

United States Patent

Gauthier

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[54] DEVICE FOR MEDICAL USE

[72] Inventor: Oscar Gauthier, 7560 Milan Blvd.,
Ville de Brossard, Quebec, Canada

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[52] U.S. Cl. 128/79, 128/327, 128/346

[51] Int. Cl. A61f 5/00

[58] Field of Search 128/327, 346, 79, 1 R; 3/1

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Primary Examiner—Lawrence W. Trapp

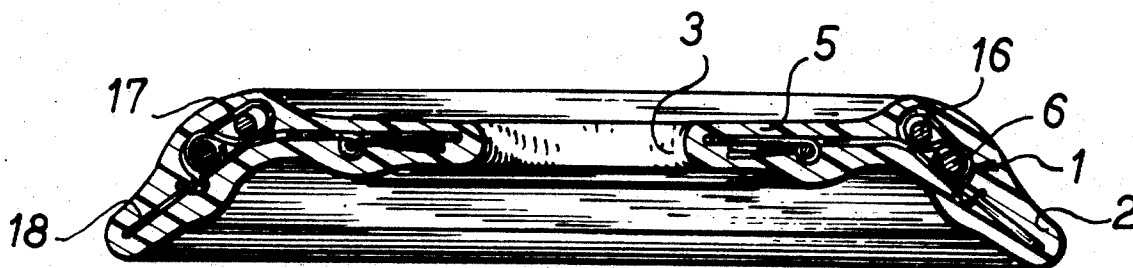
Attorney—Pierre Lesperance

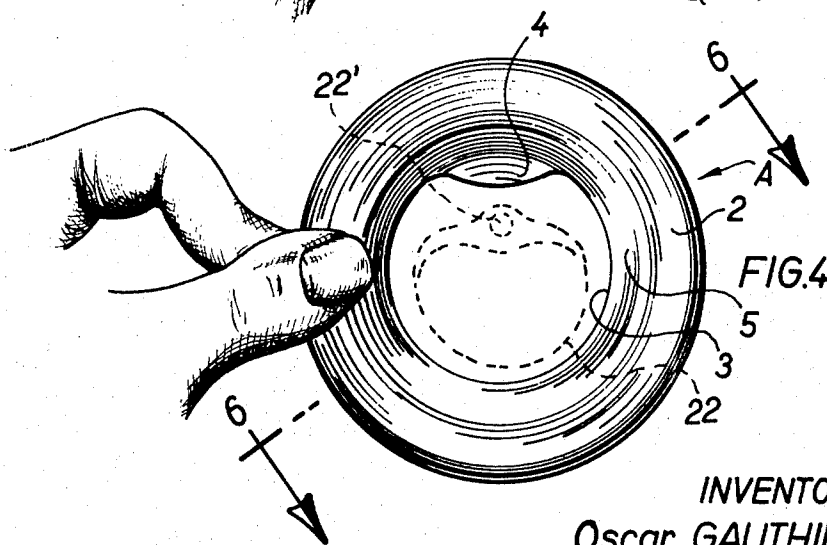
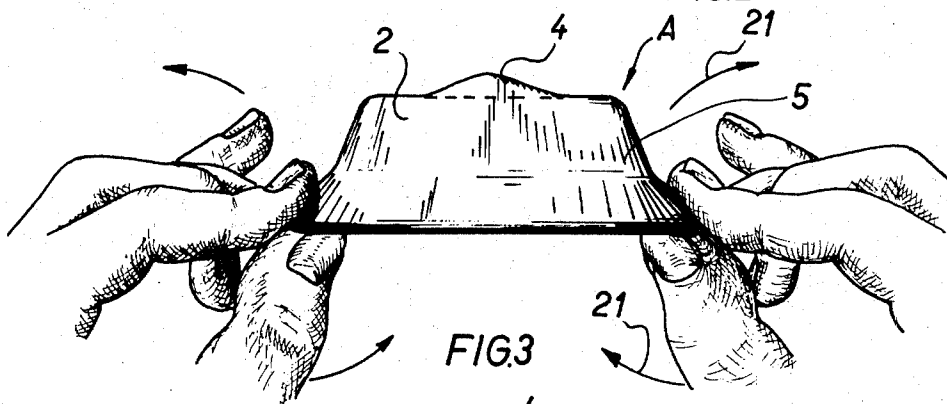
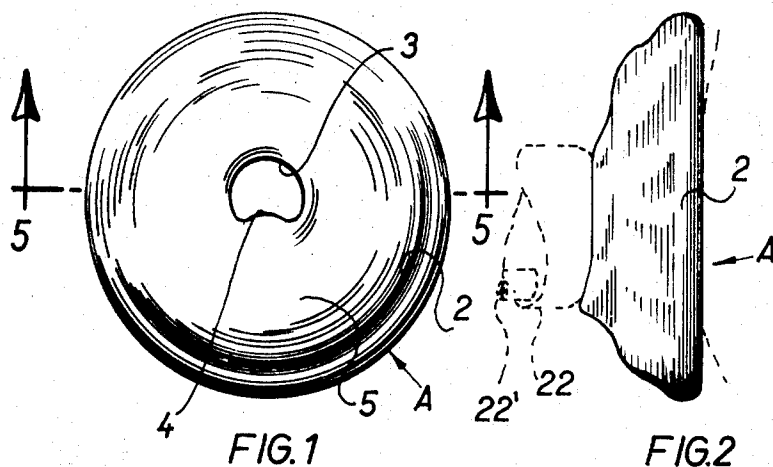
[57] ABSTRACT

A device operating as a tourniquet for assisting erection of the penis and used as a contraceptive by stopping semen discharge. The device can also be modified to be used as an artificial anus. The device

comprises an armature made of steel wire and a covering for said armature preferably made of sponge rubber. The armature comprises a base ring to which are pivotally connected a plurality of U-shaped members disposed side by side, overlapping and pivotable between closed and open position. In the closed position, the U-shaped members radially inwardly extend from the base ring substantially in the plane of the latter. In the open position, the U-shaped members form a tube-like member on one side of the ring. Spring means consisting of V-shaped resilient wires are each connected with a pair of adjacent U-shaped members and urge the same towards each other, so as to urge the U-shaped members into closed position. When used as an artificial anus, the sponge rubber covering completely closes the opening through the ring but pressure exerted from one side opens the device against the action of the spring members. When used as a tourniquet, the device is further provided with a second ring, of smaller diameter than the base ring and coaxial therewith; said second ring engages the U-shaped members to cause simultaneous opening movement of the same when the second ring is moved through the base ring under action of lever-like operator members which are pivoted on the base ring.

10 Claims, 14 Drawing Figures





INVENTOR
Oscar GAUTHIER
BY *Pierre Espérance*
AGENT

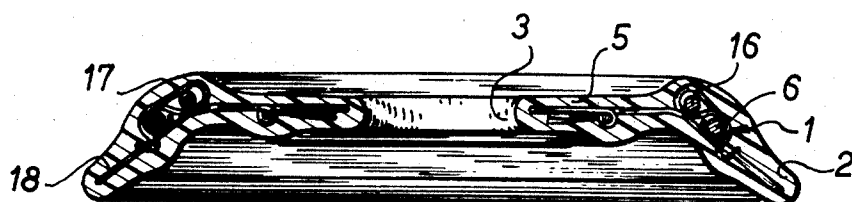


FIG. 5

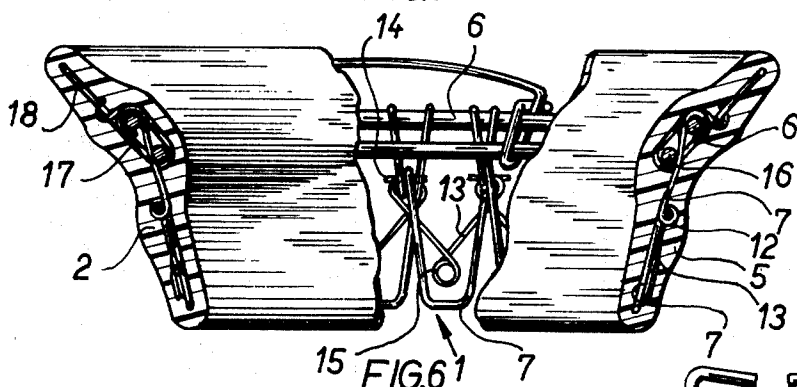


FIG. 6

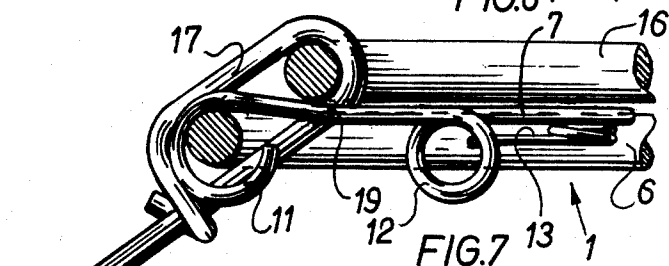


FIG. 7

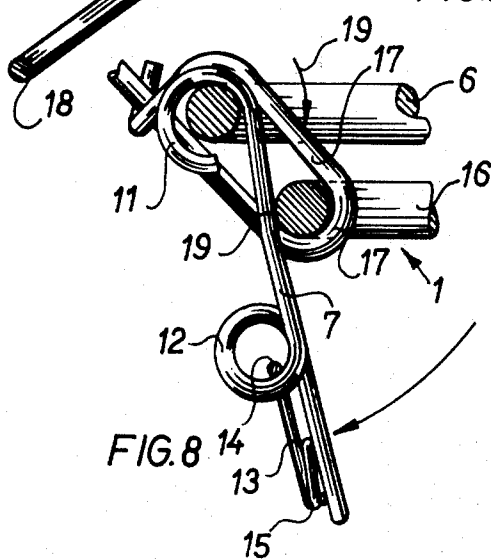


FIG. 8

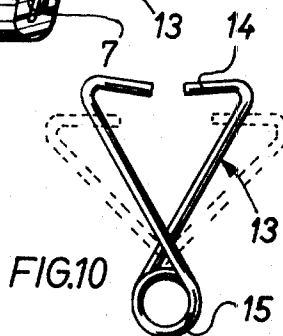


FIG. 10

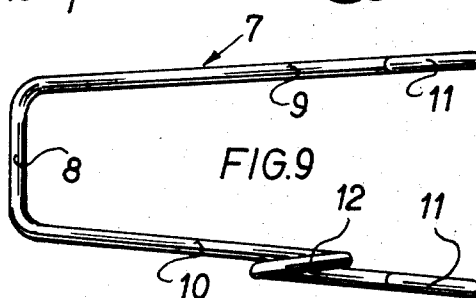
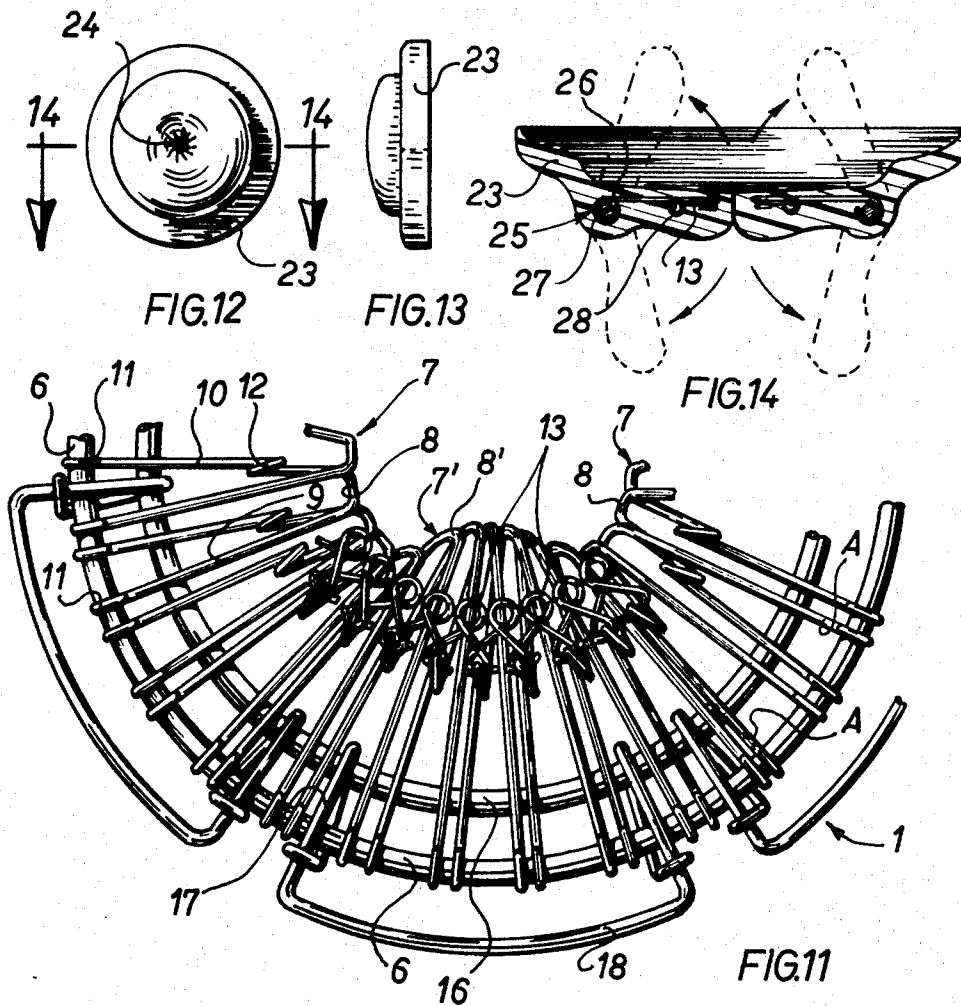


FIG. 9

INVENTOR
Oscar GAUTHIER

BY *Pierre Laperance*

AGENT



INVENTOR
Oscar GAUTHIER

BY *Pierre Lesperance*

AGENT

DEVICE FOR MEDICAL USE

The present invention relates to a device for medical use. One main application of the device is for use as a tourniquet to assist in penis erection. It is designed as an annular member adapted to surround the base of the penis and exert uniform compression thereon. The device has the additional advantage of substantially preventing ejaculation and, therefore, is effective as a contraceptive, especially when modified to pinch and block the canal deferens.

Another use of the device with suitable modification is an artificial anus, in which case it operates as a spring-loaded normally closed valve to replace the sphincter and intended to be grafted in position of the normal anus of people which have been operated for choleostomy.

The device is of simple and relatively inexpensive construction, is of long service and, when used as a tourniquet, it can be easily manipulated between open and closed position.

The foregoing will become more apparent during the following disclosure and by referring to the drawings, in which:

FIG. 1 is a front elevation of the device in accordance with the first embodiment when used as a tourniquet and shown in closed position;

FIG. 2 is a side elevation of the first embodiment in partially closed position;

FIG. 3 is a side elevation of the device in open position;

FIG. 4 is a back elevation of the device in open position;

FIG. 5 is a cross-section along line 5—5 of FIG. 1;

FIG. 6 is a cross-section along line 6—6 of FIG. 4 and showing the covering partly removed to show the inside armature;

FIG. 7 is a partial cross-section of the armature on an enlarged scale in the closed position;

FIG. 8 is a similar partial cross-section in open position;

FIG. 9 is a top plan view of one U-shaped member;

FIG. 10 is a plan view of one V-shaped spring;

FIG. 11 is a partial plan view of the armature in closed position;

FIG. 12 is a front elevation of a second embodiment of the invention used as an artificial anus;

FIG. 13 is a side elevation of the embodiment of FIG. 12; and

FIG. 14 is a cross-section, on an enlarged scale, taken along line 14—14 of FIG. 12.

In the drawings, like reference characters indicate like elements throughout.

The closure device A in accordance with the first embodiment is of generally circular shape and is composed of an armature generally indicated at 1 and shown in FIGS. 5 to 11 and a covering 2 completely enclosing the armature 1 and made of flexible material, preferably sponge rubber or the like, to act as a cushion and capable of flexing so that the armature may be closed and opened. Covering 2 preferably consists of a double wall annular member. The device in closed position defines a small size central opening 3, as shown in FIG. 1, which is mainly circular but preferably provided with a boss 4. In the open position of the device, as shown in FIG. 4, the central opening 3 is enlarged to at least twice its closed size, boss 4 being cor-

respondingly extended. In the closed position of the device, the central web 5 of the covering extends substantially in a radial plane while it forms a substantially tubular member in the open position of the device, as shown in FIG. 3. The tubular member is generally frusto-conical in shape, although it could be completely cylindrical.

The armature 1 comprises a rigid base ring 6, shown in FIGS. 5 to 8 and 11, and made of wire. A plurality of U-shaped members 7 are pivotally connected to base ring 6. Each U-shaped member is made of a steel wire, such as piano wire, has a bight portion 8 with two slightly diverging legs 9 and 10 bent at their outer ends to form a loop 11 freely surrounding the base ring 6. Furthermore, one leg, for instance leg 10 of each U-shaped member 7, is bent into a loop 12 intermediate the ends of the leg for receiving the ends of spring members, generally indicated at 13, which urge the U-shaped members 7 into closed position.

As shown in FIG. 10, each spring member 13 is of generally V-shape, its straight legs having inturned end portions 14 and its apex bent to form one or more spires 15 to provide sufficient elasticity to the spring. There are as many spring members 13 as there are U-shaped members 7 and the end portions 14 of each spring member engage the intermediate loop 12 of two adjacent U-shaped members, each loop 12 receiving the end portions 14 of two adjacent spring members with the end portions 14 inserted from opposite sides of the loop 12. The spring members 13 are preferably disposed on the outside of the U-shaped members 7 when the latter are seen in open position and spires 15 are close to bights 8. The spring members 13 extend in substantially a plane parallel to the plane of the associated U-shaped member and urge the U-shaped members laterally one towards the other. Thus, they urge the U-shaped member into closed position. Each U-shaped member 7 overlaps the adjacent U-shaped member, as clearly shown in FIG. 11. In the closed position of the U-shaped members, the overlap is a maximum, the bight portions 8 overlapping each other. In the open position of the U-shaped members 7, as shown in FIG. 6, the overlap is a minimum, the legs 9, 10 overlapping each other. In order to obtain this overlap, one or more legs of adjacent U-shaped members 7 are pivoted to the base ring 6 intermediate the two legs 9 and 10 of any given U-shaped member 7, as clearly shown in FIG. 11.

The degree of overlap of the U-shaped members may be made greater or larger so as to preferably maintain a substantially continuous inner ring formed by the bight portions 8, not only in the fully closed position of the U-shaped members but also in partially open position of the same.

The continuous expandable ring formed by the bight portions 8 may be completely circular or may have another shape, depending on whether identical U-shaped members are provided or whether some of the U-shaped members have a special form. The members 7 of FIG. 11 provided along all the periphery of the base ring 6 would provide a circular inner ring made of bight sections 8. However, this figure shows some specially shaped U-shaped members 7' for defining the boss 4 apparent in the covering 2, as shown in FIGS. 4 and 1. The U-shaped members 7' are progressively of

longer length with progressively inclined bight portion 8' on each side of the center of boss 4 starting from the regular shaped members 7. They overlap in the same manner as members 7 and are pivotally connected to the base ring 6 in the same manner.

The spring members 13 resiliently maintain each U-shaped member 7 and 7' in a radial plane in which the members 7, 7' extend radially inwardly from the base ring 6 and are substantially in the plane of said base ring 6. Means are provided to open the device against the action of spring members 13 and to keep the device in open position.

Said means comprises a fulcrum ring 16, of rigid wire material and of smaller diameter than base ring 6, such that the fulcrum ring 16 may freely pass through the base ring 6. The fulcrum ring 16 extends on one side of the U-shaped members 7 and bear against the same, being supported in coaxial position with base ring 6 by means of connector members formed by elongated loops 17 freely surrounding the two base rings and extending radially thereof, the elongated loops 17 being connected two by two by a bow-shaped operator member 18, which forms a single length of wire with the loops 17, the latter being formed by bending the two ends of the wire to form the two loops 17. The members 17, 18 serve as lever for pushing the fulcrum ring 16 through the base ring 6 against the action of the spring members 13.

Referring to FIGS. 7 and 8, in the closed position of U-shaped members 7, the operator members 18 extend at an angle to the plane of the base rings in a direction radially outwardly opposite the position of the fulcrum ring 16. The latter abuts the ends of loops 17 and is therefore stopped in a position where it prevents opening of U-shaped members 7 in the wrong direction. Pressure exerted on the bow-shaped members 18 in a direction to pivot the elongated loops 17 in the direction of arrow 19 causes axial movement of the fulcrum ring 16 through the base ring 6 to extend on the opposite side, thereby pivoting the U-shaped members 7 outwardly, as shown in FIG. 8. During this movement, the fulcrum ring 16 is free to move within the elongated loop 17, as these loops describe an arcuate movement while the ring moves in a straight direction.

The U-shaped members are kept in open position because the fulcrum ring 16 on which rest the U-shaped member 7 is sufficiently spaced from the base ring 6 and sufficiently closed to the loops 12, which are the point of attachment of the spring members 13, such that the springs 13 are no longer able to overcome the friction between the several U-shaped members 7 and the fulcrum ring 16 and thus are unable to move the fulcrum ring 16 back through the base ring. This is assisted by the fact that each leg of each U-shaped member 7 is bent at 19, so as to form a shoulder bearing against the fulcrum ring in the open position of the device and which maintains the ring in its device opening position in a positive manner. These shoulders also maintain the fulcrum ring in a plane substantially parallel to the base ring, so that all of the U-shaped members are in uniform open position.

Pressure exerted on the bow-shaped members 18, at least two of them at diametrically spaced points of the base ring while holding the base ring, in a direction to pivot the loops 17 in a direction contrary to arrow 19,

force the fulcrum ring 16 upwardly through the base ring, as seen in FIG. 8, until a point where spring members 13 take over and resiliently force the U-shaped members 7 into closed position.

Referring to FIG. 3, it is shown that pressure of the fingers on the two rings, so as to force the fulcrum ring through the base ring in the direction indicated by arrows 21, will cause opening of the device, while pressure exerted in the opposite direction will cause closing of the device. With the device surrounding a member to be compressed, the springs 13 exert uniform pressure all around the member in a plurality of inclined position of U-shaped member 7 with respect to the plane of the base ring. Thus, the tourniquet is able to compress members of different diameters.

The device, when surrounding the base of the penis indicated at 22 in dotted line in FIGS. 2 and 4 and when folded thereover with the boss 4 positioned opposite the urethra, will effectively compress the penis and block the urethra 22' when closed over the same. This has been found to facilitate erection especially amongst men affected with erection difficulties, and also because it blocks the urethra, provides an effective contraceptive.

The covering 2 is preferably made of sponge rubber to provide a cushioning effect and completely surrounds the armature to form an annular member; obviously, the armature is free to move between open and closed position within covering 2.

The device slightly modified can be used as an artificial anus to be grafted in the rectum zone of a patient who had been operated for choleostomy for replacing the sphincter ani. Such an artificial anus is shown in FIGS. 12 to 14. The rubber covering 23, when the device is in closed position, completely closes the central opening 24. This central opening is of circular shape but may be of elongated shape, as shown in FIG. 12. The periphery of the covering 23 is adapted to be grafted.

An armature 25 is entirely embedded within the covering 23. The armature 25 is substantially of the same construction as in the previous embodiment, except that it does not require any fulcrum ring 16 and bow-shaped members 18 with their elongated loops 17. Also, the U-shaped members 26 are all identical and have the same shape as U-shaped members 7, as shown in FIG. 9, and mounted in the same manner on the base ring 27. Each U-shaped member 26 has an intermediate loop 28 intermediate the ends of one of its legs as loop 12 for receiving the ends of V-shaped spring members 13, as in the previous embodiment.

With this system, the springs maintain the loops 26 in closed position in a resilient manner but allow opening of the device in either direction with respect to the base ring 27, as shown in dotted line in FIG. 14. The marginal edge of covering 23 defining the central opening 24 can be thickened to provide a better closure.

I claim:

1. A device for medical use comprising a ring, a plurality of U-shaped members each having a bight portion and two legs, the outer ends of the legs pivoted to said ring, said U-shaped members disposed side by side and pivotable between a closed position radially inwardly extending from said ring substantially in the plane of the latter, and an open position inclined to said plane

with all of said U-shaped members forming a substantially tubular member and spring means acting on said U-shaped members to urge the same into one of said positions.

2. A device as claimed in claim 1, wherein said spring members are carried by said U-shaped members and exert a force in the plane of said U-shaped members and transverse to said legs to bring said U-shaped members closer to one another and, consequently, urge said U-shaped members into closing position.

3. A device as claimed in claim 2, wherein said spring means include as many individual V-shaped springs as there are U-shaped members, each defining an apex and two limbs, the ends of the limbs attached to one leg of two adjacent U-shaped members, the limbs of said V-shaped spring members being stressed away from each other from their normal unstressed position.

4. A device as claimed in claim 1, wherein a leg of at least one adjacent U-shaped member is pivoted to said ring intermediate the two legs of any given U-shaped member, so that all the U-shaped members overlap one another.

5. A device as claimed in claim 4, wherein in the closed position of said U-shaped members, the right portions of said U-shaped members overlap one another so as to form a continuous edge portion at the radially inner end of said closed U-shaped members.

6. A device as claimed in claim 5, wherein each U-shaped member and each spring is made of spring wire and one leg of each U-shaped members is formed into a loop intermediate its ends, the ends of the V-shaped spring members being bent and engaging said loops, the V-shaped spring members extending in a plane substantially parallel to the plane of the U-shaped members with the apex away from said base ring.

7. A device as claimed in claim 2, further including means to open said U-shaped members substantially simultaneously, said means comprising a fulcrum ring

of smaller diameter than said base ring, connector means between said fulcrum ring and said base ring, affording a lost movement linkage between said two rings, said connector means maintaining said fulcrum ring substantially coaxial with said base ring and in a plane substantially parallel to the plane of said base ring and on the same side of said U-shaped member, and handle means rigid with said connector means to pivot said connector means about said base ring and force said fulcrum ring through said base ring to cause simultaneous pivotal movement of said U-shaped members against the action of said spring members.

8. A device as claimed in claim 7, wherein said connector means consists of elongated loops surrounding the two rings and radially directed, said elongated loops in the closed position of said U-shaped members acting as a stop against further separation of said two rings and maintaining said rings against the back of said U-shaped members to form a stop to prevent opening pivoting movement of said U-shaped members in a direction opposite to their normal opening movement.

9. A device as claimed in claim 8, wherein in the open position of said U-shaped members said fulcrum ring is axially spaced from said base ring and is sufficiently closed to the points of connections of said spring members to said U-shaped members, so that the spring action of said spring members is insufficient to overcome the friction between said fulcrum ring and said U-shaped members, whereby said U-shaped members are maintained in open position by said fulcrum ring.

10. A device as claimed in claim 9, wherein each leg of each U-shaped member forms a shoulder close to its pivotal connection to said base ring engageable by said fulcrum ring in the open position of said U-shaped members to maintain said fulcrum ring in substantially a plane parallel to said base ring and thereby to obtain uniform opening of said U-shaped members.

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