June 22, 1937. M. M. VISSCHER ET AL 2,084,362

ABSORBENT PAD AND METHOD OF MAKING THE SAME

Filed July 5, 1934 4 Sheets-Sheet 1

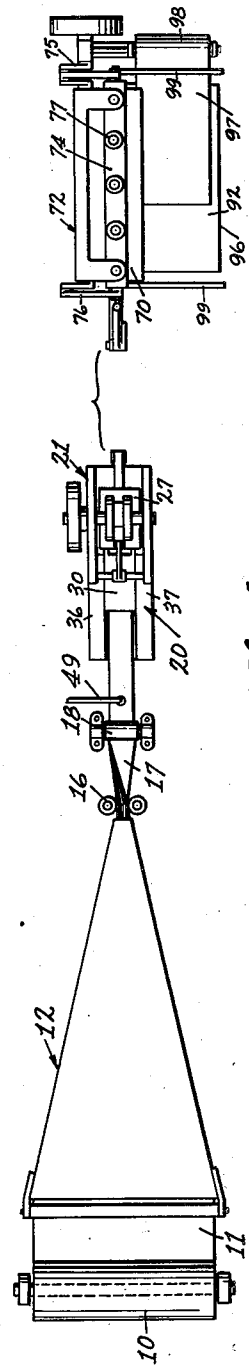


Fig. 1.

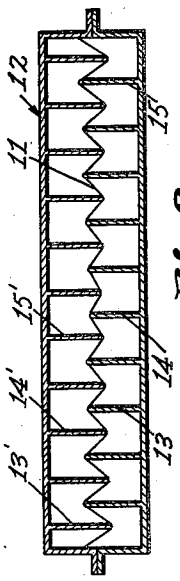


Fig. 3.

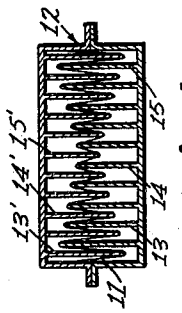


Fig. 4.



Fig. 5.

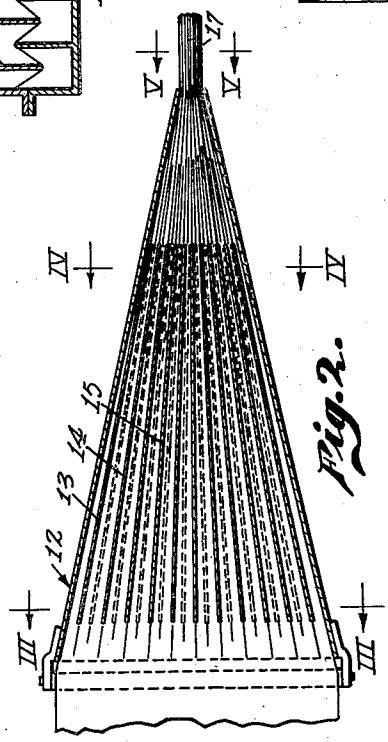


Fig. 2.

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ABSORBENT PAD AND METHOD OF MAKING THE SAME

Filed July 5, 1934 4 Sheets-Sheet 2

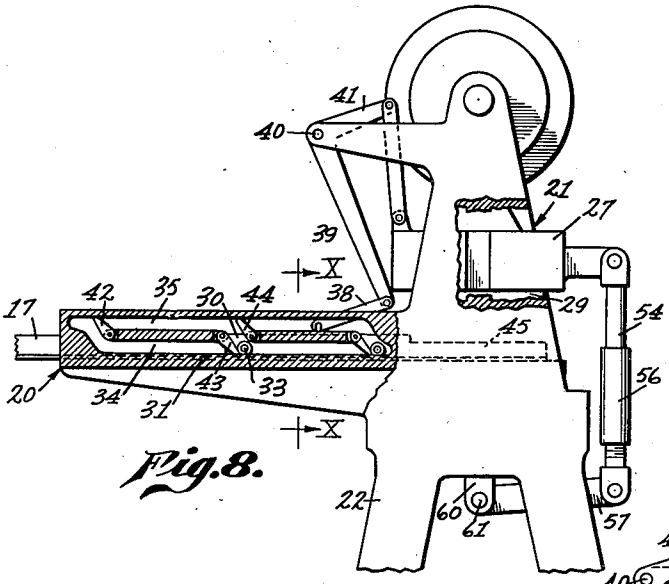


Fig. 8.

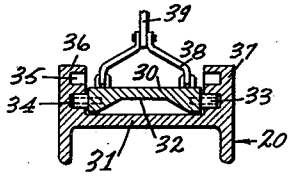


Fig. 10.

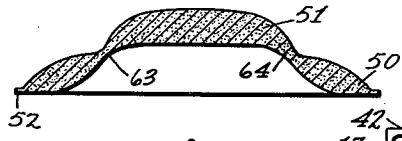


Fig. 7.

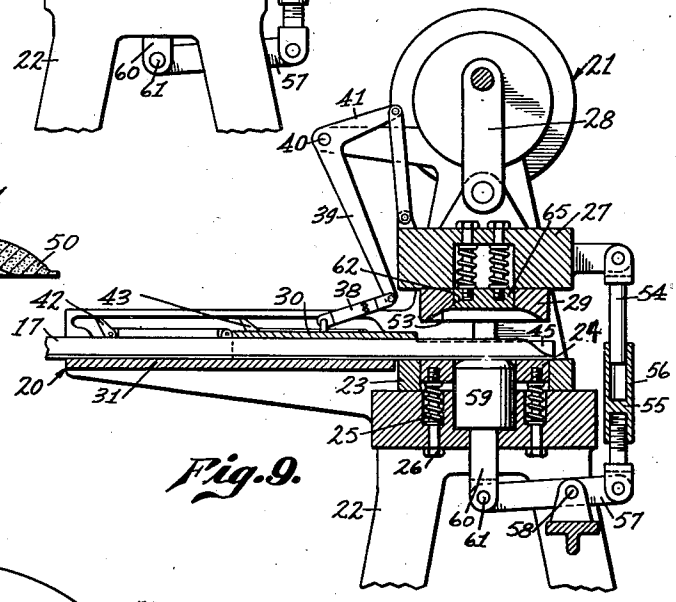


Fig. 9.

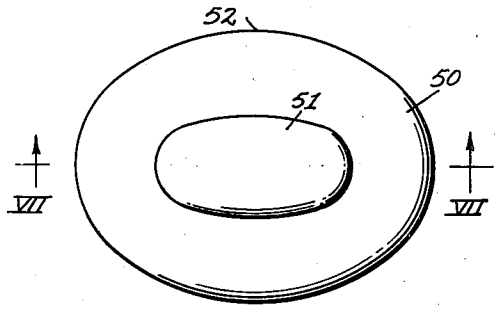


Fig. 6.

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ABSORBENT PAD AND METHOD OF MAKING THE SAME

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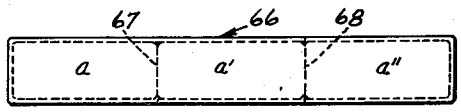


Fig. 11.

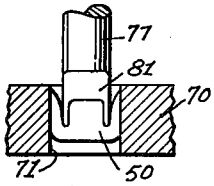


Fig. 13.

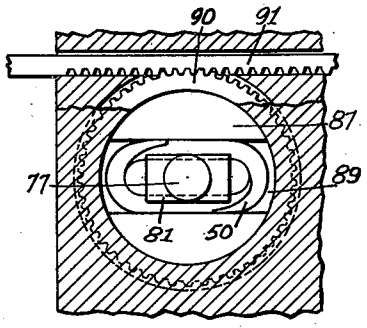


Fig. 15.

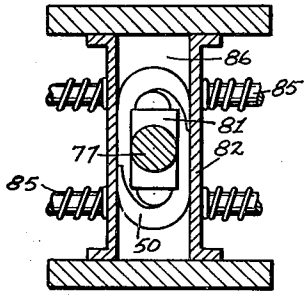


Fig. 14.

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ABSORBENT PAD AND METHOD OF MAKING THE SAME

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Fig. 12.

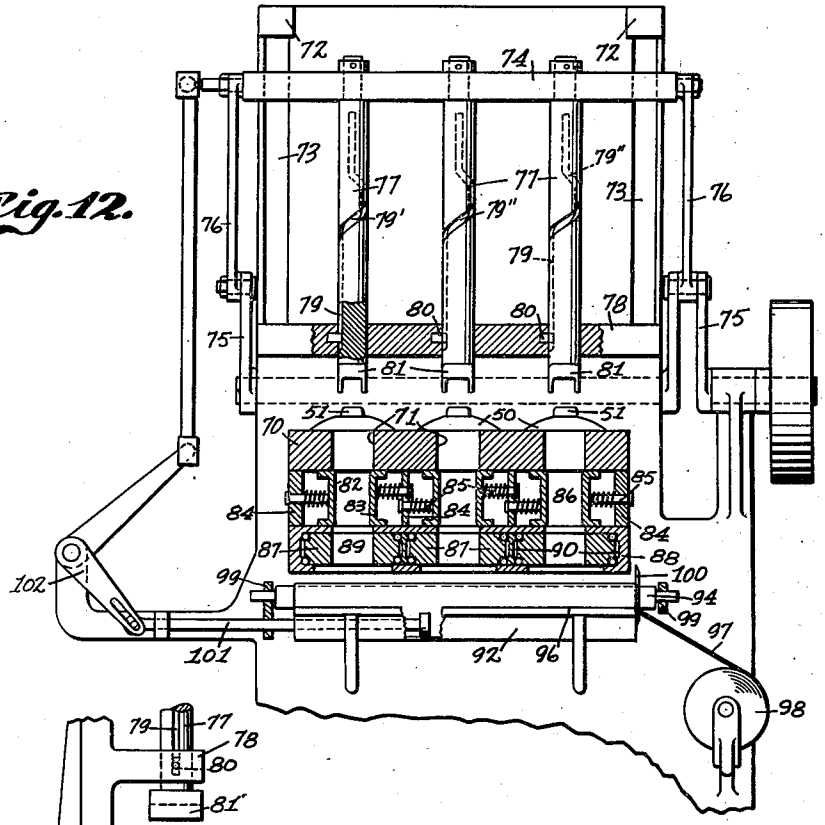
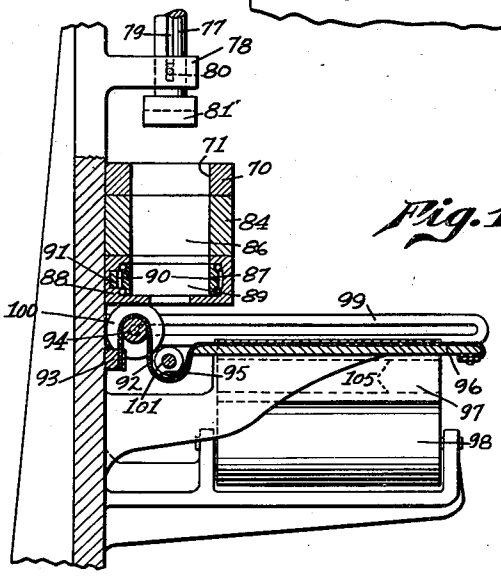


Fig. 16.



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Patented June 22, 1937 2,084,362

UNITED STATES PATENT OFFICE

2,084,362

ABSORBENT PAD AND METHOD OF MAKING THE SAME

Margaret M. Visscher and Walter L. McMillan, Los Angeles, Calif., said McMillan assignor to said Visscher

Application July 5, 1934, Serial No. 733,776

13 Claims. (Cl. 154—29)

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 shapes, 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 section 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 feeder and forming 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, cellulosic material (or other suitable substance from which the pads are to be 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 portions 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 thick band of material passing through rolls **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 device **12** by means of a feeder, 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 pressure plate **30** which is reciprocally movable 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 bail **38** pivotally connected to the pressure plate. The upper end of the bail **38** is attached to an arm **39** of a bell crank lever pivoted at **40**, the other arm **41** of the bell crank lever 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 lower grooves **34** of the guide members **36** and **37**. When the die head **27** descends so as to punch a blank out of the web **17** 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 die during the step of feeding a new portion of the band **17** beneath the die. The feeding device **20** 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 49 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 protuberance 51, said elliptical or longitudinally extending protuberance 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 portions 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 protuberance 51 contains a large quantity of absorbent material.

Difficulties have been encountered in punching shapes from a fluffy band of absorbent cotton or other purified 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 53, said concavity being spaced a distance of about $\frac{1}{16}$ inch from the outer edges of the die 29. This narrow, flat bottom portion of the die 29 compresses 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 area.

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 partition 55 of a sleeve 56 attached to one end of a lever 57, said lever being pivoted to the frame 22 at 58. This blow is transmitted to a male die 59 provided with a downwardly extending and vertically movable guide member 60, the lower end of said guide member 60 being pivotally connected to the inner end of the lever 57 at 61. The male die 59 is thereby moved upwardly into a bore 62 formed in the die 29, thus forming the longitudinally extending elliptical protuberance 51, the web 17 being crimped and somewhat compressed at points corresponding to the points 63 and 64 of the finished pad (Fig. 7). The bore 62 may be provided with an ejector 65 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, such as 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 hereinabove 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 journaled in the crosshead 74. The lower ends of the presser members 77 extend through a stationary member 78. The presser members 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 protuberance 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 said 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 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 the walls 82 and 83 of the chambers 86. Such means may comprise 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 77.

The operation of the folding and rolling machine is as follows: The pads 50 are positioned on the table 70 with the longitudinal protuberance 51 in alignment with the slots 71 formed in the table. The presser members descend, the fingers 81 gripping the protuberance 51 and forcing the pad into the slot 71, thereby causing the longitudinal edges of the pad to be folded upwardly against the protuberance 51, as shown in Fig. 13. The presser members 77 continue their descent (the key 80 continuing to ride in the vertical keyway 79) until the partially folded pad has entered the chamber 86. At that instant the presser member 77 performs half a revolution, this being caused by the spiral portion 79' of the keyway 79. 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 77 descends so as to place the folded pad into the opening 89 of the turntable 87, 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 87 and are ready for discharge therefrom by a further direct downward movement of the presser member 77.

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 16 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 axle 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 77 and thus held within said loop while the members 77 move upwardly to their original position. During upward movement of the presser members 77, 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 either against a fixed stop at one edge of the cloth 92 or (in the event disc cutter 100 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 100, 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 67 and 68, indicated in Fig. 11.

The operation of the apparatus described hereinabove 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 pad referred to hereinabove 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 hereinabove or any other utilization with 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 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 whereby longitudinally 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, 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 folds being 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 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 forms paralleling the longitudinal axis of the band, and forming an elongated protuberance 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 cellulosic 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 cellulosic 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 cellulosic 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 cellulosic 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 cellulosic material, a folding means adapted to simultaneously fold said web of material into a plurality of longitudinal folds of different widths, means for feeding said web to said folding means, a punching and forming machine adapted to cut blanks from a band of material, and means for intermittently feeding the longitudinally folded material to said punching machine.

10. In an apparatus of the character described, a supply roll for a web of cellulosic 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 cellulosic material from said roll through said folding means.

11. A method of making absorbent pads, comprising advancing a thin web of cellulosic material 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 cellulosic 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 cellulosic 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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