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ART OF MANUFACTURING POUCHES

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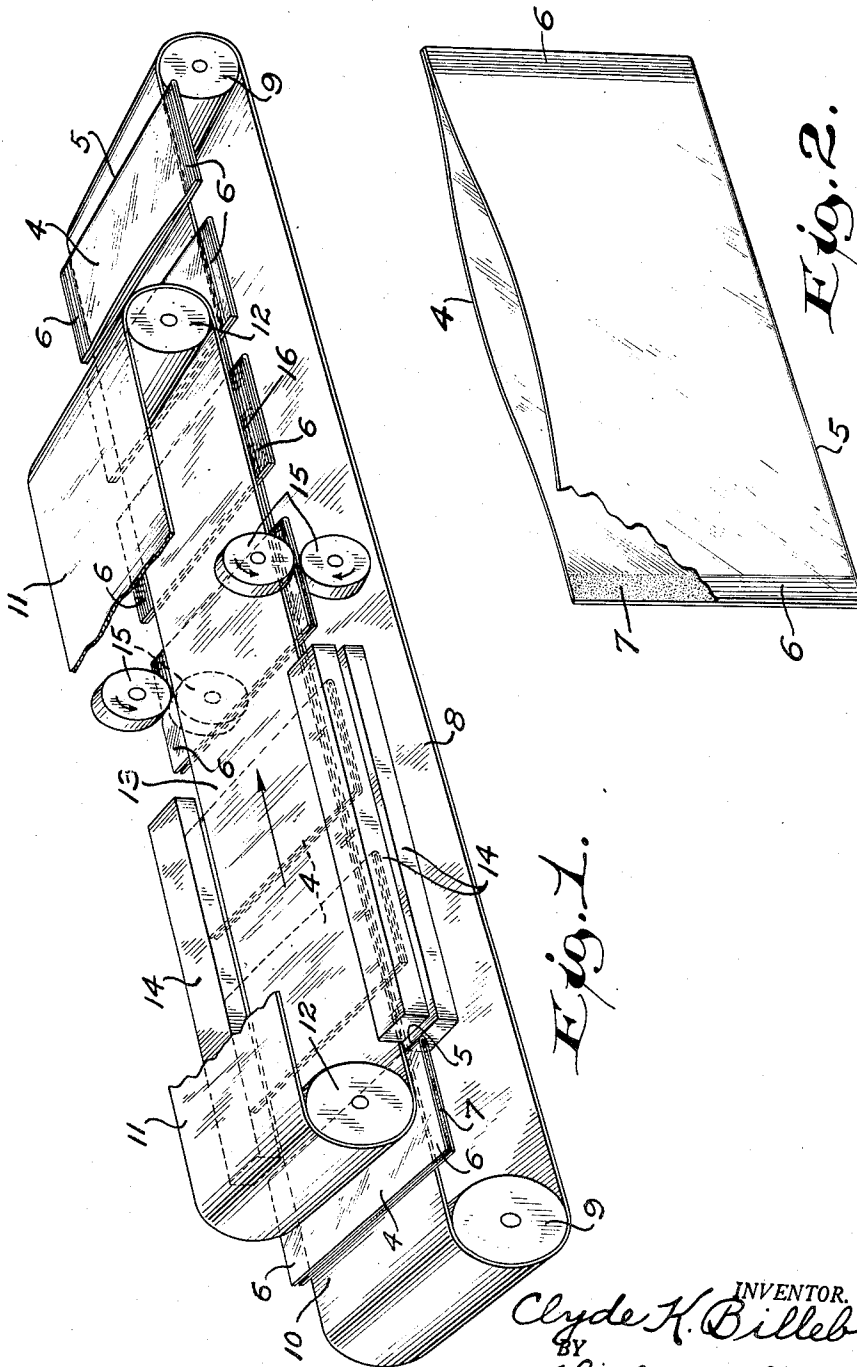


Fig. 1.

Fig. 2.

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ART OF MANUFACTURING POUCHES

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The present invention relates in general to improvements in the art of manufacturing pouches from sheet material, and relates more specifically to an improved method of and apparatus for producing pouch-like containers in rapid succession from heat-sealable sheets or the like.

An object of my present invention is to provide a new method of manufacturing pouches in a simple and expeditious manner and in rapid succession, with the aid of improved automatically functioning equipment.

Many different modes of producing pouch-like containers from diverse kinds of sheet material have heretofore been proposed and used commercially with varying degrees of success, but considerable difficulty has always been encountered with all prior methods of and machines for manufacturing pouches from coated heat-sealable sheet material the coating of which tends to flow and become tacky or sticky, and which also tends to curl and stretch, when subjected to heat sufficient to effect proper sealing. The use of pouches formed of such sheet materials for various wrapping purposes as for confining cheese, is extremely desirable; and in order to facilitate quantity production and to thereby reduce the cost of manufacture to a minimum, such pouches should be produced in rapid succession and with least handling and manual labor. These pouches should also be of uniform internal dimension and it was impossible with most of the previous methods to maintain such uniformity.

It is therefore a more specific object of the present invention to provide an improved system whereby successive approximately rectangular sheets of heat sealable material such as wax and otherwise coated regenerated cellulose, may be quickly and effectively converted into strong and neat receptacles or pouches of uniform size.

Another specific object of my invention is to provide a method of rapidly and efficiently producing successive pouches of uniform size, shape, and capacity from heat sealable sheet material having coatings which tend to become sticky and flow when heated, and which also tend to make the sheets highly flexible and subject to undesirable distortion.

A further specific object of this invention is to provide improved simple and highly efficient means for automatically and quickly conveying a succession of folded sheets of heat sealable material from station to station, while the

sheets are being transformed into pouches by successive steps.

Still another specific object of the invention is to provide simple, compact and highly efficient apparatus for effecting automatic sealing of the opposite edges of superimposed sheets of material so that only limited definite areas near the edges of the sheets will be united and the sheets will remain disconnected in the space between these areas.

These and other specific objects and advantages of the invention will be apparent from the following detailed description.

A clear conception of the several steps constituting my improved method, and of the construction and operation of the improved apparatus for carrying on the several steps in an expeditious manner, may be had by referring to the drawing accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a diagrammatic perspective view showing a preferred type of improved apparatus for automatically converting folded or otherwise superimposed sheets of heat sealable material into finished pouches; and

Fig. 2 is an enlarged perspective view of one of the completed pouches.

While the improvement has been shown and described herein as being especially adapted for the production of successive pouches from medially folded rectangular sheets of thin sheet material coated with heat sealable and protective coatings, it is not my desire or intent to thereby unnecessarily restrict the scope or utility of either the improved method or apparatus.

In accordance with my invention, successive receptacles or pouches 4 having uniformly neat appearance, accurate dimensions and like carrying capacity, can be expeditiously produced from approximately rectangular sheets of thin material such as regenerated cellulose coated with a mixture of wax and other protective substance which is adapted to become tacky, sticky and fluent when heated, and which coating also makes the base or carrying sheets relatively pliable and distortable. These coated rectangular sheets are initially medially folded to provide a closed bottom edge 5 and the superimposed parts of each assembly are subsequently firmly clamped between their opposite end edge portions 6 so as to leave the portions 6 projecting beyond the clamping zone. The edge portions 6 are thereafter subjected to heat suffi-

cient to soften the coatings 7 on the coating surfaces of these overlapped end portions, and the protruding portions 6 are then promptly squeezed so that the sealing pressure is progressively applied along these edge portions in a direction sweeping away from the initial bottom fold 5. The clamping action on the medial portion of the pouch assemblages is maintained during the heating and sealing operations so as to prevent the softened and fluent coating at the opposite edge portions 5 from spreading into the clamped zone, and this clamping action is also preferably continued after the sealing pressure has been applied for a period of time sufficient to permit cooling and permanent setting of the seals. In this manner, the successive pouches 4 shown in Fig. 2 can be rapidly and most effectively produced without undesirable distortion and without impairing their internal dimensions.

In order to facilitate commercial exploitation of the improved method, and because of the relatively delicate nature of the coated sheet material used in the formation of these pouches, it is necessary to utilize some type of apparatus for automatically carrying on the successive steps and for maintaining the clamping action, after the successive sheets have been initially folded. Such apparatus is shown diagrammatically in Fig. 1 of the drawing, and comprises in general a main endless conveyor belt 3 coacting with pulleys 9 and having an upper approximately horizontal conveying stretch 10; a shorter auxiliary endless conveyor belt 11 disposed above the main conveyor and coacting with pulleys 12, the belt 11 having a lower approximately horizontal clamping and conveying stretch 13 located in close proximity to the stretch 10; suitable means for constantly driving the belts 3, 11 so as to cause the coating stretches 10, 13 thereof to constantly advance in the same direction; two sets of elongated heaters 14 disposed adjacent to the opposite edges of the initial portions of the coating belt stretches 10, 13; two sets of coating pressure rollers 15 located adjacent to the opposite edges of the stretches 10, 13 in alignment with and beyond the heaters 14; and a cooling zone 16 for the pouches 4 extending along the stretches 10, 13 considerably beyond the sealing zone or rollers 15.

During normal operation of the improved apparatus shown in Fig. 1, and while carrying on my improved method of producing pouches or the like, the rectangular sheets from which the pouches 4 are formed, should be initially folded medially of their side edges to provide a bottom fold 5, and the successive folded assemblages should be applied between the belt stretches 10, 13 with the folded edges 5 in advance of the open edges. The conveyor belts 3, 11 and the rollers 15 should be constantly driven so as to cause the stretches 10, 13 to advance in the direction indicated by the arrow and to cause the rollers to likewise rotate in the directions indicated by the arrows. The advancing cooperating belt stretches 10, 13 will then compress the medial portions of the folded sheets and since these sheets are somewhat wider than the widths of the belts 3, 11, the opposite end portions 6 will protrude as clearly shown in the drawing. During the continued advancement of the successive folded sheets, the projecting edge portions 6 will be carried through the sets of heaters 14 and the coatings on these protruding portions 6 will be softened and placed in condition

for sealing. Immediately after leaving the zone of the heaters 14, the end portions 6 of the folded sheets are advanced between the squeeze rollers 15, and these rollers progressively apply pressure to the heat treated edge portions 6 in a direction away from the fold line 5 thereby simultaneously ironing the superimposed layers of material and sealing the opposite edge portions. During this ironing and sealing operation of the opposite ends of each pouch, the softened coatings are prevented from spreading inwardly beyond the edges of the belts 3, 11, by the clamping action of the advancing stretches 10, 13. After sealing of the opposite ends of the pouches 4 has been effected, they are advanced through the cooling and drying zone 16 without releasing the clamping pressure, and when the completed pouches 4 are finally discharged from the delivery end of the upper stretch 13, they are in finished condition and all of the pouches 4 have identical appearance and are of uniform size. In this manner the successive pouches 4 are quickly and effectively produced and the rapidity of production is limited only by the speed at which freshly folded sheets are admitted to the machine.

From the foregoing detailed description it will be apparent that my present invention provides an improved system of manufacturing pouches or the like having opposite heat sealed edges, which is simple and effective and can be utilized especially where the material has characteristics which make it difficult to handle such sheet material. The improved method comprises a series of simple steps whereby the internal dimensions of the successive pouches 4 may be maintained uniform, and undesirable distortion of the sheet material is positively avoided. The improved apparatus for carrying on the new method is both simple and compact, and by utilizing simultaneously advancing endless belt stretches 10, 13, both clamping and advancement of the successive pouches is most effectively accomplished. The invention has gone into highly successful actual commercial use and has proven its adaptability to produce pouches from sheet material the handling of which has heretofore presented many difficult problems. The apparatus furthermore functions entirely automatically except for the initial insertion of the folded sheets, and these can obviously be introduced in any suitable and convenient manner.

It should be understood that it is not desired to limit this invention to the exact steps of the improved method or to the precise details of construction of the apparatus, herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

I claim:

1. The method of producing pouches from approximately rectangular sheets of heat-sealable material, which comprises, folding each sheet medially of its end edges to provide integral superimposed layers of the material, clamping the portion of each folded sheet between the superimposed opposite side edges thereof while continuously advancing the clamped assemblages in succession with their opposite overhanging side edge portions passing through heating zones so as to prepare only the protruding side edge portions for sealing by pressure, and immediately thereafter subjecting both of the heated side portions of each advancing assemblage to external rolling pressure progressing away from its initial

fold so as to seal the sides and to thus produce pouches each having three closed and one open edge portion.

2. The method of producing pouches from approximately rectangular sheets of heat-sealable material, which comprises, folding each sheet medially of its end edges to provide integral superimposed layers of the material, clamping the portion of each folded sheet between the superimposed opposite side edges thereof while continuously advancing the clamped assemblages in succession with their opposite overhanging

5 side edge portions passing through heating zones so as to prepare only the protruding side edge portions for sealing by pressure, immediately thereafter subjecting both of the heated side portions of each advancing assemblage to external rolling pressure progressing away from its initial fold so as to seal the sides and to thus produce 10 pouches each having three closed and one open edge portion, and finally continuing the clamping action and advancing action on the pouches until the heat seals have cooled.

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