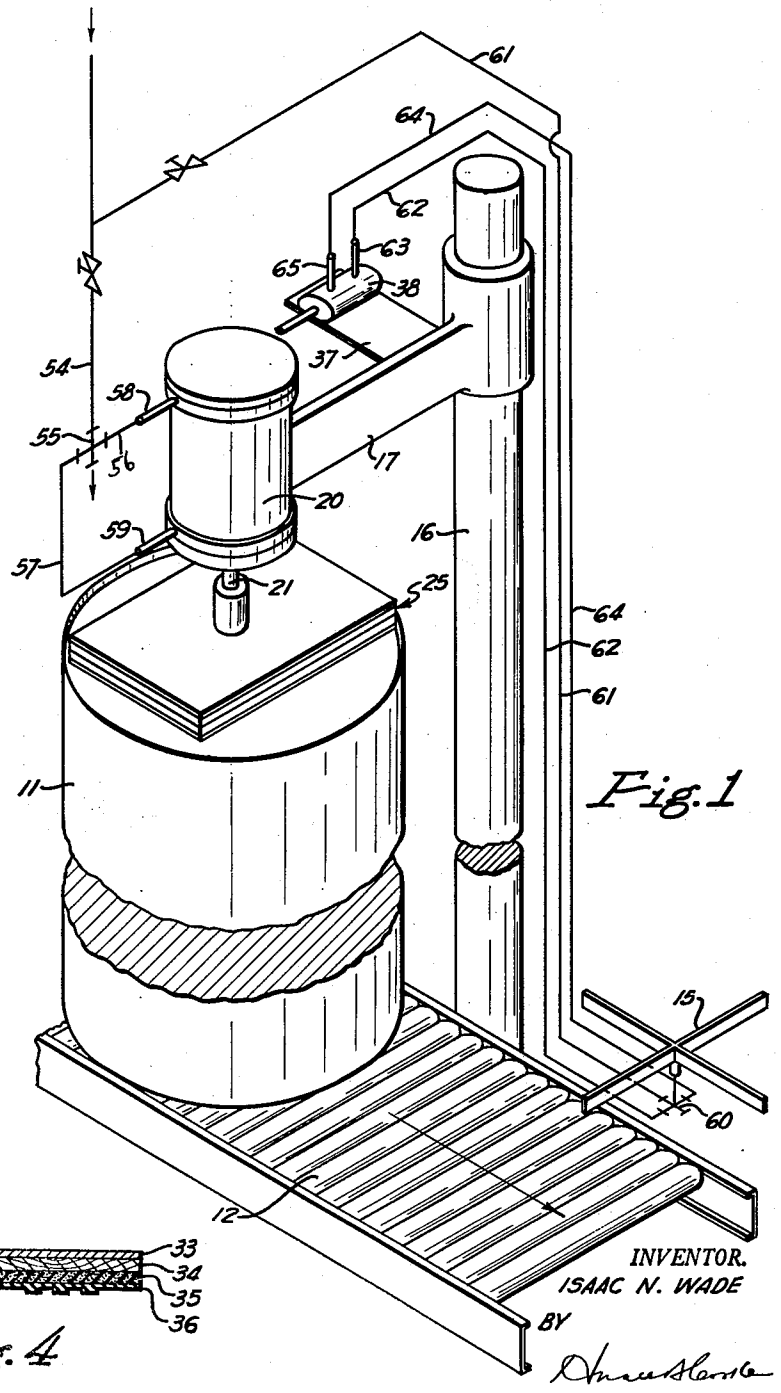


Fig. 1

Fig. 4

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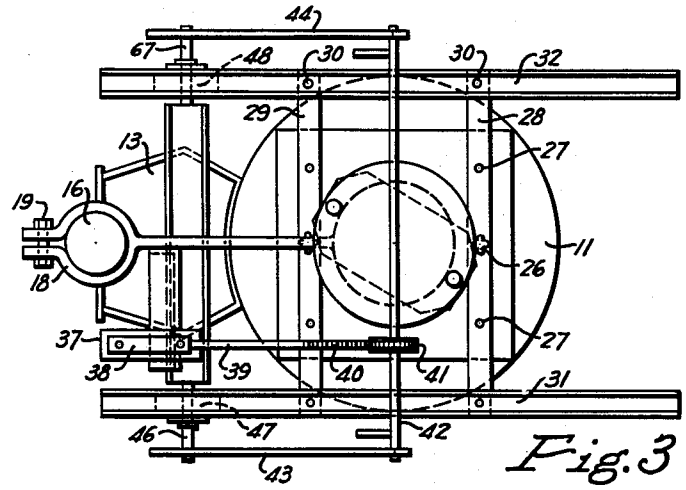


Fig. 3

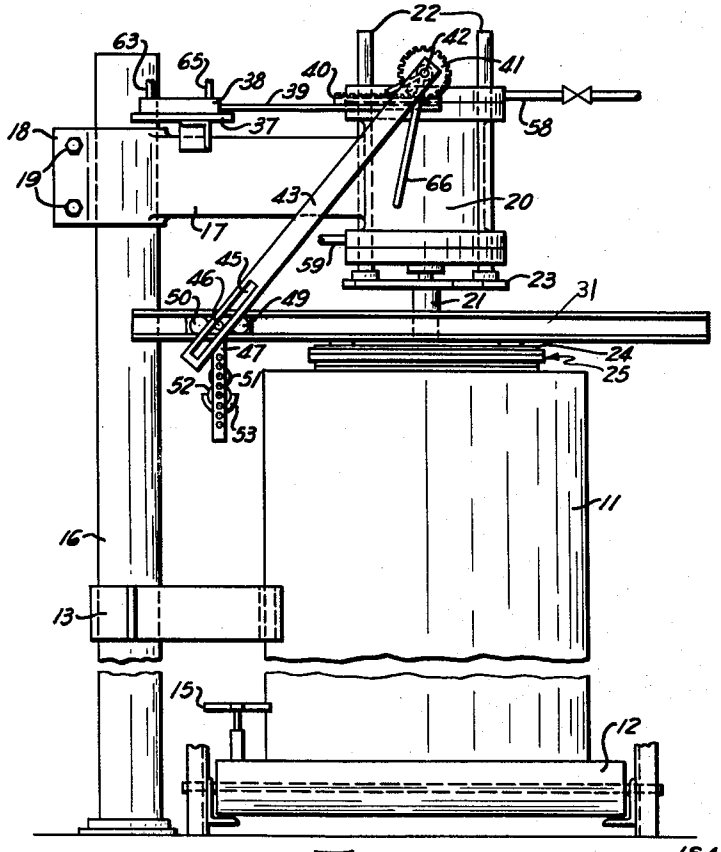


Fig. 2

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DRUM PRINTING ASSEMBLY

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2 Claims. (Cl. 101—44)

The present invention relates to printing devices and more particularly to a device for imprinting or stamping legends on the top surfaces of containers.

For purposes of identification it is usually desirable to print a legend on the top end of a container, for example, an oil drum to identify the product contained therein. The fact that the surface to be printed on is irregular and may be either convex or concave makes such printing difficult. Heretofore, the common practice has been to place the legend or brand insignia on the top end or drum head by use of a stencil or silk screen. Both of these methods are usually hand operations with definite disadvantages. In stenciling it is impossible to avoid breaks in the letter lines and silk screen printing requires trained personnel to prepare and maintain the screens. In the past, automatic printing devices have not been used for this purpose because the printing die would print on the raised portion of the convex or concave surface but the depressed areas would not be contacted.

One object of my invention is the provision of a device for printing on convex or concave surfaces in such manner that the depressed areas are contacted and printed upon as well as the raised portions of the surface.

Another object of my invention is the provision of a device adapted to print sharp, clearly defined legends on the irregular surfaces of oil drum heads.

A further object of my invention is the provision of an automatic device for stamping or printing legends on oil drums utilizing compressed air to operate the device.

These and other objects and advantages of the invention will become apparent upon an understanding of the details of the apparatus as more fully set forth hereinafter.

In accordance with my invention, I provide a device for printing legends on the ends of containers, the device having a printing assembly and inking assembly and means for actuating the printing assembly and inking assembly automatically.

More particularly stated, the invention provides a printing device for printing legends, identifying insignia or the like on the top end of containers, the device having a printing assembly adjustably secured to a support member which can be raised or lowered to accommodate various size containers, an inking assembly which serves to supply printing ink to the face of a printing die and means to operate the printing assembly and inking assembly utilizing compressed air. Furthermore, the device provides a printing assembly so constructed that it is flexible and can easily conform to irregular surfaces of containers to give a clear impression thereon.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings which form a part of the specification and wherein:

Figure 1 is a perspective view of the printing device of the invention minus the inking assembly, showing a drum in position for being printed upon.

Figure 2 is a side elevation of the apparatus of the invention, showing the mechanism for operating the printing assembly and inking assembly.

Figure 3 is a plan view of the apparatus of Figure 2.

Figure 4 is a detailed view showing the construction of the printing die assembly.

Referring now more particularly to Figures 2 and 3 of the drawings, an oil drum 11 is shown on a conveyer roller track 12 and maintained in position for printing thereon by drum positioner bracket 13 which is attached to vertical support member or pedestal 16. Star wheel 15 is provided near the base of the apparatus to make contact with oil drum 11 as the drum is moved out of printing position. Star wheel 15 controls a standard 4-way air valve which regulates the flow of compressed air to the inking assembly as will be more fully described hereinafter. Horizontal arm 17 is adjustably secured to vertical support member 16 by a bolted collar 18 and may be secured at a desired height by means of bolts 19, to accommodate containers of varying size. Horizontal arm 17 carries air cylinder 20 together with air piston 21 which reciprocates vertically within the air cylinder. The piston 21 is prevented from rotating during its reciprocating movement by a pair of pilot pins 22 secured to pilot pin plate 23 which elements move with the piston. Attached to the lower end of air piston 21 is print die holder plate 24. The printing assembly designated generally at 25 is removably attached to printing die holder plate 24 by means of thumb nuts 26. Printing die holder plate 24 is also attached for additional support as at 27 to a pair of transversely extending bars 28 and 29. Bars 28 and 29 are fastened as at 30 to a pair of guide rails 31 and 32 which extend horizontally along each side of the device as shown in Figure 3.

As shown in Figure 4, printing assembly 25 is constructed of several elements and includes a metal die assembly plate 33 to which is attached a plywood sheet 34 of approximately ¾ inch thickness. Attached below the plywood sheet is a layer of sponge rubber 35 to which is attached a rubber printing die 36 bearing rubber lettering which is vulcanized thereto. The rubber printing die 36 and its lettering are conventionally fabricated to be resistant to printing inks. The sponge rubber backing 35 for the rubber printing die makes it possible for the die to assume the shape of the drum head when pressure is applied and should be of a thickness sufficient to accommodate the difference of elevation between the highest and lowest portions of the surface on which the printing is to be imposed. In the preferred embodiment shown, a one inch thick layer of sponge rubber was found suitable.

Referring again to Figures 2 and 3 of the drawings, a lateral member 37 extending from horizontal support member 17 supports an air cylinder 38 which is provided with air piston 39. Air piston 39 which reciprocates horizontally within air cylinder 38 is provided with a rack 40 at the forward end which meshes with pinion gear 41 mounted on pinion shaft 42. Rigidly secured to each end of transversely extending pinion shaft 42 are lever arms 43 and 44. Slotted apertures as at 45 are provided near the free ends of lever arms 43 and 44 to slidably engage lateral projections 46, 67 on inking roller arms 47 and 48. T-shaped inking roller arms 47 and 48 are provided adjacent guide rails 31 and 32 respectively. Inking roller arms 47 and 48 are attached to rollers 49 and 50 which enable them to move horizontally along the guide rails. Extending between the arms 47

and 48 and carried thereby, are metallic contact roller 51 and felt ink feed roller 52 and a drip pan 53. The rollers 51 and 52 are held together by suitable tension springs as commonly used in the art. The lever arms 43 and 44 when actuated move in a slightly arcuate path carrying the inking rollers 51 and 52 beneath the printing die. Handle 66 which is attached to pinion shaft 42 is provided so that the inking operation can be accomplished by hand.

In operation as shown in Figure 1, an oil drum 11 is moved by means of conveyer 12 into printing position. Compressed air is introduced to the system through line 54 which is connected to a suitable supply of compressed air. The flow of compressed air to the printing assembly is regulated by a 4-way valve of standard type which is shown diagrammatically at 55. It will be observed that valve 55 as shown is connected to lines 56 and 57 which lead to each of 2 ports on air cylinder 20. The 4-way valve 55 is of course provided with ports for air intake and exhaust.

To actuate the printing assembly, valve 55 is opened to permit air to flow through line 56 and port 58 to air cylinder 20. Upon the entry of compressed air into air cylinder 20, piston 21 descends and causes the face of printing die 36 to contact the top surface of oil drum 11. The flexible construction of the printing die assembly enables it to conform to the surface of the drum head thereby giving a sharp, clearly defined impression thereon. To retract the air piston 21 and to raise the printing die assembly, valve 55 is turned to divert air pressure into line 57 and air cylinder 20 through air port 59. The compressed air leaves air cylinder 20 via port 58 and is exhausted through the exhaust port of valve 55. The completes the printing operation and the stamped drum is then moved out of printing position by the conveyer 12.

Star wheel 15 is positioned adjacent the conveyer track 12 so that it comes into contact with the oil drums as the drums move along the conveyer. The star wheel 15 controls the operation of a second standard 4-way valve shown diagrammatically at 60. The intake port of valve 60 connects with air line 61 which leads to a supply of compressed air. As the printed drum moves past star wheel 15 it rotates the star wheel 90° which in turn opens the air valve and permits compressed air to flow through line 62 and port 63 to air cylinder 38. When compressed air is introduced into air cylinder 38 through port 63, piston 39 moves forward causing rack 40 to engage pinion gear 41 and thereby causing it to rotate in a counterclockwise direction together with pinion shaft 42 on which it is mounted. The counterclockwise rotation of the pinion shaft 42 actuates lever arms 43 and 44 thereby causing inking roller arms 47 and 48 to move forward by means of rollers along guide rails 31 and 32. The forward movement of inking roller arms 47 and 48 causes inking rollers 51 and 52 to traverse in a forward direction the face of the printing die 36. The gearing arrangement between the rack 40 and gear 41 is suitably adjusted so that inking roller arms 47 and 48 travel to a position near the forward extremity of guide rails 31 and 32. The inking roller arms 47 and 48 together with the inking rollers 51 and 52 remain in this forward or extended position until air piston 39 is retracted. The printing die after being inked is now ready to perform a printing operation.

After another drum has been printed as described previously, the drum is moved by means of conveyer 12 past star wheel 15. As this drum moves past star wheel 15 the wheel is again turned 90°. The flow of air through line 62 which occurred from the previous turn of star wheel 15 is now diverted to line 64 and air port 65 on air cylinder 38. The entry of compressed air into air cylinder 38 through port 65 causes air piston 39 to be retracted which in turn rotates pinion gear 41 and pinion shaft 42 in a clockwise direction. The rotation of pinion shaft 42 again actuates lever arms 43 and 44 causing the inking roller arms 47 and 48 to move rearwardly along guide rails 31 and 32 to a position near the rear extremity of the guide rails. The movement of the inking roller arms 47 and 48 causes the inking rollers 51 and 52 to traverse the face of printing die 36 renewing the supply of ink thereto. The printing assembly is again ready to perform the printing operation and this sequence of operation is employed to print any number of drums as desired.

It will be apparent to those skilled in the art that the art that the invention is susceptible to various modifications and embodiments. For example, the star wheel member which controls the operation of the inking assembly can be positioned so that it contacts the drums as they move into printing position rather than as they move out of printing position as in the described embodiment. In another embodiment of the invention, an additional star wheel member can be easily provided to control the flow of compressed air to the printing assembly by contact with the drums as they move into printing position. Such modifications and embodiments are encompassed within the present invention.

It is apparent from the foregoing description that the invention discloses a novel device for printing on drum heads or other containers. Of outstanding importance and advantage is the fact that this new printing device eliminates the disadvantages which occur when such operations are performed by hand. Furthermore, the printing accomplished by the device of the invention is much more attractive than that normally obtained by prior art devices.

Although my invention has been described with reference to certain particular embodiments therein, which I have found suitable, it will be recognized that the apparatus may be modified in its details of construction without departing from the spirit of the invention and I do not intend that the scope of my invention be limited to the structural details of the apparatus as stated except as defined in the appended claims.

Having described my invention as set forth above, I claim:

1. A printing device for printing on the heads of containers comprising in combination, a vertical support pedestal, a horizontal support member extending therefrom and carrying an air cylinder, an air piston disposed within said air cylinder and adapted for vertical reciprocation therein, a printing assembly attached to the lower end of said air piston whereby the said printing assembly reciprocates between an upper and lower position, a support member extending laterally from the above mentioned horizontal support member and carrying a second air cylinder, an air piston disposed within the said last mentioned air cylinder and adapted for horizontal reciprocation therein, and provided at its forward end with a rack, a pinion gear mounted on a transversely extending pinion shaft in meshing relationship with the said rack, rigid members attached to each end of said transversely extending pinion shaft, the said rigid members attached also at the other ends to arm members, the said arm members adapted to move along horizontally extending guide rails lying on each side of the above mentioned printing assembly and to carry an inking roller and an ink feed roller, air lines connecting both air cylinders to a compressed air supply, and compressed air control means operable by contact with the containers.

2. A printing device for printing on the heads of containers comprising in combination a vertical support pedestal, a horizontal support member extending therefrom and carrying an air cylinder, an air piston disposed within said air cylinder adapted for vertical reciprocation therein, a printing assembly attached to the lower end of said air piston whereby the said printing assembly reciprocates between an upper and lower position, a support member extending laterally from the above men-

tioned horizontal support member and carrying a second air cylinder, an air piston disposed within the said last mentioned air cylinder and adapted for horizontal reciprocation therein and provided at its forward end with a rack, a pinion gear mounted on a transversely extending pinion shaft in meshing relationship with the said rack, rigid members attached to each end of said transversely extending pinion shaft, the said rigid members attached also at the other ends to arm members, the said arm members adapted to move along horizontally extending guide rails lying on each side of the above mentioned printing assembly and to carry an inking roller and an ink feed roller, air lines connecting both air cylinders to a compressed air supply, and a rotatable member with lateral projections thereon, mounted near the base of the device so as to contact the moving containers, thereby controlling the flow of compressed air to the system.

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