Sept. 5, 1967 P. M. DEL PILAR CASTRO 3,339,336

APPARATUS FOR ENCLOSING LIQUID IN SACHETS

Filed Aug. 24, 1964

FIG. 2

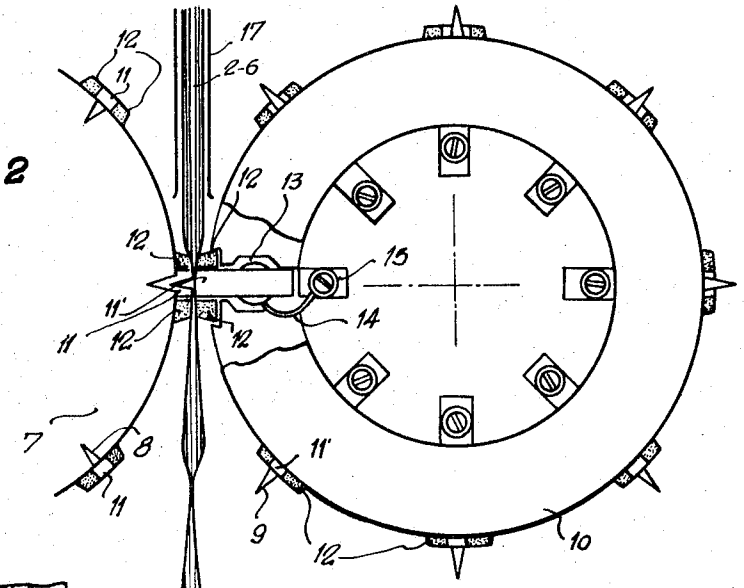
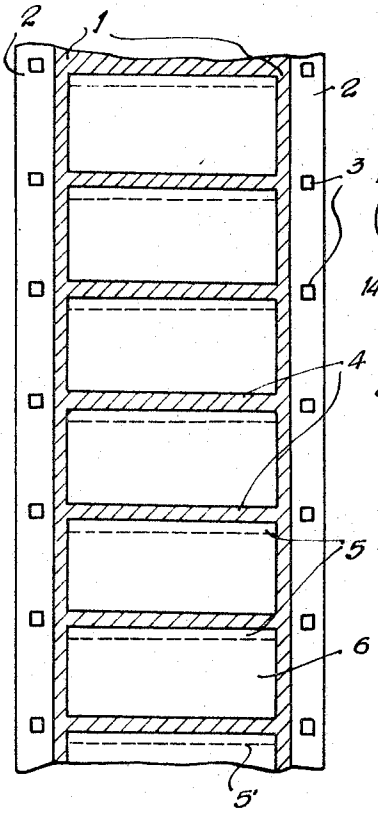


FIG. 1



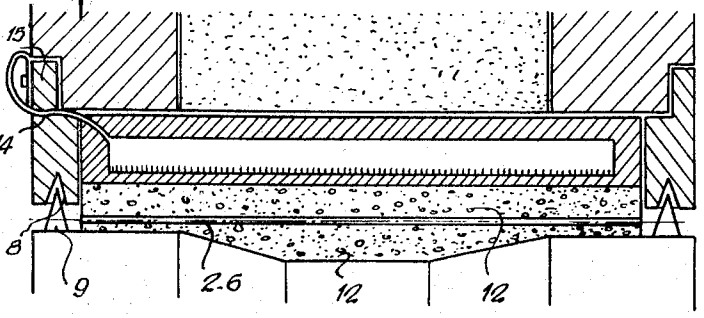


FIG. 3

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APPARATUS FOR ENCLOSING LIQUID IN SACHETS

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This invention relates to an improved method and a novel machine for enclosing liquid products in small bags of flexible sheet material generally referred to as sachets.

The process of this invention is an improvement of the known method which consists in dividing a long bag or tube of flexible sheet material containing liquid to be enclosed, by heat-sealing at certain positions the opposite walls thereof transversely of the longitudinal axis of the tube.

In accordance with the present invention, before applying the sealing heat, and in two substantially parallel zones located at either side of and next to the line intended to receive the sealing heat, the tube walls to be sealed together are pressed against each other and the liquid interposed between said walls is displaced only in the extension of the pressed zones.

The novel step mentioned above is completed by causing the liquid to completely fill the sachet without any ambient air.

Also in accordance with the invention, the liquid is passed into the receptacle at a temperature such that once it is enclosed therein any gas or vapor evolved thereby will have a specific mass the housing of which will only require the separation of a very small portion of the walls at the zone where they contact each other.

In accordance with the above, if the temperature of the liquid is increased after it has been enclosed, the mass of gas or vapor released thereby will increase and cause a corresponding separation of the walls at the zone where they engage each other, thus finding the space required by the increased volume thereof. This result is attained without causing the sachet walls to stretch and without generating within the sachet a pressure which may unduly weaken the seals connecting said walls to each other.

Furthermore, if at any time the position of the filled sachets is changed so that the zone of the contacting walls remains at the lowest level, the weight of the liquid will cause the separation of the contacting walls and the liquid will flow between them. At the same time, the upper portion of the sachet will remain empty and there will be formed therein a new zone of contacting walls equivalent to the previous one, which will remain as such until the position of the sachet is again reversed.

It should also be noted that the walls of the sachet filled with liquid will not be tense due to the contacting wall zone, and this condition will exclude the possibility of bursting the sachet when subjected to eventual external pressures during the handling required by the treatment subsequent to filling, or during shipping and use.

As regards the filling and enclosing machine, same is of the type suitable for forming sachets of flexible sheet material from a pair of strips which are first sealed together along their longitudinal edge portions and then sealed transversely, first at one end and again after each liquid-filled sachet is formed.

In other words, the machine uses a long tube of flexible sheet material obtained by sealing together the longitudinal edge portions of a pair of strips of said material, the machine having sealing means adapted to form a first transversal seal so as to thus form a first long bag. This bag is filled with a given amount of liquid to be enclosed, and as it is being filled it is moved so that the

sealing means may form a second transversal seal which will close the first sachet and at the same time form the closed bottom of a second sachet which is in turn filled and sealed to constitute also the sealed bottom of a third sachet, and so on.

The known machines of the aforesaid type generally fill the sachets completely, taking advantage of the maximum capacity available. In other cases, the sachets are only filled in part with liquid, leaving a small air space which will act as a cushion in case the filled sachet is subjected to external or internal pressures which might endanger the sound condition thereof.

The air cushion mentioned in the preceding paragraph could be satisfactory when the enclosed liquid is not altered by the presence of air or when the quality of the product is not altered by the germs which the air in said space or packet might eventually contain. The operation of the conventional liquid-enclosing machines of the aforesaid type may also be satisfactory in cases where the liquid fills the sachet completely and does not require or will not be subjected to subsequent heating, with the resulting expansions and evaporations which might destroy the sachet seals.

It is evident, however, that the known machines of the above type do not solve the problem encountered when it is desired to enclose liquid without the presence of air and said liquid is to be expanded and gasified in part after it has been enclosed in a sealed sachet.

Summarizing, if the conventional machines enclose a liquid such as a beverage containing organic substances, along with a certain amount of air, the germs in the latter may alter the composition of the beverage besides incorporating bacteria, eventually pathogenic, therein; and if the beverage is enclosed without air, the liquid will fill the sachet completely and the latter will then be generally unable to withstand any eventual increases in volume and partial vaporizations which the liquid might suffer subsequently.

The novel machine of this invention advantageously overcomes the above drawbacks and is particularly suitable for carrying out the method as described above.

From a strictly structural point of view, the novel machine comprises known elements and novel elements. The known features includes the means for supplying the flexible sheet material strips, the means for sealing the strips together along the longitudinal edge portions thereof so as to form a tube, and the filling means for depositing the liquid in the sachets which are successively formed by the transverse sealing members.

The novel features include substantially parallel elastomeric bars located at either side of, and close to, sealing bars capable of forming the transversal seals determining the closures of the filled sachets.

In accordance with one embodiment of the invention, the sealing bars and the elastomeric bars are mounted on movable means, such as jaw members, which are moved temporarily along with the filled sachets until the latter are transversely sealed.

More specifically, the novel elements comprise a first roll the periphery of which, at predetermined regular distances and in register with pairs of adjacent generator lines, is provided with pairs of bars of elastomeric material between which there is disposed a rigid bar having means for heating same. Also, aligned with said bar and at a certain distance from the ends thereof, said roll is formed with cavities or recesses capable of receiving teeth provided in a corresponding position of a second roll the axis of which is parallel to that of the first roll, the periphery of this second roll carrying a plurality of elastomeric and sealing bars disposed identically to those of the first roll. Both rolls are arranged very close together, so that

the aforesaid elastomeric bars will contact each other and the sealing bars will be mutually spaced by a very small distance. The assembly is completed with means for mechanically interconnecting said rolls and for connecting them to suitable driving means.

It may be readily understood from the above that the elastomeric bars are intended to press together the walls of the tube filled with liquid, so as to remove the liquid from the zones adjacent the line where the sealing bar will apply the sealing heat.

It will also be understood from the above that with the process of this invention the action of the elastomeric bars will take place immediately before the sealing bar applies heat along the sealing line.

This last action simultaneously brings about three important results: first, it shifts the liquid from a zone of high sealing temperature which might alter its composition, taste, color or transparency; second, the process can be carried out more rapidly since the sealing bar will not suffer the logican loss of heat which it would experience if it had to heat the liquid adjacent the sealing zone to a sealing temperature; and third, it will create a zone of contacting walls the purpose of which has been explained in connection with the advantages of the process.

In order that the invention may be more clearly understood and readily carried into practice, one of the presently preferred embodiments thereof has been illustrated by way of example in the accompanying drawings, in which:

FIG. 1 is a somewhat diagrammatic plan view of a strip of liquid-containing sachets, provided with respective contacting wall zones indicated by dash lines;

FIG. 2 is a fragmentary and partly diagrammatic view of a pair of rolls carrying the novel parts of the filling machine, the remaining known elements of which are omitted; and

FIG. 3 is a fragmentary longitudinal sectional view of the rolls shown in FIG. 2 and illustrating structural details of the sealing bars.

The same reference numerals are used to indicate like or corresponding parts or elements throughout the drawings.

Referring first to FIG. 1 of the drawings, in accordance with the process of the invention the enclosing of a liquid in sachets of flexible sheet material is carried out starting from a tube obtained through longitudinal seals **1** in two contacting sheets, the opposite edge portions **2** of which are formed with spaced perforations **3** for mounting on the means for producing the transverse seals **4**, as will be explained hereinafter in connection with FIGS. 2 and 3.

Inasmuch as the means for producing the longitudinal seals **1**, the means for forming the perforations **3**, the means for supplying the flexible sheets for forming the tube and also the liquid filling devices are of a known and conventional type, they are not illustrated and, therefore, will not be described.

The novel features of a machine suitable for carrying out the process of this invention are illustrated in FIGS. 2 and 3. As shown therein, the means for forming the transversal seals **4** include the sealing bars **11–11′** disposed at regularly spaced positions on the periphery of a pair of cylindrical rolls **7** and **10**.

Mounted on either side of each sealing bar **11**, **11′** and closely spaced therefrom is an elastomeric bar **12** the width of which may vary according to requirements, as will be explained hereinafter.

The aforesaid sealing bars **11–11′** are slidably mounted in housings provided for that purpose in the rolls **7** and **10**, and adjusting means **13** are provided for adjusting the magnitude of the emergent zone and thus graduate the mutual spacing between the active edges of said sealing bars **11–11′**, as clearly shown in FIG. 2.

Also in FIG. 2, the reference numeral **14** indicates an electric wire extending from a terminal **15** connected to an electric current supply source to an electrical resistance (not shown) constituting the heating means for the bars **11′**. Similar means are provided for the bars **11** on the roll **7**.

The rolls **7** and **10** are also provided with spaced teeth **9** and recesses **8** aligned with the sealing bars **11** and **11′**, said recesses being located adjacent the ends of the sealing bars **11**, while the teeth are positioned adjacent the ends of the sealing bars **11′**.

Inasmuch as the rolls **7** and **10** have parallel shafts, have equal diameters, are located very close to each other and are rotated in opposite directions, it will be understood that when the rolls are caused to rotate, the teeth **9** will by turn engage their respective recesses **8**, the elastomeric bars **12** on one roll will successively confront those of the other roll and the sealing bars **11** and **11′** will approach each other at predetermined intervals.

It will be understood from the above that the filling of the sachets in accordance with the process and with the machine of this invention, is carried out as follows:

Assuming that the strips of flexible sheet material indicated with the reference numerals **2–6** in FIG. 2 have already been sealed at their longitudinal edge portions by conventional means not shown, and forms a tube which is fed through a guide member **17** to the zone of the rolls **7** and **10**, the teeth or pins **9** will engage the perforations **3** and, at the same time, the sealing bars **11–11′** will seal the end of the tube, thereby forming a first container. This container is filled through liquid supplying devices which may be of any suitable known type, for which reason they are not illustrated and need not be described.

The rotary motion of the rolls **7** and **10** will cause the open end of the first filled container to be reached by the next pair of sealing bars **11–11′** and by the elastomeric bars **12**.

It will be readily understood by inspecting FIG. 2 that a first pair of elastomeric bars **12** will press together the walls of the sachet before they are pressed together by the sealing bars **11–11′**. In this way, the liquid existing between the walls previously pressed together by the pair of elastomeric bars will be shifted towards the portion of the tube which will form the next sachet. The sealing bars **11–11′** will then press together the walls to be sealed and almost simultaneously the other pair of elastomeric bars will press together the other zone adjacent the sealing bars and move out the liquid interposed between them. The area to be sealed will thus have a zone free of liquid at each side thereof. This will make it possible to obtain, first, a quick seal without unnecessary heat losses; second, an enclosed liquid which has not been exposed to the detrimental influence of a high temperature in zones next to the sealing line; and third, the formation of the contacting walls **5** (FIG. 1) the purpose of which has been explained above.

It should be added that the width of said zone **5** may be varied in each case, and to do so it will only be necessary to suitably vary the width of the elastomeric bars **12**.

Also, the machine of the present invention provides for solving the problem of sealing flexible sheets of varying thicknesses. The distance between the active edges of the sealing bars **11** and **11′** may be regulated through the means **13**.

It will be understood from the above that the liquid will completely fill the tube in the zone forming the sachet to be sealed, whereby the enclosing thereof is carried out without it being accompanied by ambient air since the latter is not present at the time of sealing the sachet.

A further important feature of the process consists in that at the time it is enclosed, the liquid is at a temperature such that once it is sealed in the sachet and exposed to room temperature, the vapor released thereby will have a specific mass which will only require the

separation of a very small portion of the walls in the zone where they contact each other for housing itself.

The invention as disclosed will be readily understood by those skilled in the art and requires no further explanation.

It is evident that in carrying the invention into practice, many changes and/or modifications may be made without departing from the scope of the invention as clearly set forth in the appended claims.

What is claimed is:

1. A machine for enclosing a liquid product in sachets by transversely sealing at predetermined intervals a liquid-filled tube of flexible sheet material, which comprises, in combination, a first roll having pairs of bars of elastomeric material at predetermined spaced positions about the periphery thereof and a sealing bar between each pair of elastomeric bars, a second roll having similarly disposed elastomeric bars and sealing bars, one of said rolls having a projecting tooth or pin adjacent

inner and outer ends of each sealing bar, capable of engaging a corresponding recess provided in the other of said rolls, said rolls having parallel shafts, rotating in opposite directions and being positioned adjacent each other so that said bars will be normally spaced by a minimum distance, and means for guiding said liquid-filled tube to the nip of said rolls.

2. A machine as claimed in claim 1, wherein said liquid-filled tube has side flanges formed with spaced perforations adapted to be engaged by the teeth or pins projecting from said one roll.

References Cited

UNITED STATES PATENTS

2,420,983	5/1947	Salfisberg	53—28
2,530,400	11/1950	Fado.	
2,936,816	5/1960	Lang	53—39

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