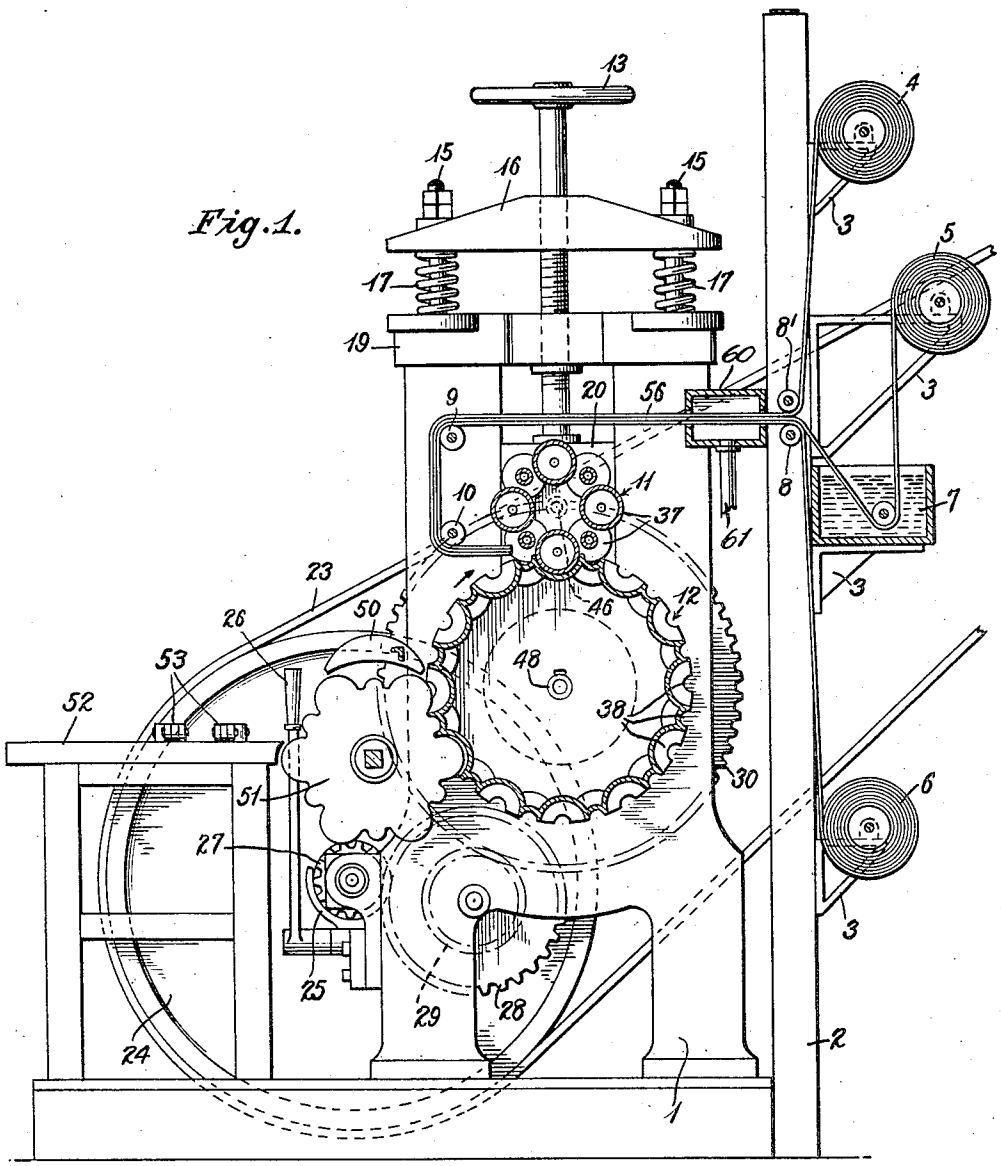
Jan. 9, 1934. G. RUEGENBERG 1,943,145

METHOD OF PRODUCING PACKING STRIPS

Filed Aug. 31, 1932

Fig. 1.



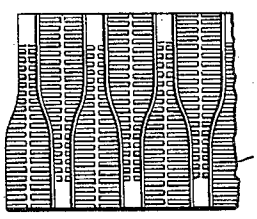


Fig. 2.

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METHOD OF PRODUCING PACKING STRIPS

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6 Claims. (Cl. 154—33)

This invention relates to a method of producing packing strips of the type adapted for the cushioning of such frangible articles as bottles and the like.

It is the object of the invention to produce packing strips in large quantities made from pasteboard or paper, resulting in a product which is strong, resistant to moisture, compact, and having a great cushioning effect for the materials protected thereby.

The invention contemplates a method of pressing a substantially non-expansible sheet of material such as paper or pasteboard into the desired configuration without any undue stretching or tearing of the same. This pressing is effected successively upon the sheet of material to form a series of depressions for the retention of the packed articles, and these depressions are simultaneously fluted or corrugated to present a more effective protection for the articles. The product resulting from my process permanently retains its pressed configuration, which makes possible the repeated use thereof.

It is the object of the invention to produce a packing strip in a continuous length, which may be cut according to requirements.

Further objects and purposes will appear from the following detailed description of the embodiment of my invention disclosed herein, taken in conjunction with the accompanying drawing in which

Fig. 1 is a sectional view of the assembly for practicing my method, and

Fig. 2 is a view of a piece of packing strip produced by this method.

In Fig. 1, the machine frame 1 supports the majority of the operating elements which contribute to the performance of my novel and improved method. Although the method may be practiced with pasteboard, I have found it advantageous to form the packing strip 65 from a composite sheet of material. Thus, brackets 3 are fixed upon vertical uprights 2 at the rear of the machine frame, across which extends a plurality of rolls of paper, of any desired grade or quality. Three of such rolls are illustrated at 4, 5 and 6. The paper leading from the roll 5 is passed through a bath 7 of an aqueous solution of water glass or sodium silicate, and upon this web of paper are superposed the webs from rolls 4 and 6. As a practical refinement, the width of the intermediate web from roll 5 is slightly narrower than the other two webs so that when the three webs pass between rollers 8 and 8' to form the composite sheet 56, the adhesive medium is not extruded beyond the edges of the sheet. Although other impregnating mediums beside water glass may be used, I have found this solution particularly suitable since it renders the finished product resistant to moisture and also imparts a reinforcing effect to the packing strip which aids in the permanent retention of the configuration of the strip. The composite sheet 56 is then carried over rollers 9 and 10 and is presented to the roller units 11 and 12 for the pressing of the desired configuration in the sheet material to form the packing strip.

Roller unit 11 is yieldingly held by spring pressure against roller unit 12 which may be adjusted by hand wheels 13 to variably position the blocks 20, in which the upper roller unit 11 is journalled with respect to the fixed journals of roller 12. The bolts 15, extending from the machine frame, support the cross bars 16 and surrounding the former are springs 17 which yieldingly press roller 11 into engagement with roller 12 through cross bars 19. The roller units 11 and 12 are rotated by a drive extending from a belt 23 to pulley 24 from a suitable drive shaft in the plant. The drive of the machine is controlled by a clutch 25 which may be shifted into or out of engagement with the pulley by means of lever 26. In the engaging position of this clutch, motion is transmitted from wheel 24 to pinion 27 which meshes with gear 28. Pinion 29, integral with gear 28, drives gear 30 which imparts rotation to the lower roller unit 12. A pinion at the opposite end of the frame transmits the motion of roller 12 to a gear which drives the upper roller at a reduced speed with respect to roller 12, the tendency being to maintain the peripheral velocity of the two roller units substantially the same. The slight yielding of the upper roller unit does not affect the driving engagement between the last-mentioned gear and pinion.

The male roller unit 11 consists of a plurality of hollow molding elements 37, which are rotatably mounted in a suitable frame upon shaft 46. These molding elements 37 are arranged circumferentially around shaft 46. These molding elements 37 receive a heating medium through shaft 46, such as steam, hot air, gas, or electricity, in a manner well known in the art. The lower female roller unit 12, consisting of a unitary element, has a plurality of recesses 38 in the periphery thereof, which are disposed complementarily and congruously to the molding elements 37 in the upper roller unit 11, due allowance being made for the thickness of the

packing strip. These recesses are of substantially semi-circular cross section and successively receive the molding elements 37 thereby forming the depressions in the packing strip for receiving the packed articles. The roller unit 12 is also heated, through hollow shaft 48.

In order to form the specific configuration desired in the instant case, the molding elements 37 have a series of ribs and grooves extending across them parallel to the direction of travel of the sheet material. In order to produce an improved article, the fluting upon each molding element is slightly displaced with respect to the fluting upon the adjacent molding elements. The recesses 38 in roller unit 12 are formed accordingly. Furthermore, in order to provide a more pliable packing strip, the deepest portions of the recesses 38 are not corrugated with ribs and grooves.

A composite sheet 56 is introduced between roller units 11 and 12 and the form of the molding units is impressed therein. In view of the fact that only one molding element of the upper roller unit effects its pressing action upon the material at one time, no tendency for the stretching or tearing of the paper takes place. The capability of the molding elements 37 of executing a supplementary rotation aids the passage of the sheet material between the units without a tearing thereof. The fact that a certain amount of slippage is possible between the three layers of material also aids in the obtaining of a product with no weak flaws therein. A preliminary control upon the condition of the sheet material prior to its passage to the pressing units is provided at casing 60 which may be suitably heated by main 61 extending from the heat source to dry the paper to a desired degree.

As the successive pressing of each molding member takes place, the pressed portion of the material remains in its respective recess 38 until the same is guided therefrom by a suitably formed rotatable take-off member 51 which cooperates with a fixed guide 50 to strip the formed packing strip from the lower roller unit 12. In the course of travel of the strip from its forming stage to its stripping stage, it is dried by the heat of the roller unit 12 which guarantees a permanence to the configuration pressed therein. After the strip is led off the roller unit 12 between elements 50 and 51, the same may be cut in any desired lengths by knives 53 mounted upon table 52. Although these knives have been shown as manually operated, they may consist of automatically operated knives or stamping cutters which are well known in the art and need not be illustrated in detail for the purpose of disclosing the instant invention.

It is to be understood that the molding members and recesses in roller units 11 and 12 may assume any form desired in accordance with the type of material to which the packing strip is desired to be adapted. The molds may be embossed with any suitable advertisement or trade indications, which will appear in the final product. Other modifications may be made to the method of procedure without altering the essence of the invention as defined in the accompanying claims.

Having described my invention, I claim:

1. The method of producing a packing strip having a series of successive depressions for the accommodation of frangible articles which comprises forming a flat composite sheet of material by coating a web of paper with a binding medium, and superposing a web of paper upon each side of said coated web, passing said flat composite sheet of material with no preliminary forming between two rotary cooperating molding male and female roller units for impressing said depressions in said flat sheet and allowing a supplementary freely rolling movement of the molding members on the male roller unit relatively to the roller units and the sheet of material passing therebetween, whereby a tearing and undue stretching of the sheet of material is obviated.

2. The method of producing a packing strip having a series of successive depressions for the accommodation of frangible articles which comprises forming a flat composite sheet of material by coating a web of paper with a binding medium and superposing a web of paper upon each side of said coated web, passing said flat composite sheet of material with no preliminary forming between two rotary cooperating molding male and female roller units for impressing said depressions in said flat sheet and allowing a supplementary freely rolling movement of the molding members on the male roller unit relatively to the roller units and the sheet of material passing therebetween, and drying the sheet of material during and after its formative stage by contact with the female roller unit.

3. The method of producing a packing strip having a series of successive depressions for the accommodation of frangible articles with corrugations in said depressions extending substantially across the complete strip for cushioning said articles, which comprises forming a flat composite sheet of material by coating a web of paper with a binding medium and superposing a web of paper upon each side of said coated web, passing said flat composite sheet of material with no preliminary forming between two rotating cooperating molding male and female roller units for simultaneously pressing said depressions and corrugations in said flat sheet and allowing a supplementary freely rolling movement of the molding members on the male roller unit relatively to the roller units and the sheet of material passing therebetween, whereby a tearing and undue stretching of the sheet of material is obviated.

4. The method of producing a packing strip having a series of successive depressions for the accommodation of frangible articles with corrugations in said depressions extending substantially across the complete strip for cushioning said articles, which comprises forming a flat composite sheet of material by coating a web of paper with a binding medium and superposing a web of paper upon each side of said coated web, preliminarily heating said composite sheet of material, passing said flat composite sheet of material with no preliminary forming between two rotating cooperating molding male and female roller units for simultaneously pressing said depressions and corrugations in said flat sheet and allowing a supplementary freely rolling movement of the molding members on the male roller unit relatively to the roller units and the sheet of material passing therebetween, whereby a tearing and undue stretching of the sheet of material is obviated.

5. The method of producing a packing strip having a series of successive depressions for the accommodation of frangible articles with corrugations in said depressions extending substantially across the complete strip for cushioning

said articles, which comprises forming a flat composite sheet of material by coating a web of paper with a binding medium, superposing a web of paper upon each side of said coated web, passing said flat composite sheet of material with no preliminary forming between two rotary cooperating molding male and female roller units for simultaneously pressing said depressions and corrugations in said flat sheet and allowing a supplementary freely rolling movement of the molding members on the male roller unit relatively to the roller units and the sheet of material passing therebetween, and drying the sheet of material during and after its formative stage by contact with the female roller unit.

6. The method of producing a packing strip having a series of successive depressions for the accommodation of frangible articles with corrugations in said depressions extending substantially across the complete strip for cushioning said articles, which comprises forming a flat composite sheet of material by passing a web of paper through a solution of water glass and superposing a web of paper upon each side of said coated web, preliminarily heating said composite sheet of material, passing said flat composite sheet of material with no preliminary forming between two rotary cooperating molding male and female roller units for simultaneously pressing said depressions and corrugations in said flat sheet and allowing a supplementary freely rolling movement of the molding members on the male roller unit relatively to the roller units and the sheet of material passing therebetween, whereby a tearing and undue stretching of the material is obviated, and drying the sheet of material during and after its formative stage by contact with the female roller unit.

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