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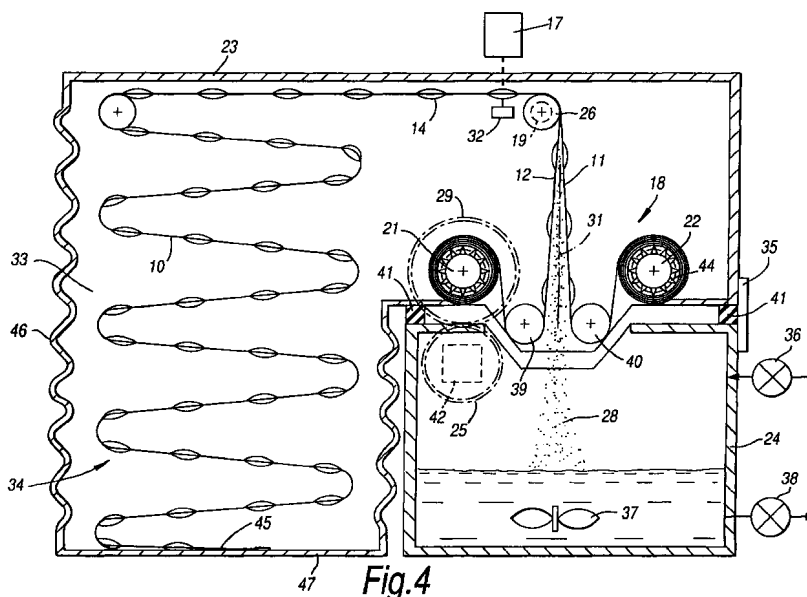
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(54) **Apparatus for progressively dispensing product**

(57) Packaging comprises a ribbon (10) formed of two sheets (11,12) in face-to-face relationship sealed together at selected locations (13) to define a plurality of closed pockets (14) therebetween. Product (28) is retained in the pockets (14). The pockets (14) may be arranged in two or more lines (15, 16) extending in the longitudinal direction of the ribbon (10). The apparatus comprises guide means (26) for guiding the ribbon along a guide path (31) to a sheet peeling device (18). Sheet take-up means (21, 22) are carried in a ribbon store (23) having a space (33) for accommodating a

supply (34) of the packaging ribbon (10). A drive device (25) is carried in a receiver (24) positioned below the sheet take-up means (21, 22). Product (28) dispensed from the packaging ribbon (10) falls into the receiver (24). The drive device (25) is releasably engageable with the sheet take-up means (21, 22) to enable the ribbon store (23) and the receiver (24) to be separated from each other. Controlled amounts of product are thereby dispensed in a convenient and an environmentally friendly manner.



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Description

FIELD OF THE INVENTION

[0001] The present invention relates to an apparatus for progressively dispensing product from packaging, especially where the product is a photographic material processing composition.

BACKGROUND OF INVENTION

[0002] There are a number of widely used processes which involve the repeated supply of a product in powder or liquid form to a processing apparatus. For example, photographic processing chemicals may be supplied in powder or liquid concentrate form to be dissolved, dispersed or diluted in water before use. Such chemicals are often supplied in canisters, in bottles or in flexible material bags, especially polyethylene bags, of various sizes.

[0003] With existing mixing devices, the operator simply cuts open the bag and pours the contents into the mixer. This action results in dust and/or mist being expelled which is inconvenient for the user. Dust and mist can be reduced where the bag is of a sufficient length to hang over the upper edge of a mixer housing with its open end below the level of liquid therein. A drawback of this solution is that when a user takes the emptied bag out of the mixer, the bag is wet due to the contact with the wet chemistry in the mixer.

[0004] One solution proposed is for the product to be contained in a sealed collapsible container which is up-ended over the mouth of a mixer housing, a device for opening the seal of the container being provided adjacent the neck of the housing. While such a proposal is environmentally friendly, only large amounts of product can be dispensed at a time, unless the collapsible containers are small when frequent attention from the operator becomes necessary. To accurately control the composition of processing liquids, it is important to be able to dispense relatively small amounts of product to the mixer.

[0005] It is known, for example from United States patent specification US-A-5 452 045 (Koboshi et al. / Konica) to provide products, for use in photographic processes, in the form of packaging comprising a ribbon formed of two sheets in face-to-face relationship sealed together at selected locations to define a plurality of closed pockets therebetween, product being retained in the pockets.

OBJECTS OF INVENTION

[0006] It is an object of the present invention to dispense controlled amounts of product in a convenient and an environmentally friendly manner.

SUMMARY OF THE INVENTION

[0007] According to a first aspect of the invention, there is provided an apparatus for progressively dispensing product from packaging comprising a ribbon formed of two sheets in face-to-face relationship sealed together at selected locations to define a plurality of closed pockets therebetween, product being retained in the pockets, the apparatus comprising guide means for guiding the ribbon along a guide path to a sheet peeling device, wherein said sheet peeling device comprises sheet take-up means carried in a ribbon store having a space for accommodating a supply of packaging ribbon from which product is to be progressively dispensed and a drive device carried in a receiver positioned below the sheet take-up means whereby product dispensed from the packaging ribbon falls into the receiver, the drive device being releasably engageable with the sheet take-up means to enable the ribbon store and the receiver to be separated from each other.

[0008] The apparatus may further comprise counting means for counting the number of pockets opened by the peeling device. The counting means may comprise a detector for sensing identification marks on the packaging and means for totalling the number of the identification marks sensed by the detector. Alternatively, the counting means may comprise means for measuring the length of packaging ribbon fed to the peeling device, for example an encoder carried on a guide roller over which the ribbon passes.

[0009] The peeling device may comprise a pair of rotatable members, such as rollers, positioned one on either side of the guide path, each adapted to take up one of the sheets of flexible material. The rollers may have sprocket teeth positioned to engage sprocket holes in a leading end portion of the ribbon. Alternatively, the ribbon may be secured to the rollers, for example by adhesive.

[0010] There may be provided means for releasably coupling the ribbon store and the receiver to each other in a closed manner. In this arrangement, after all the stored ribbon has been peeled apart to dispense the product into the receiver, the ribbon store may be removed and replaced with another of similar construction.

[0011] In a preferred embodiment of the invention, the apparatus comprises two or more ribbon stores coupled to a common receiver. When the ribbon contained in one ribbon store is used up, the dispensing of product from the ribbon in the other ribbon store may begin, and continue while the first ribbon store is replaced. In this way, continuous dispensing of product into the receiver can be achieved.

[0012] In a possible embodiment of the invention, the ribbon is attached, adjacent its downstream end, to a wall of the ribbon store, the ribbon store having a collapsible portion which is caused to collapse as the ribbon is progressively fed along the guide path.

[0013] The receiver may be a mixer, having a dosing device for introducing measured quantities of liquid into the mixer, means for mixing the liquid with product dispensed from the packaging, and an outlet for discharging the mixture of liquid and product.

[0014] The sheet material from which the ribbon is formed is preferably a flexible material, for example formed of a metal foil such as aluminium, a polymer mono-material such as polyethylene, polypropylene (optionally containing polybutylene particles) or a complex material having more than one layer such as polyethyleneterephthalate/polyethylene, polyamide/polyethylene, or paper/aluminium/polyethylene. Where the product is a powder, the sheet material is preferably provided with an anti-static coating. The two sheets are preferably separate. This gives a construction which is more convenient to peel apart than where the two sheets are formed by folding over a single sheet, since the latter arrangement results in a folded edge along one side of the ribbon. Where the product is light sensitive, the sheet material may include a suitable light filter. The two sheets may be sealed together by a variety of methods known in the art including heat and pressure sealing and the use of suitable adhesives. The size of the locations where such sealing is made influences the forces necessary to peel the packaging apart. Preferably, the packaging is constructed in such a manner that, when the sheets are peeled apart, the integrity of the sheets remains intact. In this way the peeled apart sheets can be conveniently removed, without risk of some polymer material falling into the mixer or other device into which the product is dispensed. This integrity can be achieved where each sheet comprises two or more co-extruded layers of polymer material, the inner layer (as considered in the assembled packaging) having a lower level of purity than the outer layer. Such peelable sheet materials are commercially available, for example from BISCHOF & KLEIN.

[0015] The pockets are preferably so shaped as to have substantially no edges extending at right angles to the longitudinal direction of the ribbon. This arrangement ensures that the force needed to pull the two sheets apart remains substantially constant. An elliptical, diamond or hexagonal shape with a major axis extending substantially in the longitudinal direction of the ribbon may be used.

[0016] The invention is of particular benefit where the product is in powder or liquid form. The product is preferably a photographic material processing composition, preferably selected from developing compositions, fixing compositions, activator, stabilisers, biocides and combinations thereof.

[0017] The pockets may be arranged in a line extending in the longitudinal direction of the ribbon. Where the pockets are all of the same size, the same quantity of product may be contained therein, enabling the dispensing of controlled relatively small amounts of product. Thus it is preferred that at least the majority of

the pockets contain identical amounts of product of identical composition.

[0018] It is sometimes required that two different products need to be dispensed simultaneously, in a fixed ratio. While two packaging ribbons can be used, according to a second aspect the invention provides packaging comprising a ribbon formed of two sheets in face-to-face relationship sealed together at selected locations to define a plurality of closed pockets therebetween, product being retained in the pockets, the sheets being secured together in such a manner as to be capable of being peeled apart to progressively release the product from the pockets, characterised in that the pockets are arranged in a plurality of lines extending in the longitudinal direction of the ribbon.

[0019] The pockets of one line can be of a first size, while the pockets of another line are of a second size. Thus in this arrangement it is preferred that at least the majority of the pockets in one of the lines contain identical first amounts of product of a first composition, while at least the majority of the pockets in another line contain identical second amounts of product of a second composition.

[0020] Whether the pockets are arranged in a single line or in a plurality of lines, some of the pockets, for example one or more pockets located adjacent a leading end portion of the ribbon, may contain a product different to that contained in other pockets. The pockets adjacent the leading end portion of the ribbon may contain "start-up" chemistry having a composition different from that contained in the other pockets, which constitute "top-up" chemistry. In a similar manner, some of the pockets may contain compositions which constitute "cleaning" chemistry.

DETAILED DESCRIPTION OF THE INVENTION

[0021] The invention will be described by the following illustrative embodiments with reference to the accompanying drawings without the intention to limit the invention thereto, and in which:

Figure 1 is a plan view of a packaging ribbon according to a first embodiment of the invention;

Figure 2 is a longitudinal cross section taken through the packaging ribbon shown in Figure 1;

Figure 3 is a plan view of a packaging ribbon according to a second embodiment of the invention; and

Figure 4 is a schematic view of an apparatus for dispensing product from the packaging ribbons shown in Figures 1 to 3.

[0022] As shown in the drawings a packaging includes a ribbon 10 formed of two sheets 11, 12 of flex-

ible material in face-to-face relationship. The two sheets 11, 12 are sealed together at selected locations 13 to define a plurality of closed pockets 14 therebetween, product 28 in powder or liquid form being retained in the pockets 14. The sheets 11,12 are secured together in such a manner as to be capable of being peeled apart to progressively release the product 28 from the pockets 14.

[0023] In the embodiment shown in Figures 1 and 2, the pockets 14 are arranged in a single line 15 extending in the longitudinal direction of the ribbon 10. The majority of the pockets 14 contain identical amounts of a product A2, of identical composition. One pocket located adjacent a leading end portion 30 of the ribbon 10 contains a product A1 constituting start-up chemistry, having a composition different to that A2 contained in others of the pockets and constituting top-up chemistry. The leading end portion 30 of the ribbon 10 does not include any locations where the sheets 11, 12 are sealed together. Thus the two sheets are free from each other at this end. Sprocket holes 43 are formed along the edges of the sheets 11, 12 in this leading end portion 30.

[0024] In the embodiment shown in Figure 3, the pockets 14 are arranged in two lines 15, 16 extending in the longitudinal direction of the ribbon 10. The majority of the pockets 14 in the line 15 contain identical first amounts of product A2 of a first composition, while the majority of the pockets 14 in the other line 16 contain identical second amounts of product B2 of a second composition. The pair of pockets located adjacent a leading end portion 30 of the ribbon 10 contain start-up compositions A1, B1 different to the top-up compositions A2, B2 contained in the other pockets.

[0025] The pockets 14 have edges 27 which extend generally in the longitudinal direction of the ribbon 10 or obliquely thereto. The pockets are thereby so shaped as to have substantially no edges extending at right angles to the longitudinal direction.

[0026] As shown in Figure 4, an apparatus for progressively dispensing product from the packaging shown in Figures 1 to 3 includes a sheet peeling device 18 and a first guide roller 26 for guiding the packaging along a guide path 31 to the sheet peeling device 18. The peeling device 18 includes a pair of rotatable rollers 21, 22 positioned one on either side of the guide path 31, each adapted to take up one of the sheets 11,12 of flexible material after passing over a respective one of two further guide rollers 39, 40. The rollers 21, 22 carry retractable sprocket teeth 44 which engage the sprocket holes 43 in the leading end portion 30 of the ribbon 10, to assist in the taking up of the sheets 11, 12 by the rollers 21, 22. The rotatable rollers 21, 22 are carried in a first housing part in the form of a packaging ribbon store 23 having a space 33 for accommodating a supply 34 of packaging ribbon 10 from which product 28 is to be progressively dispensed. The rotatable roller 21 is coupled to a gear 29. The further guide rollers 39, 40 can also be

carried in the ribbon store 23.

[0027] A receiver in the form of a mixer 24 carries a drive motor 42 coupled to a drive gear 25 which meshes with the gear 29 to rotate the rotatable rollers 21, 22 in a sheet peeling direction. Roller 21 is coupled to roller 22 by means of a belt or one or more gears (not shown). A catch mechanism 35 is provided for releasably coupling the packaging ribbon store 23 and the mixer 24 to each other. Seals 41 positioned between the packaging ribbon store 23 and the mixer 24 ensure that the two parts are coupled together in a closed manner, preventing the escape of dust and/or mist from the dispensed product 28. The drive gear 25 is releasably engageable with the rotatable rollers 21, 22 to enable the packaging ribbon store 23 and the mixer 24 to be separated from each other.

[0028] The mixer 24 is positioned below the rotatable rollers 21, 22 whereby product 28 dispensed from the packaging ribbon 10 falls into the mixer 24. The mixer 24 has a dosing device 36 for introducing measured quantities of water into the mixer, an agitator 37 for mixing the liquid with product 28 dispensed from the packaging, and an outlet 38 for discharging the mixture of liquid and product.

[0029] A detector 32 is positioned adjacent the guide path 31 upstream of the peeling device 18 and senses identification marks 20 on the packaging as it passes. A counter 17 totals the number of the identification marks 20 sensed by the detector 32. The detector thus serves to count the number of pockets 14 opened by the peeling device 18. An encoder 19, coupled to the guide roller 26, serves to measure the length of packaging ribbon 10 fed to the peeling device 18 and thereby also serves to count the number of pockets 14 opened by the peeling device 18.

[0030] The ribbon store 23 has a collapsible portion 46. The ribbon 10 is attached, adjacent its downstream end 45, to a remote wall 47 of the collapsible portion 46 of the ribbon store 23, so that the collapsible portion 46 is caused to collapse as the ribbon in the store 23 is progressively fed along the guide path 31.

[0031] Then all the ribbon 10 loaded in the store 23 has been peeled apart to dispense the product into the mixer 24 and the sheets 11,12 are fully wound around the rollers 21, 22, the store 23 may be removed and replaced with another of similar construction. To avoid the need for the operator to feed the leading end portion 30 of the ribbon 10 from the new ribbon store around the guide rollers 39, 40 and into engagement with the rollers 21, 22, the ribbon store 23 may be supplied with the leading end portions already in position. The operator need then merely place the ribbon store 23 in position relative to the mixer 24, to ensure that the drive gear 25 meshes with the gear 29. Operation of the motor 42 will then immediately cause dispensing of the product to commence.

[0032] By retracting the sprocket teeth 44 on the rollers 21, 22 the wound sheet material can be simply

removed therefrom and disposed of intelligently.

Reference Number List

[0033]

ribbon 10
 sheets 11,12
 locations 13
 pockets 14
 lines 15, 16
 counter 17
 sheet peeling device 18
 encoder 19
 identification marks 20
 rotatable rollers 21, 22
 ribbon store 23
 mixer 24
 drive gear 25
 first guide roller 26
 edges 27
 product 28
 end portion 30
 guide path 31
 detector 32
 space 33
 supply 34
 catch mechanism 35
 dosing device 36
 agitator 37
 outlet 38
 further guide rollers 39, 40
 Seals 41
 drive motor 42
 Sprocket holes 43
 sprocket teeth 44
 downstream end (45)
 collapsible portion (46)
 wall (47)
 start-up product A1, B1
 top-up product A2, B2

Claims

1. An apparatus for progressively dispensing product from packaging comprising a ribbon (10) formed of two sheets (11,12) in face-to-face relationship sealed together at selected locations (13) to define a plurality of closed pockets (14) therebetween, product (28) being retained in said pockets (14), said apparatus comprising guide means (26) for guiding said packaging along a guide path (31) to a sheet peeling device (18), wherein said sheet peeling device comprises sheet take-up means (21, 22) carried in a ribbon store (23) having a space (33) for accommodating a supply (34) of packaging ribbon (10) from which product (28) is to be progressively dispensed, and a drive device (25) carried in a

receiver (24) positioned below said sheet take-up means (21, 22) whereby product (28) dispensed from said packaging ribbon (10) falls into said receiver (24), said drive device (25) being releasably engageable with said sheet take-up means (21, 22) to enable said ribbon store (23) and said receiver (24) to be separated from each other.

2. An apparatus according to claim 1, wherein said sheet take-up means comprises a pair of sheet take-up members (21, 22) positioned one on either side of said guide path (31), each adapted to take up one of said sheets (11,12) of flexible material.
3. An apparatus according to claim 2, wherein said sheet take-up members comprise rollers (21, 22) having sprocket teeth (44) positioned to engage sprocket holes (43) in a leading end portion (30) of said ribbon (10).
4. An apparatus according to any preceding claim, further comprising means (35) for releasably coupling said ribbon store (23) and said receiver (24) to each other in a closed manner.
5. An apparatus according to any preceding claim, wherein said receiver (24) is a mixer, having a dosing device (36) for introducing measured quantities of liquid into the mixer, means (37) for mixing said liquid with product (28) dispensed from said packaging, and an outlet (38) for discharging the mixture of liquid and product (28).
6. An apparatus according to any preceding claim, comprising a plurality of said ribbon stores coupled to a common said receiver, enabling continuous dispensing of product into said receiver to be achieved.
7. An apparatus according to Claim 1, wherein said ribbon (10) is attached, adjacent its downstream end (45), to a wall (47) of said ribbon store (23), said ribbon store (23) having a collapsible portion (46) which is caused to collapse as said ribbon is progressively fed along said guide path (31).

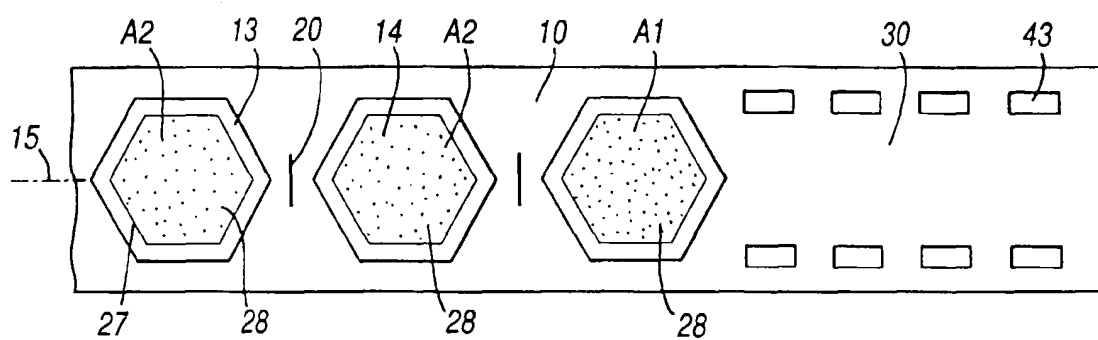


Fig. 1

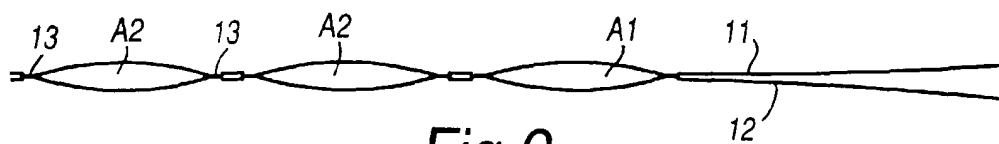


Fig. 2

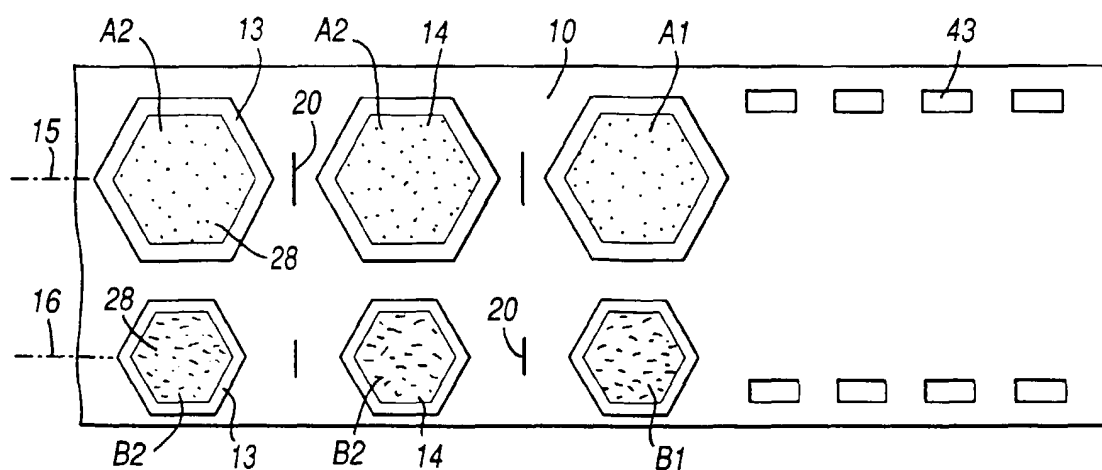


Fig. 3

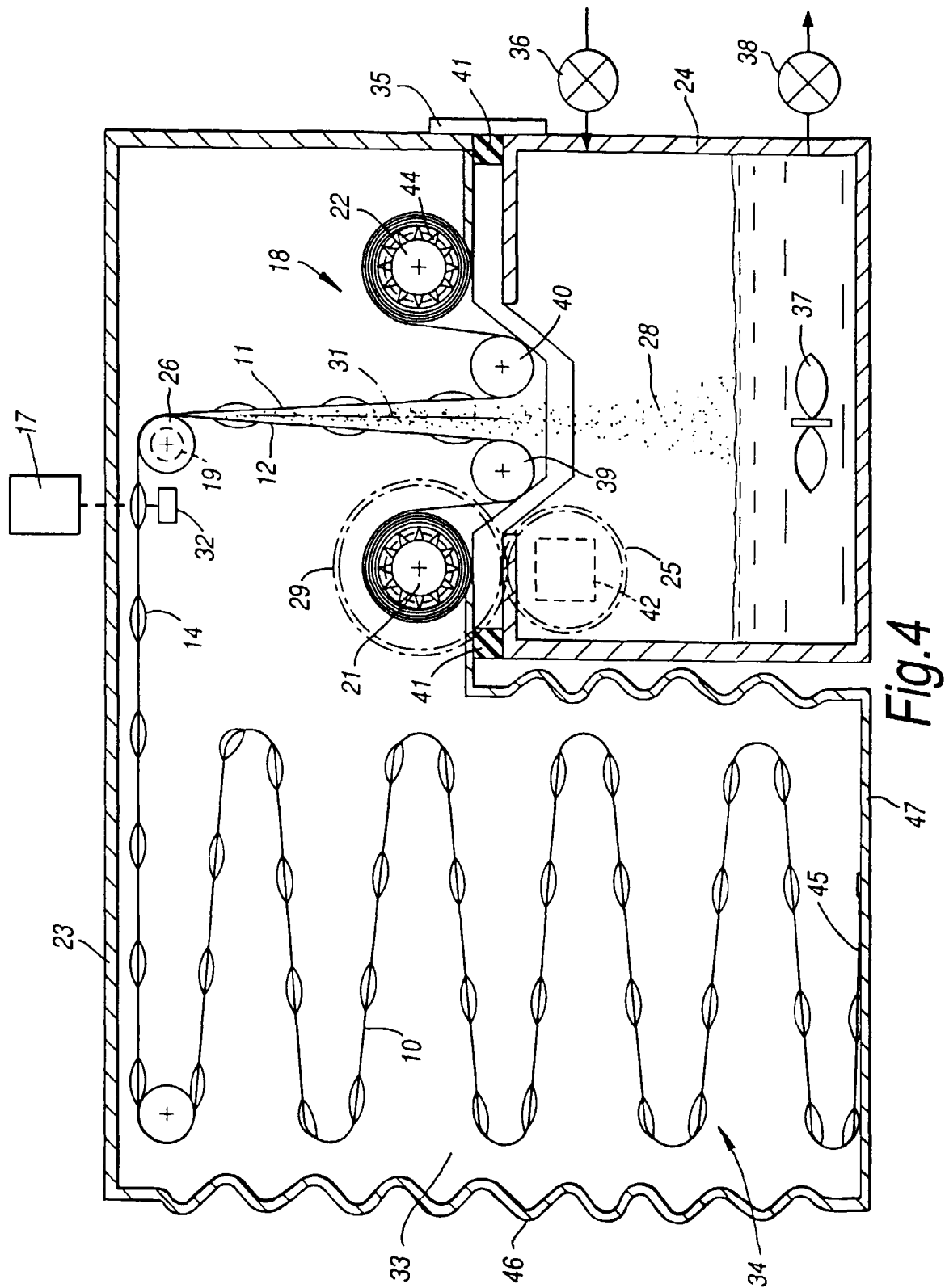


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 3607

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B01F G03C B01J A47J G03D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 April 1999	Examiner Labeeuw, R
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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