Oct. 5, 1937. C. L. RAGOT 2,095,038

TAPE MOISTENING APPARATUS

Filed Sept. 14, 1933

Fig. 2

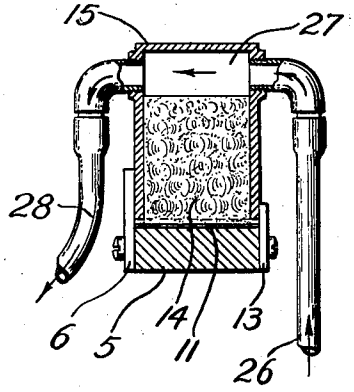


Fig. 3

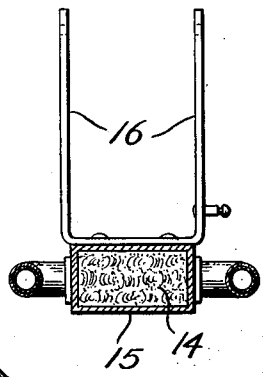


Fig. 1

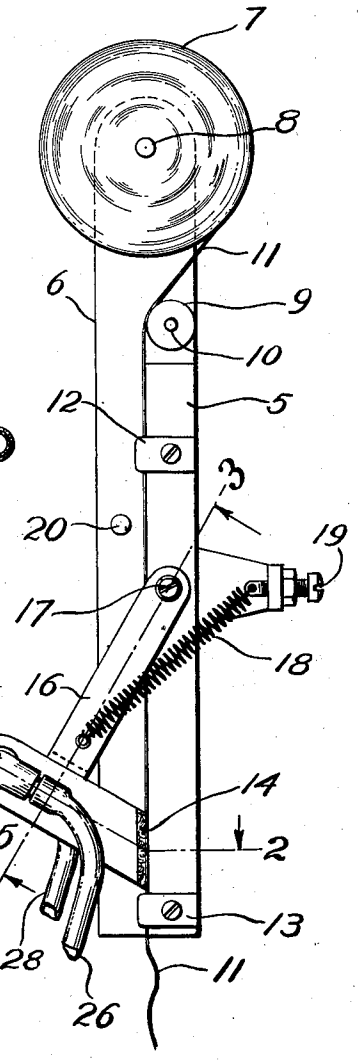
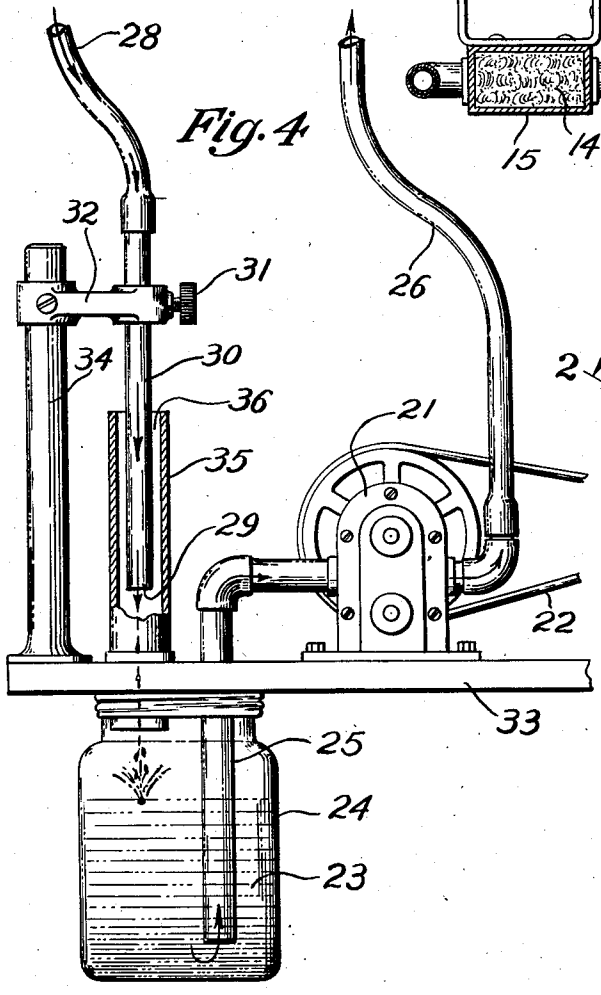


Fig. 4



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TAPE MOISTENING APPARATUS

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Application September 14, 1933, Serial No. 689,337

8 Claims. (Cl. 91—56)

This invention pertains to a novel construction of apparatus which moistens gummed tape, labels, or the like, as they are moved to a position to be applied to the selected containers or products.

This invention also relates to an improved moistening apparatus which may be readily adjusted to increase or decrease the amount of moisture available at the point of applying the same to the tape or label or the like.

One of the main features of this invention is to provide a novel apparatus for applying, dispensing, distributing, or spreading moisture to or upon extended areas or surfaces in a uniform manner, and more particularly to efficiently apply moisture when there is a relative motion between the applicator portion of the apparatus and the surface or area to be moistened. This improved apparatus is particularly adapted where the requirements are intermittent, spasmodic, or otherwise inconstant or irregular, although its performance is very efficient where the speed of the tape or the like is constant.

A further feature of the invention is to provide means whereby the moistening process is automatic in operation and compensates for variations in demand due to changes in velocity of the relative motion in order that the result will be a constant and uniform film of moisture regardless of velocity changes, interruptions, or cessation in said relative motion.

A still further feature is to provide a manual control by which the basic moisture availability can be regulated to conform to the requirements of any particular kind or grade of gum, or type of paper or surface to which the moistened part is to be applied, or coating thereon, to insure a firm and secure bond between the moistened part and the part or parts to be joined adhesively or sealed together.

When too much moisture is applied to a gummed surface, the tendency is either to flush off the gum, or else the adhesive quality is impaired or even destroyed altogether due to slippage or premature loosening from the object or part to which the moistened surface may be applied. On the other hand, when there is a lack or deficiency of moisture, the gummed surface is not fully softened or dissolved and an unsound seal is the result.

Heretofore, various methods have been used and under the most favorable conditions these methods have been inefficient due to certain inherent disadvantages, namely opposite extremes of wetness or dryness, with their attendant nuisances of flooding, gumming up, clogging, and general messiness, all contributing to a lack of uniformity in the result, and unreliable performance.

In order to overcome and eliminate the disadvantages enumerated above and to provide a uniform and constant moisture under any and all conditions to be met in practice, this invention makes use of mechanical means combined with certain structural features, so arranged and disposed as to function automatically, and with but few moving parts. In addition to these advantages, the device is compact, inexpensive and simple to manufacture, and is adaptable as to arrangement and location on a machine, and flexible as to position in its direction of operation whether upward, downward, sidewise, edgewise, or at any angle with the horizontal. Furthermore, the gummed face may be either uppermost or underneath without impairing the full and proper function and complete performance of the novel device.

One of the principal features which is incorporated in this applicator is a circulatory system for the moistening fluid which includes all of the elements to accomplish the object and scope thereof, and there is illustrated one device embodying the elements in detail with the annexed drawing and text in which like reference numbers refer to the same designated parts in both.

Fig. 1 shows a side elevation of one form of the tape holder and the moistening element, without the circulatory system;

Fig. 2 is a sectional view on line 2—2 of Fig. 1, showing the moistening element within its jacket;

Fig. 3 shows a detail, partly in section, of the moistening element on line 3—3 of Fig. 1; and

Fig. 4 is a view showing the arrangement of the circulatory system in conjunction with Fig. 2.

Referring to Fig.1, a backing plate 5 carries a side member 6 which acts as a support for a roll of tape 7 mounted to rotate freely on pin 8. A roller 9, pivoted at 10, guides the tape 11 with the gummed face to the left, onto the backing plate. From there the tape passes between side member 6 and guides 12 and 13, and under a porous element 14 protruding from a jacket 15 which is supported by arms 16 pivoted at 17. The porous element is held yieldingly against the tape by means of spring 18, adjustable at 19, and which may be swung away from the backing plate and rested against stop pin 20 to facilitate "threading" of the tape through the device.

The circulatory system is illustrated in Fig. 4 in conjunction with Fig. 2, in which a circulating pump 21, driven by a belt 22 from some source of

power, not shown, draws fluid 23 from container 24 through suction pipe 25 and sends it upwards through feed duct 26 to cavity 27 in the jacket 15 behind the porous element 14. Return duct 28 drains the fluid back to the container through orifice 29 of dribble pipe 30 which is adjustable vertically at 31. In this case, bracket 32 is mounted rigidly to base 33 by means of post 34. Dribble pipe 30 is telescopically mounted in relation to vent tube 35 allowing free access to the atmosphere by means of gap 36. Pump 21 is mounted on base 33 in a rigid manner while container 24 is shown mounted removably for purposes of cleaning same or renewing or replenishing the fluid supply therein.

As shown in Fig. 2 the cavity in the jacket is preferably located at the highest point in the circulatory system so that when the pump is stopped, the weight of the fluid remaining in the return duct and kept in suspension by atmospheric pressure and surface tension due to the constricted proportion of the duct, will prevent any of the residual fluid from flowing toward the surface to be moistened. Even after prolonged interruption of service, if the fluid should trickle out of the system, it would drain toward the container in both the feed and return ducts leaving the porous element free from flooding.

Having outlined the various parts of the invention and their relationship to the whole, the operation is explained as follows:

When it is desired to use the device as illustrated, the pump is set in motion and at once the fluid will be brought upward through the suction pipe and then pass through the feed duct to the cavity in the jacket. The excess amounts return by syphonic action through the return duct and issue from the orifice in the dribble pipe to fall free by gravity to the container from whence it started. Thus it is plain that the fluid may be circulated over and over again, and while on its circuit keeps the cavity in the jacket filled. This fluid is therefore in contact with the inner end of the porous element which it saturates.

The several elements constituting the circulating system are so proportioned and disposed that they establish a hydraulic balance. Normally the positive pressure generated by the pump to raise the fluid to the cavity behind the porous element is counteracted by an equal negative pressure brought about by the weight of the column of fluid in the return duct.

By this syphon arrangement any pressure on the porous element from within is avoided. This balance, however, is subject to adjustment by varying the height of the fluid column in the return duct. This is accomplished by raising or lowering the vertical position of the outlet orifice of the return duct.

In order to obtain an effective syphonic effect, the capacity of the pump and the diameter and positions of the ducts should be so related that the volume of fluid delivered by the pump will keep the ducts filled, especially on the return side, to prevent the system from becoming air bound.

In practice it has been found that with the various elements properly proportioned and disposed, a wide range of moisture availability can be produced, from a flooding maximum as one extreme, to actual absence of beads of moisture on the exposed portion of porous element 14 as the other; even to sucking up fluid from an outside supply by the porous element 14 may be accomplished if the dribble pipe is lowered sufficiently. It naturally follows that somewhere between these extremes there is a position which will produce and maintain the exact moisture required.

The degree of saturation of the porous element 14 may readily be regulated by the adjustment, provided the range of the effective adjustment is sufficient, plus and minus, from a normal moisture flow so as to give the desired results in wetting a tape. The apparatus is originally assembled and adjusted to function properly to properly wet the tape which is to be moved at a definite speed. However, the apparatus has sufficient flexibility so that changes in speed of the tape movement from its normal rate will not cause the moistening apparatus to become ineffective, but the tape will be properly wet during these changes in speed by reason of the stored moisture in the device and especially in the porous element 14. If the speed of tape is to be at a higher rate for a considerable length of time, then the apparatus is to be adjusted to permit more moisture to be fed to the porous element. This adjustment is readily made by changing the height of the dribble pipe. Should the speed of tape be below that of the normal speed, then the moisture flow from the pump will flow along into the dribble pipe 28 and be carried away. It will be noted that if there is a large amount of moisture backing up the porous element 14, that beads of moisture will be formed on the exposed surface of porous element 14 if there is no tape in engagement with the porous element at the time, or if the tape is in engagement beads will form on the sides of the porous element.

When the device is to be used in conjunction with a tape applying machine, the member carrying the moistener may be adjustably disposed so as to make it possible to raise or lower it in relation to the base of the machine to better locate the moistened end of the tape for applying purposes. In this case, the dribble pipe should move along with it to maintain the balance of fluid in the circulatory system, and bracket 32, Fig. 4 should be mounted on a portion of the adjustable "head" of the machine, not shown, and carried with it in unison up or down. In this manner, by maintaining the setting of the vertical distance between the cavity in the jacket and the orifice in the dribble pipe, the moistening ability would remain uniform and undisturbed, although the "head" may be raised or lowered. The pump in this case may be driven by the machine so that when the machine is stopped the circulation of fluid ceases.

The invention herein described is therefore self-contained, including not only the elements to make it function properly and automatically, but also includes means for regulating or controlling the basic amount of moisture availability at the porous element. Thus if a piece of tape be passed with its gummed face against the porous element, it will carry off fluid at a certain rate per unit of length of tape, regardless of the length passed at one draw, and no matter at what speed, whether fast or slow, either at a uniform, accelerating or retarding rate of feed. Such changes in speed tape from the normal speed of the tape still do not effect the proper moistening of the tape, as those changes in speed would only be temporary and the moistening device has stored moisture therein so that the tape will be properly wet under the temporary changes of the speed of the tape. The fluid in the cavity seeps thru the porous element by capillary action and continu-

ously restores and maintains the moisture availability according to the adjustment established, and when the pump is in operation and no tape is being drawn, the moisture availability still remains the same, constant and uniform as heretofore explained. It will be noted that the liquid passes from the pump to the chamber 27 and by capillary action some of it passes into porous element 14 and the remainder passes to return duct 28 and from there to dribble pipe 30. With this construction it will be seen that there is a closed system starting from the fluid in the reservoir 24 through pipe 25, through pump 21, duct 26 to cavity 27 to return duct 28 and dribble pipe 30 back into the reservoir. It will also be noted that no air passes backward through dribble pipe 30 or return duct 28. Thus, with this structure the moistening device itself containing the porous element 14 and the pipe connections to and from thereto, constitute a closed piece of apparatus which in some uses of this device may be considered as being a closed hydraulic system.

It will therefore be particularly noted that the moistening element is never flooded and is never dry unless there is maladjustment in the proportions or installation of the apparatus. The novel device herein is particularly adapted to be employed in any manner or under such circumstances wherein it is desired to moisten a tape, label or other like articles, and that the device may be adjusted for different installations so that its most efficient operation may be obtained.

It is understood by those versed in the art that the accompanying drawing shows only one of the many arrangements of the several units and elements, and that radical departures from this specific form could be made without departing from the spirit, scope, and purpose of my invention.

What is claimed is:

1. A moisture applicator capable of intermittent use without dripping when not in use comprising a porous element, a closed jacket except for an opening for receiving said porous element, said porous element filling at least a majority of the space of said jacket and filling said opening, means for delivering fluid from a reservoir to said jacket, and a separate and adjustable means connected to said jacket for immediately draining substantially all of the surplus fluid therefrom to said reservoir when said device is stopped, said adjustable means acting to vary the amount of fluid pressure in said porous element during the time said applicator is in use.

2. In a moisture applicator for gummed tape and the like capable of intermittent use without dripping when not in use, the combination of a closed container except for an opening, a porous element mounted in said container and adapted to fill more than one-half of said container and to fill said opening tightly and having a portion protruding therefrom adapted to engage the tape to be moistened, closed means connecting with said container for supplying moistening fluid thereto, and closed outlet means also connecting with said container for draining substantially all of the fluid from said container not used at the point of tape application and not held by said porous element.

3. In a moisture applicator for gummed tape and the like and being capable of intermittent operation without dripping when not in use, the combination of a closed container except for an opening, a porous element mounted in said container and adapted to fill said opening tightly and having a portion protruding therefrom adapted to engage the tape to be moistened, closed means connected to said container for supplying moistening fluid thereto, and closed outlet means also connecting with said container for draining immediately substantially any fluid from said container not used at the point of application and not held by said porous element, said fluid supply means being maintained at a substantially constant rate of flow of fluid, and said fluid outlet means being of relatively small cross section area and being adjustable to give an effective vertical change in the position of the end of said outlet means to differentially regulate the flow of fluid through said porous element and through said outlet means.

4. In a moisture applicator for gummed tape and the like capable of being used intermittently without dripping when not in use, the combination of a closed container except for an opening, a porous element mounted in said container and adapted to fill said opening tightly and having a portion protruding therefrom adapted to engage the tape to be moistened, closed means connected to said container for supplying moistening fluid thereto, and closed outlet means also connecting with said container for immediately substantially draining any fluid from said container not used at the point of contact with the tape and not held by said porous element, said closed container being mounted at a point higher than said fluid supply means and said fluid outlet means, said fluid outlet means being adjustable vertically to regulate the amount of excess fluid draining from said closed container and therefore the amount of moistening fluid issuing from said porous element to the tape.

5. A closed system moisture applicator capable of intermittent use without dripping comprising a closed jacket except for an opening, a porous element mounted in said jacket and having a portion extending outwardly through said opening to engage the surface of a strip to be wetted and having a portion thereof filling the opening in the jacket, inlet means connected to said jacket through which fluid is supplied to said porous element, and a closed outlet means connected to said jacket for draining surplus fluid away from said porous element, said draining means being constricted to provide some resistance to fluid outflow, said outlet means being adjustable to vary the resistance of outflow and thereby the degree of saturation in said porous element, said outlet means also acting to drain off fluid remaining in said jacket and not held by said porous element when the supply of fluid ceases, said porous element retaining its content of fluid when said outlet means has drained the free fluid from within said jacket.

6. A closed system moisture applicator capable of intermittent use without dripping comprising a closed jacket except for an opening, a porous element mounted in said jacket and having a portion extending outwardly through said opening to engage the surface of a strip to be wetted and filling said opening, closed inlet means connected to said jacket through which fluid is supplied thereto and to said porous element, and a closed outlet means connected to said jacket for draining surplus fluid away from said porous element, said jacket and said inlet and outlet means forming a closed hydraulic sys-

tem wherein said jacket is above the source of fluid supply and above the open end of the outlet means, said outlet draining means being constricted to provide some resistance to fluid outflow, said outlet means being adjustable to vary the resistance of the outflow and thereby the degree of saturation in said porous element, said outlet means acting also to drain off any fluid remaining in said jacket not held by said porous element when the supply of fluid to said jacket ceases, said porous element retaining its content of fluid when said outlet means has drained the free fluid from within said jacket.

7. A closed system moistening applicator capable of intermediate use without dripping, comprising a jacket closed except for an opening, a fluid reservoir mounted below said jacket, a supply conduit leading from said reservoir through a pump to said jacket, a closed outlet drain leading from said jacket, a porous element mounted in said jacket and having a portion thereof filling the opening in said jacket, and being of a sufficient size to fill said jacket in cross section and extending at least to one edge of said outlet means, said outlet draining means being constricted to provide some resistance to the fluid outflow, said outlet means being adjustable to vary the resistance to outflow and thereby the degree of saturation in said porous element, said outlet means acting also to drain off any fluid remaining in said jacket not held by said porous element when the supply of fluid ceases, said porous element retaining its content of fluid when said outlet means has drained the free fluid from within said jacket.

8. In a moisture applicator having a closed fluid system including a jacket, a fluid inlet and a fluid outlet connected thereto, and a porous element mounted in said jacket for receiving and dispensing the moistening fluid, a method of operating said moisture applicator which consists in maintaining a substantially uniform degree of moisture at the point of applying the moisture to an article by said porous element, said method including the steps of supplying moistening fluid to said porous element, removing fluid not taken up by said porous element while said applicator is in operation, and preventing dripping of moisture from said porous element by draining off substantially all fluid not held within said porous element after the cessation of the flow of inlet fluid.

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