April 28, 1942. J. C. BARNHARDT 2,281,017

METHOD AND MEANS FOR MAKING FILTER PADS AND THE LIKE

Filed May 4, 1940 2 Sheets-Sheet 1

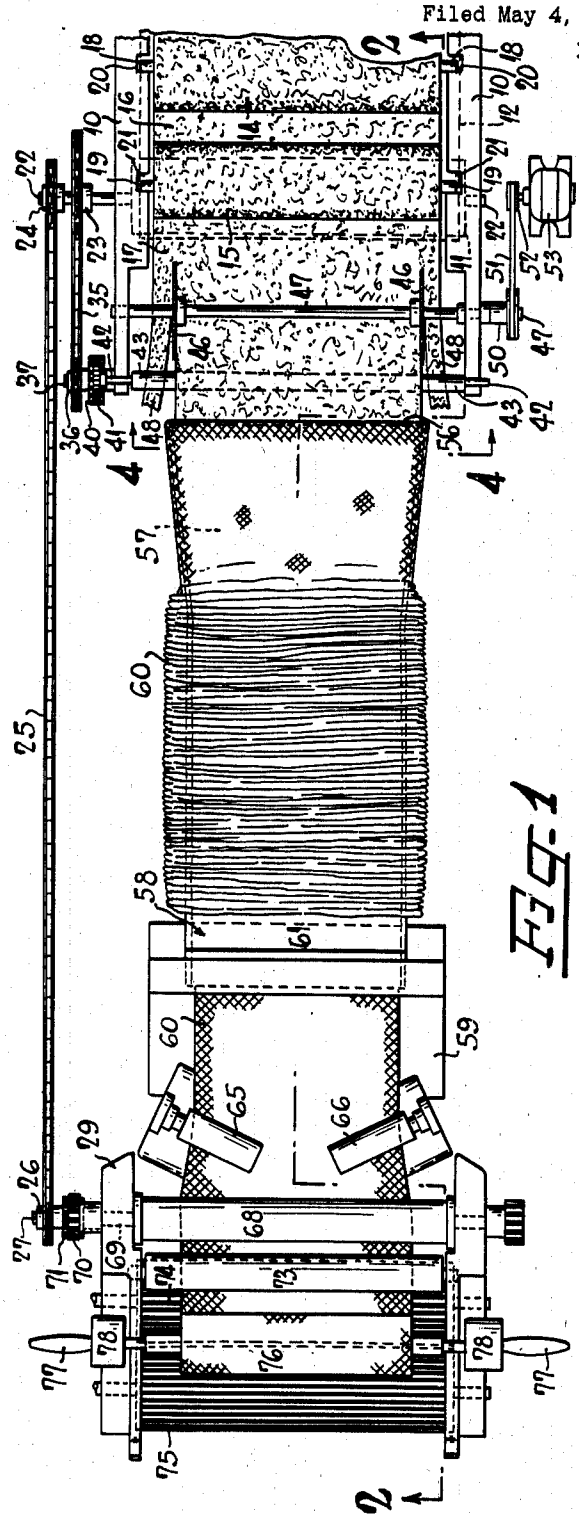


FIG-1

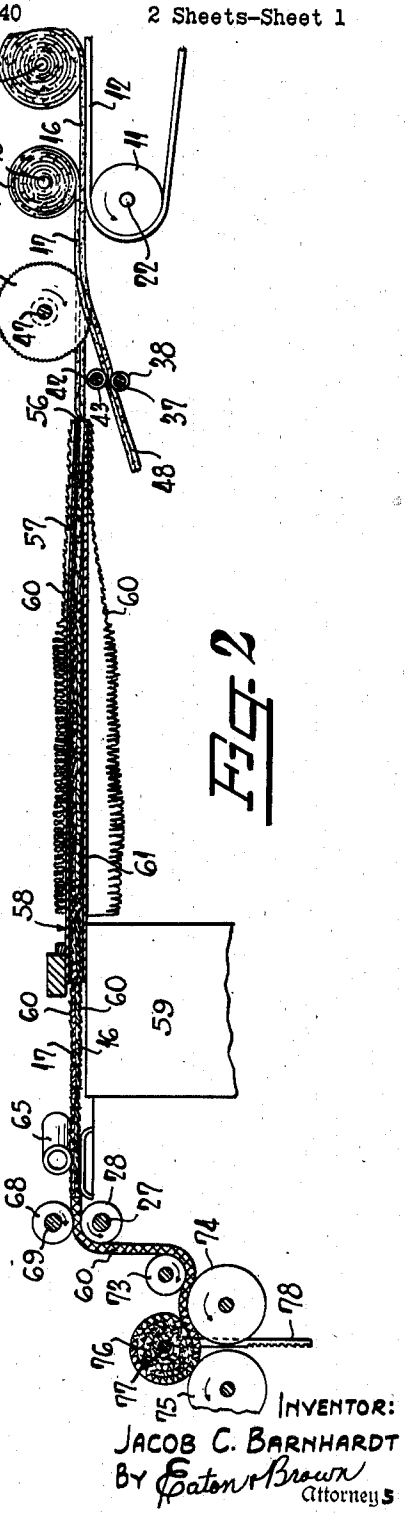


FIG-2

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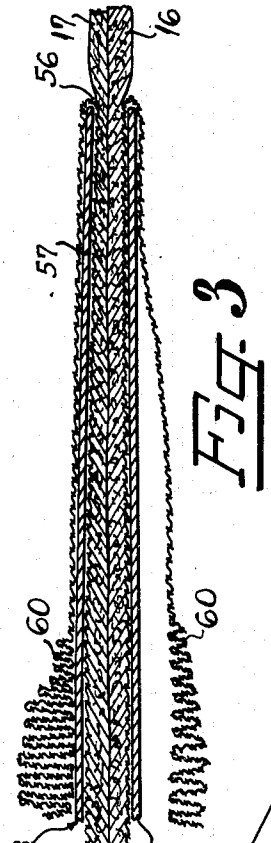


Fig. 3

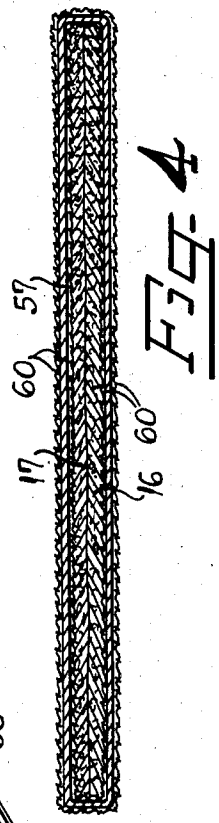


Fig. 4

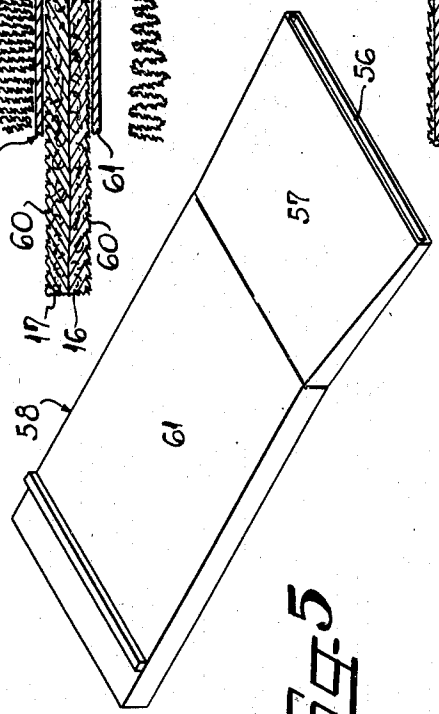


Fig. 5

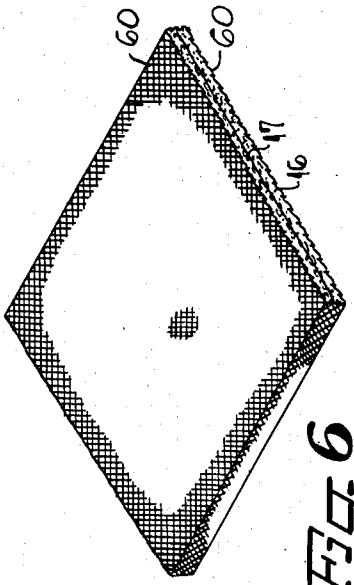


Fig. 6

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UNITED STATES PATENT OFFICE

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METHOD AND MEANS FOR MAKING FILTER PADS AND THE LIKE

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Application May 4, 1940, Serial No. 333,352

7 Claims. (Cl. 154—1)

This invention relates to a method and means for making filter pads and the like, or in fact for making any article where it is desired to encase a suitable filler material within a fabric tube.

In the manufacture of filter pads and the like, it is common practice to encase a suitable filler such as garnetted cotton, wool, flax or other fiber within a tube of cheese cloth. The filler may be formed in various widths and thicknesses, depending upon the desired shape of the finished product and the tube of fabric should be woven or otherwise formed so that it will properly fit the filler. If desired, the fabric may have one side of a certain construction and the opposite side of another. As an example, on one side it might be a plain weave of cheese cloth of a mesh of 18 threads one way and 14 threads the other, and on the other side it may be a much closer weave, such as sheeting mesh having 64 threads each way, or any other desired construction. Also this tube of fabric might be of the same construction throughout.

It is very important that the filler be properly encased by the cheese cloth so that there will be a minimum of wrinkles and irregularities in the filler and the fabric. It is therefore an object of this invention to provide an apparatus for continuously feeding a tubular fabric over a continuous filler member which apparatus will stretch the fabric uniformly to a slightly larger size than the filler before the fabric is drawn thereover. By stretching the fabric in this manner, a wrinkled fabric can not be fed onto the filler, therefore, the finished product will be of a better quality.

It is another object of this invention to provide a tubular carrier which is adapted to be surrounded by a tube of fabric compacted in overlapping folds, and which is adapted to have a filler material fed therethrough, said carrier having an enlarged end over which the fabric is withdrawn before it encases the filler material. The enlarged end on the carrier allows a great yardage of compacted fabric to be stored on the restricted portion of the carrier and yet affords means for properly stretching the same before it encases the filler.

It is another object of the invention to provide a method of encasing a filler in a tube of fabric which comprises the storing of the fabric in compacted overlapping folds on a holder, expanding the fabric as it is drawn from the holder, and then feeding the fabric reversely through the holder and over the filler.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which—

Figure 1 is a plan view showing my improved holder used in association with a conventional web feeding mechanism, and a conventional picker head;

Figure 2 is a longitudinal sectional view taken along the line 2—2 in Figure 1;

Figure 3 is an enlarged sectional view through the intake end of the tubular holder and being a reproduction on a large scale of the central portion of Figure 2;

Figure 4 is a transverse sectional view through the intake end of the holder and taken along the line 4—4 in Figure 1;

Figure 5 is an isometric view of the holder;

Figure 6 is an isometric view of a portion of the continuous encased filter pad as it appears after it has been cut into a suitable length.

Referring more specifically to the drawings, the numeral 10 denotes a suitable framework having rotatably mounted therein a roller 11, said roller being adapted to carry a conveyor belt 12. This conveyor belt supports a plurality of lap rolls such as indicated by the reference characters 14 and 15 from which emanates suitable webs or laps 16 and 17 respectively. The lap rolls 14 and 15 are wound around lap pins 18 and 19, the ends of which rest in slots 20 and 21 respectively in framework 10. By using this type of construction, the lap rolls remain in the same position while they are being unwound, and exhausted rolls can be replaced to thereby provide a continuous filler.

The conveyor belt roller 11 is mounted upon a shaft 22 which extends beyond the framework 10 and has sprocket wheels 23 and 24 mounted thereon. Sprocket wheel 24 has a sprocket chain 25, mounted thereon, which chain is also mounted upon a sprocket 26, said sprocket 26 being fixedly secured on calender roll shaft 27 of calender roll 28. The parts 26, 27 and 28 are a part of a conventional picker head which is indicated by the reference character 29. This picker head is driven in a conventional manner, not shown, but each time it is started in operation, the conventional belt 12 is likewise started up in timed relation thereto through the medium of members 11, 22, 24, 25 and 26, which have just been described.

The sprocket wheel 23 has a chain 35 mounted thereon, which chain is also mounted upon a sprocket 36 on shaft 37, said shaft 37 extending

through and supporting a roller 38. Also mounted on the shaft 37 is a gear 40 and this gear meshes with a gear 41 thereabove which extends through and supports a roller 43.

Laps or webs 16 and 17 are adapted to be cut to a predetermined width by means of suitable rotary knives 46, said knives being fixedly secured upon a rotating shaft 47. The portions or strips which are severed from the main web 16 and 17 along the edges are designated by the reference character 48 and those strips pass downwardly between positive driven rollers 38 and 43. Rollers 38 and 43 are driven in timed relation to the feeding of the webs 16 and 17 by means of members 23, 35, 37, 41 and 42; therefore, the severed strips 48 will be moved away from the knives 46 as severed.

The knife shaft 47 has a pulley 50 fixedly secured on one end thereof and this pulley has a belt 51 mounted thereon, said belt being driven in any suitable manner such as by being mounted upon a motor pulley 52 of motor 53.

After being trimmed to a predetermined width by the knives 46, the layers 16 and 17 pass into the intake opening 56 in the flared end 57 of holder 58. The holder is removably supported at its outlet end by a framework 59. In other words, the holder 58 is cantilevered so that a tubular fabric 60 can be placed thereover in compacted overlapping folds. This compacted fabric is fed over the enlarged end and deposited on the restricted portion 61 of the holder 58. The flared or enlarged portion 57 is used to stretch the tubular fabric substantially to its ultimate position as it is deposited onto the holder and again before it is used to encase the webs 16 and 17. The tubular fabric is not expanded while it remains upon the restricted portion 61, but as it is drawn off this restricted portion and over the flared portion 57, the perimeter of this flared portion increases over the perimeter of the restricted portion; consequently, the fabric will be stretched and as a result the wrinkles and creases will be removed therefrom. By feeding the tube of fabric over the enlarged end of the holder as it is being manually placed on the holder, mispicks which sometimes are near woven selvage points in the cloth can be detected. If not detected before the filler is being inserted in the tube the result is tearing of the fabric and inferior goods.

If the tubular member or holder should be of the same width throughout, it would be impossible to feed a compacted tube of fabric therefrom without feeding wrinkles and creases at the same time. In such a case, it would be necessary to provide a long holder or tubular member which would be uniformly the same size throughout with the fabric thereon stretched to its ultimate size throughout its length. It is evident that such a construction would require very much storage space to accommodate the same.

In the present construction, however, the tube of fabric 60 is stretched as it passes over the enlarged end 57. After passing over the enlarged end the direction of travel is reversed to allow the fabric to pass within the tubular holder and around the web layers 16 and 17, so that the filler material will be properly encased. By observing Figure 1 it will be noted that the width of the filler webs 16 and 17 are substantially the same as the width of the opening 56 in the intake end of the holder. The encasing tube of fabric 60 is likewise substantially of the same width. As the web and fabric move to the left within the holder the width of this web becomes somewhat narrower but at the same time the height is slightly increased.

After the encased filler passes from the tubular member 58 it contacts suitable conventional lateral stretchers 65 and 66 which serves to restore the web of material to its original width, that is to the width that it had when it entered the tubular member 58.

The encased filler pad then passes between rolls 28 and 68, said roll 68 being mounted on the shaft 69, the end of which has a gear 70 mounted thereon which gear meshes with a gear 71 on shaft 27 upon which the lower roller 28 is mounted. The encased filler then passes beneath roller 73 and then over calender rolls 74 and 75. Between these calender rolls a suitable lap roll 76 is formed upon a lap pin 77, said lap pin being allowed to move gradually upwardly by calender racks 78 in a manner that will create the proper density for the lap roll 76. By making the lap rolls 14 and 15 with a low pressure on the calender racks in the picker in which these lap rolls are made, a fluffy web is produced which avoids wrinkles in the finished filter pads and also causes the cotton fibers to permeate and stick through the meshes in the tube of fabric.

There is another decided advantage in having the enlarged flared portion 57, in that any mispicks in the tube of fabric which have been made during the weaving operation can be easily detected because the fabric is stretched substantially to its ultimate size as it is being fed onto the restricted portion 61 of the holder. If the opposed sides have been woven together, due to a mispick, a tearing in the fabric will result which can be detected at once and repaired before the withdrawing operation is begun.

The object in having the fabric 60 fed reversely through the holder along with its lap webs 16 and 17, is to produce additional strength in the combined product. The laps 16 and 17 have very little strength in themselves and can take very little tension. It is seen that these laps are positively fed from rolls 14 and 15 but after reaching the holder 58, the combination of the tubular fabric 60 and the lap webs 16 and 17 are drawn by virtue of the rotation of rollers 28 and 68 in the picker head 29. The increased strength due to the tubular encasement, allows this to be done.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the appended claims.

I claim:

1. In a machine of the character described, the combination of a tubular carrier adapted to be surrounded by a tube of fabric compacted in overlapping folds, means for feeding a filler material through said carrier, said carrier having one end thereof flared outwardly, means for feeding the tube of fabric over said flared end and over the filler whereby the fabric will be stretched just short of its ultimate stretch before encasing the filler.

2. In a machine of the character described, the combination of a tubular carrier adapted to be surrounded by a tube of fabric compacted in overlapping folds, means for drawing the filler material through said carrier, said carrier having one end thereof flared outwardly, means for

drawing the tube of fabric over said flared end and reversely through the carrier and then over the filler whereby the fabric will be stretched slightly below its breaking point before encasing the filler, and whereby the tube of fabric will reinforce the filler as it is pulled through the carrier.

3. In a tubular carrier adapted to have a web of filler material fed therethrough and adapted to be surrounded by a compacted tube of fabric to be fed reversely through the tube over the filler material, the transverse perimeter of said carrier being greater at the end over which the fabric is fed than the transverse perimeter at the point upon which the compacted fabric is stored.

4. A machine of the character described, the combination of a tubular carrier adapted to have stored thereon a length of fabric tube, said carrier having outwardly flaring sidewalls at one end and having inwardly tapering top and bottom walls in said one end, means for pulling the fabric from the carrier over said one end and through the carrier, means for feeding a lap of filler material into the fabric tube as it is drawn into said carrier, over said one end.

5. In a machine for making an elongated article adapted to be used for filter pads and the like, a tubular carrier substantially rectangular in cross section, means for supporting said tubular carrier at one end, the other end of the tubular carrier having its top and bottom walls sloping towards each other and defining an elongated, horizontally disposed slot of less vertical width than the main portion of the carrier, the side walls of said other end of the tubular carrier being flared outwardly away from each other, said tubular carrier being adapted to have stored thereon an elongated tube of fabric, means for drawing the fabric off the carrier and over said other end and into and through the carrier, means for feeding a web of fibrous material into said other end of the carrier, whereby the web of fibrous material will be carried along through the carrier by the tube of fabric moving therethrough and whereby the tube of fabric after being stretched as it passes over said other end of said carrier will be restricted in passing through the remaining portions of said carrier to decrease the width of the tube of fabric and the width of the filler to therefore provide a compact product, free from wrinkles on account of stretching of the fabric as it passes over and into the said other end of the carrier.

6. Apparatus for manufacturing filter pads and the like in continuous lengths which comprises a tubular carrier supported at one end and having its other end flared horizontally and restricted vertically and being adapted to have stored thereon a tube of fabric, means for withdrawing the fabric from the tubular carrier and over said other end and into and through the carrier, means for feeding a continuous length of filler material in web form into the said other end of the carrier and into the tube of fabric to be carried along by the tube of fabric through the carrier whereby the fabric is substantially stretched as it passes over said other end of the carrier and upon constriction as it moves through the smaller portion of the carrier resulting in a filter pad devoid of wrinkles and wherein the filler material substantially fills the tube of fabric.

7. That method of forming a continuous filter pad which comprises feeding a tube of woven fabric onto a tube while stretching the fabric and depositing the fabric in folds on the tube, then reversing the direction of travel of the tube of fabric and drawing it over the end of the tube while again stretching the fabric and then drawing the fabric through the tube, and at the same time feeding a lap of fibrous material into the stretched fabric as it passes into the tube.

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