

(19)



(11)

EP 2 777 601 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.09.2014 Bulletin 2014/38

(51) Int Cl.:
A61D 1/02 (2006.01)

(21) Application number: **13305279.5**

(22) Date of filing: **12.03.2013**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME

- **Braud, Ludovic**
49250 Saint-Rémy La Varenne (FR)
- **grosbois, karl**
49130 Les Ponts de Ce (FR)

(71) Applicant: **Desvac**
49112 Pellouailles Les Vignes (FR)

(74) Representative: **Provost, Antoine**
Cabinet Vidon
Technopôle Atalante
16B, rue de Jouanet
35703 Rennes Cedex 7 (FR)

(72) Inventors:
• **Gonzales Alonso, Carlos**
28023 Madrid (ES)

(54) **Device for inoculating a veterinary product into a poultry bird's wing**

(57) The invention pertains to a device for inoculating at least one veterinary product into at least one poultry bird, said device comprising a scarifying tool (30) of said

poultry bird and delivering means (73, 78, 79, 302, 4, 42) of said veterinary product at the previously scarified area.

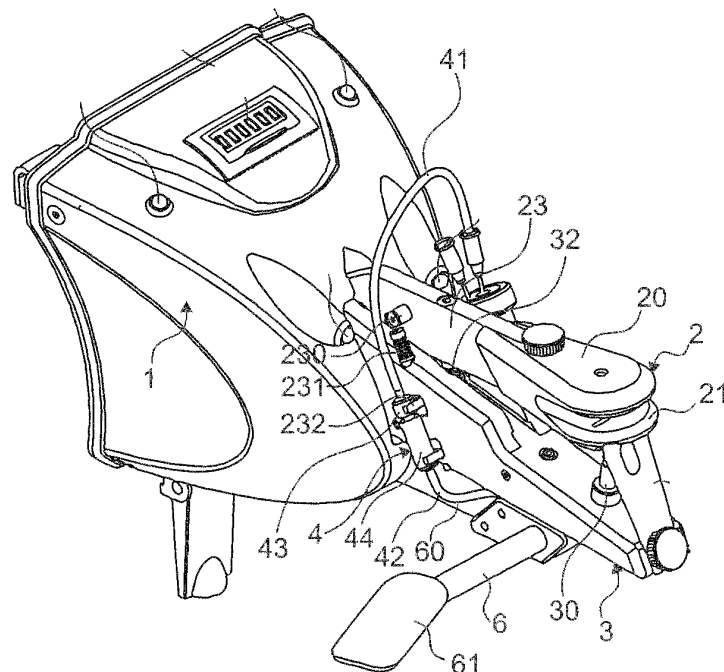


Fig. 2

EP 2 777 601 A1

Description

1. Field of the Invention

[0001] The field of the invention is that of the designing and fabrication of devices for assistance with veterinary practices. More specifically, the invention pertains to a device for inoculating birds, and more particularly poultry birds with veterinary products according to a technique by which the veterinary products are inoculated into the poultry bird's wing.

2. Prior Art

[0002] In the field of poultry breeding, it is classic to have to administer veterinary products, and especially vaccines, to poultry birds.

[0003] For certain poultry birds and certain veterinary products, one method of inoculation consists in depositing the veterinary product on the membrane known as the wing-web membrane, situated in the front part of the wing and extending between the radius and the humerus of the wing. It must be noted that at this spot, the wing-web membrane has a relatively small thickness, of the order of 1 mm.

[0004] This method of inoculation, also called transfixion or "wing-web" inoculation is among others widely used for the live vaccine that can be administered only in this way, namely the vaccine against avian pox.

[0005] Vaccination against this disease is very important in breeding because it has a heavy economic impact. Indeed, avian pox causes a drop in egg laying and affects growth performance in birds.

[0006] In addition, for many years now, pox viruses and especially avian pox virus are being seen to be remarkable vectors, through the achievements of genetic engineering, for inducing immunity against the foreign antigens for which they code. These vectors are also used to vaccinate poultry birds against many other diseases and by way of an example, we may cite the Vectormune(R)FP-LT by Ceva Santé Animale which contains a live fowlpox virus genetically modified to express infectious avian laryngotracheitis in vivo.

[0007] Thus, the wing-web method is widely used in poultry farming and is an integral part of vaccination campaigns to vaccinate poultry birds against either avian pox or other infectious diseases.

[0008] At present, this method of vaccination works as follows:

- the operator grasps the poultry bird and unfolds one of its wings so as to reveal the wing-web membrane;
- the operator dips a needle into a vaccine container, this needle having a groove that extends longitudinally and forms a sort of reserve for a dose of veterinary product;
- the operator jabs and make the needle cross the bird's wing at said wing-web membrane on one or

even two points (transfixion).

[0009] The veterinary product in the reserve of the needle gets deposited on either side of the needle in the wound made by the needle.

[0010] A method of vaccination, or more generally a method for administering a veterinary product, performed in this way, has several drawbacks, among them:

- the manual administration of a veterinary product proves to be excessively lengthy and painstaking, especially as the number of poultry birds to be treated may be very great;
- the administration of veterinary products is not done with high precision since the technique of dosing by means of the reserve in the needle turns out in practice to be imprecise or even random;
- the needle used for the inoculation of veterinary products comes into contact successively with the birds and with the veterinary product contained in the container in which the needle is dipped, at the risk of polluting the container of veterinary product;
- there is a risk that the operator might injure himself or herself with the needle.

[0011] With the aim to at least partially overcome these drawbacks, the vaccination by scarifying was developed.

[0012] The vaccination by scarifying is a method that consists in making a scarification on the skin of the subject to be vaccinated, i.e. making a slightly injury by means of a superficial incision of the surface of the dermis. The product to inoculate to the subject is brought into contact with this superficial injury of the dermis.

[0013] A device is known for inoculating a veterinary product into one poultry bird by vaccination by scarifying on the wing-web membrane situated in the front part of the wing and extending between the radius and the humerus of the wing.

[0014] Such a device comprises:

- a jaw comprising an upper part and a lower part, these parts together demarcating a receiving space designed to receive the wing-web membrane;
- a scarifying tool borne by a supporting element, this scarifying tool having a channel designed to deliver a dose of veterinary product,
- means for dosing the veterinary product, connected firstly to a container of veterinary product and secondly to the channel of the scarifying tool,

the jaw and/or the supporting element being movable towards each other and being designed to enable the scarifying tool to be brought into said receiving space.

[0015] Such a device, implementation of which allowing to vaccinate by scarifying, procures many advantages, among them:

- it clearly provides assistance to the operator, ena-

bling him to treat poultry birds more speedily and in improved conditions of comfort and safety;

- it provides for a precise and constant dosing of the inoculated veterinary products;
- it prevents risks of pollution of the veterinary products stored in the container by preventing direct contact between the scarifying tool and the container;
- in general, the circuit through which the veterinary product is conveyed into the device is isolated from any external environment (except, of course, for the passage through which it is delivered).

[0016] Such a device makes it possible to get some good results in terms of efficiency of vaccination by scarifying. It is however possible to further improve vaccination by scarifying.

3. Drawbacks of the prior art

[0017] The design of such a device is such that the moment at which the product to inoculate is brought into contact with the injury of the dermis during the vaccination is not precisely controlled.

[0018] Most of the time, the product to inoculate is brought into contact with the wing-web membrane before or during scarifying what is not optimized in terms of vaccination efficiency.

[0019] During vaccination, a portion of this product sometimes spreads on a part of the wing-web membrane that will not be later scarified. This is in particular the case when the product is inoculated before scarifying. This portion of product is consequently not inoculated that has an impact on the vaccination quality in terms of efficiency.

4. Goals of the invention

[0020] The invention is aimed especially at overcoming these drawbacks of the prior art.

[0021] More specifically, it is a goal of the invention to propose a device for improving, in at least one embodiment, the efficiency of the inoculation of a product in a subject by scarifying.

[0022] The invention aims to provide such a technique enabling, in at least one embodiment, to precisely control the moment at which the product to inoculate is effectively inoculated.

[0023] More precisely, the invention aims to provide such a technique enabling, in at least one embodiment, to inoculate the product after scarifying.

[0024] It is also a goal of the invention to provide such a device enabling, in at least one embodiment, to improve the inoculation of a veterinary product into a poultry bird's wing-web membrane by scarifying.

[0025] It is also a goal of the invention to provide such a device enabling, in at least one embodiment of the invention, to protect the integrity of the wing during inoculation.

[0026] It is another goal of the invention to provide such

a device being, in at least one embodiment, simple designed and/or simple to implement.

3. Summary of the invention

[0027] These goals, as well as others that shall appear here below, are achieved by means of the invention, an object of which being a device for inoculating at least one veterinary product into at least one poultry bird, said device comprising a scarifying tool of said poultry bird and delivering means of said veterinary product at the previously scarified area.

[0028] Thus, the invention relies on a wholly original approach which consists in providing a device for inoculating a veterinary product into a poultry bird comprising a scarifying tool implemented to make a slightly injury of the poultry bird by means of a superficial incision of the surface of its dermis, and delivering means designed to deliver the veterinary product at the scarified area previously made by the scarifying tool.

[0029] As the delivery means are designed to deliver the veterinary product at the previously scarifying area, the product to inoculate is brought into contact directly with the superficial injury of the dermis. The efficiency of the vaccination is consequently improved.

[0030] Preferentially, said scarifying tool comprises a supporting part and a scarifying part crossing by at least one delivering channel of said product, said scarifying part being movable relative the said supporting part along a displacement area comprising a first portion and a second portion, said delivering means of said veterinary product inside of said channel being inactive when said scarifying part moves along said first portion and being active when said scarifying part moves along said second portion.

[0031] In order to scarify the dermis of the subject to be vaccinated, the scarifying part is rested against the dermis. As the scarifying part meets the dermis, it moves relative to the supporting part. During a first portion of this displacement course, the scarifying part scarifies the dermis. Then, the delivery means delivers the product at the previously scarified area as the scarifying part moves relative to the supporting part along a second portion.

[0032] When the scarifying tool is rested against the dermis, the scarifying part meets the surface of the dermis and then moves relative to the supporting part while being essentially immobile relative to the surface of the dermis. The dermis is consequently scarified without any deterioration of the integrity of the subj ect.

[0033] Preferentially, said supporting part comprises an element forming a hollow shaft or a bore inside of which said scarifying part is movably mounted in translation along said displacement area.

[0034] This is a very simple way to provide a good guiding of the scarifying part and the supporting part relative to each other.

[0035] Preferentially, said scarifying part is movable from an extreme position from said first portion to said

second portion, said device comprising return means of said scarifying part to said extreme position.

[0036] The scarifying part consequently returns to its extreme position as soon as the scarifying tool is no longer rested against the dermis.

[0037] A device according to the invention preferentially comprises:

- a jaw comprising an upper part and a lower part, these parts together demarcating a receiving space designed to receive the wing-web membrane situated in the front part of the wing and extending between the radius and the humerus of the wing of said poultry bird;
- a supporting element supporting said scarifying tool;

said jaw and/or said supporting element being movable towards each other and being designed to enable said scarifying tool to be brought into said receiving space, said scarifying part moving along said first portion and then along the second portion when said jaw and/or said supporting element move towards each other, and conversely along said second portion and then along said first portion when said jaw and/or said supporting element move away from each other.

[0038] According to this embodiment, the inoculation of a veterinary product on the wing-web membrane situated in the front part of the wing and extending between the radius and the humerus of the wing of a poultry bird can simply be obtained by moving the jaw and/or the supporting element towards each other.

[0039] A device according to the invention preferentially comprises actuating means of said delivering means, said actuating means not acting on said delivering means when said jaw and/or said supporting element move towards each other along a displacement course during which said scarifying part moves along said first portion, said actuating means acting on said delivering means when said jaw and/or said supporting element move towards each other along a displacement course during which said scarifying part moves along said second portion.

[0040] It is then made sure that the veterinary product is delivered only after the dermis is previously scarified.

[0041] Preferentially, said delivering means comprise a pump interdependent with said supporting element comprising a chamber and a piston, said actuating means comprising a rod, an extremity of which being interdependent with said piston or with said jaw and a finger interdependent with said jaw or said piston, said finger acting on said rod or said rod acting on said finger to displace said piston to deliver said product inside of said channel when said jaw and/or said supporting element move towards each other along a displacement course during which said scarifying part moves along said second portion.

[0042] According to another preferential embodiment, said delivering means comprise a pump interdependent

with said jaw comprising a chamber and a piston, said actuating means comprising a rod, an extremity of which being interdependent with said piston or with said supporting element and a finger interdependent with said supporting element or said piston, said finger acting on said rod or said rod acting on said finger to displace said piston to deliver said product inside of said channel when said jaw and/or said supporting element move towards each other along a displacement course during which said scarifying part moves along said second portion.

[0043] By these simple ways, the veterinary product is delivered by the pump only after the jaw and/or the supporting element are moved towards each other to scarify the dermis. The pump is initiated again moving the jaw and/or the supporting element away from each other.

[0044] According to one preferential embodiment, the device has a frame, the supporting element being mounted fixedly to said frame while said jaw is mounted movably on said frame so that it can be moved towards or away from said supporting element.

[0045] It can therefore be understood that, in this configuration, it is the jaw that is shifted towards the supporting element. Such a configuration proves to be particularly advantageous should the jaw be placed above the supporting element, it being possible for a downward thrust of the machine to be exerted simply and through a relatively natural gesture on the part of the operator in order to treat the poultry bird.

[0046] According to one preferential embodiment, the device comprises driving means that are manual and/or assisted in order to shift the jaw and/or said element towards each other.

[0047] Preferentially, said driving means comprises a lever mounted on a secondary arm that is movable integrally with said jaw in one direction of shift, said supporting element extending in said direction of shift between said secondary arm and said jaw.

[0048] Such a lever can then be maneuvered by a thrust directly exerted by the operator.

[0049] Preferentially, said driving means can be assisted by means known to those skilled in the art such as for example a pneumatic pump controlled by a foot-operated or pedal command.

[0050] A device according to the invention preferentially comprises means for dosing the veterinary product, connected firstly to a container of veterinary product and secondly to the channel of said scarifying tool.

[0051] A device according to the invention procures many advantages, among them:

- it improves the vaccination quality;
- it prevents the subject to be vaccinated from damage;
- it clearly provides assistance to the operator, enabling him to treat poultry birds more speedily and in improved conditions of comfort and safety;
- it provides for a precise and constant dosing of the inoculated veterinary products;
- it prevents risks of pollution of the veterinary products

stored in the container by preventing direct contact between the scarifying tool and the container;

- in general, the circuit through which the veterinary product is conveyed into the device is isolated from any external environment (except, of course, for the passage through which it is delivered).

4. List of figures

[0052] Other features and advantages of the invention shall appear more clearly from the following description of a preferred embodiment of the invention, given by way of an illustrative and non-exhaustive example, and from the appended drawings, of which:

- figures 1 and 2 are each a view in perspective and a general view of a device according to the invention;
- figures 3 and 4 are a partial view in perspective of a device according to the invention;
- figure 5 is an anatomical representation of a poultry bird's wing;
- figure 6 is a cross-section view of a scarifying tool of a device according to the invention ;
- figure 7 is a perspective view of the supporting element of the scarifying tool illustrated in figure 6 ;
- figures 8 and 9 are cross-section view of the scarifying tool of figure 6 respectively in a position for scarifying and in a position for delivering product.

5. Detailed description of the invention

[0053] As indicated here above, the principle of the invention consists in proposing a device to carry out an inoculation of at least one veterinary product into a poultry bird.

[0054] Referring to Figure 5, such an inoculation is preferentially performed in the context of the invention on the wing-web membrane M situated in the front part AV of the wing A and extending between the radius R and the humerus H of the wing.

[0055] Referring to Figures 1 and 2, a device according to the invention preferentially comprises:

- a frame 1 containing, according to the present embodiment, a streamlined assembly provided with several accessories described in greater detail here below;
- a jaw 2 within which a poultry bird's wing has to be placed in order to be inoculated with a veterinary product;
- a scarifying tool 30 borne by a supporting element 3;
- means 4 for dosing out the veterinary product and a container 40 attached to the device (detachably with a view to its replacement) and connected (also detachably) to the dosing means.

[0056] In addition, the jaw 2 and/or the supporting element 3 are movable relatively to each other and are

designed to enable the scarifying tool 30 to be brought into contact with a poultry bird's wing placed in the jaw 2 with a view to incising the membrane referred to here above.

[0057] As indicated in Figure 1, the jaw 2 has a receiving space 22 designed to receive the wing-web membrane situated in the front part of the wing extending between the radius and the humerus of the wing, this receiving space being demarcated between an upper part 20 and a lower part 21 of the jaw. The jaw 2 is attached to a primary arm 23.

[0058] The upper and lower parts of the jaw 2 are positioned relatively to one another so as to have a spread between them planned in such a way that the receiving space is adjusted in height approximately at the thickness of the wing-web membrane that is to be introduced into the jaw. In any case, the upper and lower parts 20, 21 of the jaw are spaced out relatively to each other by a height smaller than the height of the radius and/or humerus of the bird's wing.

[0059] Furthermore, as illustrated in Figure 6, the scarifying tool 30 comprises a scarifying part 70 and a supporting part 71.

[0060] The supporting part 71 comprises a bore 72 realized along its longitudinal axis through a portion of its length. A channel 73, communicating with the bore 72, goes through the supporting part 71 along its longitudinal axis. A drilling 74, communicating with the bore 72, goes through the supporting part 71 along an axis that is orthogonal to the longitudinal axis of the supporting element 71.

[0061] The scarifying part 70 comprises a scarifying end 75 having at least one point 301, the scarifying tool 30 according to the present embodiment having four points 301. The scarifying end 75 is prolonged by an element forming an axle 76. This axle 76 is designed to be inserted inside of the bore 72 in such a way that the scarifying part 75 is able to move inside of the bore 72 relative to the supporting part 71 along its longitudinal axis. A groove 77 is arranged around an end of the axle 76. An annular stop 83 is arranged at this end of the axle 76. A channel 78 goes through the scarifying part 70 from its end and opens out onto ducts 79. Each duct 79 goes through a point 301 and opens out onto its extremity. The axle 76 have a flat section 80 arranged on a plane that is essentially parallel to its longitudinal axis.

[0062] In order to assembly the scarifying tool 30, a O-ring joint 81 is inserted inside of the groove 77. A compression spring 82 is mounted around the end of the axle 76 in such a way that it abuts against the annular stop 83. The axle 76 is then inserted inside of the bore 72. A pin 84 is inserted inside of the drilling 74 and of the space between the flat section 80 and the peripheral interior outline of the bore 72. The scarifying part 70 is then maintained inside of the supporting part 71 in such a way that it can move inside the bore 72 against the effect of the compression spring 82 or under the effect of compression spring 82 as it will be further explained hereafter.

[0063] The channel 73 of the supporting part 71, the channel 78 of the scarifying part 70 and the ducts 79 define altogether a delivery channel 302 designed to deliver a dose of veterinary product on and/or beneath the wing-web membrane, once the scarifying tool has incised the wing-web membrane placed in the jaw 2 and while the scarifying tool 30 is held between the upper part 20 and the lower part 21 of the jaw 2.

[0064] As can be seen in Figures 1 and 2, the dosing means 4 are constituted by a micro-pump mounted on the supporting element 3. A micro-pump of this kind is an element known to those skilled in the art. As it happens, the micro-pump used is sized so as to deliver 0.01ml doses.

[0065] The container 40 of veterinary product is also for its part mounted on the supporting element 3, on the face of the supporting element opposite the one carrying the dosing means. The container 40 is connected to the dosing means by a flexible conduit 41. Another conduit 42 connects the dosing means 4 to the scarifying tool 30, this conduit 42 communicating with the channel 302 of the scarifying tool in passing through the supporting element 30 by means of a passage 310 (Figure 4) provided for this purpose.

[0066] As can be seen in Figure 2, the micro-pump has a chamber 44 and a piston 43 laid out in a manner known per se so that a partial withdrawal of the piston out of the chamber causes a suction of product while a thrust of the piston into the chamber causes the product present in the chamber to be expelled out of the chamber. Furthermore, the primary arm 23 has a finger 230. This finger is designed to rest against a first extremity of a rod 231. This rod 231 extends in a passage crossing the wall of the supporting element 3. The other extremity of this rod 231 comprises a second finger 232 fixedly joined to the piston 43 of the micro-pump. Thus, the upward shift of the primary arm (while the supporting element 3 remains fixed) gives rise to a suction of product into the chamber and the downward shift of the primary arm (while the supporting element 3 remains fixed) causes product to be expelled toward the scarifying tool only on an end portion of this displacement of the primary arm. The rod 231 is surrounded by a spring that helps to draw the rod back in the high position.

[0067] The first finger 230, the rod 231 and the second finger 232 form actuating means of veterinary product delivery means that comprise among other the micro-pump.

[0068] The actuating means are so designed that:

- along a first course of displacement of the support element 3 and the jaw 2 towards each other, the first finger 230 does not rest against the first extremity of the rod 231, the second extremity of the rod and the second finger 232 consequently staying immobile so that no veterinary product is delivered;
- along a second course of displacement of the support element 3 and the jaw 2 towards each other

following the first one, the first finger 230 rests against the first extremity of the rod 231, the second extremity of the rod and the second finger 232 consequently resting against the piston 43 so that veterinary product is delivered.

[0069] When the support element 3 and the jaw 2 move towards each other along the first course, the scarifying part 70 moves relative to the supporting part 71 along a first portion of its displacement area. When the support element 3 and the jaw 2 move towards each other along the second course, the scarifying part 70 moves relative to the supporting part 71 along a second portion of its displacement area following the first one. The delivering means are only active to deliver product on the second portion.

[0070] According to the present embodiment of the invention, the device has a configuration according to which:

- the supporting element 3 extends beneath the jaw 2;
- the supporting element is mounted so as to be fixed to the frame 1 while the jaw is carried by the primary arm 23 mounted movably on the frame 1, in such a way that the jaw 2 can be brought closer to or moved away from the scarifying tool (the points of which are therefore pointed upwards).

[0071] In this configuration, it can be noted that:

- the lower part 21 of the jaw has a hole 210 sized and positioned so as to enable the passage of the scarifying tool 30 in order to bring it into the receiving space 22 demarcated between the lower part and the upper part of the jaw;
- the upper part 20 of the jaw has an hole 200, coaxial with the hole 210 of the lower part, making it possible to take the scarifying tool beyond the receiving space 22, and doing so in penetrating the upper part.

[0072] Furthermore, the hole 200 is provided with an insert 201 (shown in dashes in Figure 4) forming a stop for the scarifying tool. This insert herein takes the form of a washer, which may or may not be deformable, against which the points of the scarifying tool are to rest.

[0073] According to one possible variant, the insert can also take the form of a truncated part against which the scarifying tool abuts in being coaxial with the truncated part, this part being designed so that its end with the smallest diameter gets placed, at the end of travel, between the points of the scarifying tool while the points abut the external surface of the truncated part.

[0074] According to one other characteristic of the invention, the device comprises driving means designed to be actuated in this case by hand in order to shift the jaw 2 towards the supporting element 3.

[0075] As can be seen in Figures 1 and 4, these driving

means include:

- a secondary arm 60 that is movable integrally with the jaw 2 in the direction of shift D of the jaw towards the scarifying tool (this direction of shift D being shown in dashes in Figure 4 and corresponding according to the present embodiment to a curve passing through the center of the hole 200 of the upper part 20 of the jaw, through the center 210 of the lower part 21 of the jaw and through the central point between the four points of the scarifying tool), the secondary arm 60 extending beneath the supporting element 3 in such a way that, according to the present embodiment, the supporting element 3 extends between the secondary arm and the jaw in the direction of shift;
- a lever 6, mounted in an hole 600 of the secondary arm 60 so as to extend perpendicularly in a direction horizontal to the secondary arm, this lever having a plate 61 at its free end designed to form a resting surface either for the operator's hand or for the poultry bird's body (in this case the operator drives the lever and the bird together downwards).

[0076] In this configuration, it can be understood that the median plane of the primary arm, the median plane of the secondary arm and the median plane of the supporting element, all containing the direction of shift D, coincide with one another.

[0077] It must be noted that the lever 6 can be mounted equally well on either side of the secondary arm, depending on the lateralization of the operator, making it possible in other words for the lever to be positioned to the left or to the right of the device.

[0078] Furthermore, the primary arm bearing the jaw and the secondary arm bearing the lever are both mounted so as to be fixed on a common arm (not shown) pivoting on a fixed part of the frame.

[0079] Moreover, as can be seen in Figure 2, a return spring 32 is connected by one of its ends to the primary arm 23 and by its other end to the supporting element 3. A spring of this kind is designed to work in compression: when the primary arm is driven downwards (under the effect of a downward thrust exerted on the lever 6) the spring 32 is compressed. The result of this is that, when the thrust on the lever is relaxed, the spring tends to bring the primary arm back into a resting position at a distance from the supporting element.

[0080] Referring to Figure 3, it can also be noted that the supporting element 3 has, on a portion of its length, a shape of a trough 33 in which the primary arm 23 is guided laterally. Indeed, in the bottom position of the primary arm, this arm is contained in the trough 33.

[0081] The working of a device according to the invention in its embodiment described here above is as follows.

[0082] The operator seizes a poultry bird and spreads out one of the wings away from the bird so as to reveal the wing-web membrane situated in the front part of the

wing and extending between the radius and the humerus of the wing.

[0083] This cleared part of the membrane is introduced into the jaw 2, between the lower part and the upper part of the jaw which demarcates the receiving space 22.

[0084] The poultry bird's body is presented in such a way that the bottom of the wing is pointed downwards.

[0085] While the operator keeps the poultry bird with its wing engaged in the jaw of the device, he or she prompts a downward shift of the lever 6 by directly or indirectly pushing on the plate 61 of the lever.

[0086] The descent of the lever is accompanied simultaneously by the descent of the primary arm 23 and therefore, of the jaw 2 towards the supporting element 3. As and when this descent takes place, the scarifying tool gets engaged in the hole 210 of the lower part of the jaw.

[0087] The descent of the jaw 2 then continues a little until the points 301 of the scarifying tool pass through the membrane, doing so until they penetrate the hole 200 of the upper part 20 of the jaw. The points of the scarifying tool then come into contact with the deformable insert 201 placed inside the hole 200 of the upper part of the jaw.

[0088] At this stage, the jaw 2 had been moved along a first portion of its course of displacement and the dermis of the wing-web membrane is scarified by the scarifying part 70.

[0089] The descent of the jaw 2 then continues a little bit more. During this first portion of course of displacement, the support part 71 moves towards the jaw 2. The scarifying part 70 leans against the membrane relative to which it is essentially immobile. Consequently, the scarifying part 70 moves inside of the bore 72 of the supporting part 71 along a first portion of displacement during which it moves from its extreme position illustrated figure 8 to an intermediate position illustrated figure 6.

[0090] Along this first portion of the displacement of the scarifying part 70 inside of the supporting part 71, i.e. a first portion of displacement of the support element 3 and the jaw 2 towards each other, the delivery means are not activated as the finger 230 does not rest against the extremity of the rod 231, no veterinary product being consequently delivered inside of the delivery channel. Along this first portion of displacement, the scarifying is only made.

[0091] The descent of the jaw 2 then continues ones more along a second portion of its course of displacement. The scarifying part 70 still moves inside of the supporting part 71 along a second portion of displacement during which it moves from its intermediate position illustrated figure 6 to a final position illustrated figure 9. All along this second portion of displacement of the scarifying part 70, the first finger 230 rests against the first extremity of the rod 231 against the effect of the spring. As a consequence, the second extremity of the rod 231 and the second finger 232 rest against the piston 43 causing a dose of veterinary product to be drawn in from the container 40 by the micro-pump 4. This dose of veterinary product VP is sent through the conduit 42 into the chan-

nels 73, 78 and the ducts 79 and then expelled from the way out of the ducts 79 in the area previously scarified by the scarifying part 70.

[0092] According to the invention, the veterinary product is delivered only after the scarifying then improving the vaccination.

[0093] The action on the lever by the operator can then be relaxed. The spring 32 then causes the primary arm to return to its rest position, at a distance from the supporting element 3. The upward shift of the primary arm (while the supporting element 3 remains fixed) gives rise to a suction of product into the chamber as the spring pulls the rod 231 driving the same time the second finger 232 fixed to the piston 43. The scarifying part 70 goes back in its initial extreme position due to the effect of the compression spring 82 (cf. figure 8).

[0094] According to a preferred embodiment, the device of the invention is used to vaccinate poultry birds against avian pox.

[0095] According to another embodiment of the invention, the device is used to vaccinate poultry birds by the inoculation of genetically modified avian pox viruses to express antigens of one or more infectious diseases (vector vaccines) *in vivo*.

[0096] Preferably but not exhaustively, the genetically modified pox viruses express *in vivo* the antigens of Newcastle disease, infectious laryngotracheitis, avian encephalomyelitis or avian mycoplasmas.

[0097] According to an advantageous embodiment, the device of the invention is used to vaccinate poultry birds and more particularly hens, ducks and turkeys.

Claims

1. Device for inoculating at least one veterinary product into at least one poultry bird, said device comprising a scarifying tool (30) of said poultry bird and delivering means (73, 78, 79, 302, 4, 42) of said veterinary product at the previously scarified area.
2. Device according to claim 1, **characterised in that** said scarifying tool comprises a supporting part (71) and a scarifying part (70) crossing by at least one delivering channel (302, 73, 78, 79) of said product, said scarifying part (70) being movable relative the said supporting part (71) along a displacement area comprising a first portion and a second portion, said delivering means (73, 78, 79, 302, 4, 42) of said veterinary product inside of said channel (302, 73, 78, 79) being inactive when said scarifying part (70) moves along said first portion and being active when said scarifying part (70) moves along said second portion.
3. Device according to claim 2, **characterised in that** said supporting part (71) comprises an element forming a bore inside of which said scarifying part (70) is

movably mounted in translation along said displacement area.

4. Device according to claim 3, **characterised in that** said scarifying part (70) is movable from an extreme position from said first portion to said second portion, said device comprising return means (82) of said scarifying part (70) to said extreme position.

5. Device according to any one of claims 2 to 4, **characterised in that** it comprises:

- a jaw (2) comprising an upper part (20) and a lower part (21), these parts together demarcating a receiving space (22) designed to receive the wing-web membrane situated in the front part of the wing and extending between the radius and the humerus of the wing of said poultry bird;

- a supporting element (3) supporting said scarifying tool (30);

said jaw (2) and/or said supporting element (3) being movable towards each other and being designed to enable said scarifying tool (30) to be brought into said receiving space (22), said scarifying part (70) moving along said first portion and then along the second portion when said jaw (2) and/or said supporting element (3) move towards each other, and conversely along said second portion and then along said first portion when said jaw (2) and/or said supporting element (3) move away from each other.

6. Device according to claim 5, **characterized in that** it comprises actuating means (230, 231, 232) of said delivering means (73, 78, 79, 302, 4, 42), said actuating means (230, 231, 232) not acting on said delivering means (73, 78, 79, 302, 4, 42) when said jaw (2) and/or said supporting element (3) move towards each other along a displacement course during which said scarifying part (70) moves along said first portion, said actuating means (230, 231, 232) acting on said delivering means (73, 78, 79, 302, 4, 42) when said jaw (2) and/or said supporting element (3) move towards each other along a displacement course during which said scarifying part (70) moves along said second portion.

7. Device according to claim 6, **characterized in that** said delivering means comprise a pump (4) interdependent with said supporting element (3) comprising a chamber (44) and a piston (43), said actuating means comprising a rod (231) an extremity of which being interdependent with said piston (43) or with said jaw (2) and a finger (230) interdependent with said jaw (2) or said piston (43), said finger (230) acting on said rod (231) or said rod (231) acting on said finger (230) to displace said piston (43) to deliver

said product inside of said channel (302) when said jaw (2) and/or said supporting element (3) move towards each other along a displacement course during which said scarifying part (70) moves along said second portion.

5

8. Device according to claim 6, **characterized in that** said delivering means comprise a pump (4) interdependent with said jaw (2) comprising a chamber (44) and a piston (43), said actuating means comprising a rod (231) an extremity of which being interdependent with said piston (43) or with said supporting element (3) and a finger (230) interdependent with said supporting element (3) or said piston (43), said finger (230) acting on said rod (231) or said rod (231) acting on said finger (230) to displace said piston (43) to deliver said product inside of said channel (302) when said jaw (2) and/or said supporting element (3) move towards each other along a displacement course during which said scarifying part (70) moves along said second portion.
9. Device according to any one of claims 5 to 8, **characterized in that** it comprises a frame (1), said supporting element (3) being mounted fixedly to said frame (1) while said jaw (2) is mounted movably on said frame (1) so that it can be moved towards or away from said supporting element (3).
10. Device according to any one of claims 5 to 9, **characterized in that** it comprises driving means that are manual and/or assisted in order to shift the jaw (2) and/or said supporting element (3) towards each other.
11. Device according to claim 10, **characterized in that** said driving means comprises a lever (6) mounted on a secondary arm (60) that is movable integrally with said jaw (2) in one direction of shift, said supporting element (3) extending in said direction of shift between said secondary arm (60) and said jaw (2).

10

15

20

25

30

35

40

45

50

55

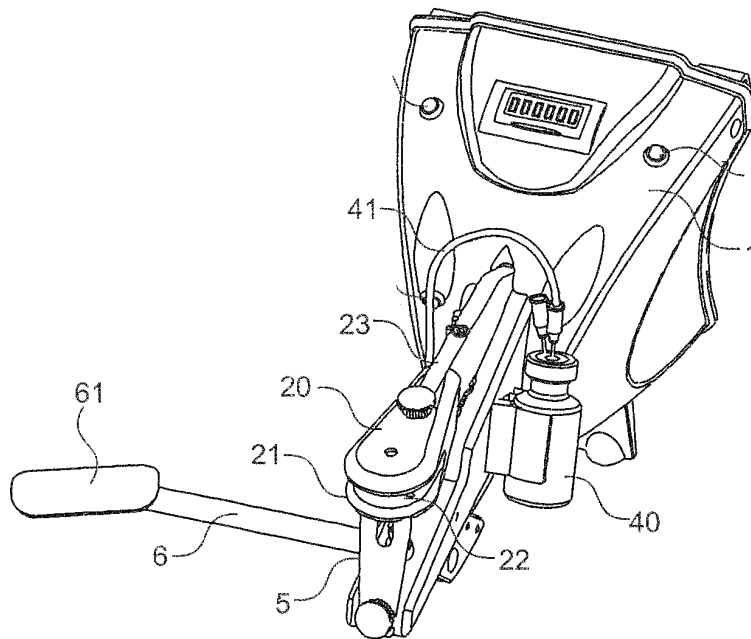


Fig. 1

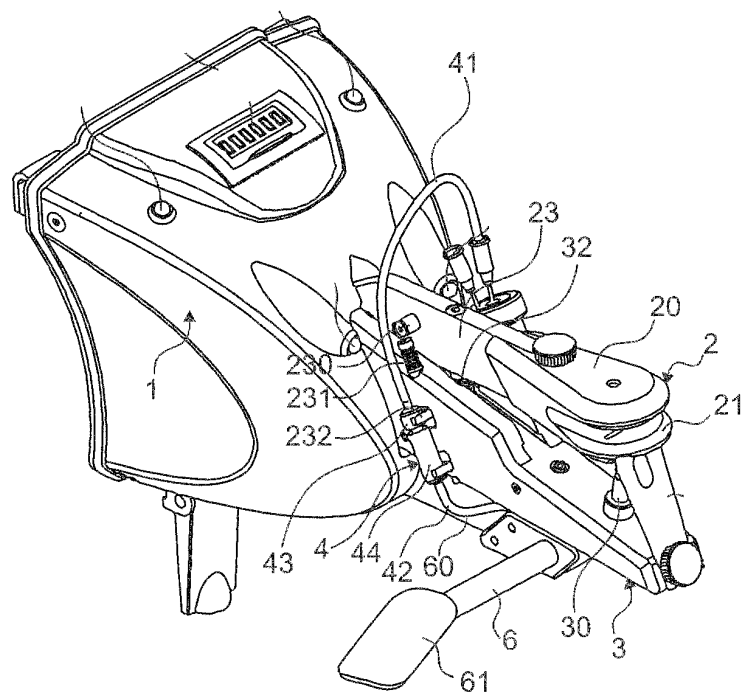


Fig. 2

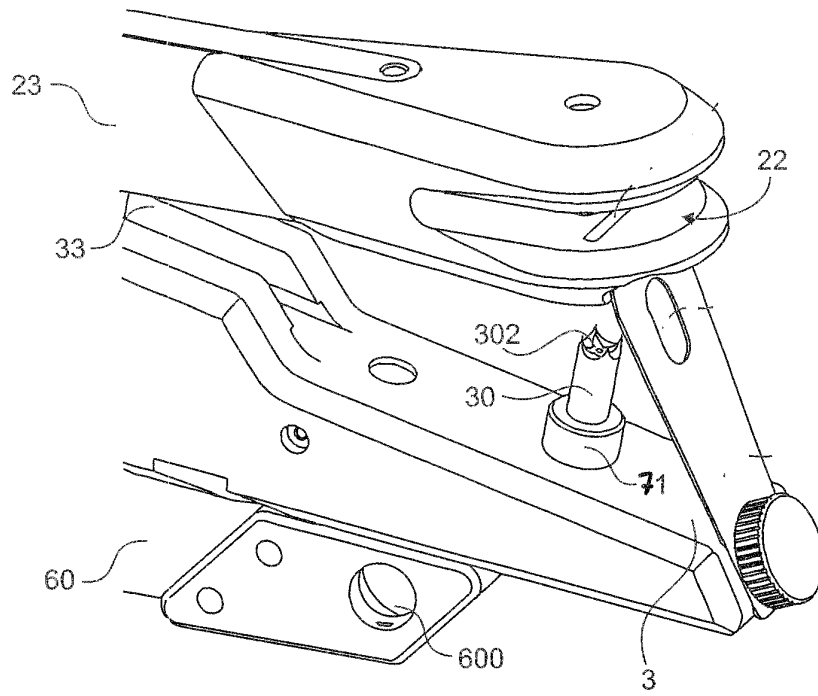


Fig. 3

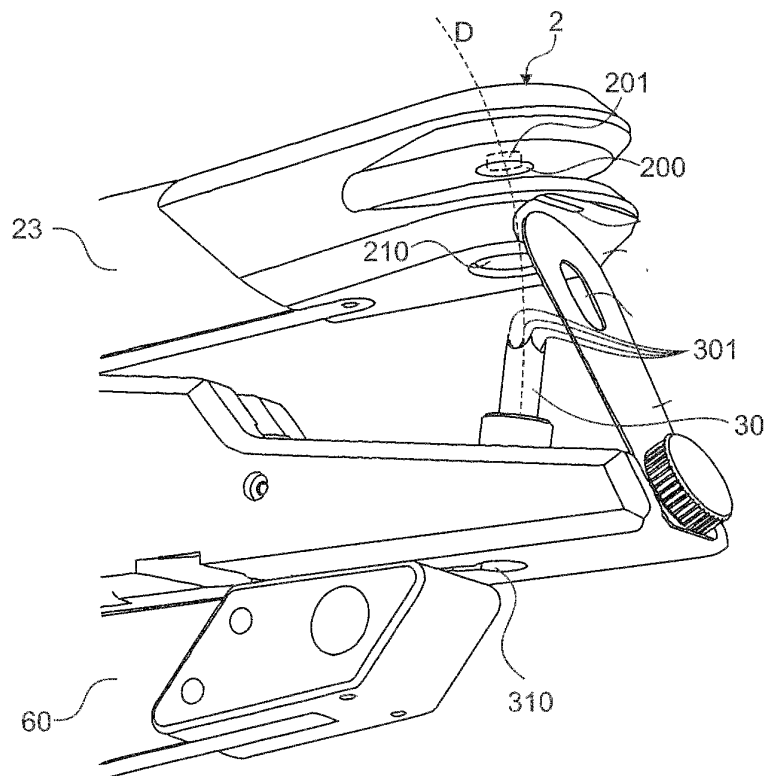


Fig. 4

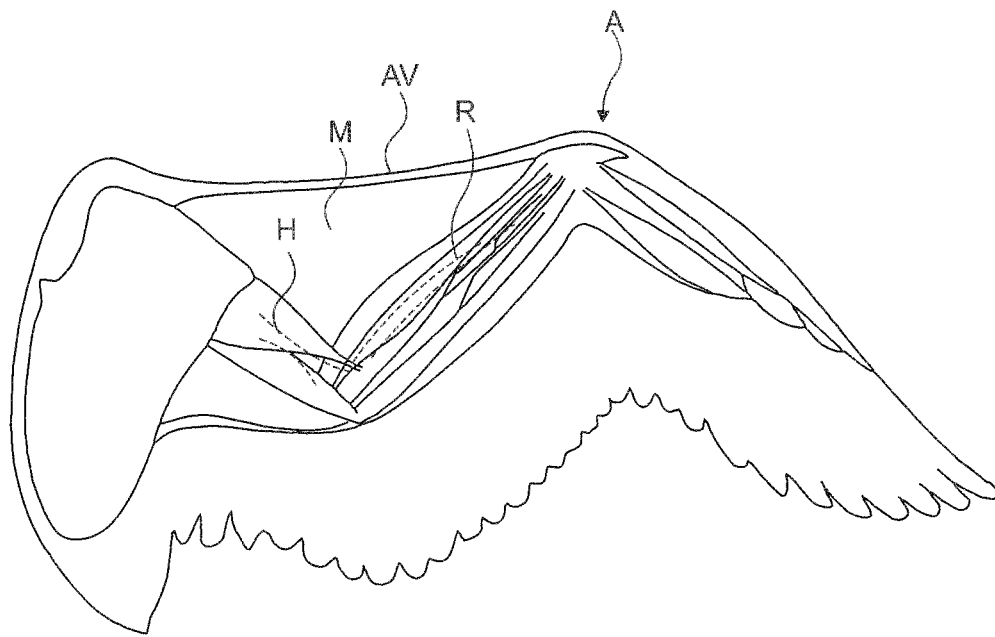


Fig. 5

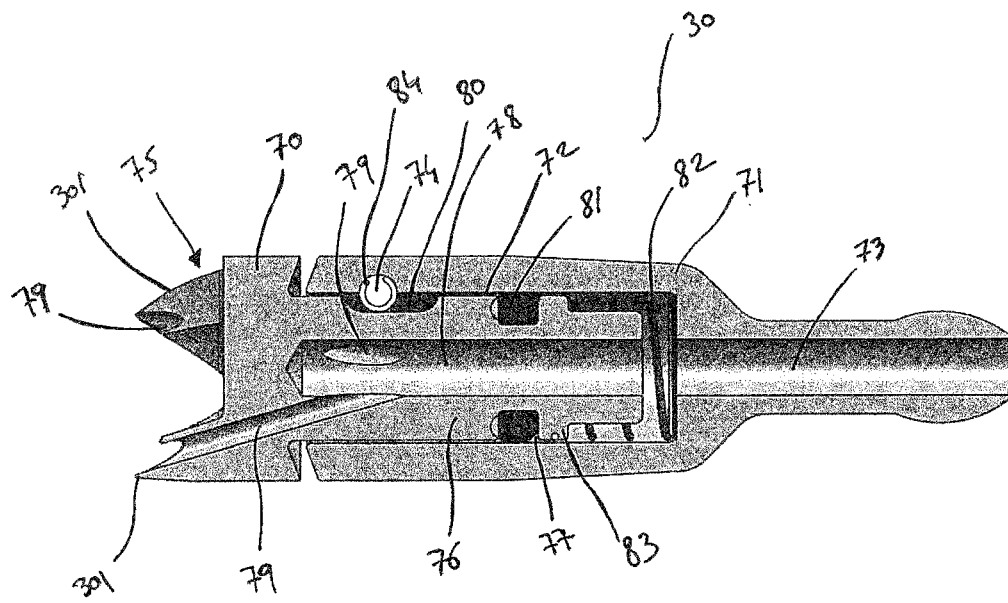


Fig. 6

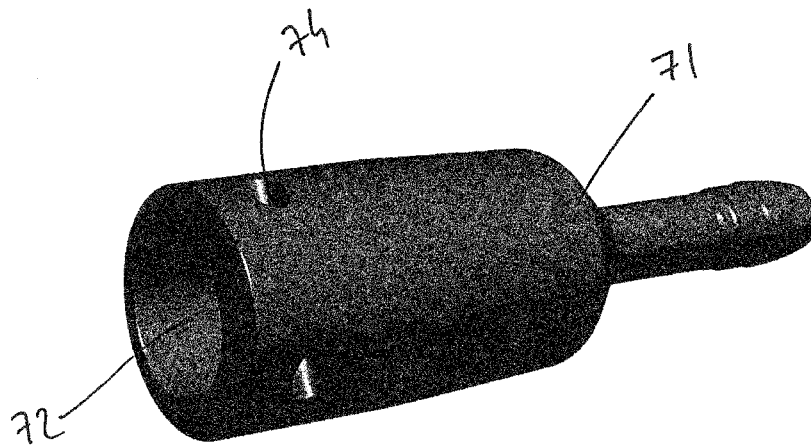
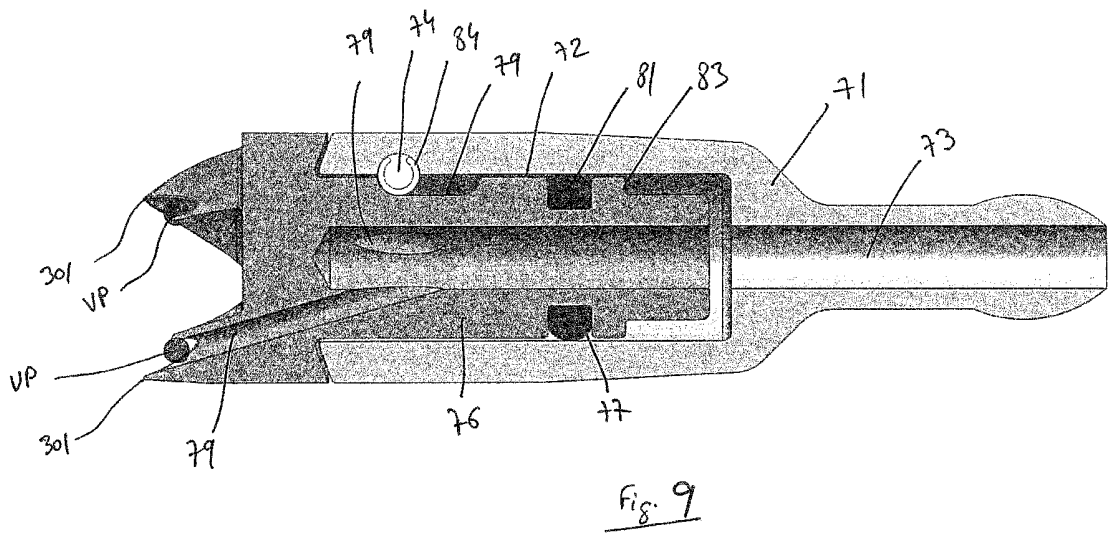
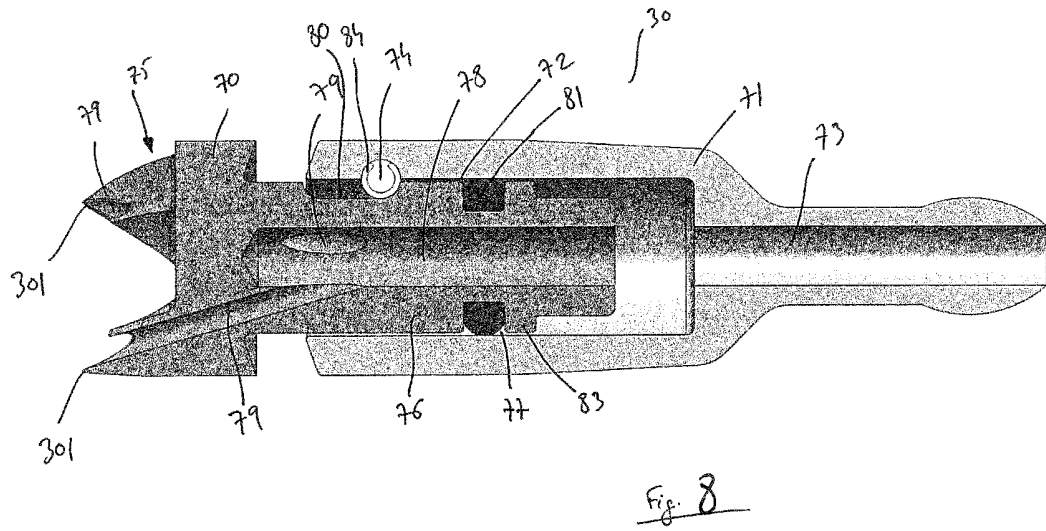


Fig. 7





EUROPEAN SEARCH REPORT

Application Number
EP 13 30 5279

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 96/07369 A1 (ARTHUR WEBSTER PTY LIMITED [NZ]; HORT MICHAEL [AU]) 14 March 1996 (1996-03-14) * page 1, paragraphs 1, 2 * * page 4, lines 20-24 * * page 5, paragraph 3 * * page 12, paragraph 3 - page 13, paragraph 2 * * figures 1, 2 *	1-4	INV. A61D1/02
X	US 2012/197181 A1 (GROSBOSIS KARL [FR] ET AL) 2 August 2012 (2012-08-02) * paragraphs [0001], [0022] - [0035], [0086], [0087], [0127] * * figures 1-4 *	1 2-11	
A	US 2 706 481 A (MIMMS SUTTON WILLIAM) 19 April 1955 (1955-04-19) * column 1, lines 34-37 * * column 2, line 26 - line 12 * * figures 1, 2 *	1,2	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61D A61B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 25 July 2013	Examiner Chabus, Hervé
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 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 13 30 5279

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

25-07-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9607369 A1	14-03-1996	AU 3487095 A WO 9607369 A1	27-03-1996 14-03-1996
US 2012197181 A1	02-08-2012	FR 2970863 A1 US 2012197181 A1 WO 2012104259 A1	03-08-2012 02-08-2012 09-08-2012
US 2706481 A	19-04-1955	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82