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PACKAGE OF PAPER SHEETS

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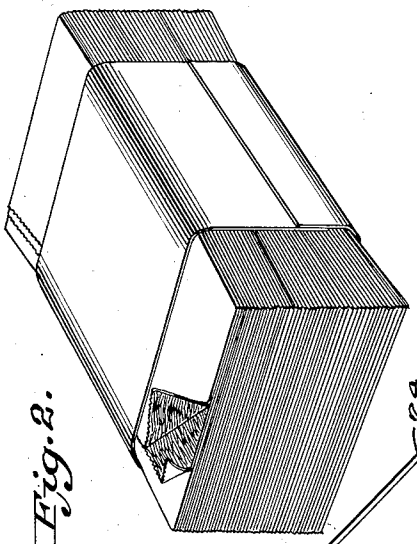


Fig. 2.

Fig. 1.

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PACKAGE OF PAPER SHEETS

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5 Claims. (Cl. 206—57)

This invention relates to packages of superposed paper sheets and more especially to a novel package of crepe paper towels or the like.

An object of the invention is to produce a package of superposed crepe paper towels each sheet having extreme softness and a velvety texture, and the sheets in the package being so condensed in comparison with conventional packages of paper towels that the improved package will occupy less storage space so that the cost of shipping and storing the improved packages is correspondingly reduced.

Heretofore, it has been customary to effect softness of paper sheets by means of embossing rollers, in which case the paper in single thickness is fed through the embossing rollers in a continuous web. However, the embossing process does not reduce the thickness of the paper, but in many cases increases the same. In accordance with the present invention, the crepe paper towels are first organized into a suitable pile or stack, and the entire stack is then subjected to a number of blows of progressively increasing pressure until the maximum pressure is reached. During the hammering, the stack is held in such manner as to prevent distortion and the hammering or pressure results in crushing of the sizing or fiber binding material throughout the stack and thereby not only makes the sheets softer but reduces the thickness of the package.

In an application for patent, Serial No. 727,572, filed May 25, 1934, a process and apparatus are disclosed for making the package or stack of paper towels forming the subject matter of the present invention. In that application it was pointed out that ram pressures ranging from about 1000 pounds upwardly, are suitable for the making of the improved package, but the softening effect is increased in proportion to the pressure. In practice, approximately 1500 pounds ram pressure has given very satisfactory results on certain kinds of paper without excessive power requirements, but in actual practice, it is best to use ram pressures of approximately 40,000 pounds up to 100,000 pounds for stacks of folded towels, napkins, etc., made of crepe paper.

The invention will be described in connection with the accompanying drawing and it consists in the novel features hereinafter described in detail, illustrated in said drawing, and more particularly pointed out in the appended claims.

In the drawing:

Fig. 1 is a side elevation, partly in vertical longitudinal section, of one form of apparatus suitable for making the improved package of crepe paper towels.

Fig. 2 is a perspective view of the improved package.

In accordance with the present invention an ordinary or conventional stack or package of crepe paper towels is transformed in such manner that the resulting package is of materially reduced thickness in comparison with that of a conventional package and each towel is softer than the crepe paper towels heretofore known. These results are brought about by crushing the sizing, fiber binding material or other stiffening throughout the package. In order that the invention may be understood it is pointed out that in one method of making packages of crepe paper towels, the wood pulp employed as raw material is beaten while in the presence of water so as to convert the same into a pasty mass. Then resin soap or any other suitable sizing agent is added to the mass and the beating is continued until the disintegration of the pulp is complete. At this time alum or the like is added to the mass for the purpose of precipitating the resin or sizing on to the fibers of the mass. Now the mass is fed to a crepe paper machine where it is formed into a web of creped paper and is dried. This drying, of course, causes the sizing and any other constituents within the mass which is capable of stiffening under heat, to stiffen the sheets, with the result that towels made from such paper are relatively stiff and more or less harsh to the skin of the user. After the web is creped and dried it is run through a folding machine wherein the web is folded and cut into towel lengths and finally the resulting sheets are placed in superposed relation to make up the stack which forms the package of crepe paper towels.

As disclosed in the above mentioned patent application, such stacks are treated in a particular way in order to form an improved crepe paper towel package. In order that such treatment may be readily understood from the present application, it will be noted that **4** designates suitable supports carrying horizontal shafts **5** on which are mounted pulleys or rollers **6** and **7**. The pulley **6** is fixed to its shaft. A belt **8** is mounted on the pulleys and is adapted to feed stacks **9** of the paper articles through the compressing mechanism. Any suitable means is provided for advancing the belt step by step. For example, a ratchet wheel **10** can be fixed to the roller **6** and will be actuated by a pawl **11** pivotally carried by a lever **12** loosely mounted on the shaft **5**.

Pivotally connected links 13 and 14 connect lever 12 to a crank 15 on the main shaft 16 of the machine.

Supports 17 at the medial portion of the machine carry an anvil 18 across which the upper bight of the belt travels in order to bring the stacks successively beneath the hammer 19. The latter is vertically guided by a guide 20 fixed to the supports 17, and the upper end of the hammer is pivotally connected at 21 to a link 22 suspended from a crank 23 fixed to the main shaft 16.

The upper face of the anvil has a flat surface intermediate its ends, and the hammer has a lower flat surface corresponding thereto, but a long horn or projecting shoe 24 extends forwardly from the hammer toward the roller 5 for a purpose hereinafter described.

Guide pulleys 25, 26 and 27 are rotatably carried by the supports 17, and a belt 28 passes about these pulleys and beneath the hammer 19. A belt tightening pulley 29 is supported by arms 30 pivotally suspended from the shaft 31 of the pulley 26, and the pulley 29 rests upon the belt and causes the same to press upon the lower surface of the hammer 19.

Any suitable means may be provided for advancing the belt 28 in timed relation with the belt 8. For example, a lever 32 may have one of its ends pivotally connected to the links 13, 14, as shown at 33, and the other end of the lever may be pivotally mounted on the shaft 34 of the pulley 25. A pawl 35 on the lever can engage a ratchet wheel 36 on the pulley 25.

The main shaft may be driven by any appropriate prime mover, for instance, through the instrumentality of a belt 37 which drives a pulley 38 fixed to the main shaft.

In operation, it will be understood that when the main shaft 16 is turned in a clock-wise direction, the hammer 19 will be reciprocated, and while the hammer is moving upwardly, the belt 28 will be moved in a clock-wise direction, and the belt 8 in a counter-clock-wise direction. Of course, the belts will be stationary when the hammer is in its lowermost position. In accordance with such method, the stacks or packages 9 are placed on the belt 8 at the right end of the machine, and the belt is advanced between strokes of the hammer. In practice, the belt advances about five inches for each stroke of the hammer, and the projecting horn 24 acts to gradually reduce the thickness of the package or stack step by step with gradually increasing pressure until the package reaches the flat part of the hammer. Then the maximum pressure is brought to bear on the stack for the purpose of materially reducing its bulk. During such operation, the upper belt cooperates with the lower belt to prevent distortion of the package or stack and distribute the pressure uniformly over the entire area of the sheets.

As extremely high pressures are used in such method, a stack of paper towels or napkins of the customary thickness cannot only be reduced to about one-half such thickness, but the paper is given a velvety or soft texture so that a towel out of a package treated in this manner can be used on the face as well as on the hands.

Prior to this invention, it has been customary in packaging crepe paper towels and the like, to compress the stack to a slight extent for the purpose of placing a retaining band of paper around the same, but this compression is of such minor degree as to in no way change the characteristics of the paper sheets.

It has been found that by using relatively high pressures ranging between about 1000 and 100,000 pounds ram pressure, the customary stack can be reduced to about half the conventional size and that each towel or the like in the stack is so changed that its outer surfaces have maximum softness and a velvety texture.

While we have disclosed one form of apparatus and method which may be employed in the making of our improved package, we are aware that the package may be made in other ways without departing from the spirit of the invention as expressed in the claims.

What we claim and desire to secure by Letters Patent is:

1. A package of crepe paper towels in which the solidified resin or fiber binding material throughout the package is in crushed condition.

2. A package of crepe paper towels in which the solidified sizing throughout the package is in crushed condition.

3. A package of crepe paper towels comprising superposed sheets of crepe paper, each sheet containing solidified sizing in a crushed condition and the corrugations of each sheet being relatively flat in comparison with similar sheets in which the sizing is in uncrushed condition.

4. A package of crepe paper towels comprising superposed sheets of crepe paper forming a stack, each sheet containing solidified sizing material and such sizing material being in crushed condition throughout the package.

5. A package of crepe paper towels comprising a stack of superposed sheets of crepe paper, the number of sheets in the stack being equal to the number of sheets in a conventional paper towel package but the package being of substantially reduced thickness in comparison with a conventional package, and the solidified sizing in each sheet being in crushed condition.

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