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(21) International Application Number: PCT/US90/03104 (22) International Filing Date: 31 May 1990 (31.05.90) (30) Priority data: 359,988 31 May 1989 (31.05.89) US (71)(72) Applicant and Inventor: KLEIN, Paul, E. [US/US]; 928 Lake Shore Road, Lake Oswego, OR 97034 (US). (74) Agents: DICKINSON, Jon, M. et al.; 200 Pacific Building, 520 S.W. Yamhill Street, Portland, OR 97204 (US).		(81) Designated States: DE*, JP. Published <i>With international search report.</i> <i>With amended claims.</i>
(54) Title: ANTI-CONTAMINATION ORTHODONTIC DEVICE DISPENSER 		
(57) Abstract The invented anti-contamination orthodontic device dispenser (10) includes a container (11) for housing orthodontic devices, an aperture (32) in the container through which the devices are dispensed, and a guide structure (38) which directs the devices to the aperture (32) for dispensing. The dispenser is gravity and friction controlled so that when one device is dispensed, the next device is presented and ready for dispensing. The container (11) and guide structure (38) are constructed so that the devices are stacked on top of each other and touching because of gravity. Each device has a tooth (60) on its upper surface and ridges (64) on its lower surface. When a device is dispensed, its tooth (60) contacts the ridges (64) on the device immediately above it creating friction which positions the next device for dispensing. The invented dispenser is particularly effective for dispensing orthodontic O-rings mounted on a carrier or stick (52).		

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ANTI-CONTAMINATION ORTHODONTIC DEVICE DISPENSER

Technical Field

5 This invention relates to an orthodontic device dispenser and, more particularly, to a dispenser that protects orthodontic devices from contamination.

Background Art

10 There has recently been a concern in the medical fields about cross-contamination between patients. Particularly, persons who work with patients suffering from an affliction have tried to protect other patients and themselves from being exposed to the affliction. One specific area with a high potential for cross-contamination is orthodontics.

15 While working on a patient, an orthodontist might employ several devices. Accordingly, the orthodontist may reach from a patient's mouth, select a device and then continue working on the patient. If, while selecting the device, the orthodontist touches other devices or the packaging of the devices, they may be contaminated. Subsequently, when the orthodontist works on
20 another patient, reaches for the same device or an adjacent device and then returns to work, the new patient may be exposed to the contamination.

 For example, orthodontic O-rings are often packaged together in selected quantities to minimize the packaging costs. When an orthodontist reaches into a package of O-rings to select some for use, he risks touching and
25 contaminating the remaining stock. Thereafter, any use of the remaining stock may result in cross-contamination between patients.

 To prevent contamination, orthodontic devices may be individually packaged. Nevertheless, the orthodontist must still touch each individual package to expose the device. Additionally, it is more expensive for
30 manufactures to individually package orthodontic devices. Alternatively, each device can be sterilized, but sterilization is time consuming and expensive.

 The invented anti-contamination orthodontic device dispenser allows manufacturers to package "patient-specific" selected quantities of devices,

organized into cohesive dispense-groups each containing a predetermined quantity of devices -- such quantity being that typically expected to be, at the most, required for a single treatment session for each individual patient. The dispenser also allows an orthodontist to select such a dispense-group of devices without touching either the dispenser or the remaining clean stock of devices. Accordingly, the invention protects devices from contamination without requiring individual packaging or sterilization.

Disclosure of the Invention

The invented anti-contamination orthodontic device dispenser includes a container for housing orthodontic devices, an aperture in the container through which the devices are dispensed, and a guide structure which directs the devices to the aperture for dispensing. The dispenser is gravity and friction controlled so that when one device is dispensed, the next device is presented and ready for dispensing.

The container and guide structure are constructed so that the devices are stacked on top of each other and touching because of gravity. Each device has a tooth on its upper surface and ridges on its lower surface. When a device is dispensed, its tooth contacts the ridges on the device immediately above it creating friction which positions the next device for dispensing.

The invented dispenser is particularly effective for dispensing orthodontic O-rings mounted on a carrier or stick to form what was referred to above as a patient-specific dispense-group.

Brief Description of the Drawings

Fig. 1 is a perspective view of one embodiment of the invented dispenser.

Fig. 2 is a side, plan view of one module or container used in the invented dispenser.

Fig. 3 is an end view of the module shown in Fig. 2, taken along line 3-3.

Fig. 4 is similar to Fig. 2 except the module is empty.

Fig. 5 is a top view of a device which may be dispensed by the invented dispenser.

Fig. 6 is a bottom view of the device of Fig. 5.

Fig. 7 is a side view of the device of Fig. 5.

5

Detailed Description and Best Mode
for Carrying Out the Invention

One embodiment of the invented anti-contamination orthodontic device dispenser is shown generally at 10 in Fig. 1. Dispenser 10 includes four
10 anti-contamination containers or modules 11, 12, 13, 14 (also referred to as a magazine housing). Other embodiments of dispenser 10 may include only one or many different modules. Modules 11-14 are rectangular boxes which may be made of plastic.

Module 11 is shown in more detail in Figs. 2, 3 and 4. Fig. 2
15 is a side view of module 11, Fig. 3 is an end view, and Fig. 4 is a side view of module 11 when it is empty. In Figs. 2, 3 and 4 module 11 is constructed of clear plastic so that its interior may be seen.

Module 11 includes an upper wall 16, a lower wall 18, a rear wall 20, a front wall 22, and side walls 24, 26. These walls define a cavity or
20 chamber 28 in which orthodontic devices, such as device 30, may be stored.

In module 11, the devices are dispensed through a presenting/dispensing aperture 32. Aperture 32, as seen in Fig. 3, contains an upper portion 34 and a lower portion 36. The upper portion has a narrower side-to-side dimension than the lower portion. The upper portion allows a
25 device to be presented but does not allow the entire device to be dispensed. Specifically, the upper portion only allows a tongue 37 of an orthodontic device to extend out of the module. Lower portion 36 is large enough to permit an entire device to be dispensed.

As shown in Figs. 2 and 3, the devices to be dispensed are
30 stacked on top of each other and touch each other due to gravity. After a device has been dispensed, gravity causes the remaining devices to move down so that the next device may be dispensed.

The device are directed to the position where they can be dispensed by the side walls and by a guide structure 38. Structure 38, best seen in Fig. 4, is an elongate rod with a tapered end that is connected to upper wall 16. It extends down toward lower wall 18 a predetermined distance, but does not touch it. Structure 38 prevents the orthodontic devices within the module from tipping and moving out of position. Structure 38 and the side walls operate with the orthodontic devices and guide them to a position ready for dispensing. Structure 38 does not touch the bottom two devices so that they may be presented and dispensed.

Dispenser 10 also includes a stand 40. Module 11 is connected to stand 40 by sliding into grooves 42, 44. Grooves 42, 44 act as a vertical track in which module 11 is mounted. Specifically, module 11 has two flanges 46 on its rear wall. The flanges extend perpendicularly away from the module's side walls. Flanges 46 support module 11 in grooves 42, 44.

As can be seen in Fig. 3, flanges 46 are tapered from top to bottom. Accordingly, module 11 is slid into grooves 42, 44 until the taper of the flanges stops the module. In this manner, module 11 is supported on stand 40 and may be slid out when empty and easily replaced with a new module. Modules 12-14 are mounted to stand 40 in the same fashion.

Stand 40 also includes a vertical portion 48 and a horizontal portion 50. Dispenser 10 may be mounted to a wall along portion 48 or to a flat surface along portion 50 by an adhesive.

Fig. 5 shows at 30 a top plan view of an orthodontic device designed to be dispensed by the invented dispenser. Device 30 includes a manipulation carrier or stick 52 along which a plurality of intra-oral units or O-rings, such as O-ring 54, are connected. The O-rings are easily detached from the carrier when used. The tongue 37 of device 30 is also shown.

Device 30 is typically made of an elastomeric material and may be approximately 3-1/4" long. Device 30 includes an aperture 56 through which a tool may be inserted to facilitate handling and dispensing of the device. Device 30 also includes an eyelet 58. Eyelet 58 fits around guide structure 38 in module 11, thereby allowing structure 38 to guide device 30 to its dispense position.

Device 30 also has a tooth 60 which extends above the upper surface of the device. Tooth 60 is used to create friction with another device when it is dispensed from module 11.

Fig. 6 is a bottom view of device 30. A channel 62 exists within eyelet 58 to allow a tooth 60 in another device to slide past. Device 30 also includes ridges 64 which are used to contact a tooth 60 on another device and create friction. Accordingly, because the devices are stacked in the module, when one device is dispensed its tooth contacts the ridges of the immediately superior device and pulls the superior device into a presented position. The elastomeric nature of device 30 allows the tooth of one device to move past the ridges of the superior device when the superior device is stopped.

Fig. 7 is a side view of device 30 showing ridges 64 and tooth 60.

Operation

The invented anti-contamination orthodontic device dispenser may be mounted to a counter or wall and may be designed to hold one or several modules. Each module contains orthodontic devices to be dispensed. Initially, each module has a bottom seal which must be removed. Withdrawing the seal advances the first device into its dispense position.

When an orthodontist desires a device, he simply grasps the tongue of the device extending from the module and pulls. As the orthodontist pulls, the device contacts the immediately superior device and pulls it a predetermined distance out of the module. The immediately adjacent device is stopped from being pulled completely out of the module by the limited upper dimension of the dispensing aperture. The orthodontist continues pulling until the device is completely withdrawn from the module. Thereafter, the remaining devices move down under gravity and the next device is presented ready for dispensing. In this manner, devices are presented and dispensed in seriatim. The process of presenting and dispensing may be thought of as a dispense cycle.

In this manner, orthodontic devices are dispensed in patient-specific cohesive groups without an orthodontist touching either the dispenser

or any devices apart from the one being dispensed. Accordingly, anti-contamination of the remaining devices is assured.

When a module is empty, it is removed from the stand and replaced with another full module.

- 5 While the best mode and preferred embodiment of the invention have been described, variations may be made without departing from the spirit of the invention.

IT IS CLAIMED AND DESIRED TO SECURE BY LETTERS PATENT:

1. Anti-contamination-seriatim, presenting/dispensing apparatus for plural orthodontic devices, where each includes at least one intra-oral unit and a manipulation carrier detachably joined to and bearing such unit, such carrier including a tongue extending a certain distance from adjacent to beyond such unit, said apparatus comprising:

an anti-contamination container including presenting/dispensing aperture structure, and

guide structure formed with said container and cooperable with said aperture structure to direct successive devices held within said container, successively in time to a pair of predispose conditions including a terminal, predispose (presented) condition and a preterminal predispose (non-presented) condition.

2. The apparatus of claim 1, wherein said aperture structure has an upper portion large enough to permit only such a tongue to be presented, and a lower portion large enough to permit dispensing of a device.

3. The apparatus of claim 1, wherein such carriers each have an eyelet at one end, and wherein said guide structure comprises a rod, connected to and within said container, passing through each carrier's eyelet, except the next carriers that are to be dispensed.

4. The apparatus of claim 1, further including a stand supporting said container.

5. The apparatus of claim 1, wherein the next device to be dispensed is positioned in its presented condition by friction contact with the previously dispensed device.

6. The apparatus of claim 5, wherein such contact occurs between interengageable components formed on adjacent devices within said container.

7. The apparatus of claim 6, wherein the interengageable components, vis-a-vis a pair of adjacent devices, include a tooth on one device and ridges on the other device.

8. Anti-contamination-seriatim, presenting/dispensing apparatus for plural orthodontic devices, where each includes at least one intra-oral unit and a manipulation carrier detachably joined to and bearing such unit, such carrier including a tongue extending a certain distance from adjacent to beyond such unit, said apparatus comprising:

an anti-contamination container including presenting/dispensing aperture structure, and

guide structure formed with said container and cooperable with said aperture structure to direct successive devices held within said container, during use of the apparatus, in such a manner that, at the initiation of a dispense cycle, the tongue of the carrier in one device only, is presented for access on the outside of said aperture structure, and performance of such a cycle effects withdrawal alone of said one only device, with simultaneous shifting of the immediately adjacent device in said container to the same presented-for-access condition just held by its just-dispensed neighbor.

9. The apparatus of claim 8, wherein said aperture structure has an upper portion large enough to permit only such a tongue to be presented, and a lower portion large enough to permit dispensing of a device.

10. The apparatus of claim 8, wherein such carriers each have an eyelet at one end, and wherein said guide structure comprises a rod, connected to and within said container, passing through each carrier's eyelet, except the next carriers that are to be dispensed.

11. The apparatus of claim 8, further including a stand supporting said container.

12. The apparatus of claim 8, wherein the next device to be dispensed is shifted to its presented-for-access condition by friction contact with the previously dispensed device.

13. The apparatus of claim 12, wherein such contact occurs between interengageable components formed on adjacent devices within said container.

14. The apparatus of claim 13, wherein the interengageable components, vis-a-vis a pair of adjacent devices, include a tooth on one device and ridges on the other device.

15. An anti-contamination apparatus for dispensing orthodontic O-rings comprising:

carriers on which such O-rings are mounted;

a container for housing said carriers;

aperture structure in said container through which said carriers may be dispensed; and

guide structure within said container for directing successive carriers to a position where they may be dispensed through said aperture.

16. The apparatus of claim 15, wherein such carriers each have an eyelet at one end, and wherein said guide structure comprises a rod, connected to and within said container, passing through each carrier's eyelet, except the next carriers that are to be dispensed.

17. The apparatus of claim 15, further including a stand supporting said container.

18. The combination of
a magazine housing having defined within it an elongate magazine chamber;

a stack of plural, elongate, flexible orthodontic devices disposed one above another to form the stack and said stack occupying said chamber and extending lengthwise in said chamber;

said housing having a floor supporting the base of said stack and further having a side wall with a dispensing outlet therein disposed adjacent said floor;

the orthodontic devices each having a tongue portion and a remainder portion, the remainder portion being wider than the tongue portion and said aperture having an upper portion and a lower portion with the upper portion narrower than the lower portion, the lower portion of said aperture accommodating the passage therethrough of an entire orthodontic device and the upper portion accommodating the passage therethrough of the tongue portion only of an orthodontic device; and

each orthodontic device having a gripping portion on the top thereof for frictionally engaging an overlying orthodontic device so that longitudinal movement of an overlying orthodontic device.

AMENDED CLAIMS

[received by the International Bureau
on 22 November 1990 (22.11.90);
original claims 5,6,12,13,15-18 cancelled; original
claims 1,7,8 and 14 amended; other claims
unchanged (3 pages)]

1. Anti-contamination-seriatim, presenting/dispensing apparatus for plural orthodontic devices capable of allowing dispensing solely through external contact which is limited to contact with a device in the apparatus, where each device includes at least one intra-oral unit and a manipulation carrier detachably joined to and bearing such unit, such carrier including a tongue extending a certain distance from adjacent to beyond such unit, said apparatus comprising:

an anti-contamination container including presenting/dispensing aperture structure, and

guide structure formed with said container and cooperable with said aperture structure to direct successive devices held within said container, successively in time to a pair of predispose conditions including a terminal predispose (presented) condition and a preterminal predispose (non-presented) condition, each next-to-be dispensed device being presented in its presented condition via frictional contact occurring between interengageable components formed on adjacent devices within said container.

2. The apparatus of claim 1, wherein said aperture structure has an upper portion large enough to permit only such a tongue to be presented, and a lower portion large enough to permit dispensing of a device.

3. The apparatus of claim 1, wherein such carriers each have an eyelet at one end, and wherein said guide structure comprises a rod, connected to and within said container, passing through each carrier's eyelet, except the next carriers that are to be dispensed.

4. The apparatus of claim 1, further including a stand supporting said container.

7. The apparatus of claim 1, wherein the interengageable components, vis-a-vis a pair of adjacent devices, include a tooth on one device and ridges on the other device.

8. Anti-contamination-seriatim, presenting/dispensing apparatus for plural orthodontic devices capable of allowing dispensing solely through external contact which is limited to contact with a device in the apparatus, where each device includes at least one intra-oral unit and a manipulation carrier detachably joined to and bearing such unit, such carrier including a tongue extending a certain distance from adjacent to beyond such unit, said apparatus comprising:

an anti-contamination container including presenting/dispensing aperture structure, and

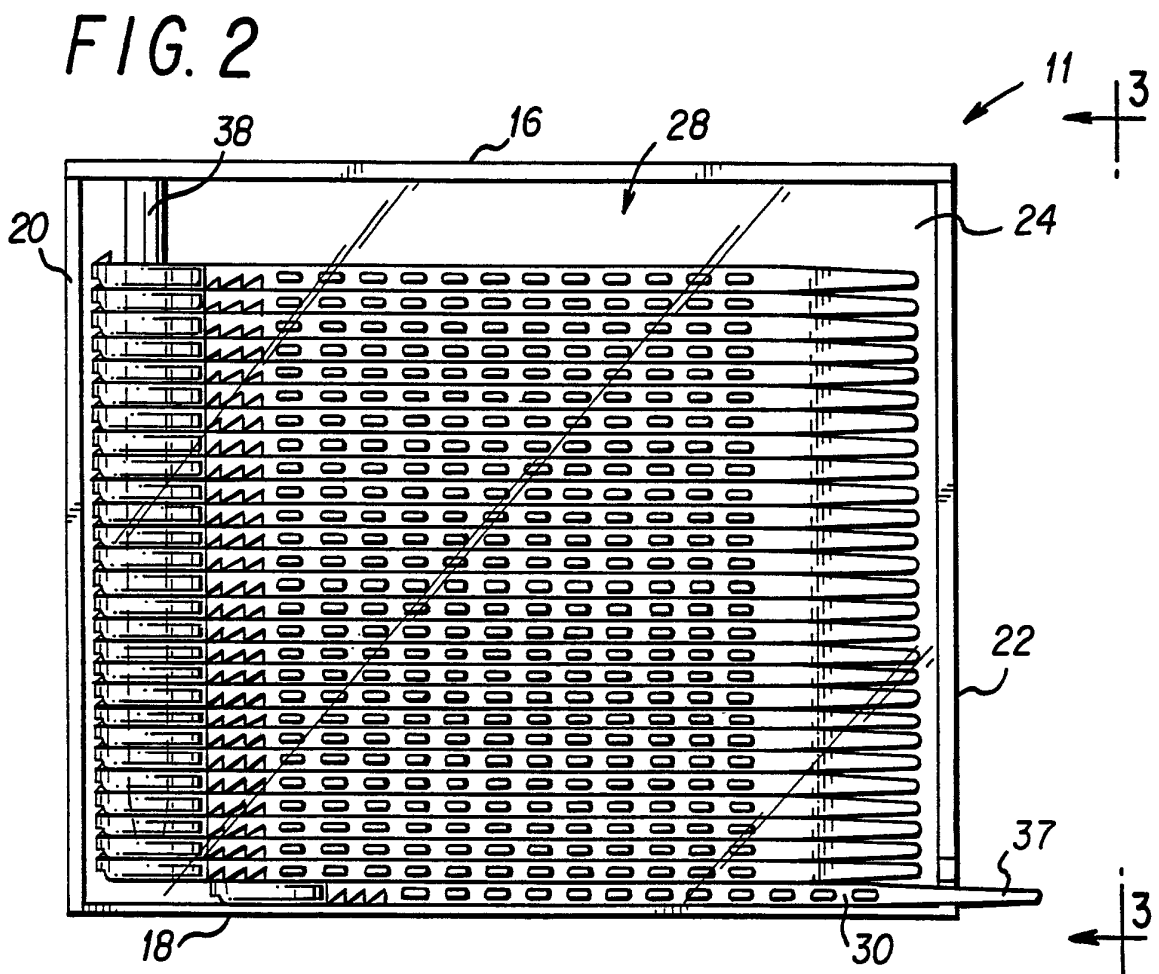
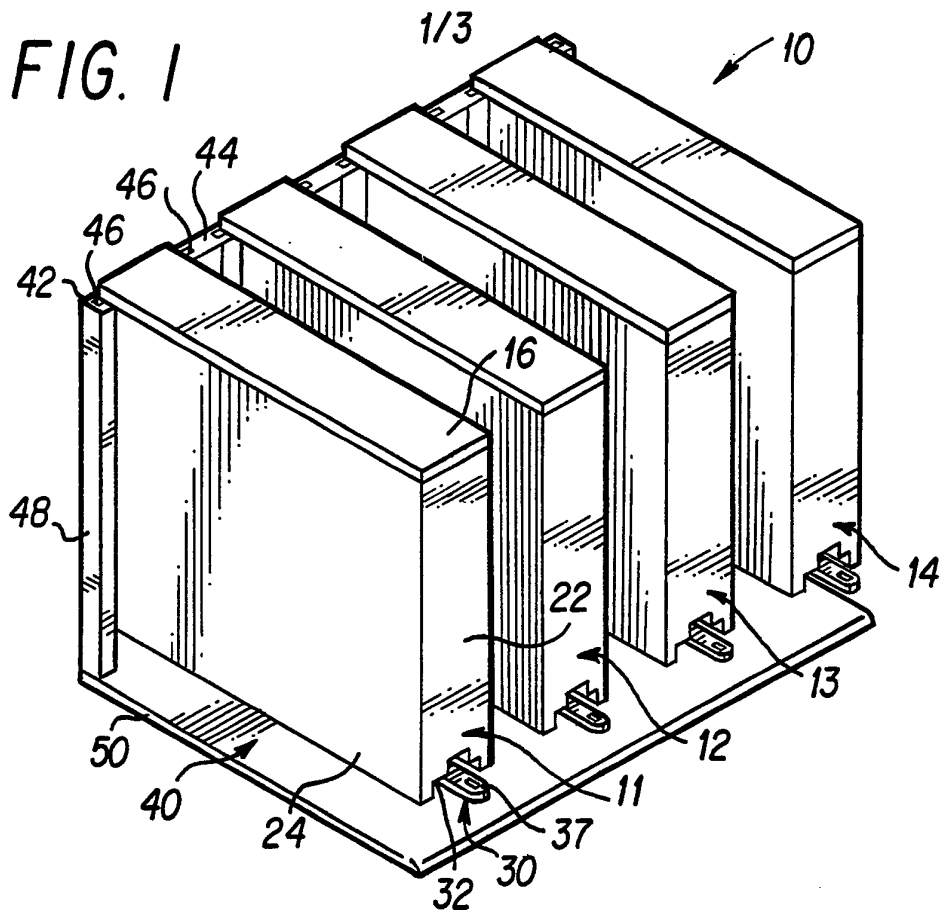
guide structure formed with said container and cooperable with said aperture structure to direct successive devices held within said container, during use of the apparatus, in such a manner that, at the initiation of a dispense cycle, the tongue of the carrier in one device only, is presented for access on the outside of said aperture structure, and performance of such a cycle effects withdrawal alone of said one only device, with simultaneous shifting of the immediately adjacent device in said container to the same presented-for-access condition just held by its just-dispensed neighbor, each next-to-be dispensed device being presented in its presented condition via frictional contact occurring between interengageable components formed on adjacent devices within said container.

9. The apparatus of claim 8, wherein said aperture structure has an upper portion large enough to permit only such a tongue to be presented, and a lower portion large enough to permit dispensing of a device.

10. The apparatus of claim 8, wherein such carriers each have an eyelet at one end, and wherein said guide structure comprises a rod, connected to and within said container, passing through each carrier's eyelet, except the next carriers that are to be dispensed.

11. The apparatus of claim 8, further including a stand supporting said container.

14. The apparatus of claim 8, wherein the interengageable components, vis-a-vis a pair of adjacent devices, include a tooth on one device and ridges on the other device.



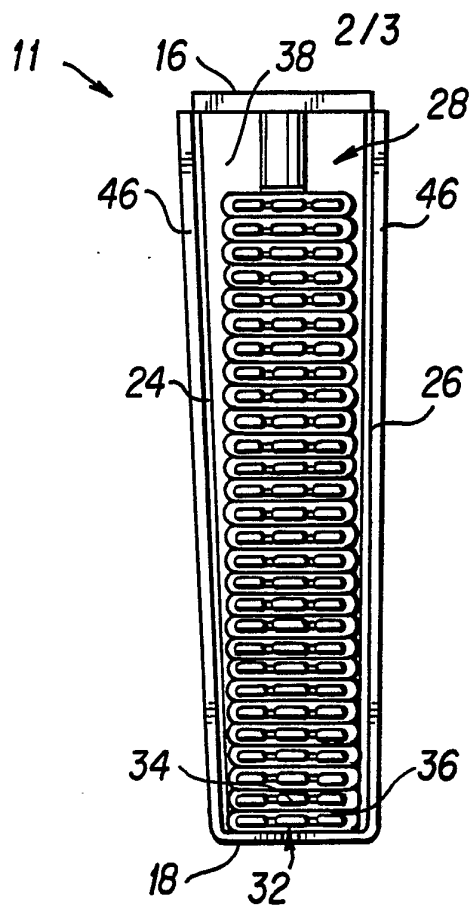


FIG. 3

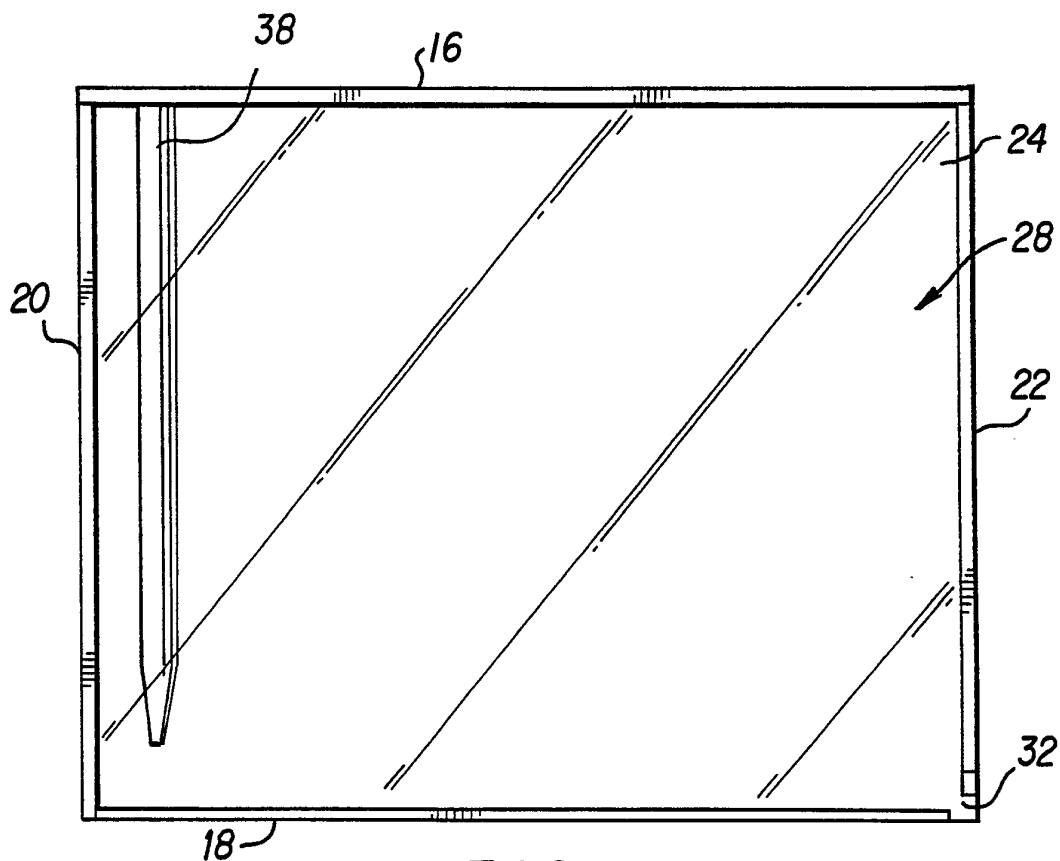


FIG. 4

3/3

FIG. 5

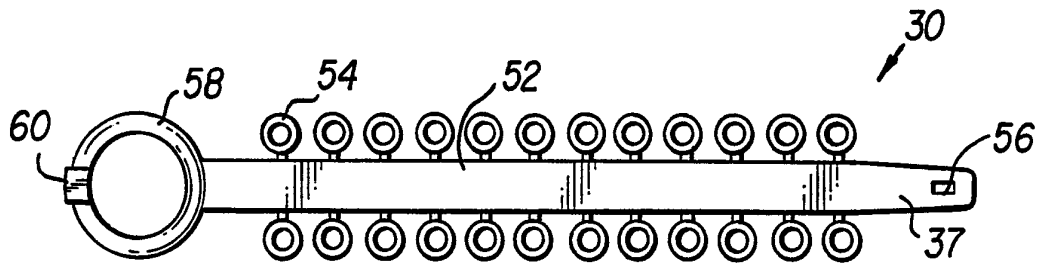


FIG. 6

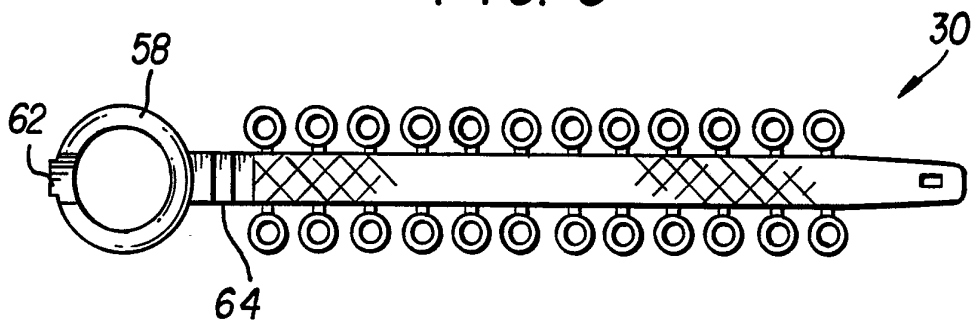
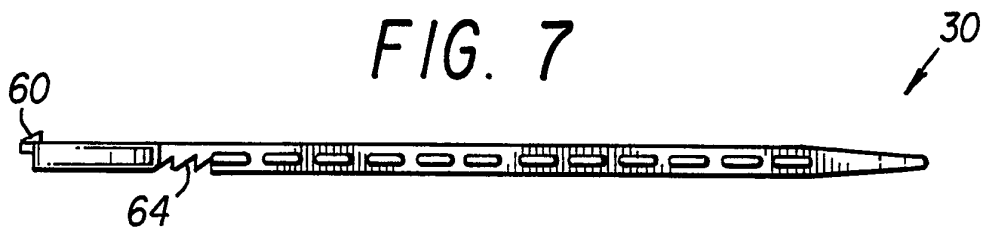


FIG. 7



INTERNATIONAL SEARCH REPORT

International Application No

PCT/US90/03104

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³ According to International Patent Classification (IPC) or to both National Classification and IPC IPC (5): A61C 7/00 US CL : 221/22						
II. FIELDS SEARCHED Minimum Documentation Searched ⁴ <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%; text-align: left; border-bottom: 1px solid black;">Classification System</th> <th style="width: 80%; text-align: left; border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="vertical-align: top; padding: 5px;">US</td> <td style="vertical-align: top; padding: 5px;">221/22, 92, 240, 283, 303, 305, 312A; 433/3, 8, 11, 18</td> </tr> </table> Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁶			Classification System	Classification Symbols	US	221/22, 92, 240, 283, 303, 305, 312A; 433/3, 8, 11, 18
Classification System	Classification Symbols					
US	221/22, 92, 240, 283, 303, 305, 312A; 433/3, 8, 11, 18					
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴						
Category [*]	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸				
Y	US,A 2,946,482 (JOHNSON) 26 July 1960, see column 4, lines 8-32	1, 3-5, 15-17				
Y	US,A 4,038,753 (KLEIN) 02 August 1977, see column 3, lines 11-36	1-5, 8-12, 15-18				
Y	US,A 4,530,445 (DECKER) 23 July 1985, see column 3, lines 18-36	3, 10, 16				
Y	US,A 755,001 (HENDERSON) 22 March 1904, see page 1, lines 77-98	4, 17				
Y	US,A 2,851,192 (MAYO ET AL) 09 September 1958, see column 2, line 52 to column 3, line 16	2, 8-12, 18				
A	US,A 1,018,845 (MILLER) 27 February 1912					
A	FR,A 1,365,369 (GILLIER) 22 March 1965					
[*] Special categories of cited documents: ¹⁵ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family						
IV. CERTIFICATION						
Date of the Actual Completion of the International Search ² 13 AUGUST 1990		Date of Mailing of this International Search Report ² 1 OCT 1990				
International Searching Authority ¹ ISA/US		Signature of Authorized Officer ²⁰ F.J. BARTUSKA				