

[54] **LIQUID DISPENSING SYSTEM**

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[57] **ABSTRACT**

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A liquid dispensing system for depositing a liquid along a line of a paper transported by a conveyor. The liquid is utilized for aiding a subsequent folding of the paper along the line. A pipe having an outlet orifice for depositing the liquid is positioned adjacent the paper. A liquid reservoir holds a sufficient supply of the liquid during the process. A valve controls the flow of the liquid to the outlet orifice. The orifice can be vertically and horizontally adjusted with respect to the paper so as to place the liquid along the desired line of the paper.

[56] **References Cited**

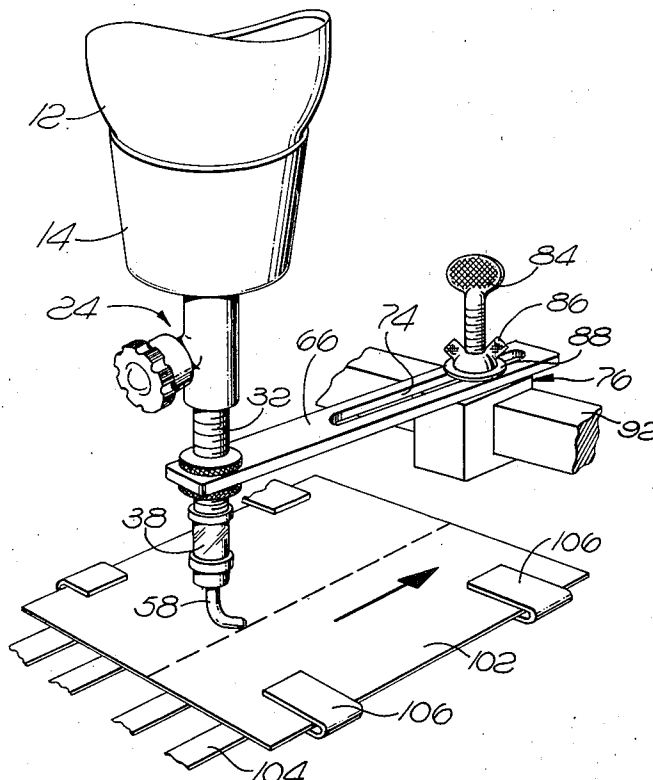
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4 Claims, 3 Drawing Figures



LIQUID DISPENSING SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the invention.

The field of art to which the invention pertains includes the field of liquid dispensing systems, particularly with respect to an adjustable dispenser for use with paper folding machine apparatus.

2. Description of the prior art.

In paper folding machines, multiple fold products normally have been found to entrap air between the folds once the first fold of the multiple fold is completed. Additionally, certain weight papers, and papers having certain grains, especially papers which are folded against the grain (cross-grain) require additional machinery for folding. To aid in folding the paper along the desired line, liquid penetrators typically made of water and alcohol are utilized to penetrate the fiber of the paper. Thus, when the paper is folded along the line, the weakened fibers aid to simplify the folding. In one form of apparatus which places a liquid along a line to be folded, liquid is transferred from a rotatable ball onto the paper. The ball itself must touch the paper and press against the table of the conveyor machine in order to transfer the liquid. Such a system is relatively complex and wear on the ball as well as the machine table results in an incomplete or inaccurate transfer of the liquid after prolonged use. Alternative arrangements utilize scoring or creasing of the paper which may be used in combination with or in place of liquid dispensers. Still other arrangements include crude makeshift flow systems wherein liquid is transferred and fluid flow controlled by means of crimping a liquid flow line.

The present invention provides a simple means for placing a liquid line on a paper to be folded. The device need not touch the paper and wear on the conveyor transporting the paper is prevented. The device is relatively simple and is adjustably mounted on the table so that the liquid can be placed along any line parallel to the axis of movement of the paper.

SUMMARY OF THE INVENTION

A liquid dispensing for depositing liquid along a line of the paper transported by a conveyor, for subsequent ease in folding the paper along the line. A pipe having an outlet orifice is positioned adjacent the paper for depositing the liquid on the paper. A liquid reservoir holds a supply of the liquid. A valve controls the flow of liquid to the outlet orifice. The orifice can be adjusted vertically and horizontally with respect to the paper for placing a line along the paper parallel to the axis of movement of the paper.

The advantages of this invention, both as to its construction and mode of operation, will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the Figures.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the liquid dispensing system made in accordance with the invention;

FIG. 2 is a side view, partly in section, of a portion of the liquid dispensing system; and

FIG. 3 is a top view of a portion of the liquid dispensing system illustrating the technique of adjusting the system in a horizontal plane.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, there is shown in FIG. 1, a perspective view of the liquid dispensing system constructed in accordance with principles of the invention. A container 12 which is illustrated in the form of an inverted bottle is placed so that its contents will pour into a cup-shaped reservoir 14.

The liquid dispensing system is shown in cross-sectional view in FIG. 2. Liquid 16 from the container 12 is partially emptied into the cup-shaped reservoir 14 through an opening 18 formed at the neck end 22 of the container 12.

A needle valve mechanism 24 which controls the flow of liquid out of the cup-shaped reservoir 14 is connected at one end 26 to the bottom of the reservoir 14. The other end 28 of the needle valve mechanism 24 is connected to an externally threaded conduit 32. Flow of liquid from the reservoir 14 to the externally threaded conduit 32 is controlled by a needle valve mechanism 24 by means of a conventional rotatable knob 34 secured to the needle valve 24.

The externally threaded conduit 32, which is threadably secured at one end to the needle valve mechanism end 28 is secured at its other end by means of a cylindrical flange 36 to a visible conduit 38 which is typically made of glass or clear plastic. The visible conduit 38 is of a generally cylindrical configuration with one end being mounted in a slot 42 formed in the bottom surface 44 of the cylindrical flange 36. The other end of the visible conduit 38 is secured to a transitional pipe 46 at its top surface 48. The top surface 48 contains a slot 52 similar to the slot 42 into which the visible conduit is secured by conventional techniques.

The transition section 46 has an inner diameter slightly smaller than that of the visible conduit 38 at their junction and tapers in a step-like fashion to a central intermediate size bore 54 and hence tapers to an outlet 56 having an outlet pipe 58 secured thereto. The outlet pipe has a central elbow 62 secured at an obtuse angle which terminates at an outlet orifice 64. A mounting bracket 66 is secured at first end 67 to the externally threaded conduit 32 and is movable along the axis of the conduit 32 through an opening (not shown). Positioned on the externally threaded 32 conduit on opposite sides of the bracket are a pair of adjustable fastening nuts 68 and 72. The nuts 68 and 72 enable the mounting brackets 66 to be adjustably vertically positioned along the axis of the conduit 32.

The mounting bracket 66 is generally of an elongated configuration of rectangular shape and is mounted in a plane perpendicular to the axis of the threaded conduit 32. A longitudinal slot 74 extends from the second end 75 of the bracket 66 to approximately halfway across the bracket.

A U-shaped clamp 76 is positioned below the mounting bracket 66 and is movable along the longitudinal slot 74. One arm 78 of the U-shaped clamp 76 contains a threaded aperture 82 into which a thumb screw 84 can be inserted. The thumb screw extends from above the mounting bracket 66 through the longitudinal slot 74 and into the threaded aperture 82. To secure the thumb screw 84 to the longitudinal slot a wing nut 86

is threadably secured thereon with rotation of the wing nut causing a spring washer 88 to tighten about the top surface of the mounting bracket 66. The thumb screw 84 is utilized to tighten the U-shaped clamp 76 to a mounting device, which is illustrated in FIG. 1 as a mounting bar 92.

In FIG. 1 the liquid dispensing apparatus is illustrated as placing a line of liquid along a piece of paper 102 which moves along a conveyor 104 in the direction shown by the arrow in FIG. 1. Normally, a plurality of feet 106 are placed on opposite edges of the paper 102 adjacent the conveyor 104.

As illustrated in FIG. 1, the outlet orifice 64 is placed adjacent the paper, with the curved portion formed by the elbow 62 curved in a direction of movement of the paper. The orifice 62 is adjacent the paper but slightly spaced therefrom so that no touching of the outlet pipe 58 and the paper 102 occurs.

The liquid dispensing apparatus is utilized to place a fine line of liquid from the container 12 onto the paper. Typically, such liquid could be a water and alcohol mixture which when placed on the paper slightly disintegrates the fabric of the paper and enables the paper to be more easily folded. The liquid from the container 12 is emptied into the reservoir 14. The reservoir 14 stores the liquid 16 and as the knob 34 of the needle valve 24 is opened a flow of liquid into the conduit 32 occurs. Liquid from the conduit 32 enters the visible conduit 38 where the flow can be observed and adjusted if desired.

The liquid passes from the conduit 38 into the transition section 46 and hence into the outlet pipe 58. The outlet pipe 58 is positioned so that the outlet orifice 64 will place the liquid along a line of the paper 102 as is desired. The outlet pipe 58 is provided with a curved elbow 62 so that should the paper 102 rise during its movement, the elbow 62 will tend to keep the paper adjacent the conveyor 104 without tearing.

As can be seen in FIG. 3 the longitudinal slot 74 on the mounting bracket enables the dispensing system to be moved across the transverse axis of the conveyor so

that any position of the paper can have a liquid line placed thereon with the liquid being placed along the axis of travel of the paper. Additionally, the longitudinal slot 74 enables the liquid dispenser system to be varied in its position along the axis of the conveyor by an amount equal to the length of the slot.

I claim:

1. A liquid dispensing system for depositing liquid along the line of a paper transported by a conveyor means for subsequent ease in folding said paper along said line comprising:

conduit means having an outlet orifice positioned adjacent and spaced from said paper for depositing a fine line of said liquid on said paper;

a liquid reservoir for holding a supply of said liquid; valve means for controlling the flow of said liquid to said outlet orifice;

means for adjusting the vertical and longitudinal position of said orifice with respect to said paper, wherein said conduit is secured to a mounting bracket said bracket being fixed to a mounting member, said mounting member supporting said longitudinal adjusting means and said bracket supporting said vertical adjusting means.

2. A liquid dispenser in accordance with claim 1 wherein said conduit has a curved elbow portion adjacent said orifice in a direction with respect to travel of said paper for aiding deflection of said paper when said paper tends to lift from said conveyor means.

3. A liquid dispensing system in accordance with claim 1 wherein said bracket being formed in a plane parallel to the plane of movement of said conveyor, said bracket being movable radially and circumferentially about a circle whose circumference is defined by said conduit movement for enabling said orifice to place a line of liquid along any part of said paper.

4. A liquid dispensing system in accordance with claim 1 wherein said line is placed along said paper in a plane parallel to the axis of movement of said paper.

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