Oct. 24, 1972 I. JANISCH ET AL 3,700,404

PROCESS AND APPARATUS FOR THE WET TREATMENT OF EXPANDED TEXTILE MATERIAL LENGTHS

Filed April 8, 1970 2 Sheets-Sheet 1

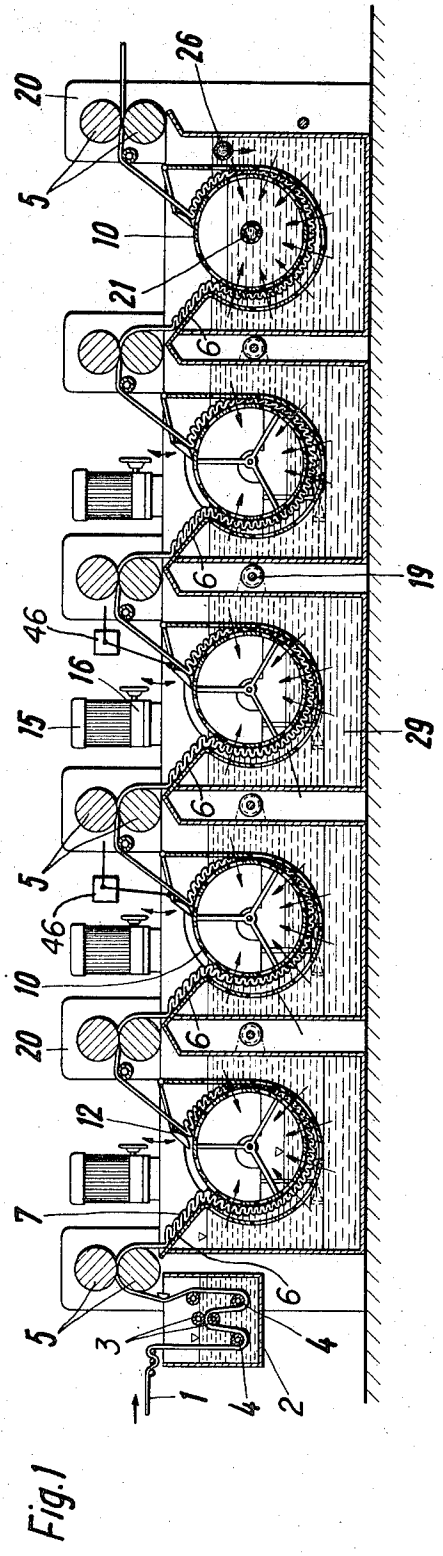

Fig.1

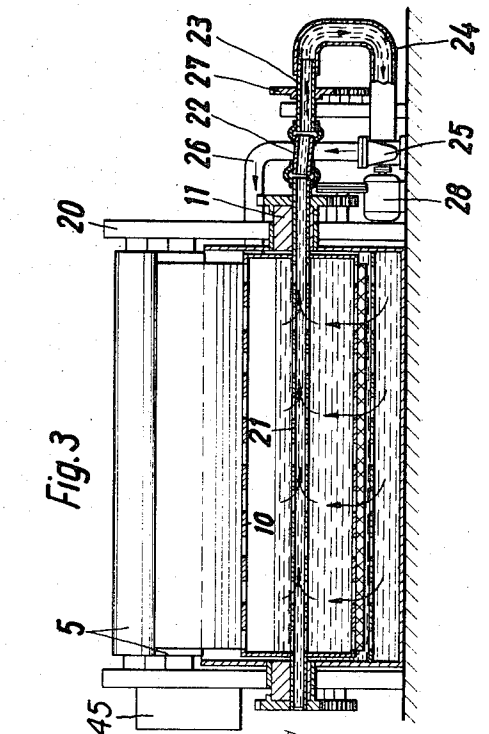

Fig.3

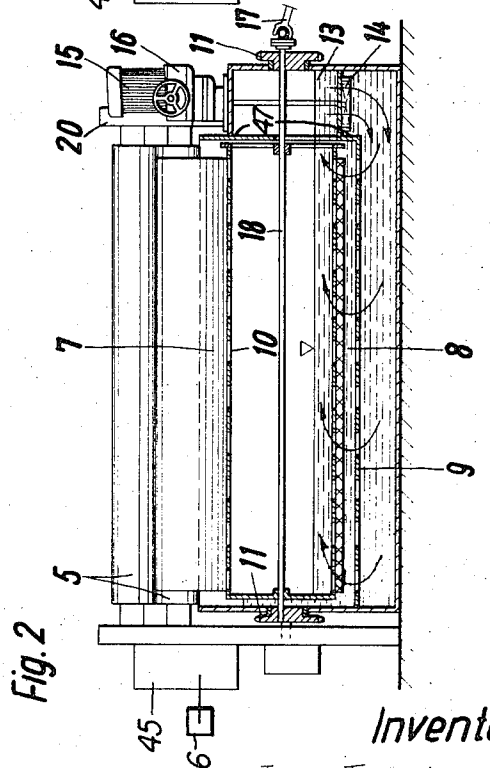

Fig.2

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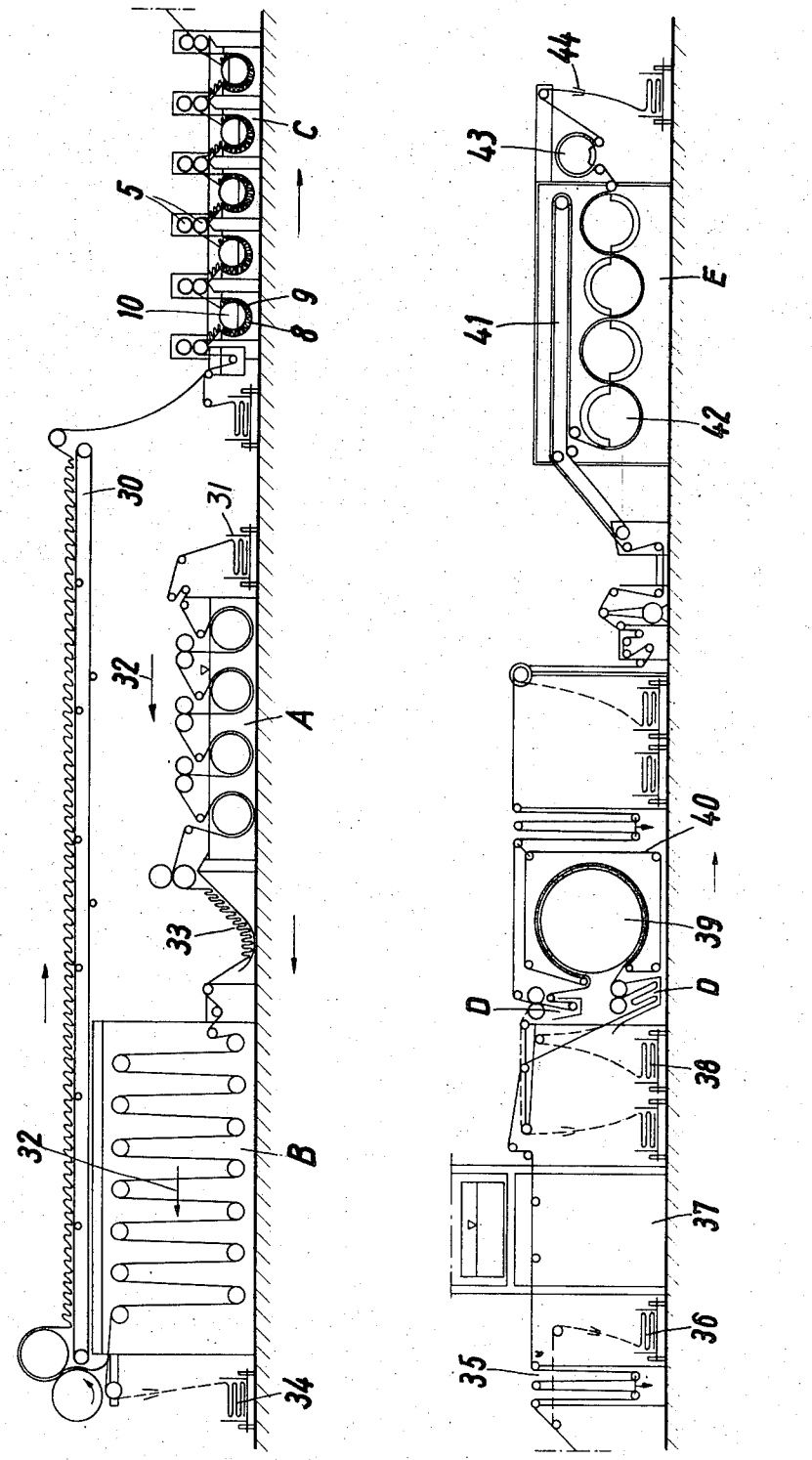

Fig. 4

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PROCESS AND APPARATUS FOR THE WET TREATMENT OF EXPANDED TEXTILE MATERIAL LENGTHS

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U.S. Cl. 8—158 35 Claims

ABSTRACT OF THE DISCLOSURE

The present disclosure is directed to a process and apparatus for the wet-treating, fulling and/or kneading of textile material lengths which comprises at least one liquor container adapted to contain a treatment liquor, said liquor container containing a sieve drum means, rotatably disposed therein, drive means for rotating said sieve drum means, a liquid-permeable trough means provided in the liquor container and extending a distance from the surface of the sieve drum means, said trough means and the surface of said sieve drum means defining a compression channel therebetween, inlet means for overfeeding the material to be treated to the compression channel thereby plaiting the material at the beginning of said channel, means for supporting and driving the sieve drum means so that it performs an oscillating motion during rotation, thereby subjecting the plaited material length in the compression channel to a mechanical treatment due to the varying compression force of the sieve drum means against the plaited material in said compression channel, and outlet means for removing the plait-like overfeed at the outlet of the compression channel. The present disclosure is also directed to the combination of the wet-treatment process and apparatus with an acidifying, a carbonizing, a padding, and a drying process and apparatus.

BACKGROUND OF THE INVENTION

The present invention relates to a process and apparatus for the wet-treatment, fulling and/or kneading of expanded textile material lengths, especially fabrics and knit fabrics.

When washing expanded textile material lengths, manufacturers aim not only at a good cleaning effect but also at a better final appearance of the material as well as a good shrinkage effect. The final appearance is particularly important with wool fabrics and wool mixture fabrics. A good final appearance of the material is obtained by the so-called kneading or milling of the material length. However, with the known washing machines only a very unsatisfactory kneading effect is obtained through the use of squeezers. In a known washing machine the material is therefore transformed into a package of plaits on a chute and this package then compressed by so-called hammers. In this process the mechanical strain exercised on the material is very great, the final appearance, however, is still not satisfactory. With these known machines it is especially difficult to carry the washing process through with respect to the material conditions, for example, the material textile, in such a way that all requirements are met. Apart from a good cleaning effect, a good removal of tensions from the textile material length is also aimed at.

SUMMARY OF THE INVENTION

An object of the present invention is to avoid the prior art disadvantages in the wet-treatment of expanded textile material lengths.

Another object of the present invention is to provide an improved process and apparatus for the wet-treatment, fulling and/or kneading of expanded textile material lengths, especially fabrics and knit fabrics.

A further object of the present invention is to provide an improved process and apparatus for treating textile materials wherein the final product exhibits an improved appearance, and is substantially free of tensions.

Other objects and further scope of applicability of the present invention will become apparent from the detailed desciption given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

The present invention provides an improved process and apparatus for influencing, within wide limits, and always with regard to the respective material to be processed, the final appearance, the cleaning effect, as well as the removal of tensions of various textile materials. With wool fabrics, for instance, a good final appearance and an effective removal of tensions are the main objectives. The cleaning effect in this case is of minor importance. With polyester fabrics and knit goods, on the other hand, the electrostatic nature of the material produces a very great dust content in the material. In this case the cleaning and the removal of tensions in the textile, as well as the shrinking effect are especially important. Another important factor for achieving a good final appearance of wool fabrics is the processing period which should be at least several minutes, and in some cases even more than 20 minutes. One substantial drawback of such long dwelling times is that the operating speed must be relatively high if a certain production quantity is desired. Therefore it is necessary to provide for a means for varying, within wide limits, both the dwelling time and the operating speed.

According to the present invention, the above requirements are readily met by constantly overfeeding the textile material length to the treatment media, thereby forming plaits in said material and by guiding the thus produced package of plaits through a liquor containing bowl on an oscillating sieve drum which is penetrated by the treatment liquor. This overfed material length is at the same time, mechanically treated (pressed) between the sieve drum and a liquid-permeable trough which is arranged underneath the sieve drum and extends a distance from the sieve drum surface. Because of the oscillations of the sieve drum the material is alternately pressed and penetrated by the processing liquor. By this combined process a good cleaning effect, an excellent final appearance and an effective removal of tensions are obtained. Also, the dwelling time is sufficiently long.

A particular advantageous adjustment of the apparatus to the individual materials to be treated, as well as to the required treatments is obtained if the whole process is subdivided into several stages with varying degrees of overfeeding, varying pressure frequencies and/or liquor flows. The overfeed is removed and subsequently renewed between the individual processing stages. This repeated removal and subsequent renewal of the overfeed is especially important for preventing any so-called breaking of the material at the bends produced in the material. Since the bends are constantly shifted, the whole process is made uniform. In any event, processing in stages makes it possible to apply different processing liquors and to use different temperatures at the diverse stages of the process, in accordance with the technical sequence of the process. The aforementioned process can also be carried out discontinuously, the only prerequisite being

that the ends of the textile material length are sewn together so that an endless length is obtained. This type of device is particularly advantageous for smaller production quantities. Besides, it is less expensive as only one single machine unit is needed.

For larger production quantities, however, it is substantially more advantageous to guide the textile material length continuously through the diverse processing stages, i.e. through several machine units. In this case it is possible to include drying in the general continuous process by adding an appropriate dryer, e.g. a sieve drum dryer. The individual machine units, each of which represent a separate processing step, can be operated with the liquors being completely separated from each other. However, it is also possible to produce a liquor exchange in the individual machine units by making use of the counterflow principle.

The apparatus for carrying out the process according to the present invention should comprise at least one liquor container in which a sieve drum is arranged which is penetrated by the processing liquor. In accordance with the present invention a liquid-permeable trough is adjoined to this sieve drum in the liquor container. The sieve drum and the perforated trough together form a compression channel. The sieve drum is supported in such a way, e.g., in eccentric disks, and driven in such a way that it performs an oscillating movement. The overfed textile material length is thus subjected to varying pressure forces within the compression channel due to the movement of the sieve drum against the plaited material disposed therein. The apparatus is provided with a unit for overfeeding the material length at the beginning of the compression channel and another unit for removing the overfeed at the end of the compression channel.

In order to avoid any damaging to the apparatus or of any of its parts, even in the case of material accumulation, it is suggested to support the trough and/or the sieve drum in flexible bearings. It is advantageous to support the sieve drum on levers so that it is not only flexible but also that at least part of its weight rests on the material. Furthermore, the apparatus is provided with a pump which ensures the liquor circulation through the trough, the textile material length and the sieve drum. The pump drive is to be variable down to zero. The eccentric drive, too, is to be variable to zero, independent of the sieve drum drive. The sieve drum drive, that is, the sieve drum speed, is also variable within wide limits because of the specific overfeed ratios that are to be obtained. This is ensured by installing an infinitely variable control gear.

To ensure continuous operation it is suggested to arrange several of the processing bowls in line one behind the other and to provide a draining unit, e.g. a squeezer and/or suction device between the individual bowls. Especially for devices that are designed for high operating speeds of up to about 100 m./min. and more, it is suggested to arrange a wetting bowl in front of the processing bowls. This wetting bowl can be designed as a normal immersion trough with a squeezing unit below the surface of the liquor.

When using an apparatus in which the sieve drum is designed as a suction drum, it is suggested to arrange a suction pipe with holes within the sieve drum, said suction pipe being connected with a pump outside the processing bowl by means of a pipe joint which effects the transmission of the torque onto the sieve drum. Here it is advantageous to insert the suction pipe through a central borehole in the eccentric disks. However, it is also possible, and in many cases even very advantageous, to utilize a so-called outflow drum instead of a suction drum. This outflow drum is penetrated by the processing liquor because of the difference of liquor levels prevailing inside and outside the sieve drum. The outflow drum is connected to a collecting vessel for the liquor that flows out at one end of the drum. The oscillating sieve drum can be sealed against this collecting vessel by elongating the front plate of the sieve drum beyond the drum jacket (this elongation should amount to not more than the eccentric deviation) or by fitting a ring flange of ample size to the sieve drum jacket. The elongated front plate, that is, the ring flange which is parallel to the side wall of the collecting vessel thus separates the sieve drum from the side wall of the collecting vessel. Negligible clearance losses are compensated by installing a pump of ample size.

There does not exist any known production lines wherein wool or wool containing synthetic fabrics or knit fabrics can be continuously treated, i.e. acidified, carbonized, washed neutralized, finished and finally stretched to a required width and dried. Although the demands for this kind of continuous lines which permit a reduction of personnel costs and an increase in production speeds increases steadily, it has, up to now, been impossible to develop continuous lines for treating the above types of textile materials because there did not exist an effective device for the wet treatment, i.e. for washing, removing tensions and for shrinking textile material. Heretofore, the wet treatment had to be carried out discontinuously in some kind of kneading or fulling device. One of such known machines is a chute on which the material is plaited and subsequently compressed by hammers.

The aforementioned invention relates to a process and apparatus for the continuous treatment of wool fabrics or wool containing synthetic fabrics or knit fabrics which means that now finishing lines for wool fabrics can be developed. Such a production line for the continuous treatment of the above textile materials comprises the aforementioned apparatus and preceding carbonizing and acidifying machines as well as a subsequent padder for applying the required chemical finishes followed by a unit for drying the textile material length and heat-setting the applied finishes. In this production line either all or certain individual operations that are necessary for treating wool can be carried out. The material can be fed to the first machine, conveyed through the whole line without any interruption in the process and discharged from the last machine. It is unnecessary to fold the material in between the disperse steps of the process in order to treat it discontinuously in one of the known devices. The individual machines can be supervised by only a few operators, which means that there are considerable savings in personal costs.

There can be other machines installed between the above main units of the finishing line, depending on the specific purpose for which the line is designed. For example, it is possible to install a crabbing machine between the padder and the drying unit for fixing the measurements of the material length and for possibly dissolving out any spinning oils which may be of inferior quality. The padder serves for applying any kind of chemical finishes to the material. Of course, it is possible to dye the material at the same time in the padder and to heat-set the dyestuffs in the drying unit. This drying unit is preferably designed as a perforated drum dryer which is preceded by a tenter feed section which is subject to heat.

The materials which can be treated by the apparatus of the present invention include any of the natural or synthetic fibers. The natural fibers can include cotton, wool, silk, cellulose, etc., and the synthetic fibers may comprise synthetic polymers such as polyolefins, e.g., polyethylene, polypropylene, etc., polyamides, e.g., nylon 6 obtained by the condensation of caprolactam, nylon 66, obtained by the condensation of hexamethylene diamine with adipic acid, etc., polyester, e.g., polyethylene terephthalate, etc., phenolic resins, e.g., phenol formaldehyde resins, urea formaldehyde resins, etc., polyvinyl materials, e.g., polyvinyl chloride, polyvinyl acetate, etc., and acrylate resins, such as e.g., polymethylmethacrylate. Copolymers of these materials with one another or with

ethylenically unsaturated monomers, and similar type polymers are also encompassed by the present invention. The present invention is also applicable to blends of the above-mentioned textile materials.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only and thus are not limitative of the present invention and wherein,

FIG. 1 is a longitudinal section of the apparatus of the present invention;

FIG. 2 is a cross section of the present apparatus provided with an outflow drum;

FIG. 3 is a cross section of the present apparatus provided with a suction drum; and

FIG. 4 is a production line for the treatment of wool fabrics.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The apparatus of the present invention, and particularly according to FIG. 1 comprises a wetting bowl **2** for wetting a textile material length **1**. The wetting bowl **2** is provided with a pair of squeeze rollers **3** for squeezing the textile material length beneath the surface of the liquor and guide rollers **4** for guiding the material through the wetting liquor. The textile material length is then passed through a pair of squeeze rollers **5** and guided onto a chute **6**. Rollers **5** are controlled by drive mechanism **45**. The material is overfed on the chute so that a package of plaits **7** is formed which is then conveyed into a compression channel **8**. The compression channel **8** is formed by a liquid-permeable trough **9** and a sieve drum **10**. The sieve drum **10** is supported in eccentric disks **11** and thus performs an oscillating movement. Because of this oscillating movement of the sieve drum **10** the textile material length is continually subject to a compression, i.e. it is constantly fulled and kneaded. Fulling generally signifies a slight milling of the material. Because of the overfeeding, a great material quantity is fed to the compression channel **8**. With a fixed operating speed the dwelling time is sufficiently long. At the end of the compression channel, a swivelable feeling unit **12** is arranged. The deflection of this feeler actuates a potentiometer **46** which, in turn, controls the drive mechanism **45** of the pair of squeeze rollers **5**. This pair of squeeze rollers **5** serves for removing the overfeed which is then renewed on a chute **6** in the following bowl. The first four bowls are provided with outflow drums, according to FIG. 2. The last, i.e. the fifth bowl is designed as a suction drum bowl and corresponds to FIG. 3. Normally, all bowls comprise either suction or outflow drums. However, the combination of both of the above-described systems is also possible.

In the apparatus according to FIG. 2 the sieve drum **10** has one open front side so that the liquor that flows into the sieve drum **10** can be discharged into a laterally arranged collecting vessel **13**. At the floor of this collecting vessel there is provided a pump **14**. The pump drive **15** is installed outside of the bowl and normally is combined with a variable speed gear **16**. The vessel **13** is sealed against the sieve drum by a ring flange or elongation of the side wall **47**. The liquor that is pumped back into the bowl flows through the liquid-permeable trough **9**, into the compression channel **8** and from there through the material back into the sieve drum **10**. In this embodiment of the present invention there is provided a drum drive **17** at the front side of the sieve drum which fits against the collecting vessel **13**. The drive shaft **18** is pushed through a borehole in the eccentric disks **11**. Both eccentric disks **11** are driven by a shaft **19** which can be supported in the squeezing unit frame **20**.

In the embodiment of the apparatus of the present invention according to FIG. 3 the sieve drum **10** is designed as a suction drum. Within the sieve drum there is a suction pipe **21** arranged which is inserted through a borehole in the eccentric bearing **11**. Since the suction pipe **21** also performs an eccentric movement, there must be provided a pipe joint **22** for compensating for this eccentric movement. At the connecting element **23** are mounted both the suction main **24** of a pump **25** and the sieve drum drive **27**. This means that the pipe joint **22** as well as the suction pipe **21** affect the drive of the sieve drum **10** via the connecting element **23**. The drawn-off liquor is guided back into the processing bowl **29** by means of the pump **25**, through a main **26**. Here it is advantageous to return the liquor to the container at the material discharge end because the oscillating movement of the sieve drum produces a liquor flow towards the feed end of the bowl, that is, the inlet end of the compression channel. The pump drive is noted with the number **28**.

FIG. 4 shows the production line for wool fabrics according to the present invention. The individual machine units are arranged in such a way that they can be used either separately or in groups or all together. For this reason, the acidifying machine A is arranged, not at the beginning of the line but beneath a conveyor belt **30**. The acidifying machine takes in the material which is transported to it in a carriage **31**, at its right-hand side. The material then passes through the acidifying machine A in several steps, following the arrow **32**, is plaited in an additional acidifying trough **33** and finally fed into a carbonizing oven B. In this oven the sulphuric acid which has been applied to the material in the acidifying machine reacts on the wool portion of the material for a sufficiently long period of time so that any vegetable dirt in the wool is burned. If requested, it is possible to plait the material that has left the carbonizing oven B into the carriage **34**. However, if the material must be subsequently washed, it is guided on the conveyor **30** in plaited form. This conveyor **30** bridges the machines A and B. The material is then fed into the continuous open-width washing machine C. The dwelling time is thus further prolonged. The open-width washing machine C has already been described above, so that reference can be made thereto. After having been discharged from the washing machine the material passes a material spray **35** from where it can be plaited into containers, if required.

If the material is not plaited at this point it passes the distance **37** to the padder D into which it can also be fed directly from the carriage **38**. The padder D is followed by a crabbing machine **39** which comprises a heated roller and a rubber belt **40** around the roller. The wet material is held between the rubber belt and the roller and heated up in this manner. The liquor is thus evaporated and the ironing effect fixes the material measurements and produces a luster or a bulky feel, depending on the nature of the material being treated. After having left the crabbing machine **39** the material can pass another padder where, for instance, a dyestuff can be applied. The absorbed dyestuff is dried and heat-set in the following machine unit marked E. The material shrinks under the influence of heat. A well known way of avoiding any shrinkage is to dry and heat-set the material on a stenter. However, these kinds of machines have very large dimensions and do not yield the required drying effect.

Several types of drying and heat-setting devices have been previously described in earlier patent application. With these machines it is possible to dry the material in an economical way without any danger of undesired shrinkage in width. FIG. 4 shows one embodiment E of such a drying and heat-setting device. The material is passed onto a stenter **41** outside of the device, said stenter extending over the whole length of the dryer. After having re-reached the inlet end of the dryer, the material length is introduced onto the first drum **42**. Due to the suction principle, the material is dried much more rapidly on the drums than on the stenter **41**. The stenter prevents any shrinkage of the material while it is being

preliminary heated. When treating heated material, the danger of shrinking does not exist. Therefore the textile material can subsequently be completely dried on sieve drums which are followed by a cooling drum **43** with an adjoined plaiting device **44**.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be apparent to one skilled in the art are intended to be included.

What is claimed is:

1. An apparatus for the wet-treating, fulling and/or kneading of textile material lengths which comprises at least one liquor container adapted to contain a treatment liquor, said liquor container having a sieve drum means rotatably disposed therein, drive means for rotating said sieve drum means about a longitudinal axis, a liquid-permeable trough means provided in the liquor container and extending a distance from the surface of the sieve drum means, said trough means and the surface of said sieve drum means defining a compression channel therebetween, inlet means for overfeeding the textile material to be treated to the compression channel thereby plaiting the material at the beginning of said channel, means for supporting and moving the sieve drum means so that said sieve drum means performs an oscillating motion transversely to said longitudinal axis during rotation, thereby subjecting the plaited textile material length in the compression channel to a mechanical treatment due to the varying compression force of the sieve drum means against the plaited material in said compression channel and outlet means for drawing said textile material from said compression channel and removing the overfeed plaiting at the outlet of the compression channel.

2. The apparatus of claim **1**, wherein the liquid-permeable trough means extends a distance from the surface of the submerged portion of the sieve drum means and is complementary to said surface.

3. The apparatus of claim **1**, wherein the overfeeding inlet means and outlet means are squeeze roller means provided with drive means.

4. The apparatus of claim **3**, wherein a chute means provides communication between the inlet squeeze roller means and the compression channel.

5. The apparatus of claim **4**, wherein a wetting bowl is provided in front of the inlet squeeze roller means, said wetting bowl containing guide roller means and squeeze roller means for guiding and squeezing the textile material length beneath the surface of the treatment liquor.

6. The apparatus of claim **3**, wherein a swivelable feeling element is disposed at the end of the compression channel, said feeling element being deflected by the textile material exiting from said channel and being operatively associated with a potentiometer, which in turn is operatively associated with the outlet squeeze roller means, whereby the deflection of the feeling element actuates said potentiometer to control the drive means of the outlet squeeze roller means.

7. The apparatus of claim **1**, wherein the supporting means for the sieve drum means include eccentric disks.

8. The apparatus of claim **7**, wherein the eccentric disks are provided with an eccentric drive, said eccentric drive for the sieve drum being variable down to zero, independent of the sieve drum drive.

9. The apparatus of claim **8**, wherein the sieve drum drive means is variable in accordance with the overfeed rate desired to effect the plaiting of said textile material.

10. The apparatus of claim **1**, comprising a plurality of the liquor containers containing sieve drum means.

11. The apparatus of claim **10**, wherein all of the sieve drum means are outflow drums.

12. The apparatus of claim **11**, wherein each outflow drum comprises a sieve drum means with one open front side which communicates with a laterally disposed collecting vessel containing a pump in the lower portion thereof, said pump recirculating the liquor that flows out of the sieve drum means into the collecting vessel back into the liquor container.

13. The apparatus of claim **12**, wherein each outflow drum is provided with a drum drive at that side of the sieve drum which is adjacent the collecting vessel.

14. The apparatus of claim **13**, wherein each outflow drum is provided with a drive shaft which is supported at both ends by eccentric disks, the drum drive communicating with the drive shaft through one of said eccentric disks.

15. The apparatus of claim **14**, wherein both eccentric disks are driven by a shaft which is supported in the frame of the apparatus.

16. The apparatus of claim **12**, wherein the pump means is provided with a variable drive means, variable down to zero.

17. The apparatus of claim **12**, wherein the collecting vessel is arranged at the open front side of the sieve drum means and is sealed against said sieve drum means by means of a ring flange.

18. The apparatus of claim **10**, wherein all of the sieve drum means are suction drums.

19. The apparatus of claim **18**, wherein each suction drum comprises a sieve drum means supported at both ends by eccentric bearings and having a suction pipe disposed therein which is inserted through a borehole in one of said bearings.

20. The apparatus of claim **19**, wherein a pump means and a suction main communicate with the suction pipe through a connecting element and a pipe joint so that the treatment liquor which is drawn out of the sieve drum means by the suction pipe is drawn by the pump means through the pipe joint, the connecting element and the suction main and returned to the liquor container.

21. The apparatus of claim **20**, wherein the suction main returns the treatment liquor to that end of the liquor container from which the textile material is discharged.

22. The apparatus of claim **20**, wherein the pump means is provided with a variable drive means, variable down to zero.

23. The apparatus of claim **10**, wherein the sieve drum means are a combination of outflow drums and suction drums.

24. The apparatus of claim **10**, wherein a dehydrating unit is provided between the liquor containers.

25. The apparatus of claim **1**, wherein the liquid-permeable trough means are supported in flexible bearings.

26. A process for the wet-treatment, fulling and/or kneading of expanded textile material lengths, particularly wool fabrics and knit fabrics or wool containing synthetic fabrics and knit fabrics which comprises introducing a textile material length in a plaited condition onto the surface of a sieve drum means by overfeeding said material to said sieve drum means, compressing said plaited material length between a liquid-permeable trough containing a liquid treatment liquor and being positioned adjacent to the surface of the sieve drum means, subjecting said compressed material to a mechanical treatment by imparting an oscillating motion to the sieve drum means, and removing the plaited condition from the textile material after said textile material is withdrawn from said treatment liquor.

27. An apparatus for the wet-treatment of textile material lengths which comprises at least one bowl means containing a treatment liquor; a sieve drum means rotatably mounted about a longitudinal axis within said bowl means; a liquid permeable trough means positioned in said bowl means extending closely adjacent to said sieve drum means to form a compression channel therebetween; feed means for overfeeding a textile material length onto said sieve drum means and into said compression channel whereby the textile material enters said channel in a plaited condition; means for rotating said sieve drum means about

said longitudinal axis and for effecting an oscillating motion of said sieve drum means transversely to said longitudinal axis whereby the textile material in the plaited condition within said compression channel is subjected to mechanical treatment due to the varying compression forces applied therein and means for withdrawing said textile material from said compression channel.

28. The apparatus of claim **27**, wherein said means for withdrawing the textile material includes roller means for removing the plaited condition from said textile material.

29. A process for the wet-treatment of expanded textile material lengths which comprises constantly overfeeding a textile material length onto the surface of a sieve drum means to form plaits in said textile material, guiding said plaited textile material through a treatment liquor between the surface of the sieve drum means and a liquid permeable trough means disposed within said liquor, subjecting said plaited textile material to a mechanical treatment with varying pressure between the sieve drum means and said trough by imparting an oscillating motion to said sieve drum means, and thereafter removing the textile material from said treatment liquor and from the surface of said sieve drum means.

30. The process of claim **29**, wherein the textile material is treated in a plurality of wet-treatment stages with varying overfeed rates, frequency of mechanical treatments and liquid flow therethrough.

31. The process of claim **30**, wherein said plaits are removed from said textile material and again introduced into said textile material between each of the individual wet-treatment stages.

32. The process of claim **30**, wherein the textile material length is treated with different treatment liquors and at different temperatures during the individual stages of wet-treatment.

33. The process of claim **30**, wherein the ends of individual textile material lengths are sewn together to provide an endless length which is subjected to the different treatment stages discontinuously in one single wet-treatment unit.

34. The process of claim **30**, wherein the textile material length is continuously treated sequentially in several wet-treatment units.

35. The apparatus of claim **1**, wherein the liquid-permeable sieve drums means are supported in flexible bearings.

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