(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 090 647**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **83301765.0**

(22) Date of filing: **29.03.83**

(51) Int. Cl.³: **C 11 D 13/10**, C 11 D 13/08

(30) Priority: **29.03.82 GB 8209153**

(43) Date of publication of application: **05.10.83**
Bulletin 83/40

(84) Designated Contracting States: **AT BE CH DE FR IT LI NL SE**

(71) Applicant: **UNILEVER NV, Burgemeester s'Jacobplein 1 P.O. Box 760, NL-3000 DK Rotterdam (NL)**

(72) Inventor: **Clarke, Terence Allan, 2 Norbury Close Bebington, Wirral Merseyside (GB)**
Inventor: **Edwards, Richard Barrie, Treeview Cedar Way Gayton, Wirral Merseyside (GB)**
Inventor: **Irving, Graeme Neil. 14 Kirket Close Bebington, Wirral Merseyside (GB)**

(74) Representative: **Roscoe, Brian Corrie et al, UNILEVER PLC Patents Division P.O. Box 68 Unilever House, London EC4P 4BQ (GB)**

(54) **Detergent bar processing.**

(57) A volatile component, for example a perfume, is mixed with a soap-containing formulation by passing the admixed volatile component and formulation between two mutually displaceable surfaces which work the mixture. The device is enclosed and provides efficient temperature control.

EP 0 090 647 A1

B.709

TITLE : DETERGENT BAR PROCESSING

Field of the Invention

This invention relates to the processing of soap feedstocks to introduce volatile components, for example perfumes.

Background to the Invention

When processing soap feedstocks a usual requirement is to introduce a perfume to provide a fragrance for the product. It may also be desirable for some products to incorporate another class of volatile material, eg a solvent during processing. The efficiency of incorporation will depend on a number of factors including processing temperatures, and times, and communication with the atmosphere.

General description

It has been found a cavity transfer mixer provides an efficient route for incorporation because the processing temperatures are maintained, in general, below those usually encountered in soap processing. The processing time is low and the mixing occurs in an enclosed volume. The energy required will normally be lower than that required in conventional processes.

The present invention uses a device of the cavity transfer mixer class to introduce a volatile component into the soap base. These devices comprise two closely spaced mutually displaceable surfaces each having a pattern of cavities which overlap during movement of surfaces so that material moved between the surfaces traces a path through cavities alternately in each surface so that the bulk of the material passes through the shear zone in the material generated by displacement of the surfaces.

Cavity transfer mixers are normally prepared with a cylindrical geometry and in the preferred devices for this process the cavities are arranged to give constantly available but changing ways path through the device during mutual movement of the two surfaces. The devices having a cylindrical geometry will comprise a stator within which is journalled a rotor; the opposing faces of the stator and rotor carry the cavities through which the material passes during its passage through the device.

The temperature of processing is preferably from about 30°C to about 55°C, more preferably below about 40°C.

The device may also have a planar geometry in which opposed plane surfaces having patterns of cavities would be moved mutually, for example by rotation of one plane, so that material introduced between the surfaces at the point of rotation would move outwards and travel alternately between cavities on each surface.

Another form of cylindrical geometry maintains the inner cylinder stationary while rotating the outer cylinder. The central stator is more easily cooled, or heated if required, because the fluid connections can be made in a simple manner; the external rotor can also be

cooled or heated in a simple manner. It is also mechanically simpler to apply rotational energy to the external body rather than the internal cylinder. Thus this configuration has advantages in construction and use.

Material is forced through the mixer using auxilliary equipment as the rotor is turned. Examples of the auxilliary equipment are screw extruders and piston rams. The auxiliary equipment is preferably operated separately from the mixer so that the throughput and work performed on it can be separately varied. The separate operation may be achieved by arranging the auxiliary equipment to provide material for processing at an angle to the centre line of the shear-producing device. This arrangement allows rotational energy to be supplied to the device producing shear around its centre line. An in-line arrangement is more easily achieved when the external member of the device is the rotor. Separate operation of the device and auxiliary equipment assists in providing control of the processing.

In general a variety of cavity shapes can be used, for example Metal Box (UK 930 339) disclose longitudinal slots in the two surfaces. The stator and rotor may carry slots, for example six to twelve, spaced around their periphery and extending along their whole length.

Preferably one or both surfaces are subjected to thermal control. The process allows efficient heating /cooling of the materials to be achieved.

The detergent feedstock may contain non-soap detergents in amounts which would not interfere with the desired effect. Examples of these actives are alkane sulphonates, alcohol sulphates, alkyl benzene sulphonates,

alkyl sulphates, acyl isethionates, olefin sulphonates and ethoxylated alcohols.

The processed feedstock was made into bar form using standard stamping machinery. Other product forms, eg extruded particles (noodles) and beads can be prepared from the feedstock.

Drawings:

The invention will be described with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a longitudinal section of a cavity transfer mixer with cylindrical geometry;

Figure 2 is a transverse section along the line II-II on Figure 1;

Figure 3 illustrates the pattern of cavities in the device of Figure 1;

Figures 4, 5 and 7 illustrate other patterns of cavities;

Figure 6 is a transverse section through a mixer having grooves in the opposed surfaces of the device;

Figure 8 is a longitudinal section of a cavity transfer mixer in which the external cylinder forms the rotor;

Specific description of devices

Embodiments of the devices will now be described.

A cavity transfer mixer is shown in Figure 1 in longitudinal section. This comprises a hollow cylindrical stator member 1, a cylindrical rotor member 2 journalled for rotation within the stator with a sliding fit, the facing cylindrical surfaces of the rotor and stator carrying respective pluralities of parallel, circumferentially extending rows of cavities which are disposed with:

a) the cavities in adjacent rows on the stator circumferentially offset;

b) the cavities in adjacent rows on the rotor circumferentially offset; and

c) the rows of cavities on the stator and rotor axially offset.

The pattern of cavities carried on the stator 3 and rotor 4 are illustrated on Figure 3. The cavities 3 on the stator are shown hatched. The overlap between patterns of cavities 3, 4 is also shown in Figure 2. A liquid jacket 1A is provided for the application of temperature control by the passage of heating or cooling water. A temperature control conduit 2A is provided in the rotor.

The material passing through the device moves through the cavities alternately on the opposing faces of the stator and rotor. The cavities immediately behind those shown in section are indicated by dotted profiles on Figure 1 to allow the repeating pattern to be seen.

The material flow is divided between pairs of adjacent cavities on the same rotor or stator face because of the overlapping position of the cavity on the opposite stator or rotor face.

The whole or bulk of the material flow is subjected to considerable working during its passage through the shear zone generated by the mutual displacement of the stator and rotor surfaces. The material is entrained for a short period in each cavity during passage and thus one of its velocity components is altered.

The mixer had a rotor radius of 2.54 cm with 36 hemispherical cavities (radius 0.9 cm) arranged in six rows of six cavities. The internal surface of the stator carried seven rows of six cavities to provide cavity overlap at the entry and exit. The material to be worked was injected into the device through channel 5, which communicates with the annular space between the rotor and stator, during operation by a screw extruder. The material left the device through nozzle 6.

Figure 4 shows elongate cavities arranged in a square pattern; these cavities have the sectional profile of Figure 2. These cavities are aligned with their longitudinal axis parallel to the longitudinal axis of the device and the direction of movement of material through the device; the latter is indicated by the arrow.

Figure 5 shows a pattern of cavities having the dimensions and profile of those shown in Figures 1, 2 and 3. The cavities of Figure 5 are arranged in a square pattern with each cavity being closely spaced from flow adjacent cavities on the same surface. This pattern does not provide as high a degree of overlap as given by the pattern of Figure 3. The latter has each cavity closely

spaced to six cavities on the same surface, ie a hexagonal pattern.

Figure 6 is a section of a cavity transfer mixer having a rotor 7 rotatably positioned within the hollow stator 8 having an effective length of 10.7 cm and a diameter of 2.54 cm. The rotor carried five parallel grooves 9 of semi-circular cross section (diameter 5 mm) equally spaced around the periphery and extending parallel to the longitudinal axis along the length of the rotor. The inner cylindrical surface of the stator 8 carried eight grooves 10 of similar dimensions extending along its length and parallel to the longitudinal axis. This embodiment, utilised cavities extending along the length of the stator and rotor without interruption. Temperature control jacket and conduit were present.

Figure 7 shows a pattern of cavities wherein the cavities on the rotor, shown hatched, and stator have a larger dimension normal to the material flow; the latter is indicated by an arrow. The cavities are thus elongate. This embodiment provides a lower pressure drop over its length compared with devices of similar geometry but not having cavities positioned with a longer dimension normal, i.e. perpendicular to the material flow. To obtain a reduction in pressure drop at least one of the surfaces must carry elongate cavities having their longer dimension normal to the material flow.

The cavity transfer mixer of Figure 8 had the external cylinder 11 journalled for rotation about central shaft 12. Temperature control jacket 13 and conduit were present but the latter is now shown because the cavities on the central shaft are shown in plan view while the rotor is sectioned. The central stator (diameter 52 mm) had three rows 14 of three cavities with partial, i.e. half cavities

at the entry and exit points. On the rotor there were four rows 15 of three cavities. The cavities on the stator and rotor were elongate with a total arc dimension of 5.1 cm normal to the material flow with hemispherical section ends of 1.2 cm radius joined by a semicircular sectioned panel of the same radius. The cavities were arranged in the pattern of Figure 7, i.e. with their long dimension normal to material flow. The rotor was driven by a chain drive to external toothed wheel 16.

Examples of the process of the invention will now be given.

Example I

The mixer used the cavity pattern of Figure 3 and had a rotor radius of 2.54cm with 36 hemispherical cavities (radius 0.9cm) arranged in six rows of six cavities. The internal surface of the stator carried seven rows of six cavities to provide cavity overlap at the entry and exit.

A tallow/coconut superfat feedstock (60/40/7½) was prepared. 2-phenylethanol (1.0%) was added to this base in a ribbon mixer to coat the noodles with this volatile material. The base was divided with the first half being treated in the cavity transfer extruder with the aid of a soap plodder and the second being subjected to conventional treatment. Tablets were stamped and analysed by gas chromatography of the head space. Results showed less of the volatile component was lost by the cavity transfer mixer route.

Example II

A tallow/coconut (80/20) soap with a glycerol content of 1.25% was used as base. Limonene (1.5% on base) was added to a sample of soap in chip form and conventionally processed.

A second sample was mixed with the same quantity of limonene and passed through a device of Figure 1 having cavities of diameter 2.4 cm arranged with six cavities in a circumferential circle. The stator carried four complete cavities and the rotor three complete cavities with two half cavities at each end. The soap temperature was 25°C input and 35°C at exit with cooling applied to the stator and rotor. The throughput was 400 g/minute from a soap plodder with the rotor operated at 35 r.p.m.

Using headspace analysis with a gas chromatograph it was found the conventional processed soap retained 60% of original perfume and the soap mixed according to the invention retained 75%.

What we claim is:

1. The process of introducing a volatile material into a soap-containing detergent material in which the soap-containing material and volatile material are mixed by passing the materials in admixture between two closely spaced mutually displaceable surfaces each having a pattern of cavities which overlap during movement of the surfaces so that the material moved between the surfaces traces a path through cavities alternately in each surface, whereby the bulk of the material passes through the shear zone in the material generated by displacement of the surfaces.

2. A process according to Claim 1 wherein the two surfaces have cylindrical geometry.

3. A process according to Claim 1 or 2 wherein thermal control is applied to at least one surface.

4. A process according to any preceding claim wherein the cavities in at least one surface are elongate with their long dimension normal to the flow of material.

5. A process according to any preceding claim wherein the temperature of the soap-containing formulation during processing is in the range from about 30°C to about 55°C.

6. A process according to any preceding claim wherein the volatile material is a perfume.

***

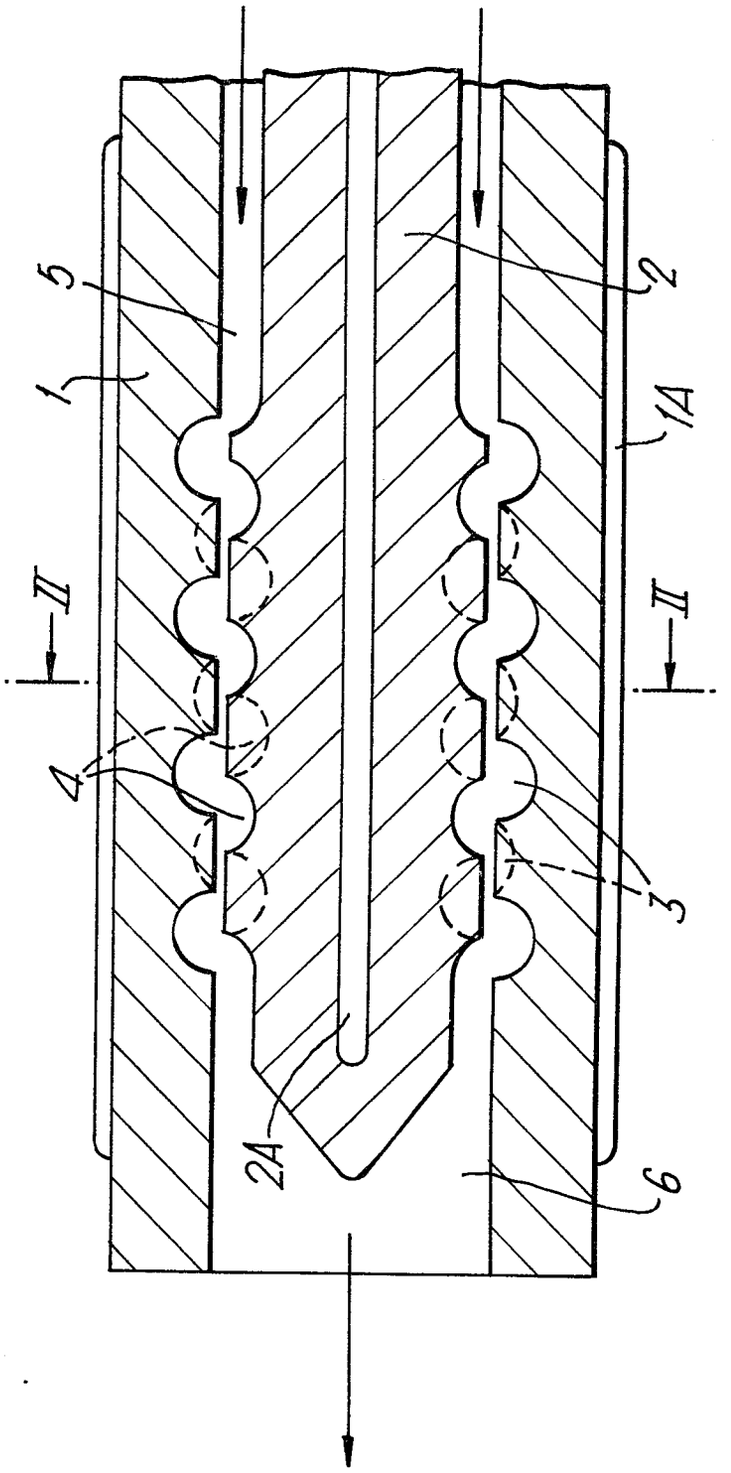


Fig. 1.

0090647

Fig.2.

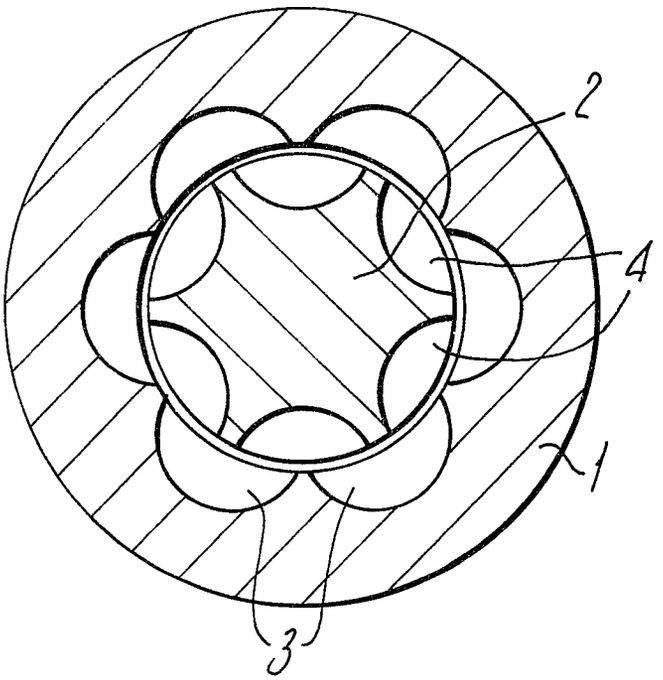


Fig.3.

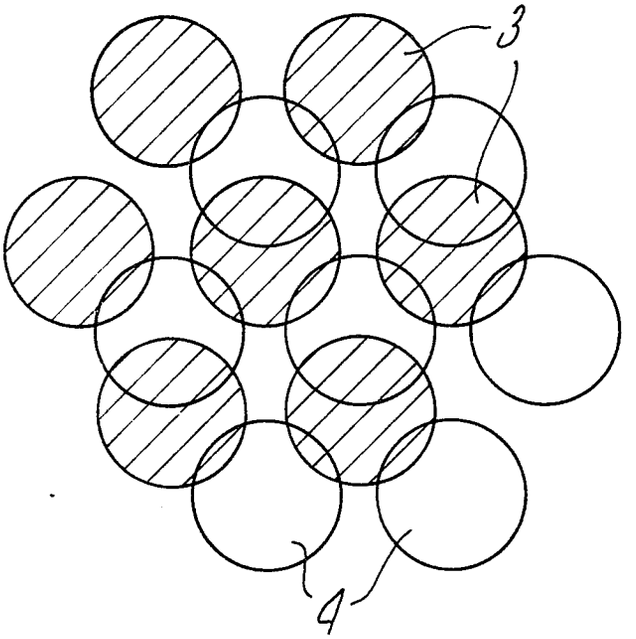


Fig. 4.

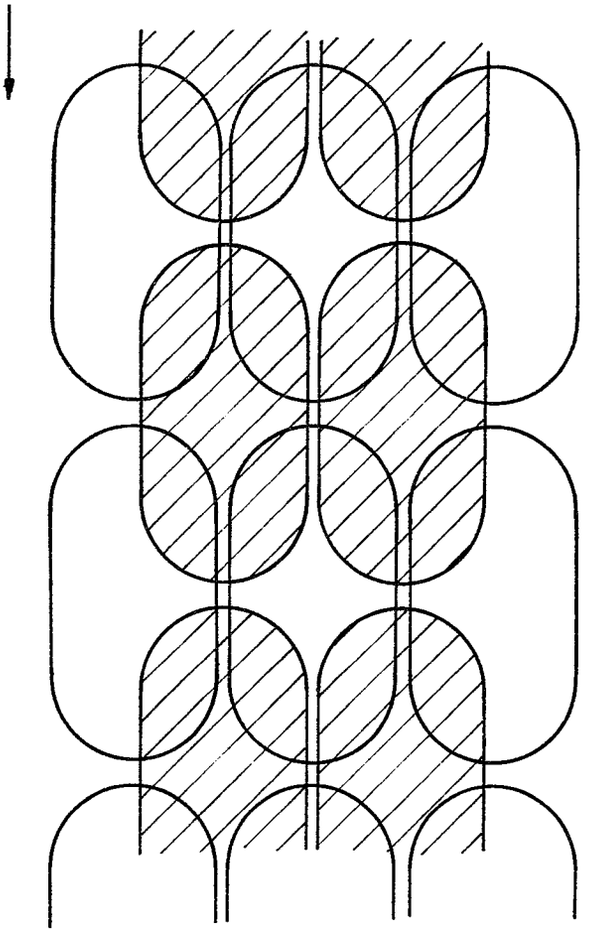
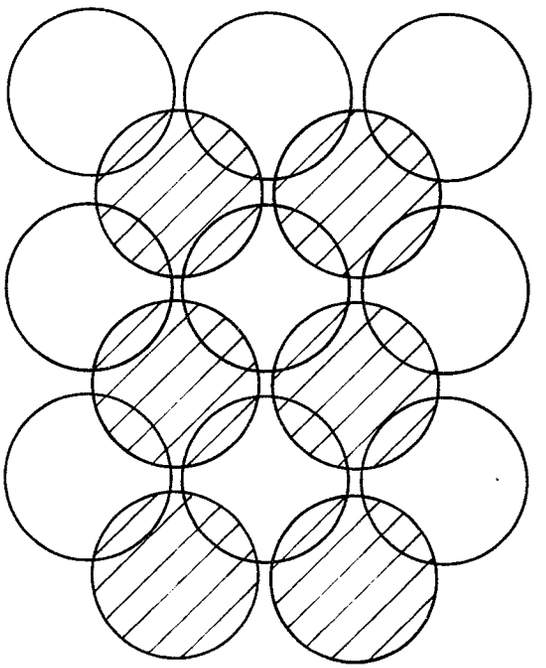


Fig. 5.



0090647

Fig.6.

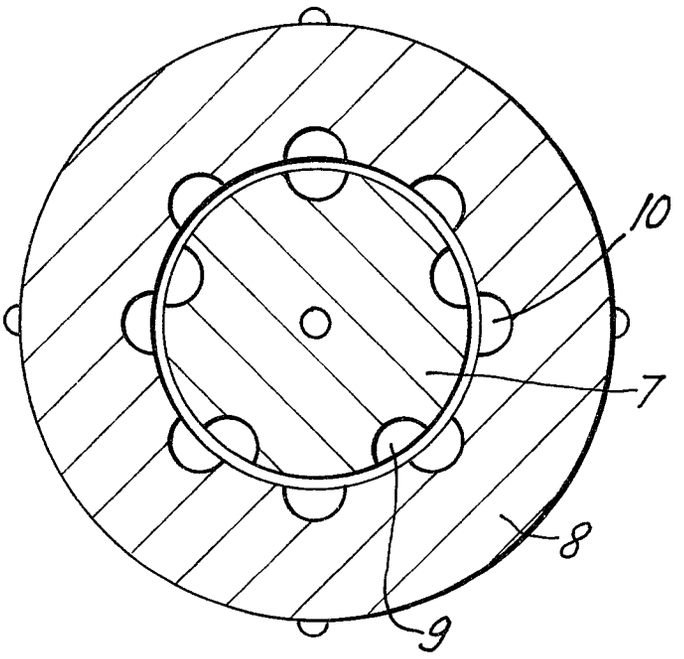
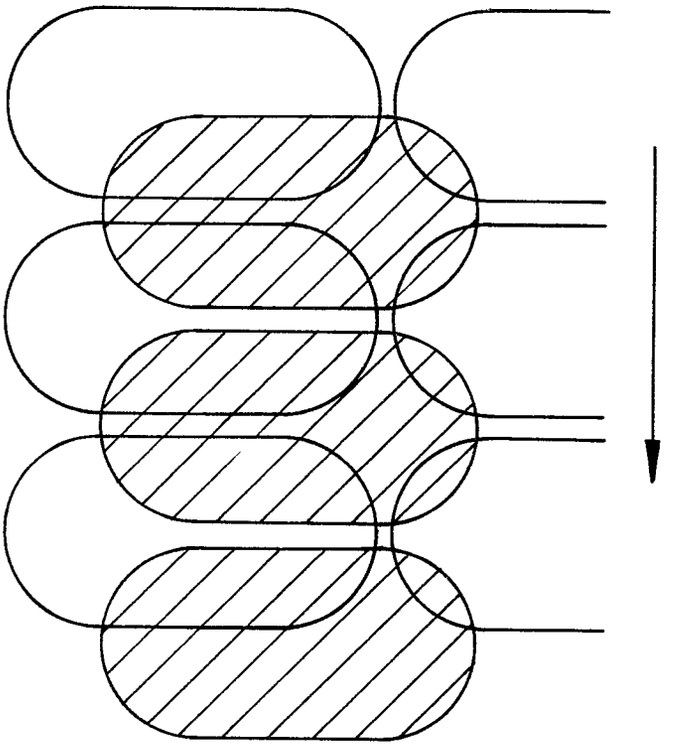
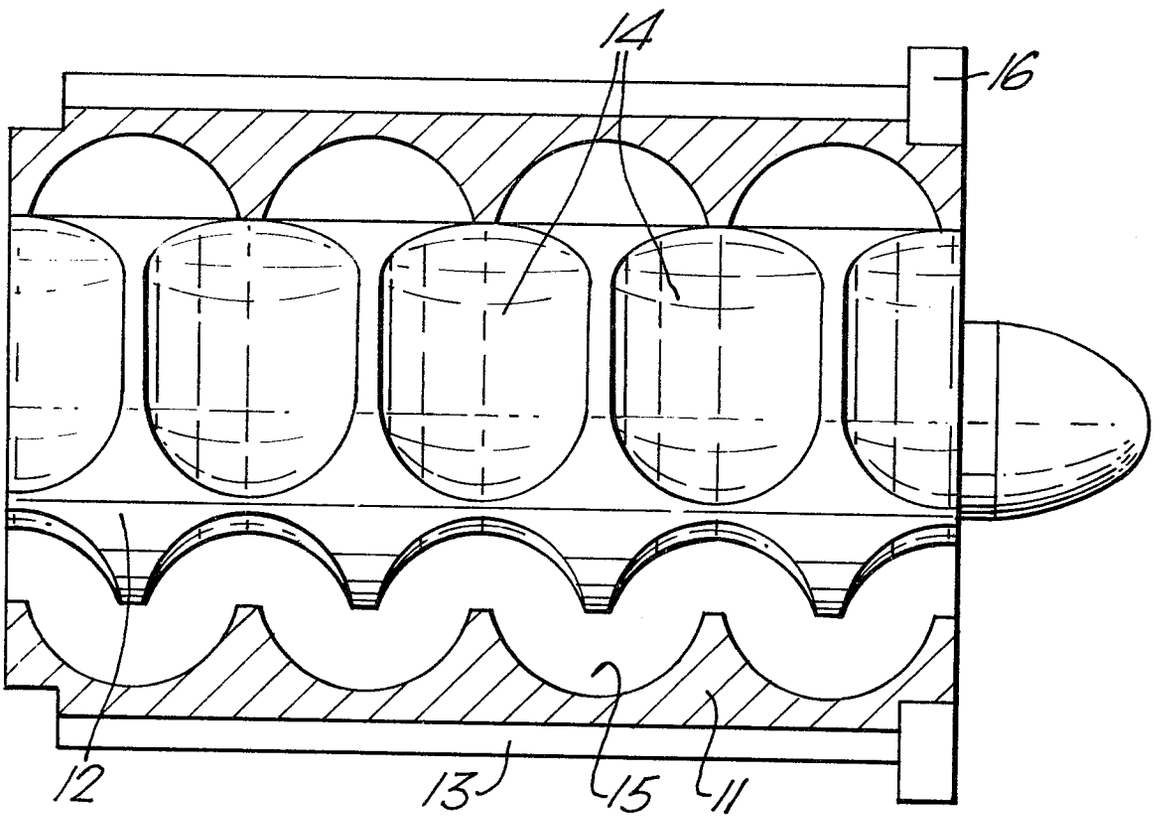


Fig.7.



0090647

Fig. 8.



European Patent Office

EUROPEAN SEARCH REPORT

0090647

Application number

EP 83 30 1765

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
D,A	GB-A- 930 339 (METAL BOX CO.) * Claims 1-4; figure 3 *		C 11 D 13/10 C 11 D 13/08
A	DE-A-2 050 222 (LES LABORATOIRES REUNIS) * Claim 1; figure *		
A	GB-A-2 034 742 (F.J. ZUCKER) * Claim 1 *		
A	US-A-3 779 521 (H. GODINES) * Figures 1, 2; claim 1 *		
A	DE-C-1 090 183 (DRAISWERKE GMBH) * Figure 4 *		TECHNICAL FIELDS SEARCHED (Int. Cl. ³) B 01 F 7/00 B 01 F 15/00 C 11 D 13/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	15-06-1983	SCHULTZE D

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503 03.82