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(54) **GARDEN HOSE NOZZLES**

(57) A garden hose nozzle comprising a body and a sleeve which is mounted on the body for axial movement relative to the body, the nozzle having an inlet for connection to a supply of water, a main outlet portion for allowing water out of the nozzle with at least one spray pattern, and an auxiliary outlet portion for allowing water out of the nozzle with a further spray pattern which is different from said at least one spray pattern, wherein the nozzle defines a first flow passage for feeding water received via the inlet to the main outlet portion and defines a second flow passage for feeding water received via the inlet to the auxiliary outlet portion, and the nozzle further comprises a flow switching valve arrangement for switching flow between the first and second flow passages in dependence on the relative axial positions of the body and the sleeve such that when the sleeve is in a first axial position relative to the body, the inlet is in fluid communication with the first flow passage and when the sleeve is in a second axial position relative to the body, the inlet is in fluid communication with the second flow passage.

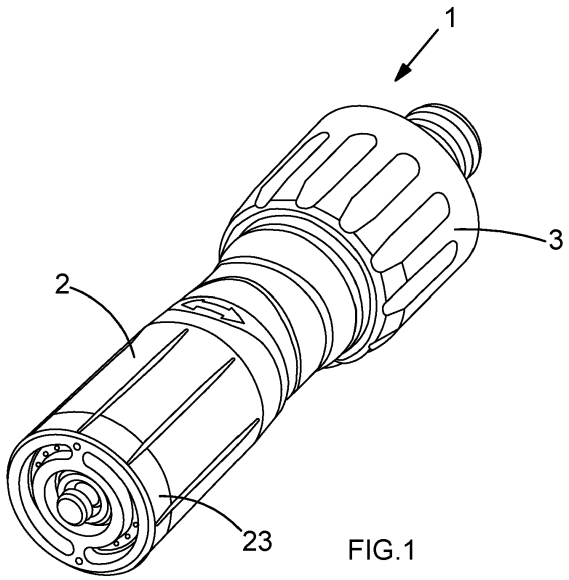

FIG.1

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Description

[0001] This invention relates to garden hose nozzles.

[0002] Garden hose nozzles are used on the end of hose pipes for controlling the outlet of water. Typically, garden nozzles are arranged to provide spray patterns which are useful for say, washing or cleaning but tend to be ill-suited for watering applications. This is because the spray patterns produced tend to be too fierce and may damage plants and/or disturb soil whilst watering. In such a circumstance a user might make use of a hose gun of some kind. For example, a multi-feature hose gun with a relatively complicated construction may be used allowing more control over the outlet pattern from the hose pipe but at the expense of the provision of a more complicated device which will cost more to manufacture and therefore purchase. Such a device will include more parts and typically may be more likely to fail due to general wear and tear, damage or misuse.

[0003] It would be desirable to provide a garden hose nozzle which retains simplicity whilst facilitating use in a larger number of applications, say use in applications other than washing and/or spraying. As an example such a nozzle in at least some embodiments may be more suitable for use in watering applications. It would be particularly preferred if such devices can be obtained without necessitating a significant increase in the complexity of the product.

[0004] According to a first aspect of the present invention there is provided a garden hose nozzle comprising a body and a sleeve which is mounted on the body for axial movement relative to the body, the nozzle having an inlet for connection to a supply of water, a main outlet portion for allowing water out of the nozzle with at least one spray pattern, and an auxiliary outlet portion for allowing water out of the nozzle with a further spray pattern which is different from said at least one spray pattern, wherein the nozzle defines a first flow passage for feeding water received via the inlet to the main outlet portion and defines a second flow passage for feeding water received via the inlet to the auxiliary outlet portion, and the nozzle further comprises a flow switching valve arrangement for switching flow between the first and second flow passages in dependence on the relative axial position of the body and the sleeve such that when the sleeve is in a first axial position relative to the body, the inlet is in fluid communication with the first flow passage and when the sleeve is in a second axial position relative to the body, the inlet is in fluid communication with the second flow passage.

[0005] This can allow the provision of a hose nozzle with additional functionality without increasing complexity more than necessary and can, for example, help minimise the number of components required.

[0006] The garden hose nozzle may be a jet and cone garden hose nozzle in which the main outlet portion is arranged for allowing water out of the nozzle with a selected one of a jet spray pattern and a cone spray pattern in dependence on the relative axial position of the body and the sleeve.

[0007] In such a case the nozzle can be arranged such that when the sleeve is in a first axial position relative to the body, the inlet is in fluid communication with the first flow passage and the main outlet portion produces a jet spray pattern in use;

when the sleeve is in a second axial position relative to the body, the inlet is in fluid communication with the second flow passage and water leaves the auxiliary outlet portion in use; and

when the sleeve is in a third axial position relative to the body, the inlet is in fluid communication with the first flow passage and the main outlet portion produces a cone spray pattern in use.

[0008] According to a second aspect of the present invention there is provided a jet and cone garden hose nozzle comprising a body and a sleeve which is mounted on the body for axial movement relative to the body, the nozzle having an inlet for connection to a supply of water, a main outlet portion for allowing water out of the nozzle with a selected one of a jet spray pattern and a cone spray pattern in dependence on the relative axial position of the body and the sleeve, the nozzle further comprising an auxiliary outlet portion for allowing water out of the nozzle with a further spray pattern which is different from said jet spray pattern and said cone spray pattern, wherein the nozzle defines a first flow passage for feeding water received via the inlet to the main outlet portion and defines a second flow passage for feeding water received via the inlet to the auxiliary outlet portion, and the nozzle further comprises a flow switching valve arrangement for switching flow between the first and second flow passages in dependence on the relative axial position of the body and the sleeve such that:

when the sleeve is in a first axial position relative to the body, the inlet is in fluid communication with the first flow passage and the main outlet portion produces a jet spray pattern in use;

when the sleeve is in a second axial position relative to the body, the inlet is in fluid communication with the second flow passage and water leaves the auxiliary outlet portion in use; and

when the sleeve is in a third axial position relative to the body, the inlet is in fluid communication with the first flow passage and the main outlet portion produces a cone spray pattern in use.

[0009] It is convenient when the auxiliary outlet is provided in a jet and cone nozzle as defined above since it provides a simple way that three spray patterns may be achieved using one selection mechanism - i.e. the movement of the sleeve relative to the body. This can also facilitate manufacturing of a nozzle of the type defined above on a production line or other production facility

which was originally put in place to manufacture a jet and cone nozzle, or at least allow use of parts of such a facility.

[0010] The main outlet portion may comprise an outlet valve portion and an outlet valve seat.

[0011] One of the outlet valve portion and the outlet valve seat may be provided on the sleeve and the other of the outlet valve portion and the outlet valve seat may be provided on the body.

[0012] Preferably the outlet valve portion is provided on the body and the outlet valve seat is provided on the sleeve.

[0013] The flow switching valve arrangement may be arranged so that when the inlet is put in fluid communication with the first flow passage, fluid communication with the second flow passage is blocked. The flow switching valve arrangement may be arranged so that when the inlet is put in fluid communication with the second flow passage, fluid communication with the first flow passage is blocked. These features can allow provision of a device where flow is only allowed out of one of the outlets but not the other at any one time.

[0014] As mentioned above, in one set of embodiments:

> when the sleeve is in a first axial position relative to the body, the main outlet portion produces a jet spray pattern in use; and
> when the sleeve is in a third axial position relative to the body, the main outlet portion produces a cone spray pattern in use.

[0015] In a subset of those embodiments, when the sleeve is in a fourth axial position relative to the body, the main outlet portion is shut off. This may be by virtue of the outlet valve portion sealing against the outlet valve seat. The inlet may be in fluid communication with the first flow passage when the sleeve is in the fourth axial position relative to the body.

[0016] This can provide a convenient way to shutoff the nozzle completely at the nozzle, such that a user does not need to return to a tap/faucet to stop the water leaving the nozzle.

[0017] The outlet valve portion and outlet valve seat may co-operate to cause generation of a jet spray pattern in use when in a first relative position to one another. In such a case, this first relative position corresponds to the first axial position of the sleeve relative to the body.

[0018] The outlet valve portion and outlet valve seat may co-operate to cause generation of a cone spray pattern in use when in a second relative position to one another. In such a case, this second relative position corresponds to the third axial position of the sleeve relative to the body.

[0019] The body may comprise a fluid supply passage which leads from the inlet to the flow switching arrangement. The fluid supply passage may comprise an axial bore defined in the body.

[0020] The flow switching arrangement may comprise a switching valve portion provided on one of the body and the sleeve and a switching valve seat portion provided on the other of the body and the sleeve.

[0021] Preferably the switching valve portion is provided on the body and the switching valve seat is provided on the sleeve.

[0022] The body may comprise a supply outlet that is in fluid communication with the fluid supply passage and feeds into a chamber in the flow switching arrangement, which chamber is fluidically connectable to the first passage and the second passage.

[0023] The flow switching arrangement may comprise first and second seals which are arranged for selective sealing against flow of fluid from the chamber into the first passage and from the chamber into the second passage.

[0024] The first and second seals may be provided on the body so as to be axially spaced from one another and located so that the supply outlet is disposed in the axial spacing between the first and second seals.

[0025] Provision of seals on the body can ease the manufacturing process compared to providing seals in the sleeve and can also facilitate the use of standard/simple/reliable seals.

[0026] The sleeve may comprise a first switching valve seat against which the first seal is arranged to seal when the sleeve is in the first axial position relative to the body and the sleeve may comprise a second switching valve seat against which the second seal is arranged to seal when the sleeve is in the second axial position relative to the body.

[0027] In this way the first seal can seal against flow from the chamber into the second flow passage whilst flow is allowed from the chamber into the first flow passage when the sleeve is in the first axial position relative to the body and the second seal can seal against flow from the chamber into the first flow passage whilst flow is allowed from the chamber into the second flow passage when the sleeve is in the second axial position relative to the body.

[0028] In one set of embodiments, the body comprises a fluid supply passage which leads from the inlet to the flow switching arrangement,

> the body comprises a supply outlet that is in fluid communication with the fluid supply passage and feeds into a chamber in the flow switching arrangement, which chamber is fluidically connectable to the first passage and the second passage, wherein,
> the flow switching arrangement comprises first and second seals which are arranged for selective sealing against flow of fluid from the chamber into the first passage and from the chamber into the second passage and the first and second seals are provided on the body so as to be axially spaced from one another and located so that the supply outlet is disposed in the axial spacing between the first and second seals and

the sleeve comprises a first switching valve seat against which the first seal is arranged to seal when the sleeve is in the first axial position relative to the body and the sleeve comprises a second switching valve seat against which the second seal is arranged to seal when the sleeve is in the second axial position relative to the body.

[0029] This can provide a particularly convenient arrangement and in this way the first seal can seal against flow from the chamber into the second flow passage whilst flow is allowed from the chamber into the first flow passage when the sleeve is in the first axial position relative to the body and the second seal can seal against flow from the chamber into the first flow passage whilst flow is allowed from the chamber into the second flow passage when the sleeve is in the second axial position relative to the body.

[0030] Flow from the supply outlet to the first flow passage may exit a first axial end of the chamber. This first axial end may be a front or outlet end.

[0031] Flow from the supply outlet to the second flow passage may exit a second axial end of the chamber. This second axial end may be a rear or inlet end.

[0032] The flow switching arrangement may be arranged to control flow rate of fluid delivered from the chamber into at least one of the first flow passage and the second flow passage in dependence on the relative axial position of the sleeve and the body.

[0033] The flow switching arrangement may be arranged so that the available flow path between the chamber and the first flow passage increases as the second seal is moved away from the second switching valve seat.

[0034] The flow switching arrangement may be arranged so that the available flow path between the chamber and the second flow passage increases as the first seal is moved away from the first switching valve seat.

[0035] The switching valve seat portion may comprise the first and second switching valve seats.

[0036] The switching valve seat portion may define said chamber.

[0037] The first and second switching valve seats may be generally cylindrical each with a respective internal diameter and may have the same internal diameter as one another. Having the same internal diameter can ease manufacture.

[0038] The sleeve may have first and second enlarged internal diameter bore portions at positions axially outside of each end of the switching valve seat portion in which the respective one of the first and second seals are accommodated when not in contact with their respective switching valve seat.

[0039] At least one of the first and second seals may comprise a respective O-ring.

[0040] The valve switching arrangement may comprise a cylindrical retaining portion disposed in the first and/or second enlarged internal diameter bore portion for retaining the first and/or second seal when outside of the switching valve seat portion. At least one bypass channel may be provided in the cylindrical retaining portion such that flow past the respective seal can still occur if the respective seal expands against the cylindrical retaining portion

[0041] Typically the flow paths between the supply outlet and the first and second flow passages will be bounded by respective portions of the sleeve and the body.

[0042] At least one main seal, say an O-ring seal, may be provided between the sleeve and the body to provide at least one boundary to at least one of the flow paths between the supply outlet and the first and second flow passages.

[0043] The first flow passage may comprise an axial bore provided in the sleeve.

[0044] The second flow passage may comprise one or more channels provided in the sleeve at a location radially outside of the first flow passage. The second flow passage may comprise an annular or part annular channel.

[0045] In one set of embodiments, the sleeve comprises a first switching valve seat against which the first seal is arranged to seal when the sleeve is in the first axial position relative to the body to seal against flow from the chamber into the second flow passage and the sleeve comprises a second switching valve seat against which the second seal is arranged to seal when the sleeve is in the second axial position relative to the body to seal against flow from the chamber into the first flow passage, wherein

when the sleeve is in the first axial position relative to the body, the second seal is away from the second switching valve seat and the inlet is in fluid communication with the first flow passage via the chamber; and

when the sleeve is in the second axial position relative to the body, the first seal is away from the first switching valve seat and the inlet is in fluid communication with the second flow passage via the chamber.

[0046] The flow switching arrangement may be arranged so that a constriction in a flow path from the chamber to the main outlet portion is created at a location downstream of the second seal as the second seal approaches the second valve switching seat. This can create a back pressure as nozzle moves towards a state where flow to the first flow passage is shut off. This can serve to damp vibration of the second seal and help prevent the second seal rolling out of position.

[0047] The constriction may be defined between the body and sleeve. The constriction may be provided in the first flow passage.

[0048] The auxiliary outlet portion may comprise a plurality of orifices arranged in an array around the main outlet. The orifices may be arranged in an arcuate array.

[0049] The auxiliary outlet portion may comprise at least one part-annular array of outlet orifices. There may

be two part-annular arrays.

[0050] Each outlet orifice may be located in a recess in the outlet portion. A plurality of orifices may be located in a common recess.

[0051] Where there is an arcuate array of orifices these may be provided in a respective arcuate recess.

[0052] The auxiliary outlet portion may comprise at least one part-annular recess in which is provided a respective part-annular array of outlet orifices.

[0053] The provision of the orifices in a recess can help protect the orifices and for example help prevent them from becoming blocked by dirt or foreign objects.

[0054] At least one side wall of the recess may comprise at least one contour portion for causing or allowing shaping a spray pattern of water leaving the orifices in use.

[0055] Each orifice may be formed in an end plate portion of the sleeve.

[0056] Each orifice may have a main axis that is transverse to the end plate portion of the sleeve. The main axis of each, or at least one, orifice may be perpendicular to the end plate portion and thus aligned to a main axis of the nozzle. Preferably however, the main axis of each, or at least one, orifice is inclined to the main axis of the nozzle. Preferably the main axes of the orifices are flared outwards from the main axis of the nozzle so that the resulting water pattern tends to diverge from the main axis of the nozzle.

[0057] Each orifice may be part conical in shape having a larger diameter on an inner face of the end plate than on an outer face of the end plate.

[0058] In such a case the axes of the part conical shape of each nozzle may be inclined outwardly with respect to the main axis of the nozzle.

[0059] The use of a part conical orifice through the end plate has been found to improve the provision of a diffuse and softened spray pattern.

[0060] Where the orifices are provided in a recess and the axes of the orifices are flared outwardly, a radially outer side wall, say an outer circumferential side wall, of the recess may be provided with a respective series of flutes aligned with the orifices. This can help avoid interference to the flaring of the spray pattern.

[0061] The auxiliary outlet portion may be arranged to create a watering spray pattern, such as a rose watering pattern. This will be such as to provide a softer, more diffuse, spray pattern than the main outlet - say softer than a jet or cone spray pattern. The auxiliary outlet portion may comprise a rose outlet.

[0062] The end plate portion of the sleeve may comprise the outlet valve seat.

[0063] The end plate portion of the sleeve may be of one piece.

[0064] Either or both of the above two features can help ease manufacture and reduce the number of components required in the nozzle.

[0065] Thus the main outlet valve seat and the auxiliary outlet portion may be formed in the sleeve end plate portion and may be of one piece.

[0066] The end plate may comprise a central recess which accommodates an end of the outlet valve in at least some relative axial positions of the body and the sleeve. This can serve to protect the end of the outlet valve.

[0067] The nozzle may comprise an axial drive arrangement for axially moving the sleeve relative to the body when the sleeve is rotated relative to the body by a user.

[0068] This means that axial movement of the sleeve relative to the body to select different spray patterns can be achieved by the user rotating the sleeve relative to the body.

[0069] The axial drive arrangement may comprise complementary threaded portions provided respectively on the body and the sleeve.

[0070] The nozzle may comprise a grip portion which is mounted on the body and arranged to be grasped by a user. The grip portion can be usable in rotating the body relative to the sleeve.

[0071] The grip portion may be sleeve shaped and may comprise a bore that accommodates a respective portion of the (main) sleeve.

[0072] According to a third aspect of the present invention there is provided a garden hose nozzle comprising a body and a sleeve which is mounted on the body for axial movement relative to the body, the nozzle having an inlet for connection to a supply of water, a main outlet portion for allowing water out of the nozzle with at least one spray pattern, and an auxiliary outlet portion for allowing water out of the nozzle with a further spray pattern which is different from said at least one spray pattern, wherein the nozzle defines a first flow passage for feeding water received via the inlet to the main outlet portion and defines a second flow passage for feeding water received via the inlet to the auxiliary outlet portion, wherein,

the body comprises a fluid supply passage which is in fluid communication with the inlet and which leads to a supply outlet that feeds into a chamber in the nozzle, which chamber is fluidically connectable to the first flow passage and the second flow passage;
the nozzle comprises first and second seals which are arranged for selective sealing against flow of fluid from the chamber into the first passage and from the chamber into the second passage, the first and second seals being provided on the body so as to be axially spaced from one another and located so that the supply outlet is disposed in the axial spacing between the first and second seals;
the sleeve comprises a first switching valve seat against which the first seal is arranged to seal when the sleeve is in a first axial position relative to the body to seal against flow from the chamber into the second flow passage and the sleeve comprises a second switching valve seat against which the second seal is arranged to seal when the sleeve is in a second axial position relative to the body to seal

against flow from the chamber into the first flow passage, and wherein,
when the sleeve is in the first axial position relative to the body, the second seal is away from the second switching valve seat and the inlet is in fluid communication with the first flow passage via the chamber; and
when the sleeve is in the second axial position relative to the body, the first seal is away from the first switching valve seat and the inlet is in fluid communication with the second flow passage via the chamber.

[0073] Note that, in general terms and with any necessary modifications in wording, all of the further features defined above following any aspect of the invention above are applicable as further features of all other aspects of the invention defined above. These further features are not restated after each aspect of the invention merely for the sake of brevity.

[0074] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a hose nozzle;
Figure 2 is an end view of the hose nozzle shown in Figure 1;
Figure 3 is an exploded view of the hose nozzle shown in Figures 1 and 2;
Figures 4 to 7 are sectional views of the hose nozzle shown in Figures 1 to 3 when in different operative configurations: -
Figure 4 shows a sleeve of the hose nozzle in a first relative axial position to a body of the hose nozzle;
Figure 5 shows the sleeve in a second axial position relative to the body;
Figure 6 shows the sleeve in a third axial position relative to the body;
Figure 7 shows the sleeve in a fourth axial position relative to the body;
Figure 8 shows part of a first alternative nozzle;
Figure 9 shows a partial section of a second alternative nozzle showing part of a flow switching valve arrangement of the second alternative nozzle;
Figure 10 shows a part of the flow switching valve arrangement of the second alternative nozzle;
Figure 11 shows a section of the flow switching valve arrangement of the second alternative nozzle in a first state; and
Figure 12 shows a section of the flow switching valve arrangement of the second alternative nozzle in a second state.

[0075] Figures 1, 2 and 3 show a hose nozzle which comprises a body 1 (most clearly seen in isolation in Figure 3) on which is mounted a sleeve 2 for rotation and axial movement relative to the body 1. The hose nozzle further comprises a grip portion 3 which is sleeve-like and fixed against rotation to the body 1 while having a main bore 3a which accommodates part of the sleeve 2. In the present embodiment as shown in Figure 3, the sleeve 2 is manufactured in two parts 2a, 2b which are sonic welded together.

[0076] As can be seen in Figure 3 the hose nozzle also comprises first and second switching valve seals 41, 42 which will be described in more detail below, a main O-ring seal 43 which is provided for sealing between the body 1 and the sleeve 2, and a connector O-ring seal 44 provided towards the end of the body 1. The connector O-ring is part of a standard push fit connector portion which acts as an inlet 51 into the hose nozzle.

[0077] It will of course be appreciated that in other embodiments, a different form of connector may be provided at the inlet 51 to the nozzle than the standard push fit connector provided in this case. Indeed in some instances the nozzle may be more permanently mounted to a hose tube or other feed in component.

[0078] As mentioned above the sleeve 2 is mounted for rotational and axial movement relative to the body 1. Figures 4, 5, 6 and 7 show the sleeve 2 in different relative axial positions relative to the body 1. These different relative axial positions of the sleeve 2 relative to the body 1 correspond to different functional modes of the hose nozzle. In this way the present hose nozzle has some similarities with some pre-existing jet and cone garden hose nozzles.

[0079] However, the present hose nozzle provides additional functionality.

[0080] Figure 4 shows the sleeve 2 in a first axial position relative to the body 1 and this corresponds to the hose nozzle being arranged for outputting a jet spray pattern as illustrated in dotted lines in Figure 4.

[0081] Figure 5 shows the hose nozzle in a configuration where the sleeve 2 has a second axial position relative to the body 1 and this corresponds to the hose nozzle being arranged for delivering a rose output spray pattern as illustrated in dotted lined in Figure 5.

[0082] Figure 6 shows the hose nozzle in a further configuration corresponding to the sleeve being in a third axial position relative to the body 1 which corresponds to the nozzle being in state for outputting a cone spray pattern as illustrated in dotted lined in Figure 6.

[0083] Figure 7 shows a further configuration which corresponds to the sleeve 2 being a fourth axial position relative to the body 1 and this corresponds to a shut off state of the nozzle.

[0084] Further description of the internal parts and functioning of the hose nozzle will now be described with reference to Figures 1 to 7. Figures 4-6 show schematically water paths through the nozzle and the resultant spray patterns in dotted lines. There are no such dotted lines included in Figure 7. Thus, Figure 7 will be referred to initially due to the absence of these dotted lines.

[0085] The nozzle comprises an axial drive arrangement 6 which comprises complimentary threaded portions 61, 62 on the body 1 and the sleeve 2. Specifically,

a worm gear portion 61 (see also Figure 3) is provided on the body 1 and an internally threaded portion 62 is provided on the sleeve 2. Thus, as the sleeve 2 is rotated relative to the body 1, the interaction of the threaded portions 61, 62 drives the body 1 axially relative to the sleeve 2. In use, the user may adjust the rotational position and hence relative axial position of the body 1 and sleeve 2 by grasping the grip portion 3 in one hand and the exposed portion of the sleeve 2 in the other hand and twisting these portions relative to one another.

[0086] In Figure 7 the seals 41, 42, 43 and 44 mentioned above can be seen in position on the body 1. The seals 41, 42, 43, 44 are provided on the body 1 and they, in particular the flow switching seals 41, 42, stay in position on the body 1 as the sleeve 2 is driven axially relative to the body 1. Providing seals on the body 1 is preferably to providing seals in the sleeve 2 as it eases manufacture - both in terms of sourcing the seals and in assembling the product.

[0087] In the present embodiment the inlet 51 feeds into a fluid supply passage 52 which is provided inside the body 1. In the present embodiment the fluid supply passage 52 is provided by an internal bore formed in the body 1. The fluid supply passage 52 leads to a flow switching valve arrangement 7 which is arranged for switching supply of fluid between a main outlet portion 8 of the nozzle and an auxiliary outlet portion 9 of the nozzle.

[0088] The flow switching arrangement comprises a switching valve portion 71 provided on the body 1 and a switching valve seat portion 72 provided in the sleeve 2. The switching valve portion 71 carries the first and second switching valve seals 41, 42 mentioned above. Each of these seals is in the form of an O-ring seal provided in a respective groove on the body 1. The seals 41, 42 are axially spaced from one another along the body 1. A supply outlet 73 is provided through a side wall of the body 7 at a location between the location of the first and second switching seals 41, 42. This supply outlet 73 is in fluid communication with the fluid supply passage 52 which runs inside the body 1. Thus there is a fluid communication path from the inlet 51 through the fluid supply passage supply 52 and out of the supply outlet 73 into the region between the two switching valve seals 41, 42. The switching valve seat portion 72 in combination with the switching valve portion 71 define a chamber 74 in the region between the two switching valve seals 41, 42. It is into this chamber 74 that fluid from the inlet 51 is fed in use.

[0089] A first flow passage 81 is provided in the nozzle which leads from the flow switching arrangement 7, and in particular the chamber 4, towards the main outlet portion 8. A second flow passage 91 is provided which leads from the flow switching arrangement 7, and in particular the chamber 74, towards the auxiliary output portion of the nozzle 9.

[0090] In this embodiment, the first flow passage 81 is defined between the sleeve 2 and the body 1. The second flow passage 91 is defined in the sleeve 2 at a location radially outside of the first flow passage 81 - in this case as an annular channel. This annular channel 91 surrounds and in the present embodiment is provided coaxially with a main bore of the sleeve 2 in which the body 1 resides.

[0091] Now if we turn to consider the configuration of the nozzle as shown in Figure 4 with the sleeve 2 in a first axial position relative to the body 1, it can be seen that the first switching valve seal 41 seals against a respective portion of the switching valve seat portion 72 (which portion can be considered as a first switching valve seat 72a). On the other hand, the second switching valve seal 42 is outside of the switching valve seat portion 72 and rather resides in an enlarged diameter bore portion 21 of the sleeve 2. When in this enlarged diameter bore portion 21 the second switching valve seal 42 is spaced away from the side wall of the sleeve 2 and thus fluid is free to flow therepast. Thus the supply outlet 73 opens out into the chamber 74 and this is in fluid communication with the first flow passage 81 such that fluid may flow from the inlet 51 through the fluid supply passage 52, through the flow switching valve arrangement 7 and out of the main outlet portion 8 via the first flow passage 81.

[0092] On the other hand, if we consider the position with the configuration of the nozzle as shown in Figure 5 with the sleeve 2 in a second axial position relative to the body 1, there is a different result.

[0093] Here the second switching valve seal 42 is in sealing contact with the switching valve seat portion 72 (at a region that may be considered as the second switching valve seat 72b). On the other hand, the first switching valve seal 41 is at a location outside of the switching valve seat portion 72 and in particular at a second enlarged diameter portion 22 within the sleeve 2 where the first switching valve seal 41 is spaced from the surrounding sleeve portion 2 such that fluid may flow therepast.

[0094] Thus in this situation, fluid from the inlet 51 may flow through the fluid supply passage 52 into the flow switching valve arrangement 7, and in particular into the chamber 74, and out of there into the second flow passage 91 towards the auxiliary outlet portion 9.

[0095] In this configuration a more diffuse spray pattern may be obtained by virtue of the water leaving the nozzle via the auxiliary outlet portion 9.

[0096] It might be noted that with the configuration shown in Figure 4, fluid leaves the chamber 74 in what might be considered a forward direction i.e. towards the main outlet portion 8 whereas in the configuration shown in Figure 5, fluid leaves the chamber 74 in the backwards direction or towards the inlet 51 of the nozzle and from here feeds into the second flow passage 91 which leads back to the auxiliary outlet portion 9. At this stage the main seal 43 helps bound the region into which water may reach when leaving the chamber 74 in this rearwards direction.

[0097] The water leaving the chamber 74 into the re-

gion 22 "behind" the chamber must also pass another restriction to enter the second flow passage 91 - again this can help soften the outlet pattern.

[0098] In the present embodiment there is further refinement in terms of the flow which may be caused to leave the auxiliary outlet 9 in use. This is because if the sleeve 2 is moved further in the outlet direction from the position shown in Figure 5, this moves the first switching valve seal 41 further away from the switching valve seat 72a and increases the available space through which fluid may escape the chamber 74 on its way to the second flow passage 91. That is to say this change in position gives, in use, a change in the rate of flow of fluid through the nozzle and out of the auxiliary outlet 9. Thus in operation a user may control the speed of water leaving the auxiliary outlet 9 by controlling this position of the sleeve 2 relative to the body 1 over a range of positions at which the inlet 51 is put into fluid communication with the auxiliary outlet 9.

[0099] Referring now to Figures 4 and Figure 6, it may be noted that the main outlet portion 8 comprises an outlet valve portion 82 which is provided on the body 1, and in this particular embodiment is provided at the distal end of the body 1, and an outlet valve seat 83 which is provided on the sleeve 2. In this embodiment, the outlet valve seat 83 is provided in an end plate portion 23 of the sleeve 2. The outlet valve portion 82 and outlet seat 83 are shaped and arranged so that the spray pattern achieved at the main outlet portion 8 is dependent on the relative positions of the outlet valve portion 82 and outlet valve seat 83. In a more retracted position as shown in Figure 4 where the end of the outlet valve portion 82 is close to flush with the outside of the outlet valve seat 83, a jet spray pattern is produced where the water largely bypasses the outlet valve portion 82 as it leaves the outlet 8.

[0100] On the other hand, with a more extended position of the outlet valve portion 82 relative to the outlet valve seat 83 as shown in Figure 6, a cone spray pattern is produced. Here as water leaves the main outlet portion 83 it is directed around a bulbus portion 82a of the outlet valve portion 82 which deflects the spray pattern outwardly so as to form diverging cone pattern.

[0101] Other than this difference in the spray pattern produced, the flow of fluid through the nozzle to reach the main outlet portion 8 in the configuration shown in Figure 6 is substantially the same as that described above in relation to the configuration shown in Figure 4. Thus, the possible rearward exit path from the chamber 74 is blocked by the first switching valve seal 41 and fluid from the supply outlet 73 progresses forwards and into the first flow passage 81 towards the main outlet 8.

[0102] In the configuration shown in Figure 7, again the first flow switching seal 41 seals against the flow of liquid out of the chamber 74 in the rearward direction such that fluid will not leave the nozzle via the auxiliary outlet 9. Fluid can leave the chamber 74 in the forward direction towards the first flow passage 81. However, exit out of this region via the main outlet 8 is blocked by virtue of the outlet valve portion 82 sealing against the outlet valve seat 83 such that main outlet 8 is shut off. Thus in the configuration shown in Figure 7 the nozzle as a whole is shut off.

[0103] In the present embodiment the sleeve 2 is made of two pieces 2a, 2b, as this simplifies tooling. In alternatives however the sleeve 2 might be formed in a single piece. In the present embodiment each of the sleeve 2, body 1 and grip portion 3 are made of an injection moulding plastics material. In the present embodiment the sleeve 2, particularly including the auxiliary outlet portion 9, has a diameter which is small enough so as to be able to pass through the bore 3a provided in the grip portion 3. This eases assembly and can help minimise production costs. In less preferred alternatives a larger end portion of the sleeve, particularly that portion including the auxiliary outlet portion 9 might be provided.

[0104] More detail of the auxiliary portion 9 in the present embodiment will now be described.

[0105] As mentioned above, the main outlet portion valve seat 83 is formed as part of the sleeve end plate 23. In the present embodiment the auxiliary outlet portion 9 is also formed as part of the sleeve end plate 23 and the sleeve end plate 23 is formed in one piece. This helps minimise the number of components in the device and for example, is different than many existing watering devices which include a separate rose plate which is mounted to other components.

[0106] In the present embodiment as best shown in considering, for example, Figures 1, 2 and 7, the auxiliary outlet portion 9 comprises a plurality of orifices 92 which open out into the second flow passage 91. These orifices 92 provide an outlet path for water from the second flow passage 91 to the exterior of the nozzle for forming the rose spray pattern of the auxiliary outlet portion 9. The orifices 92 are arranged in an arcuate array around a main axis of the nozzle as best seen in for example, Figure 2. In the present embodiment, two semi-annular arrays 93 of orifices 92 are provided. Each semi-annular array 93 of orifices 92 is provided in a respective recess 94. The provision of the orifices 92 in a respective recess 94 can help protect the orifices and for example, help protect them from becoming clogged with dirt or other foreign objects.

[0107] Similarly, it can be noted for example by considering Figure 4 that the main outlet portion valve seat 83 is also accommodated in a respective recess. Again this can help protect the main outlet and in particular the main outlet valve portion 82 from damage.

[0108] In the present embodiment each recess 94 is semi-annular and accommodates a respective one of the semi-annular arrays 93 of orifices 92.

[0109] As may be seen by consideration of, for example, Figure 5 or Figure 7, each orifice 92 in the present embodiment has a part conical shape as it passes through the end plate portion 23. Furthermore, the orifices 92 are orientated outwards, that is away from the main axis of the nozzle in order to direct water leaving the

nozzle on an outward path. The provision of the part conical shape in the orifice 92 can help encourage a diffuse flow pattern. Similarly flaring the axes of the orifices outwards, away from the main axis of the nozzle can again tend to encourage a diffuse flow pattern. Furthermore, the number of the orifices, the size of the orifices and a radial spacing of the orifices away from the main axis of the nozzle can help encourage a more diffuse flow path. Any one or combination of these features may be used in order to encourage a more diffuse flow pattern.

[0110] In at least some cases the aggregate cross-sectional outlet area provided by the auxiliary outlet 9 is higher than that of the main outlet 8. This can be a factor in providing a different and/or more diffuse outlet spray pattern.

[0111] The number of orifices in the auxiliary outlet 9 is higher than the number of outlets openings provided in the main outlet. This can be a factor in providing a different and/or more diffuse outlet spray pattern.

[0112] Although not present in the embodiment, flutes may be provided in the outer circumferential side wall of the recesses 94 at locations aligned with each orifice 92 where this is appropriate to avoid interference between the side wall of the recess 94 and the desired spray pattern. The outlet portion of an alternative nozzle including such flutes 95 is shown in Figure 8, otherwise this nozzle is the same as that shown in Figures 1 to 7.

[0113] It might be noted that in the present embodiment the fourth relative axial position of the sleeve 2 relative to the body 1 as shown in Figure 7 corresponds to the sleeve 2 being retracted as far as possible relative to the body 1 towards the inlet 51.

[0114] On the other hand, the configuration shown in Figure 5, corresponding to what we refer to as the second relative axial position between the sleeve 2 and body 1, represents a position where the sleeve 2 is getting towards a position which is as extended as far as possible away from the inlet 51. At the end of the travel in this direction the auxiliary outlet 9 will be in fluid communication with the inlet 51 and flow rate though the auxiliary outlet 9 will be at a maximum. As mentioned above, in the position shown in Figure 5, this maximum flow rate has not been achieved although there is fluid communication between the inlet 51 and the auxiliary outlet 9.

[0115] The configuration shown in Figure 4 where the nozzle is configured for producing a jet corresponds to a position where the sleeve 2 is still relatively far extended relative to the body but not as far as the position shown in Figure 5.

[0116] In Figure 6 where the main outlet 8 is configured for producing a cone spray pattern, the sleeve 2 is rather more retracted towards the body 1 than in the position shown in Figure 4 but not yet at the fully retracted position of Figure 7.

[0117] As will be appreciated, at intermediate positions between that shown in Figure 5 and Figure 4, as the jet begins to become operational, some flow control may be achieved as the flow path towards the jet begins to open up. Similarly, as the sleeve is moved from the position shown in Figure 6 towards the position shown in Figure 7, some flow control may be achieved in the cone pattern mode as the nozzle moves towards the fully shut off position shown in Figure 7.

[0118] It can be noted that with this device overall, a hose nozzle offering quite a number of different aspects of functionality for the user may be obtained while making use of one adjustment mechanism. By making use of one adjustment mechanism, i.e. the axial movement of the sleeve 2 relative to the body 1, the present arrangement allows the production of a nozzle which can have three distinct output flow patterns, and which can at least in some circumstances, provide flow control in respect of one or more of these flow patterns. Furthermore, this may be achieved in a device which is relatively simple to manufacture and may make use of some production line aspects or production facilities which originally might be provided for production of an existing hose nozzle, say an existing jet and cone nozzle. Further, a hose nozzle can result which is simple and intuitive for the user to operate with a single control (i.e. rotational movement of the sleeve 2 relative to the grip portion 3 (and hence body 1)) to move between the different available spray patterns and also obtain flow rate control in respect of one or more of these different spray patterns.

[0119] Figures 9 to 12 show parts of a second alternative nozzle which is similar to that show in and described in relation to Figures 1 to 7. This second alternative nozzle also, in this case, includes flutes 95 as in the first alternative nozzle.

[0120] Beyond the inclusion of flutes 95, the second alternative nozzle differs from that show in and described in relation to Figures 1 to 7, in, and only in, relation to some aspects of the flow switching arrangement 7 as will be described below. The same reference numerals are used to indicate features of the second alternative nozzle as are used in relation to the corresponding features of the nozzle show in and described in relation to Figures 1 to 7. Detailed description of these common features and common operation of the two versions of the nozzle is omitted.

[0121] As described above in relation to Figure 5, in the nozzle described in relation to Figures 1 to 7, when the sleeve 2 in the second axial position relative to the body 1, the first switching valve seal 41 is at a location outside of the switching valve seat portion 72 and in particular at a second enlarged diameter portion 22 within the sleeve 2 where the first switching valve seal 41 is spaced from the surrounding sleeve portion 2 such that fluid may flow therepast.

[0122] It has been noted that in some instances, if the first switching valve seal 41 is not held in position in some way, it may tend to roll out of its groove in the body 1 when outside of the switching valve seat portion 72. To resist this, as shown in Figures 9 and 10, the valve switching arrangement 7 in the second alternative nozzle comprises a cylindrical retaining portion 901 provided in the

second enlarged diameter portion 22. The inner diameter of the cylindrical retaining portion 901 is selected so as to be larger than the natural outer diameter of the seal 41 so that there is a flow path past the seal 41 when in its natural state even when located in the cylindrical retaining portion 901. However in some cases, especially when water is supplied to the nozzle at relatively high pressure - say (6-10 bar) - the seal 41 can be caused to expand by the water flow and fill the flow past space. This can then give undesirable sealing of the flow path to the auxiliary outlet 9. Thus at least one bypass channel 902 is provided in the cylindrical retaining portion 901 such that flow past the seal 41 can still occur if the seal 41 expands against the cylindrical retaining portion 901. This allows retention of the seal 41 whilst avoiding the risk of undesirable sealing. In the present alternative a plurality of bypass channels 902 are provided. These are equispaced - in particular six equispaced bypass channels 902 are provided. Each bypass channel 902 is provided in the form of a slot.

[0123] Figure 11 shows the flow switching arrangement 7 of the second alternative nozzle when in a first state which corresponds to the sleeve 2 being in the first axial position relative to the body 1. In this state the nozzle is arranged for providing a jet spray pattern as shown in Figure 4 in relation to the nozzle of Figures 1 to 7. In the second alternative nozzle, when in this first state, the spacing (indicated by "I-beams" 1101 in Figure 11) between facing portions of the body 1 and sleeve 2 which define the flow path from the chamber 74 in the flow switching arrangement 7 to the main outlet portion 8 is arranged to be substantially equal along the length of the flow path. This can help maximise flow through the nozzle in this jet mode.

[0124] Figure 12 shows the flow switching arrangement 7 of the second alternative nozzle when in a second state which corresponds to the sleeve 2 moving away from the first axial position relative to the body 1 shown in Figure 11 and towards the second axial position relative to the body 1. That is to say, it shows the flow switching arrangement 7 beginning to close off the flow of fluid from the chamber 74 towards the first flow passage 81 and main outlet 8. Here it can be seen that the spacing 1101 between the facing portions of the body 1 and sleeve 2 is no longer equal along the length of the path.

[0125] The second seal 42 at this stage has almost begun to contact the second valve switching seat 72b and there is a small clearance therebetween. It has been found that in some instances (say under relatively high pressure of say 6-10 bar), when the nozzle of Figures 1 to 7 is in this state (ie the flow path to the first flow passage 81 and main outlet portion 8 is about to be closed off) the second seal 42 can be forced out of its groove on the body 1 and/or the seal 42 can be caused to vibrate, which can be audible. In the second alternative nozzle the body 1 and sleeve 2 are arranged so that a constriction 1201 in the flow path from the chamber 74 to the main outlet portion 8 is created at a location downstream of the second seal 42 as the second seal 42 approaches the second valve switching seat 72b. The constriction 1201 is defined between the body 1 and sleeve 2. It creates a back pressure as nozzle moves towards the state show in Figure 12, ie as it moves towards the state where flow to the first flow passage 81 that leads to the main outlet 8 is shut off. This can serve to damp vibration of the second seal 42 and help prevent the second seal 42 rolling out of its groove.

[0126] Further statements of invention in numbered paragraphs are set out below.

[0127] Where below "any preceding paragraph" is mentioned, this refers to the preceding numbered paragraphs in the section below.

[0128] Paragraph 1. A garden hose nozzle comprising a body and a sleeve which is mounted on the body for axial movement relative to the body, the nozzle having an inlet for connection to a supply of water, a main outlet portion for allowing water out of the nozzle with at least one spray pattern, and an auxiliary outlet portion for allowing water out of the nozzle with a further spray pattern which is different from said at least one spray pattern, wherein the nozzle defines a first flow passage for feeding water received via the inlet to the main outlet portion and defines a second flow passage for feeding water received via the inlet to the auxiliary outlet portion, and the nozzle further comprises a flow switching valve arrangement for switching flow between the first and second flow passages in dependence on the relative axial position of the body and the sleeve such that when the sleeve is in a first axial position relative to the body, the inlet is in fluid communication with the first flow passage and when the sleeve is in a second axial position relative to the body, the inlet is in fluid communication with the second flow passage.

[0129] Paragraph 2. A garden hose nozzle according to paragraph 1 which is a jet and cone garden hose nozzle in which the main outlet portion is arranged for allowing water out of the nozzle with a selected one of a jet spray pattern and a cone spray pattern in dependence on the relative axial position of the body and the sleeve.

[0130] Paragraph 3. A garden hose nozzle according to paragraph 1 or paragraph 2 in which the body comprises a fluid supply passage which leads from the inlet to the flow switching arrangement.

[0131] Paragraph 4. A garden hose nozzle according to any one of paragraphs 1 to 3 in which the flow switching arrangement comprises a switching valve portion provided on the body and a switching valve seat portion provided on the sleeve.

[0132] Paragraph 5. A garden hose nozzle according to paragraph 3 or paragraph 4 in which the body comprises a supply outlet that is in fluid communication with the fluid supply passage and feeds into a chamber in the flow switching arrangement, which chamber is fluidically connectable to the first passage and the second passage.

[0133] Paragraph 6. A garden hose nozzle according

to paragraph 5 in which the flow switching arrangement comprises first and second seals which are arranged for selective sealing against flow of fluid from the chamber into the first passage and from the chamber into the second passage, wherein the first and second seals are provided on the body so as to be axially spaced from one another and located so that the supply outlet is disposed in the axial spacing between the first and second seals.

[0134] Paragraph 7. A garden hose nozzle according to paragraph 6 in which the sleeve comprises a first switching valve seat against which the first seal is arranged to seal when the sleeve is in the first axial position relative to the body and the sleeve comprises a second switching valve seat against which the second seal is arranged to seal when the sleeve is in the second axial position relative to the body.

[0135] Paragraph 8. A garden hose nozzle according to any one of paragraphs 5 to 7 in which the flow switching arrangement is arranged to control flow rate of fluid delivered from the chamber into at least one of the first flow passage and the second flow passage in dependence on the relative axial position of the sleeve and the body.

[0136] Paragraph 9. A garden hose nozzle according to paragraph 8 in which the flow switching arrangement is arranged so that the available flow path between the chamber and the first flow passage increases as the second seal is moved away from the second switching valve seat.

[0137] Paragraph 10. A garden hose nozzle according to paragraph 8 or paragraph 9 in which the flow switching arrangement is arranged so that the available flow path between the chamber and the second flow passage increases as the first seal is moved away from the first switching valve seat.

[0138] Paragraph 11. A garden hose nozzle according to any one of paragraphs 6 to 10 in which the sleeve has first and second enlarged internal diameter bore portions at positions axially outside of each end of the switching valve seat portion in which the respective one of the first and second seals are accommodated when not in contact with their respective switching valve seat.

[0139] Paragraph 12. A garden hose nozzle according to any one of paragraphs 6 to 11 in which at least one of the first and second seals comprises a respective O-ring.

[0140] Paragraph 13. A garden hose nozzle according to any preceding paragraph in which the first flow passage comprises an axial bore provided in the sleeve.

[0141] Paragraph 14. A garden hose nozzle according to paragraph 13 in which the second flow passage comprises one or more channels provided in the sleeve at a location radially outside of the first flow passage.

[0142] Paragraph 15. A garden hose nozzle according to any preceding paragraph in which the auxiliary outlet portion comprises a plurality of orifices arranged in an array around the main outlet.

[0143] Paragraph 16. A garden hose nozzle according to paragraph 15 in which each outlet orifice is located in a recess in the outlet portion.

[0144] Paragraph 17. A garden hose nozzle according to paragraph 15 or paragraph 16 in which each orifice is formed in an end plate portion of the sleeve.

[0145] Paragraph 18. A garden hose nozzle according to paragraph 17 in which each orifice has a main axis that is transverse to the end plate portion of the sleeve and inclined outwards relative to the main axis of the nozzle.

[0146] Paragraph 19. A garden hose nozzle according to paragraph 17 or paragraph 18 in which each orifice is part conical in shape having a larger diameter on an inner face of the end plate than on an outer face of the end plate.

[0147] Paragraph 20. A garden hose nozzle according to any preceding paragraph in which the main outlet portion comprises an outlet valve portion and an outlet valve seat, the outlet valve seat being provided on the sleeve and the outlet valve portion being provided on the body.

[0148] Paragraph 21. A garden hose nozzle according to paragraph 20 when dependent on any one of paragraphs 17 to 19 on which the end plate portion of the sleeve comprises the outlet valve seat.

[0149] Paragraph 22. A garden hose nozzle according to any one of paragraphs 17 to 19, and 21 in which the end plate portion of the sleeve is of one piece.

[0150] Paragraph 23. A garden hose nozzle according to any preceding paragraph in which the auxiliary outlet portion is arranged to create a watering spray pattern, such as a rose watering pattern.

[0151] Paragraph 24. A jet and cone garden hose nozzle comprising a body and a sleeve which is mounted on the body for axial movement relative to the body, the nozzle

having an inlet for connection to a supply of water, a main outlet portion for allowing water out of the nozzle with a selected one of a jet spray pattern and a cone spray pattern in dependence on the relative axial position of the body and the sleeve, the nozzle further comprising an auxiliary outlet portion for allowing water out of the nozzle with a further spray pattern which is different from said jet spray pattern and said cone spray pattern,

wherein the nozzle defines a first flow passage for feeding water received via the inlet to the main outlet portion and defines a second flow passage for feeding water received via the inlet to the auxiliary outlet portion, and the nozzle further comprises a flow switching valve arrangement for switching flow between the first and second flow passages in dependence on the relative axial position of the body and the sleeve such that:

when the sleeve is in a first axial position relative to the body, the inlet is in fluid communication with the first flow passage and the main outlet portion produces a jet spray pattern in use;

when the sleeve is in a second axial position relative to the body, the inlet is in fluid commu-

nication with the second flow passage and water leaves the auxiliary outlet portion in use; and
when the sleeve is in a third axial position relative to the body, the inlet is in fluid communication with the first flow passage and the main outlet portion produces a cone spray pattern in use.

[0152] Paragraph 25. A garden hose nozzle comprising a body and a sleeve which is mounted on the body for axial movement relative to the body, the nozzle having an inlet for connection to a supply of water, a main outlet portion for allowing water out of the nozzle with at least one spray pattern, and an auxiliary outlet portion for allowing water out of the nozzle with a further spray pattern which is different from said at least one spray pattern, wherein the nozzle defines a first flow passage for feeding water received via the inlet to the main outlet portion and defines a second flow passage for feeding water received via the inlet to the auxiliary outlet portion, wherein,

the body comprises a fluid supply passage which is in fluid communication with the inlet and which leads to a supply outlet that feeds into a chamber in the nozzle, which chamber is fluidically connectable to the first flow passage and the second flow passage;
the nozzle comprises first and second seals which are arranged for selective sealing against flow of fluid from the chamber into the first passage and from the chamber into the second passage, the first and second seals being provided on the body so as to be axially spaced from one another and located so that the supply outlet is disposed in the axial spacing between the first and second seals;
the sleeve comprises a first switching valve seat against which the first seal is arranged to seal when the sleeve is in a first axial position relative to the body to seal against flow from the chamber into the second flow passage and the sleeve comprises a second switching valve seat against which the second seal is arranged to seal when the sleeve is in a second axial position relative to the body to seal against flow from the chamber into the first flow passage, and wherein,
when the sleeve is in the first axial position relative to the body, the second seal is away from the second switching valve seat and the inlet is in fluid communication with the first flow passage via the chamber; and when the sleeve is in the second axial position relative to the body, the first seal is away from the first switching valve seat and the inlet is in fluid communication with the second flow passage via the chamber.

Claims

1. A garden hose nozzle comprising a body and a sleeve which is mounted on the body for axial movement relative to the body, the nozzle having an inlet for connection to a supply of water, a main outlet portion for allowing water out of the nozzle with at least one spray pattern, and an auxiliary outlet portion for allowing water out of the nozzle with a further spray pattern which is different from said at least one spray pattern, wherein the nozzle defines a first flow passage for feeding water received via the inlet to the main outlet portion and defines a second flow passage for feeding water received via the inlet to the auxiliary outlet portion, and the nozzle further comprises a flow switching valve arrangement for switching flow between the first and second flow passages in dependence on the relative axial position of the body and the sleeve such that when the sleeve is in a first axial position relative to the body, the inlet is in fluid communication with the first flow passage and when the sleeve is in a second axial position relative to the body, the inlet is in fluid communication with the second flow passage.

2. A garden hose nozzle according to claim 1 which is a jet and cone garden hose nozzle in which the main outlet portion is arranged for allowing water out of the nozzle with a selected one of a jet spray pattern and a cone spray pattern in dependence on the relative axial position of the body and the sleeve.

3. A garden hose nozzle according to claim 1 or claim 2 in which the body comprises a fluid supply passage which leads from the inlet to the flow switching arrangement, optionally wherein, the flow switching arrangement comprises a switching valve portion provided on the body and a switching valve seat portion provided on the sleeve.

4. A garden hose nozzle according to claim 3 in which the body comprises a supply outlet that is in fluid communication with the fluid supply passage and feeds into a chamber in the flow switching arrangement, which chamber is fluidically connectable to the first passage and the second passage.

5. A garden hose nozzle according to claim 4 in which the flow switching arrangement comprises first and second seals which are arranged for selective sealing against flow of fluid from the chamber into the first passage and from the chamber into the second passage, wherein the first and second seals are provided on the body so as to be axially spaced from one another and located so that the supply outlet is disposed in the axial spacing between the first and second seals.

6. A garden hose nozzle according to claim 5 in which the sleeve comprises a first switching valve seat against which the first seal is arranged to seal when the sleeve is in the first axial position relative to the

body and the sleeve comprises a second switching valve seat against which the second seal is arranged to seal when the sleeve is in the second axial position relative to the body.

7. A garden hose nozzle according to claim 6 in which the first and second switching valve seats are generally cylindrical each with a respective internal diameter and having the same internal diameter as one another.

8. A garden hose nozzle according to any one of claims 4 to 7 in which the flow switching arrangement is arranged to control flow rate of fluid delivered from the chamber into at least one of the first flow passage and the second flow passage in dependence on the relative axial position of the sleeve and the body, optionally wherein:

a) the flow switching arrangement is arranged so that the available flow path between the chamber and the first flow passage increases as the second seal is moved away from the second switching valve seat; and/or
b) the flow switching arrangement is arranged so that the available flow path between the chamber and the second flow passage increases as the first seal is moved away from the first switching valve seat.

9. A garden hose nozzle according to any one of claims 6 to 8 in which the sleeve has first and second enlarged internal diameter bore portions at positions axially outside of each end of the switching valve seat portion in which the respective one of the first and second seals are accommodated when not in contact with their respective switching valve seat.

10. A garden hose nozzle according to claim 9 in which the valve switching arrangement comprises a cylindrical retaining portion disposed in the first and/or second enlarged internal diameter bore portion for retaining the first and/or second seal when outside of the switching valve seat portion and wherein at least one bypass channel is provided in the cylindrical retaining portion such that flow past the respective seal can still occur if the respective seal expands against the cylindrical retaining portion.

11. A garden hose nozzle according to any one of claims 5 to 10 in which the flow switching arrangement is arranged to create a constriction in a flow path from the chamber to the main outlet portion at a location downstream of the second seal as the second seal approaches the second valve switching seat.

12. A garden hose nozzle according to claim 2 or any one of claims 2 to 11 when dependent on claim 2 in which when the nozzle is in a state for providing a jet spray, the spacing between facing portions of the body and sleeve which define the flow path from the chamber in the flow switching arrangement to the main outlet portion is arranged to be substantially equal along the length of the flow path.

13. A garden hose nozzle according to any preceding claim in which the auxiliary outlet portion comprises a plurality of orifices arranged in an array around the main outlet.

14. A garden hose nozzle according to claim 13 in which each outlet orifice is located in a recess in the outlet portion.

15. A garden hose nozzle according to claim 13 or claim 14 in which each orifice is formed in an end plate portion of the sleeve.

16. A garden hose nozzle according to claim 15 in which each orifice has a main axis that is transverse to the end plate portion of the sleeve and inclined outwards relative to the main axis of the nozzle.

17. A garden hose nozzle according to claim 15 or claim 16 in which each orifice is part conical in shape having a larger diameter on an inner face of the end plate than on an outer face of the end plate.

18. A garden hose nozzle according to any preceding claim in which the main outlet portion comprises an outlet valve portion and an outlet valve seat, the outlet valve seat being provided on the sleeve and the outlet valve portion being provided on the body.

19. A garden hose nozzle according to claim 18 when dependent on any one of claims 15 to 17 on which the end plate portion of the sleeve comprises the outlet valve seat.

20. A garden hose nozzle according to any preceding claim in which the auxiliary outlet portion is arranged to create a watering spray pattern, such as a rose watering pattern.

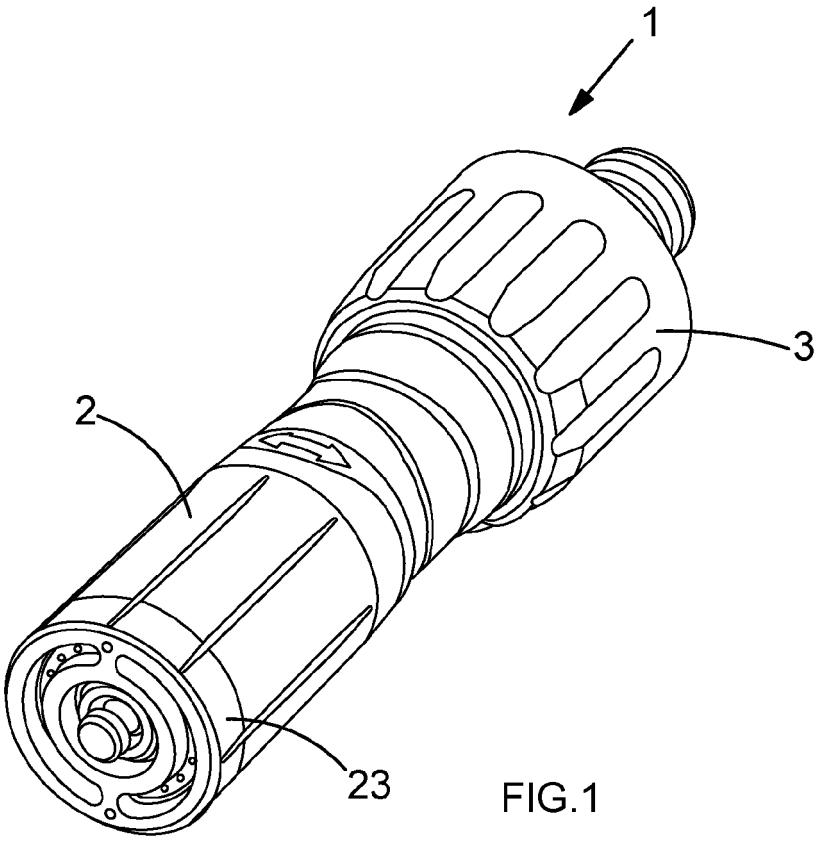

FIG.1

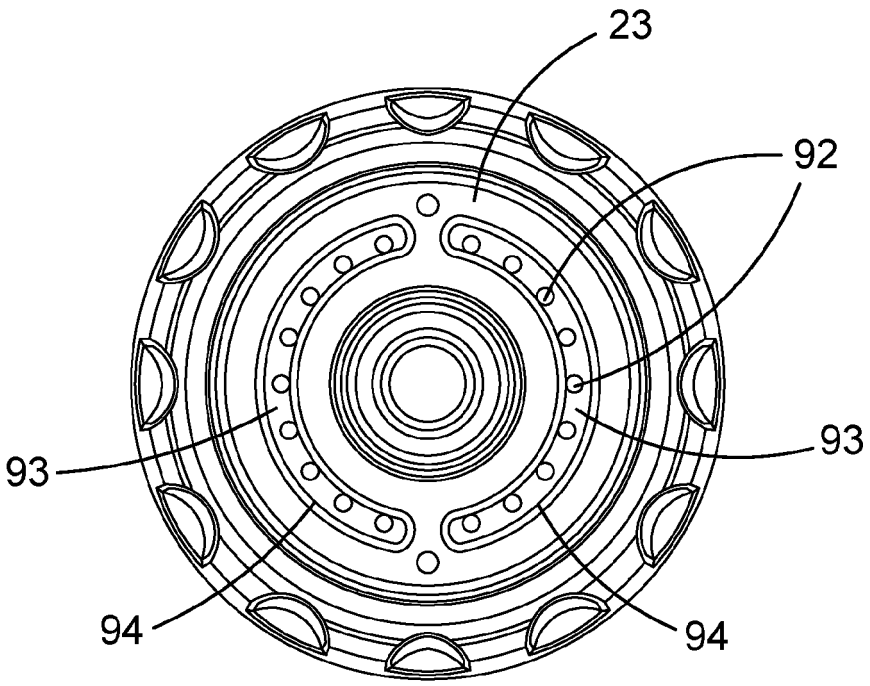

FIG.2

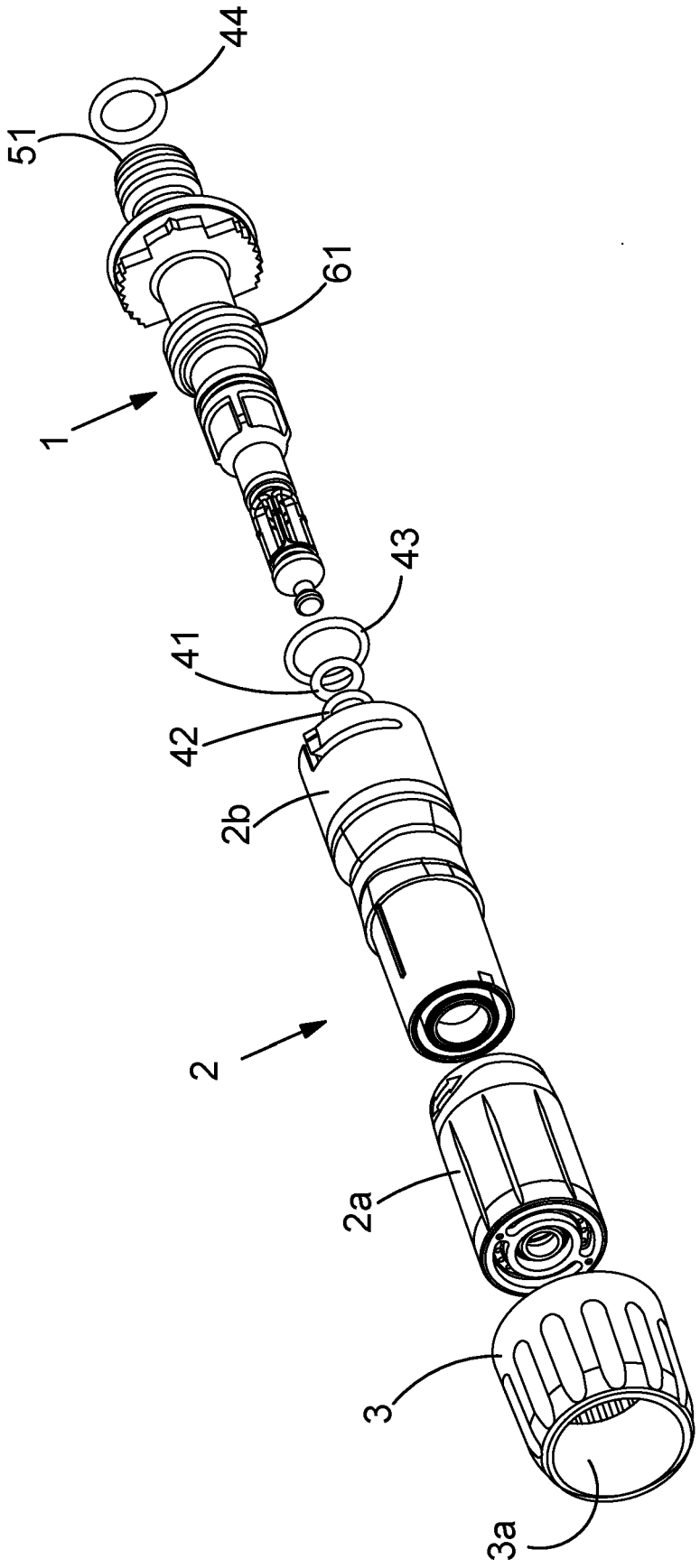

FIG.3

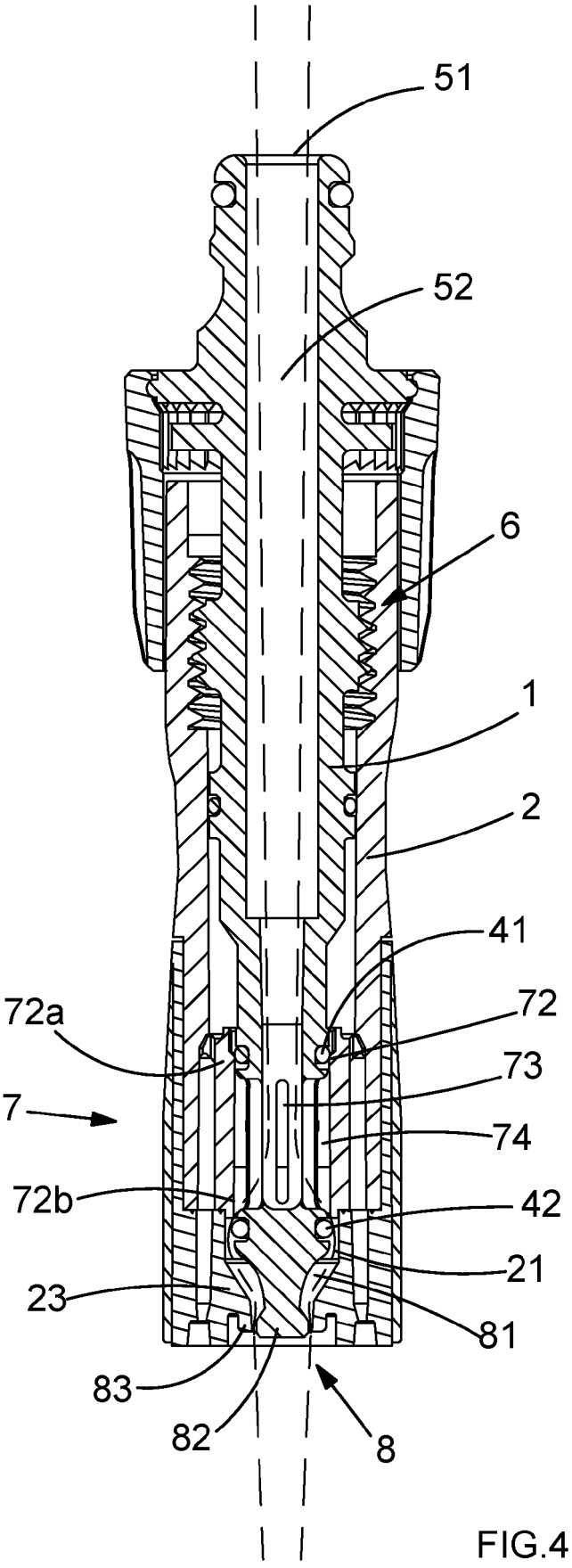

FIG.4

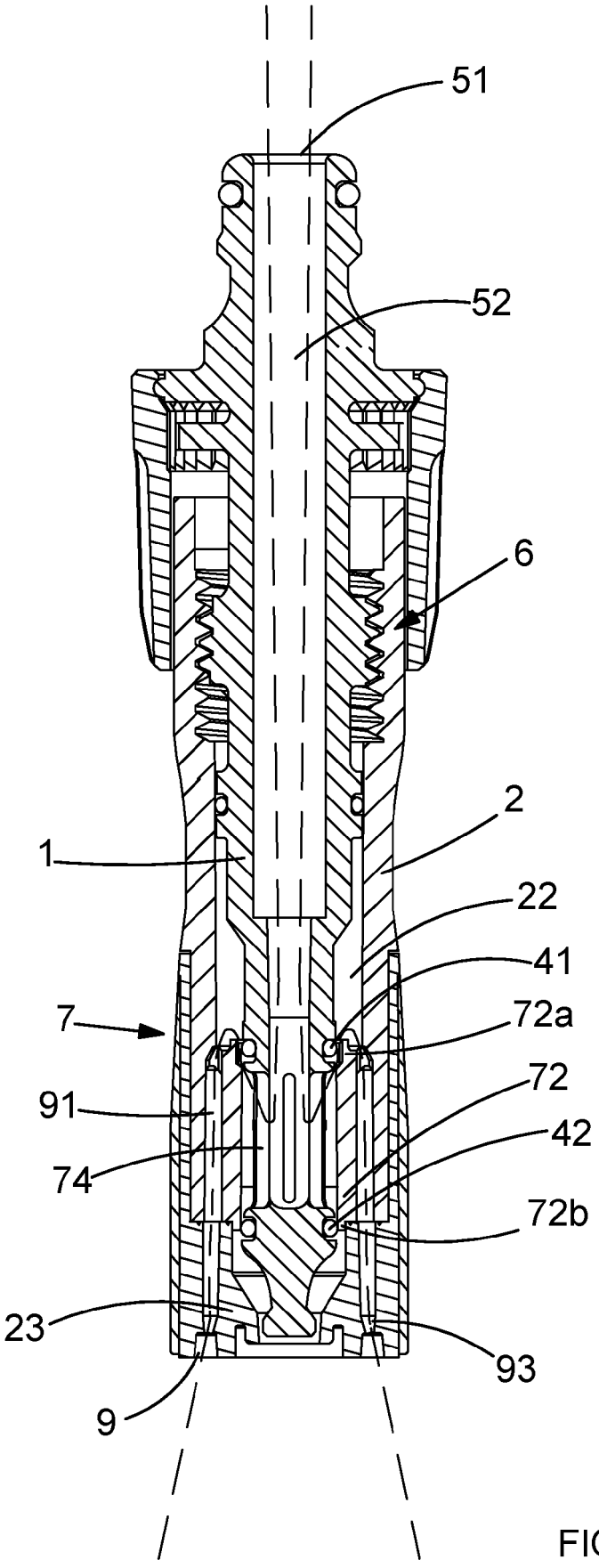

FIG.5

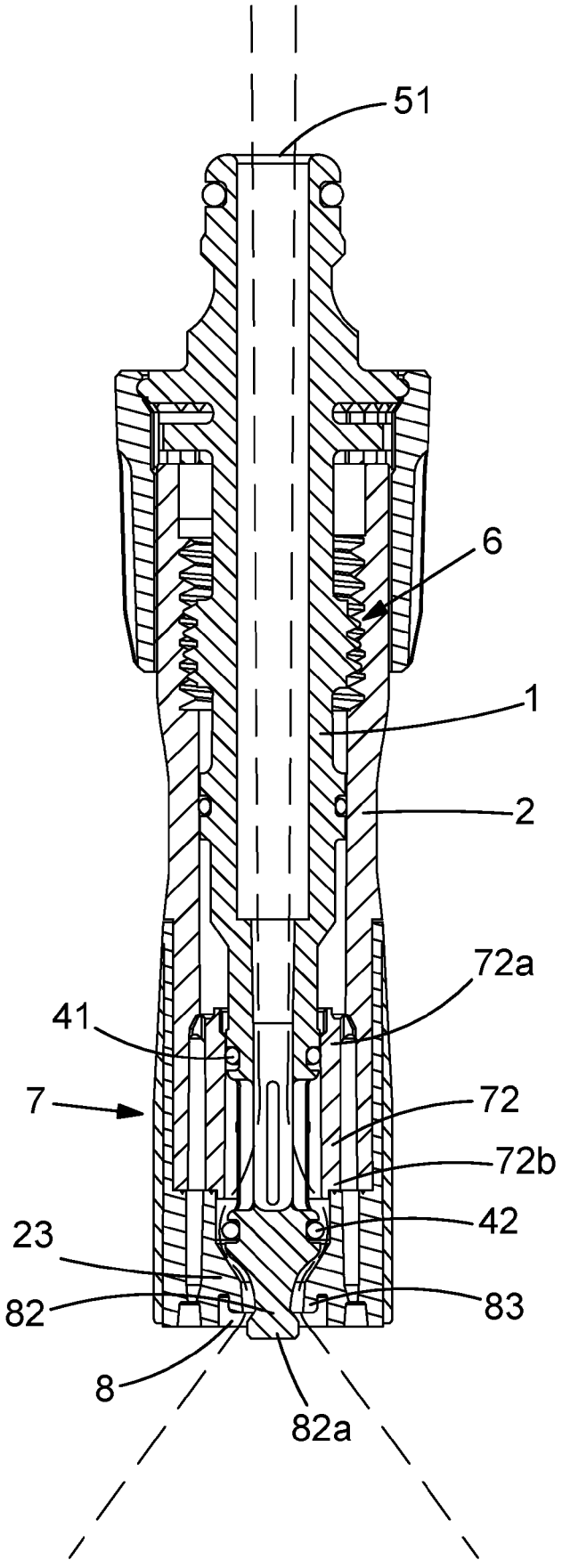

FIG.6

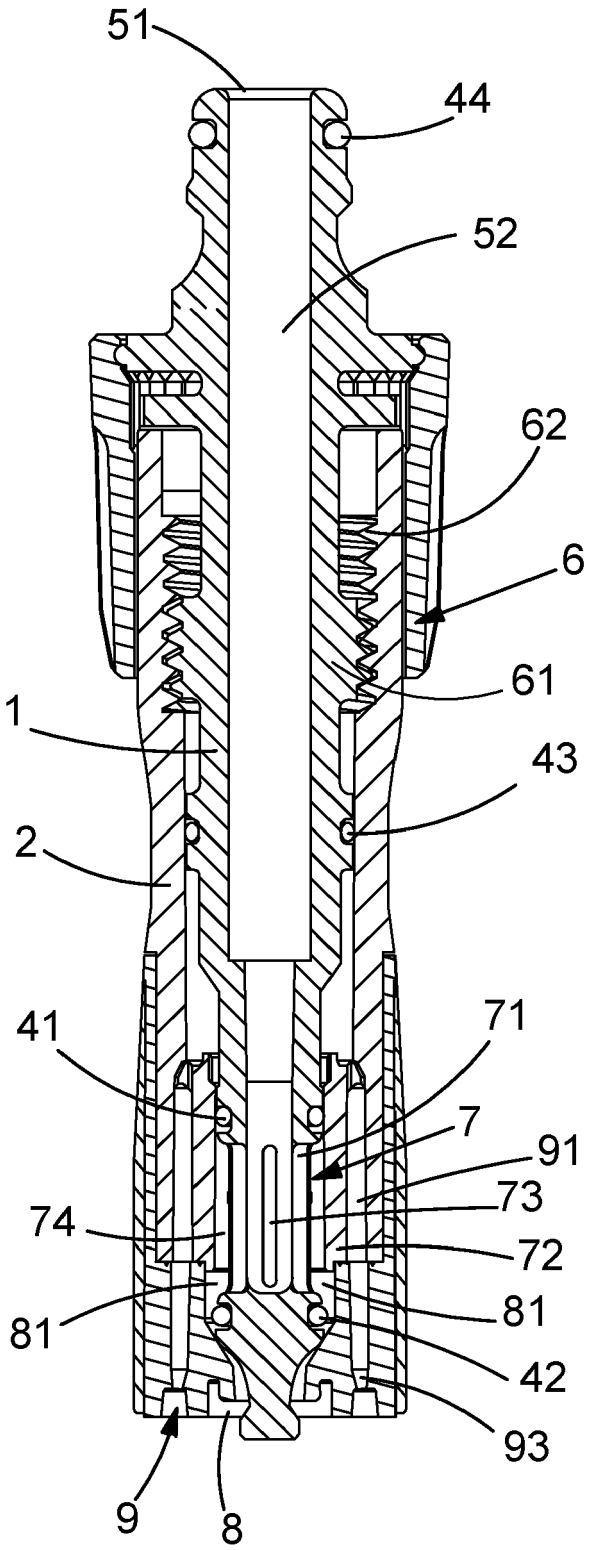

FIG.7

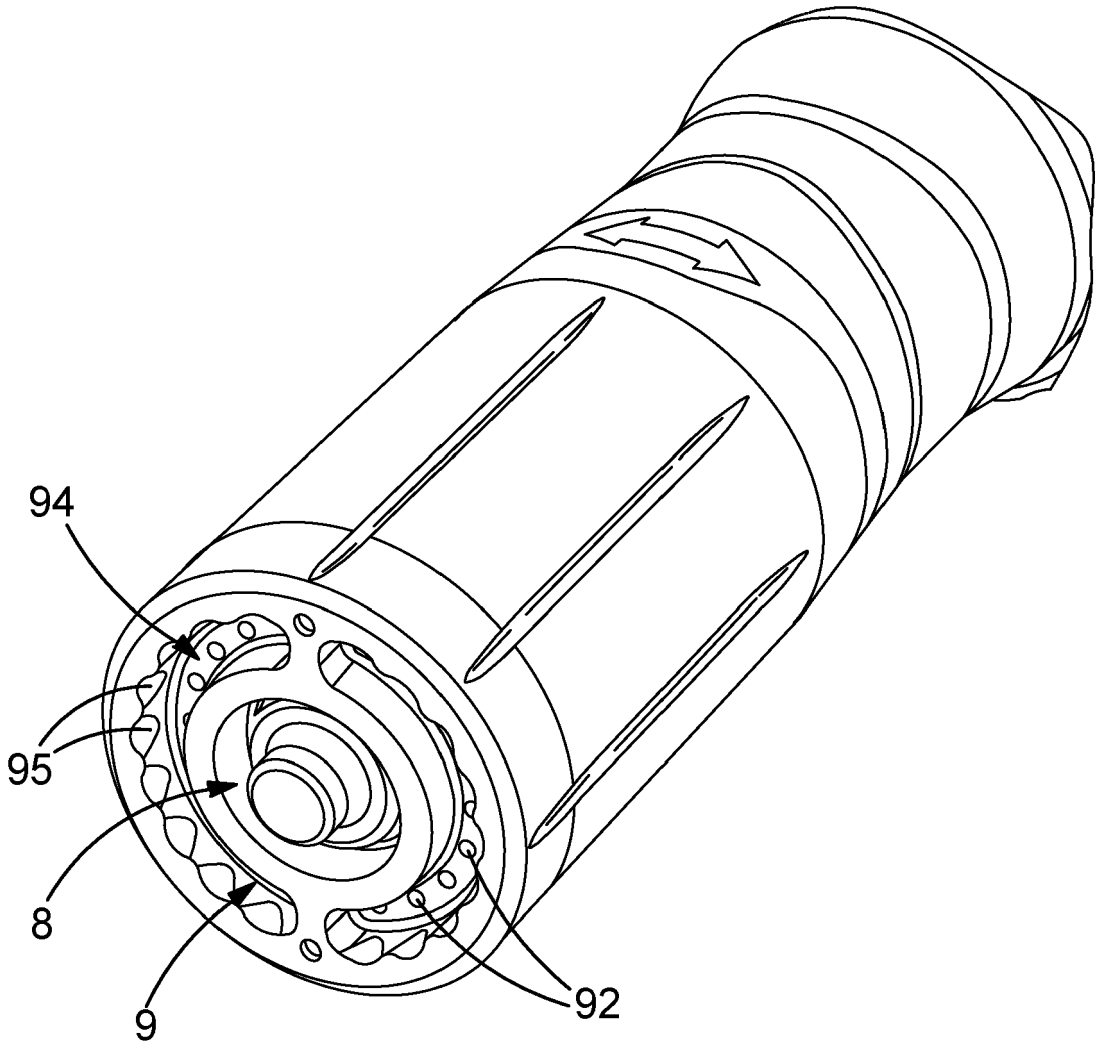

FIG.8

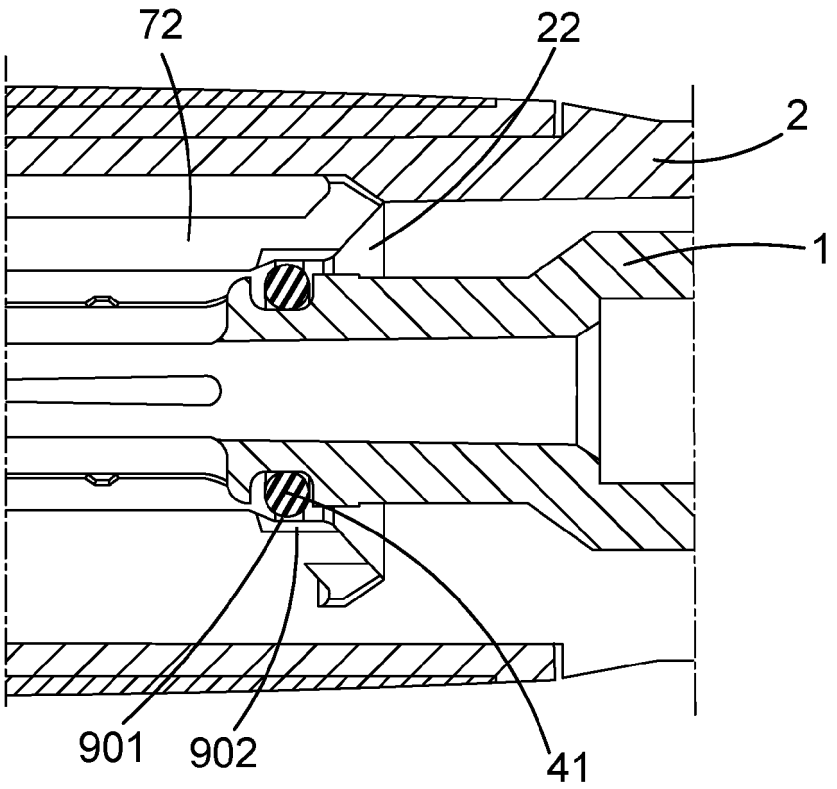

FIG.9

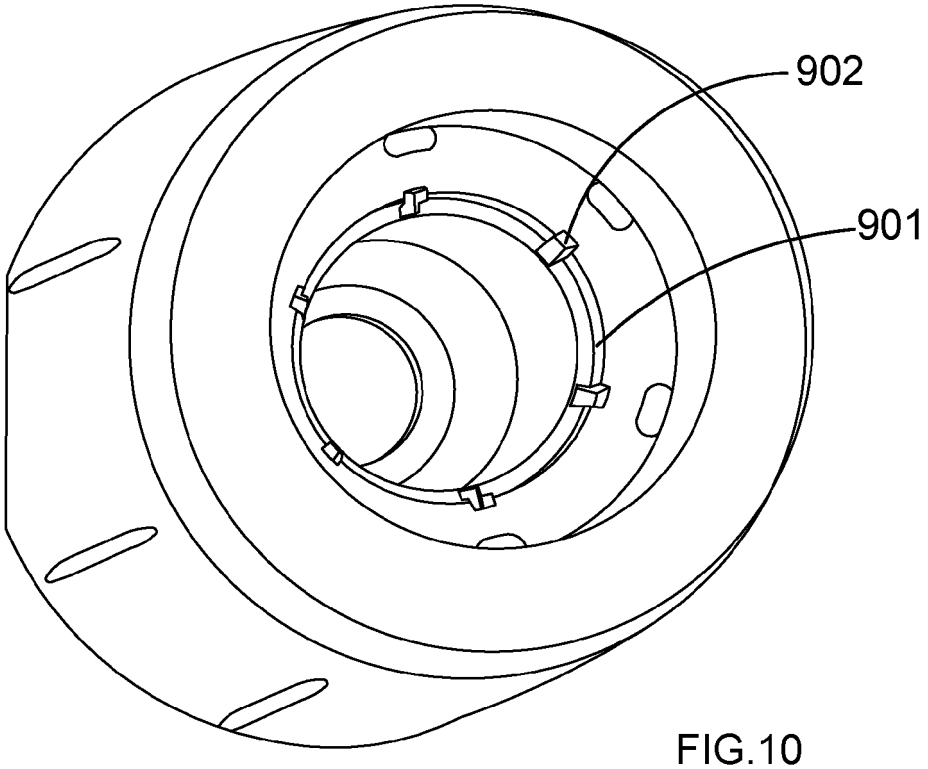

FIG.10

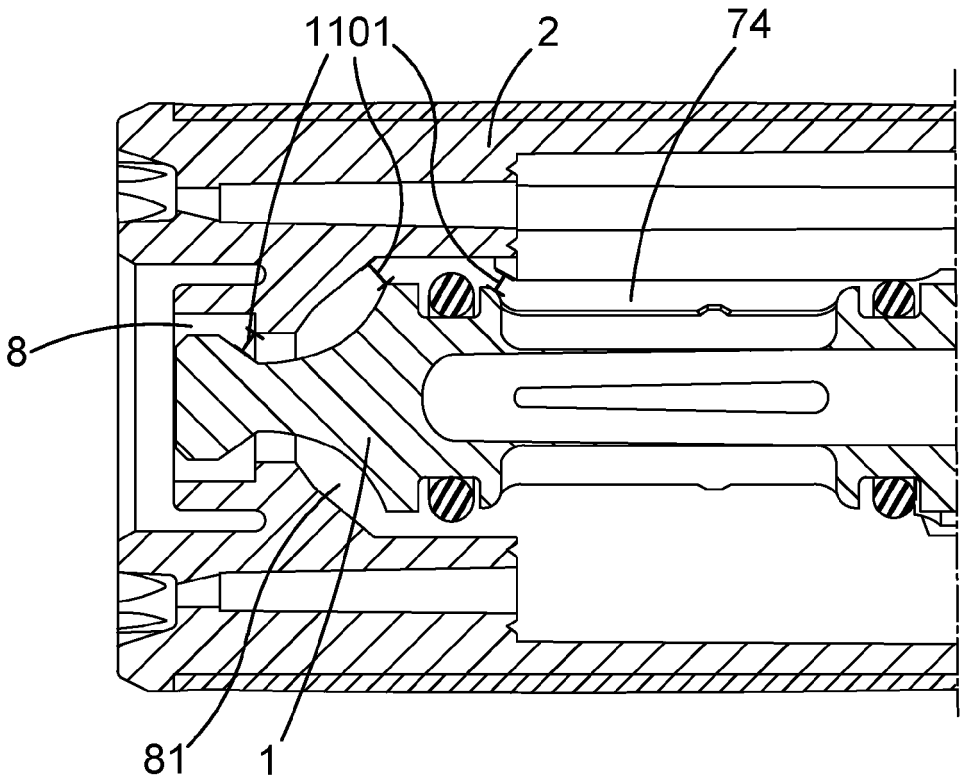

FIG.11

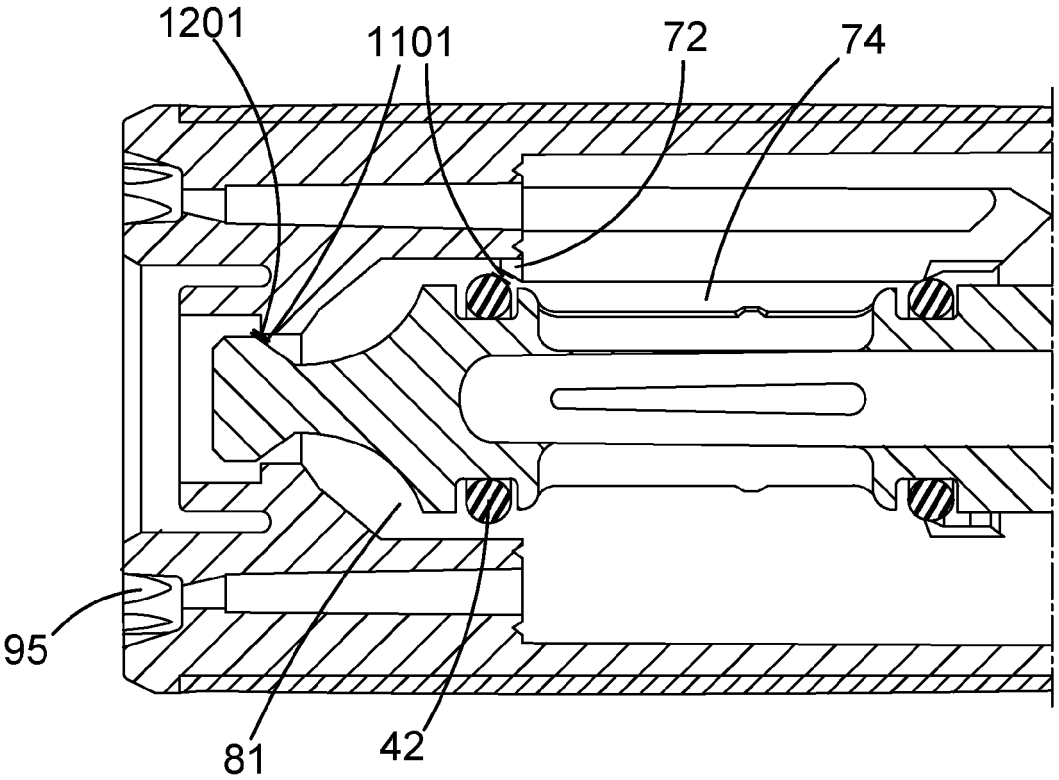

FIG.12

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EUROPEAN SEARCH REPORT

Application Number
EP 23 15 9189

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	CN 215 655 796 U (CHANGSHA SUIXIN AUTOMATION TECH CO LTD) 28 January 2022 (2022-01-28) * abstract; figures 1-7 * * paragraph [0013] * * paragraph [0027] - paragraph [0028] *	1-20	INV. B05B1/30 B05B1/18 B05B1/16 B05B1/12
X	US 8 794 546 B2 (ELEY CRAIG D [US]; SCHOLLMEYER DARIN [US]; ELEY CORP [US]) 5 August 2014 (2014-08-05) * abstract; figures 1-14 * * column 2, line 52 - column 5, line 46 *	1-3, 12-15,20	
X	US 3 514 042 A (FREED MARVIN J) 26 May 1970 (1970-05-26) * abstract; figures 1-4 * * column 2, line 18 - column 3, line 60 *	1-4,13, 14,18	
			TECHNICAL FIELDS SEARCHED (IPC)
			B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 July 2023	Frego, Maria Chiara

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CN 215655796 U	28-01-2022	NONE	
US 8794546 B2	05-08-2014	NONE	
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