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(54) **A package containing a liquid-impregnated sponge and a method and a machine for manufacturing said package.**

(57) The object of the present invention is to provide a package consisting of sheet material and containing a liquid-impregnated sponge. The sponge is held under compression within said package and the entire package is completely filled with liquid. There is also provided a method of manufacturing that package and a machine for manufacturing it.

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The invention relates to a package containing a liquid-impregnated sponge or the like and a method and a machine for manufacturing said package.

For different types of washing and cleaning there is often used a sponge impregnated with liquid detergent. Until now the most usual procedure has been that the person who carries out the washing or cleaning himself impregnates the sponge with detergent. For example, before surgical operations patients are washed by means of a sponge which is impregnated with disinfectant. Disinfectant and a sponge may, for example, be sent to the patient so that he can wash himself at home and present himself in a clean state for the operation. This has led to handling problems since the disinfectant is in liquid state and has to be transported in bottles and since the washing should be performed with a more or less sterile sponge.

It would therefore be desirable to produce a disinfectant-impregnated sponge in an airtight pack. In the case described above, however, this entails problems as large volumes of liquid are required to completely fill the sponge and bacterial growth will occur in the sponge during storage if the sponge is not completely filled with the disinfectant.

The object of the present invention is to provide a package containing a liquid-impregnated sponge by means of which this problem is eliminated and also to provide a method and a machine for manufacturing said package.

According to the present invention there is provided a package consisting of sheet material and containing a liquid-impregnated sponge, characterized in that the sponge is held under compression within said package and that the entire package including said compressed sponge is completely filled with liquid.

According to the invention there is also provided a method of manufacturing a liquid-impregnated sponge according to which the sponge is placed between two layers of sheet material which are tightly sealed around the sponge when this is in a compressed state and the fluid is applied to the sponge in such quantities as to at least completely fill the space enclosed by the layers of sheet material in the compressed state of the sponge.

The liquid may be injected into the sponge before the sponge is compressed, after which the sponge, which is positioned between the layers of sheet material, is compressed to a volume at which it is completely filled with fluid and the layers of sheet material are sealed around it.

A machine for manufacturing a package consisting of sheet material and containing a liquid-impregnated sponge according to the invention comprises a device for compressing the sponge and for sealing the two layers of sheet material between which the compressed sponge is positioned around the same, and a device for applying liquid to the sponge in such quantities as to at least fill the space enclosed by the layers of sheet material in the compressed state of the sponge.

In a preferred embodiment of the machine according to the invention, the device for compressing the sponge and sealing the layers of sheet material comprises a support device which supports a pressure plate, which is displacable against the sponge positioned between the two layers of sheet material for compressing the sponge, and a sealing jaw which is displacable against the layers of sheet material in a sealing zone surrounding the sponge.

The invention is described in the following with reference to the accompanying drawings.

Fig. 1 is a side view of a machine for manufacturing a package according to the invention.

Fig. 2 is a section of a detail of the machine shown in Fig. 1

Fig. 3 is a plan view of the machine shown in Fig. 1.

The machine shown in the drawings comprises a frame structure 2 having a working table 4. At one end of the working table 4 there is a conveyor belt 6 by means of which sponges 8, which consist of, for example, polyether, are fed to the working table 4. The frame structure 2 also supports an injection device 10 for injecting fluid into the sponges 8 and a feeding device 12 for transporting the sponges to the working table 4. The frame structure 2 also carries a support device 14 for a lower supply roll 16 of sheet material and a support device 18 for an upper supply roll 20 of sheet material. Strips 22 and 24 of sheet material are fed from the rolls 16 and 20. The sheet material preferably consist of aluminium foil having a plastic coating, although it is of course possible to use within the scope of the invention also other types of sheet material which can be sealed to form packaging material.

The machine according to the invention also comprises a pressing and sealing device consisting of an upper and a lower pressing and sealing jaw. The upper pressing and sealing jaw is shown on an enlarged scale in Fig. 2.

The machine also has a reverse stop device 28, a feeding device 30 and a cutting device 32.

The machine naturally also has the necessary driving device in the form of an electric motor.

During the operation of the machine sponges 8 are transported in a manner not shown to the conveyor belt 6 and are positioned on the conveyor belt at a suitable distance from one another. The conveyor belt 6 feeds the sponges 8 to the injection device 10 which injects a liquid, e g a detergent or disinfectant, in predetermine quantity into the sponges 8 by means of an injection tube 34. The quantity of liquid is adjusted so as to completely fill the packing space of the package which later leaves the machine.

The liquid-impregnated sponge is transported sideways by means of the feeding device 12 onto the lower strip of sheet material 22, which extends from the roll 16 over the working table 4. The strip of sheet material 22 is displaced to the left in Figs 1 and 3, whereupon the liquid-impregnated sponge is moved to a position below the upper strip of sheet material 24. Thus, the sponge is positioned between the strips of sheet material 22 and 24. When the strips of sheet material 22 and 24 are displaced to the left in Figs 1 and 3, the sponge arrives to the pressing and sealing device 26. In the pressing and sealing device 26 the sponge is compressed and the sheet material is sealed around the compressed sponge to form a thin pack containing the compressed, liquid detergent-impregnated sponge.

Fig. 2 is a section of the upper pressing and sealing device 26 on an enlarged scale in relation to Figs 1 and 3. The pressing and sealing device 26 comprises a support device 36 which, at its lower end, supports a plate 38. A sealing tool 42 is connected with the plate 38 by means of springs 40. The sealing tool is electrically heated in a manner not shown. The sealing tool 42 consists of a rectangular frame of somewhat larger internal dimensions than the sponge 8. A pressure plate 44 is supported by a rod 46 which is displacably positioned in the support device 36, a spring 48 being positioned between the pressure plate 44 and the plate 38 in order to position the pressure plate 44 at a greater distance from the plate 38 than the sealing tool 42 when the pressing and sealing device 26 is not operated.

When a sponge 8 arrives in position in the pressing and sealing device 26, the lower and upper parts thereof are moved against the strips 20 and 24 so as to

compress the sponge positioned between the strips. When the lower and upper par of the pressing and sealing device are moved, the pressure plates 44 initially engage the sheet material in order to compress the sponge positioned between th strips. As the parts of the pressing and sealing device continue to move toward the sponge, the plates 44 are continuously displaced so that the central openin of the sealing tools 42 receive the pressure plates 44 and the sealing tools 42 engage the sheet material in the zone outside the sponge. The sealing tools 42 provide that the upper and lower strips of sheet material 24 and 22 melt togeth in the sealing zone around the sponge.

When the parts of the pressing and sealing devices are subsequently removed fro the sponge, the pressure plates 44 continue to exert pressure on the sponge for short time after the sealing tools 42 have released their pressure on the sheet material. The time during which the pressure plates 44 exert pressure on the sp after the sealing tools 42 have released their pressure on the sheet material m have a duration of, for example, about 1.5 seconds. During this time the molten plastic in the strips of sheet material hardens so that the seam is able to res the forces exerted by the sponge in endeavouring to regain its original size. Thus, the pressure plates 44 do not release their pressure on the sponge until seam can resist the elastic forces exerted by the sponge. With the pressing and sealing device 26 shown and described, the correct time-course of the described compression and sealing process is automatically achieved.

The purpose of the reverse stop device 28 positioned after the pressing and sealing device 26 is to affix the strips of sheet material 24 and 22 during the pressing and sealing operation. During this operation, the reverse stop device grips the strip of packages which leaves the pressing and sealing device, there preventing it from being retracted, which would otherwise occur during compress

The feeding of the strips of sheet material 24 and 22 and the strip of packages which leaves the pressing and sealing device 26 is provided by means of the feeding device 30, which advances the strip of packages stepwise so that the sponges are successively carried to the correct position in the pressing and sealing device 26.

At the end of the working table 4 the individual packs are separated from each other by the cutting device 32, which cuts the strip of packages within the transverse part of the sealing zone.

By means of the described process and the illustrated and described machine, a package containing a compressed, liquid-impregnated sponge has been produced in which the package containing the sponge is of extremely small dimensions, whic facilitates transport and reduces transport costs, and in which the sponge, owing to the compression, can contain the correct volume of liquid so that the entire package is filled and no part of the sponge is free from liquid, thus preventing bacterial growth in the pack.

The invention can be modified within the scope of the following claims.

C L A I M S

1. A package consisting of sheet material and containing a liquid-impregnated sponge, c h a r a c t e r i z e d in that the sponge is held under compression within said package and that the entire package including said compressed sponge is completely filled with liquid.

2. A method of manufacturing a package containing a liquid-impregnated sponge or the like, c h a r a c t e r i z e d in that the sponge is positioned between two layers of sheet material which are tightly sealed around the compressed sponge and that the liquid is supplied to the sponge in such quantities as to at least fill the packing space enclosed by the layers of sheet material.

3. A method according to claim 2, c h a r a c t e r i z e d in that the liquid is supplied to the sponge before the sponge is compressed and that the sponge, impregnated with liquid, is compressed when being positioned between the layers of sheet material, which are then sealed around the sponge.

4. A method according to claim 2 or 3, c h a r a c t e r i z e d in that the sponge is kept compressed for a short time after the layers of sheet material have been sealed around it.

5. A method according to any one of claims 2-4, c h a r a c t e r i z e d in that several sponges are successively fed between two strips of sheet material, that the sealing around the sponges takes place while the strips are still connected with each other and that the sponges are finally separated from each other to form individual packages.

6. A machine for manufacturing a package consisting of sheet material and containing a liquid-impregnated sponge or the like in accordance with claim 1, c h a r a c t e r i z e d by a device for compressing the sponge and sealing the layers of sheet material around the compressed sponge positioned between two layers of sheet material, and a device for supplying liquid to the sponge in such quantities as to at least completely fill the packing space enclosed by the layers of sheet material.

7. A machine according to claim 6, c h a r a c t e r i z e d in that the device for compressing the sponge and sealing the layers of sheet material comprises a support device which supports a pressure plate displacable against

he sponge positioned between the layers of sheet material, so as to compress the ponge and a sealing jaw which is displacable against the layers of sheet material n a sealing zone surrounding the sponge.

.. A machine according to claim 6, c h a r a c t e r i z e d in that the ressure plate is supported by the support device in such a way that when the upport device moves towards the package the pressure plate engages the package o as to compress the sponge before the sealing jaw engages the layers of sheet aterial in the sealing zone, and that the pressure plate is displacable in elation to the support device and is loaded by means of springs.

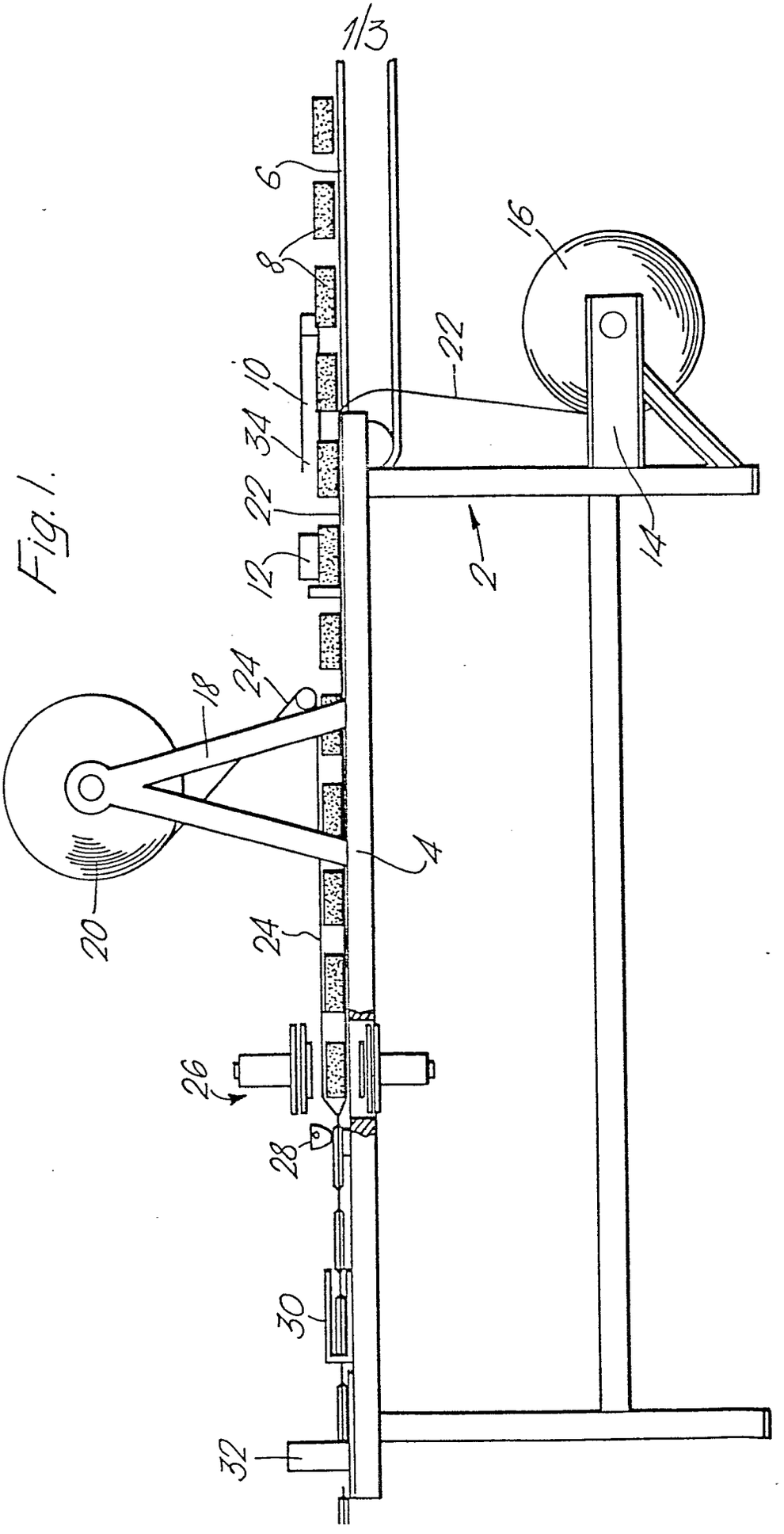
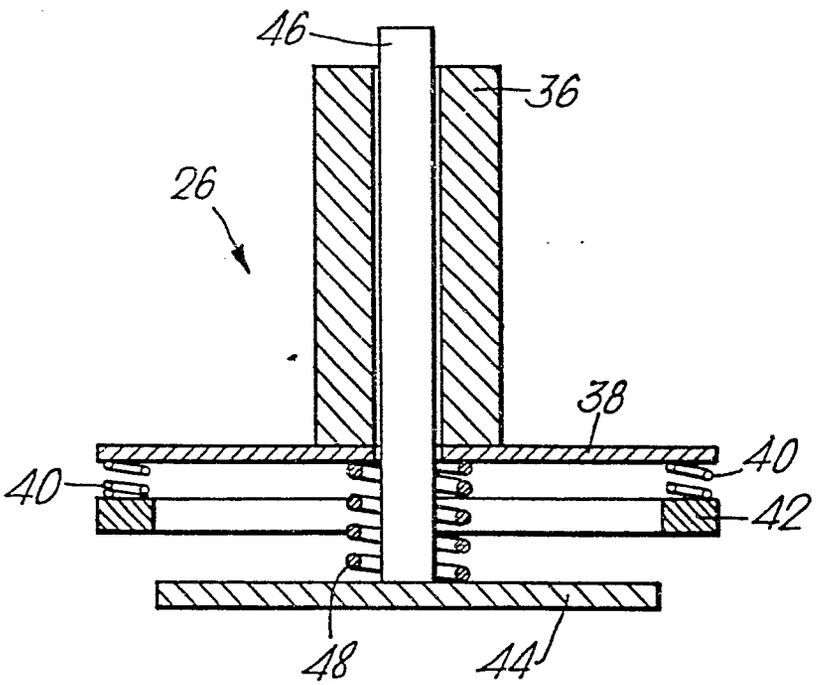


Fig. 1.

Fig. 2.



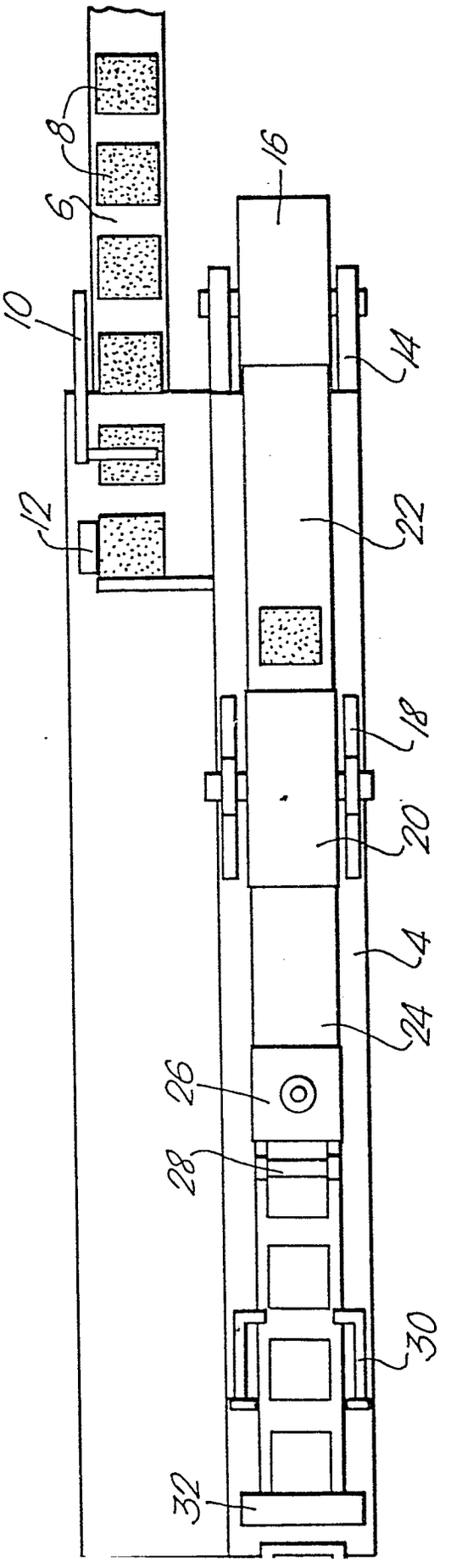


Fig. 3.

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EUROPEAN SEARCH REPORT

0046739
Application number
EP 81850132.2

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	DE - A1 - 2 436 504 (LA MULTI-SPUGNA)	1
A	DE - C -960 036 (LEIDNER)	1
A	DE - B - 1 164 920 (KUSTNER FRERES)	6-8
A	US - A - 2 232 783 (HAUSHEER)	2-8
A	US - A - 3 688 465 (BENITEZ)	6

CLASSIFICATION OF THE APPLICATION (Int. Cl.)

B 65 B 9/02
B 65 D 81/22

TECHNICAL FIELDS SEARCHED (Int. Cl.)

B 65 D 75/00
B 65 D 81/00
B 65 B 9/00
B 65 B 11/00
B 65 B 51/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
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T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	11-11-1981	MELZER

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