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ABSORBENT PAD AND METHOD OF MAKING THE SAME

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Fig. 8.

Fig. 9.

Fig. 6.

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This invention relates to methods of producing a new and improved form of absorbent pad from cellulosic material and particularly from cellulosic material in the form of continuous bands or webs. The invention also relates to combinations and arrangements of elements whereby the absorbent pads may be manufactured in a rapid, economical and facile manner.

Although absorbent pads of various types may be made in accordance with this invention, the invention is particularly directed to a catamenial absorbent pad capable of being employed without the use of external supporting devices such as tapes, belts, clips, etc. The preferred pad of this invention is an elongated, or elliptical structure having high moisture absorbing capacity and free from woven materials or sections which not only add to the size and bulk of the device but in addition also cause chafing and irritation. The specific form of pad described hereinabove in detail consists essentially of purified absorbent cotton of elliptical plan, provided with an elliptical protuberance disposed centrally thereof, the axis of the protuberance being parallel to the longitudinal axis of the pad as a whole, said pad being of appreciably greater thickness in the middle than at the longitudinal edges, the absorbent cotton being held together solely by the felting of the fibers and a mild adhesive. Such pad may be held in place independently of attaching devices, the elliptical protuberance being capable of introduction between the labia.

The method of the invention permits stamping of the pads from a continuous band of cellulosic material. The band is preferably formed by longitudinally advancing a thin web of cellulosic material while simultaneously folding the same longitudinally. The finished pads are then rolled or folded into cylindrical shape in accordance with the method of this invention, and a plurality of such cylindrical shapes then wrapped, while in abutting and aligned relation, so as to form a cylinder. The wrapping is preferably provided with means for subdividing the wrapper at points spaced a distance substantially equal to the length of each of the shapes. In this manner, a very convenient package containing a plurality of pads is provided, the entire package being capable of subdivision into units, each unit containing a single pad still retained within a protective wrapper.

An object of this invention, therefore, is to disclose and provide a method of forming absorbent pads from continuous bands of cellulosic material.

Another object is to disclose and provide a method of making an absorbent pad capable of being used as a catamenial device without the concomitant use of removable or extraneous supporting or holding devices.

A further object is to disclose and provide an absorbent pad of a structure, shape and physical properties which render the pad capable of being used as a simple and effective catamenial device.

An object of the invention is to disclose and provide as an article of manufacture, a wrapper containing cylindrical forms, said wrapper being provided with means whereby it can be subdivided into units, each of the units containing a single cylindrical device.

A still further object of the invention is to disclose and provide arrangements and combinations of elements whereby continuous webs of material may be rapidly and effectively folded in any desired manner to form bands of material; whereby suitable shapes may be punched from readily compressible absorbent bands of material; and whereby pads or other shapes made from cellulosic materials may be folded, rolled and wrapped in a ready and facile manner.

These and other objects, advantages, uses and modifications of the invention will become apparent to those skilled in the art from the following detailed description of preferred forms of the invention, it being understood that the invention is not limited thereto, such preferred forms being described simply for the purpose of acquainting the art with a form of the invention.

In the subsequent description, reference will be made to the appended drawings, in which:

Fig. 1 is a diagrammatic plan view of an arrangement of elements whereby the method of this invention may be placed into operation.

Fig. 2 is an enlarged horizontal section of a folding device which may be employed.

Fig. 3 is a vertical transverse section taken along the plane III—III of Fig. 2.

Fig. 4 is a transverse section taken along the plane IV—IV of Fig. 2.

Fig. 5 is a transverse section through a formed band of cellulosic material, said band being taken along the plane V—V of Fig. 2.

Fig. 6 is a plan view of a preferred form of absorbent pad particularly adapted for use as a catamenial device.

Fig. 7 is a longitudinal section taken along the plane VII—VII of Fig. 6.
Fig. 8 is a side elevation, partly broken away, of a forming device and feeder.

Fig. 9 is a transverse section through the forming and feeding device of Fig. 8.

Fig. 10 is a transverse section taken along the plane X—X of Fig. 8.

Fig. 11 is a side elevation of a finished, wrapped package containing three cylindrical shapes.

Fig. 12 is a side elevation, partly broken away, of a folding and rolling device for pads.

Fig. 13 is a vertical section through a portion of the folding device, illustrating the first step in the folding operation.

Fig. 14 is a horizontal section of a portion of the folding device illustrated in Fig. 12, depicting a secondary stage in the folding and rolling operation.

Fig. 15 is a horizontal section through another portion of the folding device of Fig. 12.

Fig. 16 is an end view of the wrapping device whereby the articles of Fig. 11 may be produced.

In considering the description of the apparatus, it is to be remembered that the apparatus is represented diagrammatically and that numerous changes and modifications may be made. As shown in Fig. 1, a roll 10 of web-like, purified, cellulose material (or other suitable substance from which the web is made) is provided. The thin web of material indicated at 11 then passes into the folding device 12 which may be triangular in plan, as shown, and which may be provided with suitable means for longitudinally folding the web 11 upon itself.

As shown in Figs. 2, 3, and 4, the folding device 12 may be provided with a plurality of radially extending ridges on members 13, 14, 15, and the like, said members or ridges being spaced from one another. The housing of the folding device may be horizontally split, as indicated in Figs. 3 and 4, the members 13, 14, 15, etc., being a part of the bottom portion of the device. The upper portion of the device is provided with a similar radially arranged series of members 13', 14', 15', etc., this second series partially extending into the spaces between the lower series of members. This second series of members extends into the spaces between members of the first series to progressively greater distances as members of each series approach each other. The height of each series of members may either be uniform or it may vary. If, for example, it is desired to fold the web 11 in such manner so as to produce a finished web or band of substantially uniform thickness, then the members of each series will be of uniform height. If, on the other hand, it is desired to form a finished band which is thicker in the center than at the edge portions, then the edge members of each series, such as the members 13 and 14, may extend into the spaces between opposing members to a greater extent than the members near the center of the folding device, for example, members 15. In Figs. 3 and 4 an arrangement of folding members is shown whereby the finished band assumes a transverse section somewhat as shown in Fig. 5, a greater thickness of material existing in the middle portion of the band than at the edge portions.

The web 11 is threaded between the opposing series of members and is discharged in the form of a relatively thin and rolling band 16. The band is indicated at 17. Suitable means for turning the band over on its side (so as to assume a horizontal position) may be provided, such as the rolls 18 which, in conjunction with the rolls 16, twist the band from a vertical position to a horizontal position. The rolls 18 may be either cylindrical or concave.

The web of material 11 and the band 17 are drawn through the folding and feeding device generally indicated by the numeral 20. The feeder may be caused to draw the band through the folder and simultaneously feed the band into a punching and forming machine 21.

As illustrated in Figs. 8, 9, and 10, the feeding and punching machine may comprise a base or frame 22 provided with a stationary bed plate 23 and a movable bed plate 24. The movable bed plate 24 is yieldably urged upwardly by means of springs 25 but such upward movement is limited by means of the bolts 26 so that the upper surfaces of bed plates 23 and 24 lie in the same plane under normal conditions.

A vertically reciprocating die 27 is carried by the forming machine, this die being operably driven by any suitable means, such as, for example, the crank 28. The peripheral configuration in plan of the die 29 carried by the die head 27 is substantially identical to the peripheral configuration of the movable bed plate 24 for reasons which will become apparent from the subsequent description.

The advancing and feeding mechanism may comprise a base plate 30 which is moveable over a bed 31. The pressure plate 30 may be provided with a concave lower surface, indicated at 32, so as to conform to the cross-sectional distribution of layers of web in the band 17, which band 17 is received between the lower surface of the pressure plate 30 and the upper surface of the table 31. The concave surface 32 is particularly applicable when the band 17 is thicker in the central or middle portions than at the edges. The pressure plate 30 is provided with rollers 33 adapted to ride in grooves 34 and 35 formed in guide members 36 and 37 extending above the table 31. Reciprocating motion is imparted to the pressure plate 30 by means of a ball 38 pivotally connected to the pressure plate. The upper end of the ball 38 is attached to an arm 39 of a bell crank lever pivoted at 40, the other end of whicharm 39 is moveably being operably connected to the die head 27.

During reciprocation of the die head 27, a reciprocating motion is imparted to the pressure plate 30. When the die head 27 moves upwardly, the pressure plate moves towards the base plates 23 and 24 and the rollers 33 carried by the pressure plate ride in the upper grooves 35 of the guide members 36 and 37. When the die head 27 descends so as to punch a blank out of the web 11 advanced by the pressure plate into position below the die head, the pressure plate 30 moves away from the die head, the rollers 33 then riding in the upper grooves 35 of the guides 36 and 37, thereby retaining the pressure plate 30 out of contact with the web or band 17 during the return movement. The rollers 33 change from lower to upper guides by reason of pawls or dogs 42, 43, 44, etc., normally retained in the positions indicated by means of springs.

The pressure plate 30 may also be provided with side arms 45 capable of extending beneath the male die 29 for the purpose of removing previously punched blanks and advancing them beyond the path of material passing through the band 17. The portion of the band 17 beneath the die 16. The feeding device 29 therefore advances the web 11 through the folder 12, feeds the band 17 beneath the punch press 21, and simultaneously removes punched blanks from beneath the die.
Between the feeding machine 20 and the roll 18 means may be provided for applying a spray of mild adhesive to either one or both surfaces of the web 17, such spray means being indicated at 48 in Fig. 1.

The preferred form of pad to which this invention relates is illustrated in Figs. 6 and 7 and as there shown comprises an elliptical member 50 provided with an elliptical protrusion 51, said elliptical or longitudinally extending protrusion being adapted to be inserted between the labia. The preferred pad is made from a web or band of the character indicated in Fig. 5, which is of materially greater thickness or contains more absorbent material in the central portion than in the longitudinal edge portions. The longitudinal axis of the elliptical pad 50 is in alignment with the longitudinal axis of the band 17 so that the longitudinal edge portions 52 are relatively thin, whereas the central protrusion 51 contains a large quantity of absorbent material.

Difficulties have been encountered in punching shapes from a flimsy band of absorbent cotton or other purified natural cellulosic material but such difficulties are obviated by the construction of the punch press shown in Figs. 8 and 9. The die 29 is provided with a concavity 83, said concavity being spaced a distance of about ¼ inch from the outer edge of the die 29. This narrow, flat bottom portion of the die 28 comprises the loose band 17 against the upper surface of the bed plate 24. The springs 25 offer sufficient resistance to downward movement to insure the formation of a narrow densely compressed band which outlines the plan of the finished pad. Further downward movement of the die head 27 causes the die 29 to force the movable bed plate member 24 downwardly, thereby cutting a blank out of the band 17 along such previously compressed bounding areas.

While in such lower position with the lower edges of the die 29 in contact with the movable bed plate 24 and extending slightly below the upper surface level of the stationary bed plate 23, the downwardly extending arm 54 carried by the die head 27 strikes a blow against the part of a cleaver 86 attached at one end of a lever 57, said lever being pivoted to the frame at 52. As the blow is transmitted to a male die 89 provided with a downwardly extending and vertically movable guide member 60, the lower end of said guide member 60 being pivotally connected to the end of the lever 57 at 61. The male die 89 is thereby moved upwardly into a bore 62 formed in the die 29, thus forming the longitudinally extending elliptical protrusion 51, the web 17 being crimped and somewhat compressed at points corresponding to the points 63 and 56 of the finished pad (Fig. 7). The bore 62 may be provided with an ejector 64 adapted to expel the entire blank or formed pad out of the die 29 when said die 29 is raised.

The pad so made may be packed in any suitable manner. Before being sold for use, it is desirable to apply a deodorant and antiseptic powder to said pads. The spray applied at 49 may consist, for example, of very finely divided vegetable gum acacia, mixed with a sterilizing antiseptic or deodorant substance such as boric acid compounds, or various suitable powdered substances now on the market. If desired, the die head 27 may be provided with means for injecting additional mild adhesive to the edge portions of the pad during the punching operation.

The finished pad described hereinafjore and illustrated in Figs. 6 and 7, may be wrapped and marketed in any suitable manner. It has been found that by folding or rolling the pads into substantially cylindrical shapes and then wrapping a plurality of such shapes while in alignment, an extremely convenient article is produced. The method and apparatus for rolling, folding and wrapping is illustrated in Figs. 12 to 16.

The preferred form of package is illustrated in Fig. 11 and comprises a wrapper 66 containing three cylindrical shapes, indicated at a, a', and a". The wrapper 66 is provided with means for subdividing the unitary package containing the three shapes into sections so that each subdivided section would still contain a shape firmly covered by a wrapper. The simplest embodiment of such means for subdivision comprises perforations 67 and 68 formed in the wrapper 66 at distances spaced the length of the cylindrical objects or pads. The finished package, therefore, may be readily separated by tearing the wrapper along the perforation 67 so as to separate a covered pad a from the other pads.

The rolling, forming and wrapping machine particularly adapted for the treatment of pads shown in Figs. 6 and 7 is illustrated in Figs. 12 to 16 and comprises a table 70 provided with a plurality of elongated slots 71. Above the table the framework 72 is provided with a vertical guiding slot 73 adapted to slidably receive a crosshead member 74 actuated in any suitable manner, as for example by means of the crank 75 and pitman 76. The crosshead 74 is provided with downwardly extending presser members 77 having their upper ends journalized in the crosshead 74. The lower ends of the presser members 77 extend through a stationary member 78. The presser members 77 are provided with keyways, indicated at 79, adapted to cooperate with keys 80 fixed in the stationary member 78. The lower ends of the presser members 77 are provided with fingers 81, said fingers being adapted to grasp the protrusion 51 of the pads. The presser members 77 are positioned for movement directly above the slots 71 and are smaller in diameter than the width of the slots.

Beneath the fixed table 70 there is a plurality of chambers provided with yieldable walled members 82 and 83. The members 82 and 83 are slightly longer than the longest dimension of the pad. They are yieldably urged toward each other by means of springs positioned between the members 82 and 83 and fixed partitions 84. The members 82 and 83 are prevented from contacting one another by means of pins 85 attached to the members 82 and 83 and slidably passing through the partitions 84.

Beneath the chambers 86 provided with said yieldable walls, turntables 87 are provided, each of said turntables being retained within a frame 88, suitable bearings being provided between the frame and the turntable. Each of the turntables 87 is provided with an elongated opening 89. Means are provided for maintaining elongated openings 89 substantially in alignment with openings 71 in the table 70 and with turntable walls 82 and 83 of the chambers 86. Such means may comprise the spring means adapted to return the turntables 87 to the required position or the circumference of the turntables 87 may be provided with spur gears 90 cooperating with the reciprocating rack 91 whereby the turntables may be turned in timed...
relation to the downward movement of the presser members 71. The operation of the folding and rolling machine is as follows: The pads 91 are positioned on the table 70 with the longitudinal protruberances 51 in alignment with the slots 71 formed in the table. The presser members descend, the fingers 51 gripping the protruberances 51 and forcing the pad into the slot 71, thereby causing the longitudinal edges of the pad to be folded upwardly against the protruberances 51, as shown in Fig. 15. The presser members 71 continue their descent (the key 80 may be omitted to ride in the vertical keyway 76) until the partially folded pad has entered the chamber 85. At that instant the presser member 71 performs half a revolution, this being caused by the spiral portion 79 of the keyway 78. During this half revolution, the ends of the pad are folded over into the position illustrated in Fig. 14, this partial revolution being made possible by the yielding side walls 82 and 83 of the chamber 86. Thereafter, the presser member 71 descends so as to place the folded pad into the opening 89 of the turntable 81, whereupon the presser member performs a one-fourth revolution (90°), this being caused by the inclined portion 79" of the keyway 79. During this partial revolution, the folded pads are placed in alignment within the various turntables 81 and are ready for discharge therefrom by a further direct downward movement of the presser member 71. Beneath the turntables 87 a wrapping machine may be positioned, capable of receiving the folded cylindrically shaped pads and wrapping the same while in alignment. A simple form of wrapping machine is illustrated in Figs. 12 and 13 and comprises a cloth 92 fastened to a stationary support at 93 and passing over a roll 94. A loop 95 is formed in the cloth, this loop depending between the roller and a wrapping table 96. The cloth extends over the table 96 and is fastened at the other end of the table. Suitable wrapping paper 97 is supplied from a roll 98 and passes transversely across and over the cloth 92 on the table 96. Means are provided (not shown) for reciprocating the roll 94 from the position illustrated in Fig. 16 to a position slightly beyond the right hand end of table 96. The longitudinal axis of the roll may ride in a slotted guide 99 extending above the table 96. The roll 94 may also be provided with a cutter 100 in alignment with one edge of the table 96 and adapted to cut the paper 97 during the wrapping operation. The pads, now of substantially cylindrical shape and still retained in the turntables 87, are forced out of said turntables into the loop 95 of the cloth 92 by additional downward movement of the presser members 71 and thus held within said loop while the members 71 move upwardly to their original position. During upward movement of the presser members 71, the cylindrically shaped pads are moved longitudinally into abutting relation by means of a pusher 101 actuated by means of a bell crank lever 102 suitably connected to the crosshead 74 or cranks 75. The pusher 101 may force the plurality of cylindrical shapes 51 to a fixed stop at one edge of the cloth 92 or (in the event disc cutter 103 is sufficiently large) they may be pushed against the cutter, which then acts as a stop. The pusher 101 is then retracted from within the loop of cloth 92 and the roller 94, together with the disc 106, is moved towards the right and across the paper 97, thereby forming a tubular package containing a plurality of cylindrical shapes, such cylindrical shapes being the folded pads. The outer edge of the paper 97 may have an adhesive applied thereto permitting the discharge of a finished wrapper.

The package may be provided with means for subdividing the same into units, each unit containing a portion of the wrapper and a single cylindrical shape. For this purpose the paper 97 may be provided with transverse score lines or perforations, as indicated at 105. These score lines or perforations 105 correspond to the perforations 61 and 68, indicated in Fig. 11.

The operation of the apparatus described hereinafore will be readily apparent to those skilled in the art who will observe that means have been provided for forming any desired type of elongated band or ribbon of fibrous material, together with means for punching blanks and forming pads therefrom, and then folding and wrapping such pads so as to produce a novel package of very convenient form. The apparatus and method of the invention are not limited to the manufacture of the specific forms of pads referred to hereinafore but may be also used in the manufacture of other pads and blanks.

Numerous changes and modifications can therefore be made both in the arrangement of elements or units described hereinafore or any other utilization of other forms of equipment. All such changes and modifications coming within the scope of the appended claims are embraced thereby.

We claim:

1. A method of making absorbent pads comprising advancing a thin web of cellulosic material longitudinally while simultaneously folding the same whereby longitudinal adjacent portions of the web are brought into contact with each other to form a relatively narrow band of material having thin edge portions and a thicker middle portion, and stamping out elliptical forms from said band, the major axes of said elliptical forms paralleling the longitudinal axis of the band.

2. A method of making absorbent pads comprising advancing a thin web of cellulosic material longitudinally while repeatedly simultaneously folding the same and simultaneously advancing to the same web to be brought into contact with each other to form a relatively narrow band of material having thin edge portions and a thicker middle portion, applying a light spray of adhesive solution to said band, and stamping out elliptical forms from said band, the major axes of said elliptical forms paralleling the longitudinal axis of the band.

3. A method of making absorbent pads comprising advancing a thin web of cellulosic material longitudinally while simultaneously folding the same upon itself, the interior folded edge narrower than the exterior folds, to form a relatively narrow band of material having thin edge portions and a thicker middle portion, and stamping out elliptical forms from said band, the major axes of said elliptical forms paralleling the longitudinal axis of the band.

4. A method of making absorbent pads comprising advancing a thin web of cellulosic material longitudinally while simultaneously folding the same repeatedly to form a relatively narrow band of material having thin edge portions and a thicker middle portion, stamping out elliptical forms from said band, the major axes of said elliptical forms paralleling the longitudinal axis of the band, and forming an elongated protruberance ex-
tending to one side of the plane of said band in said forms.

5. In a method of making absorbent pads, the steps of advancing a thin web of cellulose material longitudinally while simultaneously folding the same to form a relatively narrow band of material having thin edge portions and a thicker middle portion, subjecting limited areas of the band to pressure to form a dense felted portion enclosing a substantially uncompressed elongated portion which is disposed longitudinally of said band, maintaining said limited areas of said band under pressure while molding an elongated protuberance from portions of the web of maximum thickness lying within said enclosed portion, and cutting the band along said pressed and felted portions.

6. In a method of making absorbent pads, the steps of advancing a thin web of cellulose material longitudinally while simultaneously folding the same to form a relatively narrow band of material having thin edge portions and a thicker middle portion, subjecting limited areas of the band to pressure to form a dense felted portion enclosing a substantially uncompressed elongated portion which is disposed longitudinally of said band, maintaining said limited areas of said band under pressure while molding an elongated protuberance from portions of the web of maximum thickness lying within said enclosed portion, crimping the edges of said protuberance during said molding, and cutting the band along said pressed and folded portions.

7. In a method of making absorbent pads, the steps of advancing a thin web of cellulose material longitudinally while simultaneously folding the same to form a relatively narrow band of material having thin edge portions and a thicker middle portion, applying a light spray of adhesive solution to said band, subjecting limited areas of the band to pressure to form a dense felted portion enclosing a substantially uncompressed elongated portion which is disposed longitudinally of said band, maintaining said limited areas of said band under pressure while molding an elongated protuberance from portions of the web of maximum thickness lying within said enclosed portion, and cutting the band along said pressed and felted portions.

8. In a method of making absorbent pads, the steps of forming a band of cellulose material, said band having thin edge portions and a thicker middle portion, cutting elliptical blanks from said band, and molding an elongated protuberance along the longitudinal axis of each of said blanks to form pads.

9. In an apparatus of the character described, the combination of a supply roll for a web of cellulose material, a folding means adapted to fold said web of material longitudinally, said folding means comprising a series of radially arranged horizontally spaced members, another series of radially arranged horizontally spaced members, said second series extending into the spaces between members of the first series to progressively greater distances as members of each series approach each other, the members in the mid portion of each series being shorter than the members at the sides of said series, and means for drawing said cellulose material from said roll through said folding means.

10. In an apparatus of the character described, a supply roll for a web of cellulose material, a folding means adapted to fold said web of material longitudinally, said folding means comprising a series of radially arranged horizontally spaced members, another series of radially arranged horizontally spaced members, said second series extending into the spaces between members of the first series to progressively greater distances as members of each series approach each other, the members in the mid portion of each series being shorter than the members at the sides of said series, and means for drawing said cellulose material from said roll through said folding means.

11. A method of making absorbent pads, comprising advancing a thin web of cellulose material longitudinally while simultaneously forming a plurality of folds of various width therein, folding the material along said folds to form a relatively narrow band of material having thin edge portions and a thicker middle portion, and stamping out elliptical forms from said band, the major axes of said forms paralleling the longitudinal axis of the band.

12. A method of making absorbent pads, comprising advancing a thin web of cellulose material longitudinally while repeatedly simultaneously folding the same whereby longitudinal adjacent portions of the web are brought into contact with each other to form a relatively narrow band of material having thin edge portions and a thicker middle portion, and stamping out elliptical forms from said band, the major axes of said forms paralleling the longitudinal axis of the band.

13. In an apparatus of the character described, the combination of a supply roll for a web of cellulose material, a folding means adapted to fold said web of material into a plurality of longitudinal folds of different widths whereby longitudinally adjacent portions of the web are brought into contact with each other, means for feeding said web to said folding means, a punching and forming machine adapted to cut blanks from said band of material, said machine including a stationary bed plate provided with a recess, a yieldably movable bed plate positioned within said recess, means for normally holding the surface of said movable bed plate in the plane of said stationary bed plate, a power driven die adapted to cooperate with said bed plate, said die having a peripheral configuration substantially identical to the peripheral configuration of said movable bed plate, a male die movably carried by said bed plate and adapted to cooperate with said first named die after said movable bed plate is moved, means for driving said male die toward said first named die, and means for intermittently feeding the longitudinally folded material from said folding means to said punching means.

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