

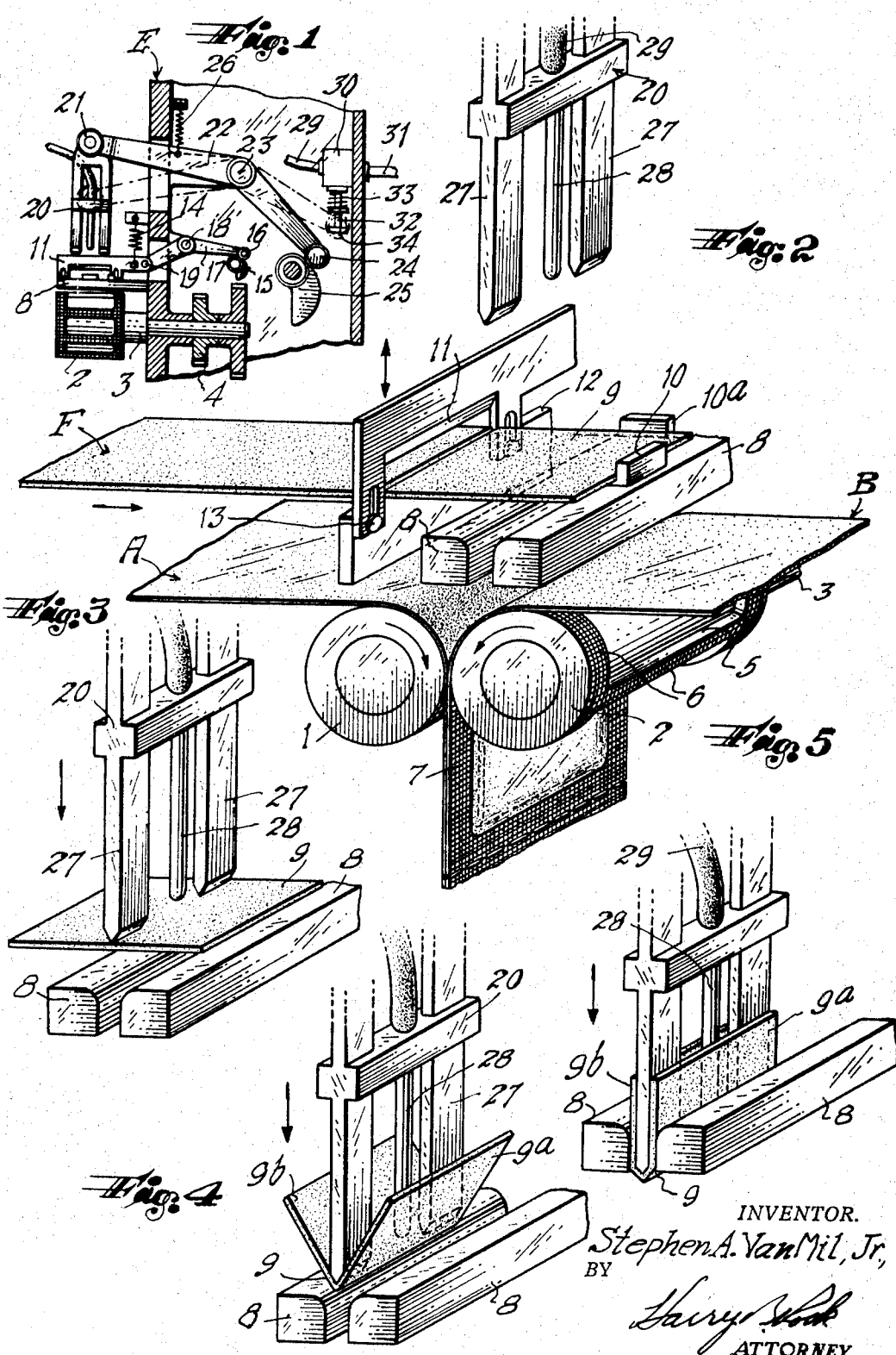
April 22, 1969

S. A. VAN MIL, JR  
METHOD AND MACHINE FOR MAKING A PACKAGE CONTAINING  
LIQUID-IMPREGNATED SHEET MATERIAL

3,439,469

Filed July 11, 1966

Sheet 1 of 2



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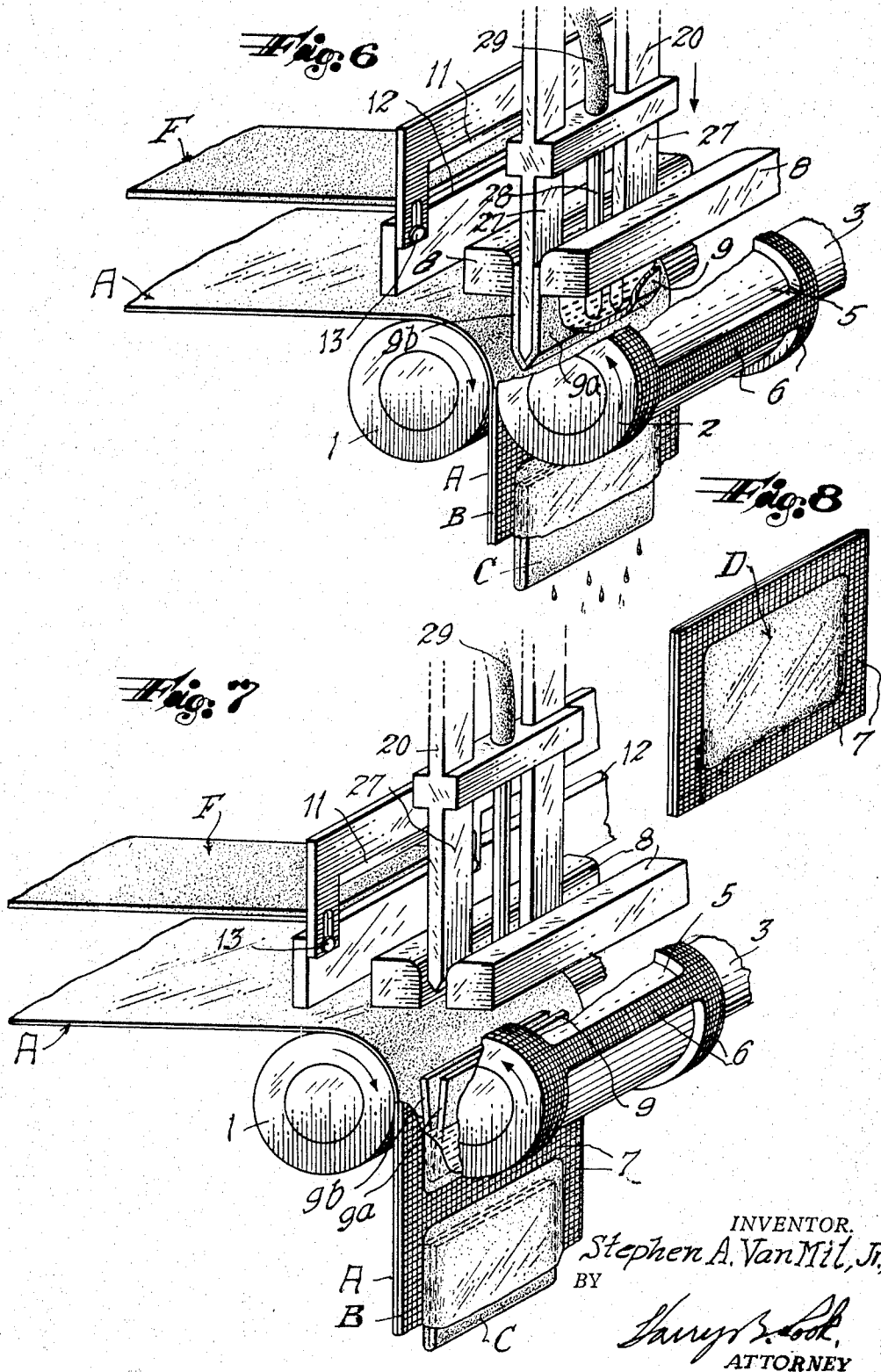
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3,439,469

**METHOD AND MACHINE FOR MAKING A PACKAGE CONTAINING LIQUID-IMPREGNATED SHEET MATERIAL**

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6 Claims

**ABSTRACT OF THE DISCLOSURE**

This invention relates to a method and machine for sheathing or packaging flexible sheets, particularly sheets of absorbent fabric or tough paper that are impregnated or coated with or serve as a vehicle for a fluent substance such as a cleansing liquid or medicine, or paste or powder.

It is one object of the invention to provide a novel and improved method and machine wherein a sheet of suitable material, for example, absorbent fabric or fibrous material is fed and folded into juxtaposed layers and a fluent substance such as liquid or paste or powder is disposed between the layers after which the folded sheet is pushed between opposed layers of flexible packaging material and the layers are sealed together to enclose said folded sheet between them.

Another object of the invention is to provide such a method and machine wherein means for folding the sheet, means for pushing the folded sheet and depositing means for liquid or other fluent substance, are moved together as a unit in one direction thereby to provide for rapid folding, impregnating or coating and sealing of the folded sheet between packaging layers.

A further object is to provide a machine of this character wherein sheet folding means having pushing fingers, and a depositing nozzle for the fluent substance are rigidly connected together and move simultaneously as a unit, and the pushing and folding fingers cooperate with the folded sheet to form a pocket for the fluent substance during the depositing thereof between the juxtaposed layers of the sheet.

Other objects, advantages and results of the invention will be brought out by the following description in conjunction with the accompanying drawings in which:

FIGURE 1 is a schematic vertical sectional view of a machine constructed in accordance with the invention;

FIGURE 2 is an enlarged fragmentary perspective view of a portion of the machine with the sheet pushing, folding and liquid depositing plunger in its position prior to a folding operation;

FIGURE 3 is a similar view with portions of FIGURE 2 omitted and showing the plunger in the position assumed immediately before the sheet-folding operation;

FIGURES 4 and 5 are similar views showing successive positions of the plunger and the folded sheet;

FIGURE 6 is a view similar to FIGURE 2 illustrating the sheet completely folded and impregnated or coated and about to be pushed between the strips of packaging material;

FIGURE 7 is a similar view showing the folded and impregnated or coated strip partially enclosed and sealed between the strips of packaging materials, and

FIGURE 8 is a perspective view of a complete package.

Specifically describing the illustrated embodiment of the invention, while it is possible to utilize other mechanism for sealing the strips of packaging material around the folded sheet, for the purpose of illustration I have shown a generally known mechanism which comprises sealing rollers 1 and 2 over which strips A and B of packaging

material such as sealable metal foil, are drawn from suitable supply reels.

These sealing rollers are rotated in opposite directions so as to draw said strips A and B between them by intermeshing gears mounted on the shafts of the rollers one of which, designated 3, has mounted thereon a gear 4 which meshes with another gear driven from a suitable source of power in known manner, for example as shown in Patents No. 2,083,617 and No. 2,541,387. The peripheries of said sealing rollers have circumferentially spaced cavities 5 so that one cavity of each roll is juxtaposed to one cavity of the other roll to form a clearance for the folded sheet generally designated C as the rollers rotate and the folded sheet is pressed between the strips A and B. These cavities are surrounded by areas 6 which are preferably serrated for sealing the strips together in zones 7 forming and bounding a compartment in which the folded sheet is enclosed to form a complete package shown in FIGURE 8 and designated D.

The rollers 1 and 2 are journaled in a machine frame E on which are also mounted means for folding the sheet, depositing a fluent substance, in the present instance liquid, between the juxtaposed layers of the folded sheet and pushing the folded sheets in succession between the packaging strips A and B, as best shown in FIGURE 1. As shown, above the rollers 1 and 2 and vertically spaced from the packaging strips A and B are folding bars 8 which are disposed in parallel relation to each other and to the bight between the rollers 1 and 2 and are spaced apart to provide clearance for a sheet 9 to be folded and impregnated. The sheet 9 is preferably fed to the machine as the leading end portion of a strip F of suitable material such as absorbent fabric or tough paper, and the length of the sheet 9 is determined by the abutment of the leading end of the sheet against a stop 10 on one of the bars 8 which cooperates with a guide lug 10a on the other bar at one longitudinal edge of the strip for locating the leading edge of the strip a predetermined distance from a vertically reciprocable knife blade 11 which coacts with a stationary knife blade 12 for severing the strip F. The knife blades 11 and 12 are only schematically illustrated, the fixed blade 12 being mounted on the machine frame E and the reciprocable blade 11 being slidably mounted on one side of the fixed blade as by pin and slot connections 13. The blade is normally held in its upper or normal position by a spring 14 and is actuated downwardly to sever the strip by a cam 15 that is rotated by suitable driving means and followed by a roller 16 on a lever 17 which is pivotally mounted at 18 on the frame and is connected at 19 to the blade 11.

After the sheet 9 has been severed from the strip F, it is folded by a plunger 20 pivotally suspended at 21 from one arm of a lever 22 which is journaled at 23 on the main frame and has a roller 24 on its other arm following a cam 25 also rotatably journaled on the frame and driven by suitable means. The plunger is normally urged into an upper position above the sheet by a spring 26 and is actuated downwardly by the cam 25.

The plunger has two folding fingers 27 spaced apart transversely of the plunger and the sheet 9 each with one edge approximately flush with the corresponding edge of the sheet, and between the fingers on the plungers 20 is a liquid depositing pipe or nozzle 28 to which liquid is supplied by a flexible tube 29 from a suitable source of supply and under suitable control.

As shown, the tube 29 is connected to the discharge or outlet side of a valve 30 mounted on the frame which is connected by a pipe 31 to a source of liquid supply, the valve having a stem 32 which is normally influenced into valve-closing position by a spring 33 and is actuated to a valve opening position by engagement of the follower

roller 24 with a head 34 on the stem. During the descent of the plunger the valve is momentarily opened to permit flow of liquid from the nozzle 28.

It will be understood that the valve, the plunger and the knife blade are operated in properly timed relation to each other by suitable driving mechanism, e.g. that which drives the cams 15 and 25.

In operation, as the plunger moves downwardly the fingers 27 engage the upper side of the sheet 9 as shown in FIGURE 3 in alignment with the space between the folding bars. As the plunger continues its descent, the sheet is folded transversely on the folding bars 8 and is pushed downwardly therebetween by the fingers which engage the sheet at the fold line. The sheet is folded into two plies 9a and 9b that are in juxtaposed and spaced relation to each other, and the nozzle 28 is disposed between those plies. Upon further descent of the plunger, the folded sheet is pushed into a position between the portions of the strips A and B of packaging material that are disposed in the bight and into the partially formed compartment through the open end thereof between the rollers 1 and 2 as shown in FIGURE 6, it being understood that the rollers 1 and 2 are continuously rotating to seal the strips A and B together in the zones 7 so as to first seal the lower portions of the compartment and gradually continue the sealing operation until the folded sheet is completely surrounded and enclosed in the compartment.

During said pushing of the folded sheet, the valve 30 is opened and the liquid is deposited on the folded sheet between the plies thereof. It will be noted that the fingers at this time form between themselves and the plies a pocket in which the liquid is deposited and the fingers prevent escape of the liquid from between the plies. Gradually but quickly the liquid is absorbed by the folded sheet and the plunger is withdrawn from between the plies of the sheet as shown in FIGURE 7 and returned to its normal position shown in FIGURES 1 and 2. Any liquid that is not absorbed by the sheet will run into the partially sealed package.

According to the method described, the packages are formed in succession in a continuous chain and may be separated from the chain either singly or in multiples by suitable known means.

From the foregoing, it will be seen that the invention provides method and machine whereby sheets of suitable material may be coated or impregnated with a fluid substance, folded or sealed into sheaths or packages in rapid succession and in practically a continuous operation, which ensures efficient and low-cost production.

I claim:

1. The method of making a package containing liquid-impregnated sheet material, said method consisting of feeding a flexible sheet of material to a folding station, transversely folding said sheet into juxtaposed plies, pushing the folded sheet from said folding station to a position between opposed flexible layers of packaging material, depositing liquid on the folded sheet as the sheet is so pushed, and sealing said layers together to enclose said folded sheet between them, pressure being applied to the folded sheet between said plies at the fold line to push the folding said sheet of material, pushing it through said open sheet between the layers of packaging material, and the liquid being deposited between said plies as the folded sheet is pushed.

2. A machine for making packages containing liquid-impregnated folded sheet material, said machine comprising means for feeding a flexible sheet of material to a folding station, sealing means beneath said folding station for sealing together layers of packaging material first to partially form a compartment with an open end between them for the folded sheet and thereafter completing the sealing of the layers to close said open end and enclose the folded sheet in a compartment between the layers, and means for end into said partially formed compartment and depositing liquid on said folded sheet in said partially formed

compartment, said sealing means including a pair of rotatable sealing rollers which pull said layers of packaging material between them and have peripheral cavities providing a clearance between them for a folded sheet, the last-named means including folding bars above the bight of said rollers, a plunger having folding and pushing fingers for pushing and folding said sheet between said bars and into the bight between said rollers, a liquid depositing nozzle between said fingers to deposit liquid on said folded sheet, and means for reciprocating said plunger alternately into an out of the partially completed compartment.

3. A machine as defined in claim 2 with the addition of means for starting and stopping the supply of liquid to said nozzle in timed relation to the movement of said plunger into and out of said partially completed compartment, respectively.

4. A machine as defined in claim 2 wherein the means for feeding said sheet of material includes spaced apart folding bars to support the sheet, stop means and guide means to be abutted by the leading end of a long strip of said material fed lengthwise across said folding bars, and means for severing said strip including a knife disposed a predetermined distance from said stop means and actuated in timed relation to the reciprocation of said plunger to sever said sheet from said long strip prior to engagement of said folding fingers with said sheet.

5. The method of making a package containing liquid-impregnated sheet material, said method consisting of feeding a flexible sheet of material to a folding station, transversely folding said sheet into juxtaposed plies, pushing the folded sheet from said folding station to a position between opposed flexible layers of packaging material, depositing liquid on the folded sheet as the sheet is so pushed, and sealing said layers together to enclose said folded sheet between them, and wherein sheet folding and pushing fingers and liquid depositing means are moved together as a unit continuously in one direction from one side of the sheet and successively fold the sheet, push the folded sheet between the layers of packaging material and deposit the liquid between the plies of the folded sheet during said movement.

6. A machine for making packages containing liquid-impregnated folded sheet material, said machine comprising means for feeding a flexible sheet of material to a folding station, sealing means beneath said folding station for sealing together layers of packaging material first to partially form a compartment with an open end between them for the folded sheet and thereafter completing the sealing of the layers to close said open end and enclose the folded sheet in a compartment between the layers, and means for folding said sheet of material, pushing it through said open end into said partially formed compartment and depositing liquid on said folded sheet in said partially formed compartment, the last-named means including folding bars above said sealing means and said open end of the partially formed compartment, a plunger having folding and pushing fingers for pushing and folding said sheet between said bars and into said partially formed compartment, a liquid depositing nozzle carried by said plunger to deposit liquid on said folded sheet, and means for reciprocating said plunger alternately into and out of said compartment.

#### References Cited

##### UNITED STATES PATENTS

3,057,128	10/1962	Gerhauser	53—36 X
2,961,678	11/1960	MacLellan et al.	53—21 X
2,541,387	2/1951	Salfisberg	53—28 X
2,828,590	4/1958	Swartz et al.	53—28
3,286,435	11/1966	Weinberger	53—117

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53—36, 120, 239