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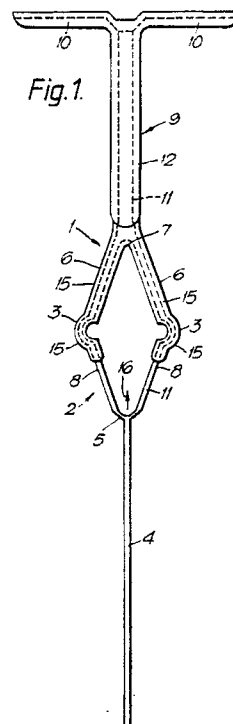
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54 Retention device for removable retention in a passage or cavity.

57 A retention device which can be removably retained in a body cavity or passage has branch members which are movably connected to each other such that two relative configurations may be obtained. In one configuration the branch members are nested inside one another for inserting the retention device in a cavity. Once in a cavity an operating member is used to displace the branch members to form the second configuration, being a diamond configuration in which parts of the branch members are resiliently expanded to bear against the walls of the cavity and retain the device.



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IMPROVEMENTS IN OR RELATING TO RETENTION DEVICES

This invention relates to retention devices for removably retaining an object in a passage or cavity, and is intended particularly though not solely to provide a device which can be removably retained in a body cavity or passage, such as within the digestive or reproductive systems of an animal, for example for veterinary or reproduction control purposes.

It is an object of the invention to provide a retention device for removable retention in a passage or cavity which will at least provide the public with a useful choice.

Accordingly, in one aspect, the invention consists in a retention device for removable retention in a passage or cavity, comprising: a pair of bifurcated members each having a pair of resilient movable branch members the branch members of one bifurcated member being movably connected to the branch members of the other bifurcated member to form a diamond in one configuration of the pair; and an operating member connected or associated with one of said bifurcated members; said bifurcated members being displaceable between at least two relative configurations, a first configuration in which a first one of said bifurcated members is substantially nested inside the other of said bifurcated members for insertion purposes, and a second configuration being a laterally extended configuration in which parts of said bifurcated members are resiliently expanded to bear in use against walls of a selected passage or cavity to retain the device therein and said device is laterally compressible so as to be insertable into and removable from said passage or cavity, said device being displaceable between said configurations by use of said operating member.

To those skilled in the art to which the invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claims. The disclosures and the descriptions herein are purely illustrative and are not intended to be in any sense limiting.

One preferred form of the invention will now be described with reference to the accompanying drawings, in which

Figure 1 shows a device in accordance with the invention in an open or diamond configuration;

Figure 2 shows the device of Figure 1 in an insertion configuration when laterally compressed for insertion into a selected passage or cavity; and

Figure 3 shows the device of Figures 1 and 2 in a retention configuration so as to be retained in

the passage or cavity.

Referring now to the figures, a device for retention in a cavity or passage, such as in a body cavity or passage of animals such as cattle or pigs, is provided and shown in Figure 1. The retention device comprises a pair of resilient movable bifurcated members, for example "V" or "U" shaped members 1 and 2 which are movably preferably resiliently interconnected at the open ends of the "V" or "U", for example by interconnections 3; and an operating member 4 is attached to or demountably associated with the junction or closed end 5 of the bifurcated member 2. Bifurcated member 1 has two preferably resiliently flexible branches 6, and bifurcated member 2 has two preferably resiliently flexible branches 8. The branches 6 are resiliently interconnected with one another at a junction 7 forming the closed end of bifurcated member 1 and the branches 8 are resiliently interconnected with each other at the junction 5 or closed end of bifurcated member 2. Branches 8 of bifurcated member 2 are suitably relatively shorter than equivalent branches 6 of bifurcated member 1 to enable nesting as shown in Figure 2.

The retention device in use may be associated with or form part of a device for veterinary purposes and may then include some other functional portion such as a known device 9 having zones impregnated with a particular pharmaceutical to be dispensed to an animal, and having foldable legs 10 or any other desired functional portion.

The device may be moulded for example of a suitable plastics material which may be moulded in the configuration shown in Figure 1 (referred to herein as the second configuration), and preferably comprises a skeleton 11 of a harder but still flexibly resilient material such as nylon or polypropylene onto which a drug carrying matrix 12 of e.g. silicone or EVA is applied. Such a device 9 is disclosed in Patent Specifications GB2154875A and US4678463 which are incorporated herein by reference. Parts or all of branches 6 and 8 and parts or all of interconnections 3 are preferably coated with a cushioning layer 15 which is preferably a continuation of or of the same composition as the drug carrying matrix 12.

When it is desired to insert the device into a passage or cavity of an animal eg. the vagina of a pig, the device may be folded, from the moulded second configuration shown in Figure 1 in which the interconnection 3 of the bifurcated members 1 and 2 are spaced apart and so that the bifurcated members 1 and 2 are in a diamond configuration opposite one another into the retention configuration shown in Figure 2 by applying force to the

operating member 5 towards the bifurcated members substantially along the longitudinal axis of the device, in the direction indicated by the arrow 16, so that the junction 5 of the bifurcated member 2 is forced towards the junction 7 of the opposite facing bifurcated member 1. Due to the pivoting and preferably resilience of the bifurcated members and of the connections 3 and 4 between them, initially the paired branches of the two bifurcated members are spread apart by application of such force, and when the relatively shorter branches 8 of member 2 are in line in the space between the interconnections 3, sprung over that line and nest with the branches 6 of the facing bifurcated member 1, as shown in Figures 2 and 3.

The parts of the skeleton 11 forming the interconnecting portions 3 are preferably provided as outwardly curved strips or portions of resilient material as shown to facilitate this springing over.

Once in the insertion configuration shown in Figure 2, the device can be laterally compressed by pinching them together as indicated by the arrows 16, and the device 9, may also be folded. The entire device may be contained in this folded form in an applicator eg. of tubular form as shown in GB2154875A, US4678463. The device is then inserted lengthwise into a selected passage or cavity, for example into a body cavity of an animal, and the applicator is then withdrawn. The branches 6 and 8 of the bifurcated members 1 and 2, when in the insertion configuration shown in Figure 2, are biased to extend laterally from the longitudinal axis of the device, which can be defined by the longitudinal axis of the operating member 5, as shown in Figure 3. When the applicator is withdrawn, the branches tend to adopt the laterally extended retention configuration shown in Figure 3 and the device is thus retained against expulsion from the passage or cavity by for example muscular contractions, as the bifurcated members and/or the connecting portion 3 bear against the walls of the passage or cavity offering resistance to expulsion.

When it is desired to remove the device, the extended operating member 5 can be grasped and pulled in the direction indicated by the arrow 12 which reverses the springing over procedure, the bifurcated members 1 and 2 resuming their open and opposite facing configuration as shown in Figure 1. Continued pulling on the operating member 5 tends to lead the device out of the passage or cavity, with extension lengthwise and narrowing the width of the diamond shape of the retention the device laterally compressing by closing of the branches 6 and 8 of bifurcated members 1 and 2 towards each other.

Thus it can be seen that a retention device is provided by the invention which is readily operated so as to be securely retained in a selected passage

or cavity and which can also be readily converted into a configuration allowing withdrawal from the passage or cavity. The device is also simple to make and operate.

The features disclosed in the foregoing description, in the following claims and/or in the accompanying drawings may, both separately and in any combination thereof, be material for realising the invention in diverse forms thereof.

Claims

1. A retention device for removable retention in a passage or cavity, comprising: a pair of bifurcated members(1,2) each having a pair of resilient movable branch members(6,8) characterised in that the branch members(8) of one bifurcated member(2) are movably connected(3) to the branch members(6) of the other bifurcated member(1) to form a diamond in one configuration of the pair, said device also having an operating member(4) connected(5) or associated with one of said bifurcated members, and said device being further characterised in that said bifurcated members(1,2) are displaceable between at least two relative configurations, a first configuration in which a first one of said bifurcated members is substantially nested inside the other of said bifurcated members for insertion purposes, and a second configuration being said diamond configuration in which parts of said bifurcated members are resiliently expanded to bear in use against walls of a selected passage or cavity to retain the device therein and said device is laterally compressible so as to be insertable into and removable from said passage or cavity, said device being displaceable between said configurations by use of said operating member.

2. A retention device as claimed in claim 1 wherein said operating member(4) is connected(5) or associated with a junction between branches(8) of said one bifurcated member(2) and the branches(8) of said one bifurcated member(2) are shorter than the branches(6) of said other bifurcated member(1).

3. A retention device as claimed in claim 1 or claim 2 wherein the flexible movable connections(3) between said branches(6,8) of said bifurcated members(1,2) are coated with a cushioning layer(15).

4. A retention device as claimed in any one of the preceding claims wherein said retention device is associated with or forms part of a device for veterinary purposes.

5. A retention device as claimed in any one of the preceding claims wherein said branches(6,8) are flexibly resilient.

6. A retention device as claimed in any one of the

preceding claims wherein said branch members(8)
of one bifurcated member(2) are resiliently
connected(3) to corresponding branch members(6)
of the other bifurcated member(1).

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