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(54) **CONTACTLESS DISCHARGE DEVICE FOR WC CISTERN**

(57) Non-contact flushing device for WC cistern comprising a lifting mechanism (2) coupled, through a mechanical hooking element (3), on flushing means (4), such as a flushing tube or plug, which, in turn, are coupled with a closing joint (5) to the lower hole (6) of the cistern (7) of the surface or "backpack" type or of the recessed type in which it is installed, where the lifting mechanism (2) It has fixing means, and in which the lifting mechanism (2) is linked to a contactless activation element (8) connected to an electronic control board and a power supply battery housed in a watertight box (10), and in which the electronic control board of the lifting mechanism (2) is linked wirelessly, for example via Bluetooth or via Wi-Fi, to the activation element (8).

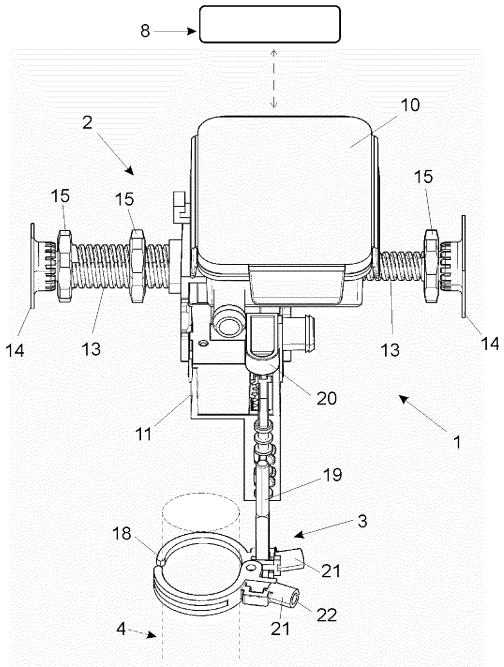

FIG. 1

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Description

OBJECT OF THE INVENTION

[0001] The invention, as expressed in the statement of the present description, refers to a contactless flushing device with a toilet cistern that provides, in the function for which it is intended, advantages and characteristics, which are described in detail below, that represent an improvement on the current state of the art.

[0002] The object of the present invention is a flushing device, from the type that comprises a lifting mechanism that can be attached to the interior of the cistern of any toilet, both of the backpack type and of the built-in type, to cause the flushing thereof through a activation element of the "touchless" or contactless type, that is, it can be operated only by bringing the hand closer to the sensor that it has. The device essentially presents the particularity that said lifting mechanism is linked to said contactless activation element wirelessly, for example via Bluetooth or Wi-Fi, so that the activator can be placed on the cistern itself but also in any other area close to it that is desired, in addition to the fact that, preferably, the lifting mechanism of the device has a an adjustable configuration that makes it a universal system, that is, suitable for adaptation to any type of cisterns, both a surface or a "backpack" type, regardless of their dimensions, as well as to built-in type cisterns.

FIELD OF THE INVENTION

[0003] The field of the present invention is within the industry sector dedicated to the manufacture of WC accessories, focusing particularly on the field of cistern flushers.

BACKGROUND OF THE INVENTION

[0004] As a reference to the current state of the art, it should be noted that, although different types and models of flushing systems and mechanisms for the toilet cistern are known, some of which even have contactless activator, at least by the applicant, the existence of one that presents technical and structural characteristics that are the same or similar to those specifically presented by the one claimed herein is unknown, whose main difference and advantage with other known systems is the fact that some aspects and limitations or shortcomings of said systems have been improved and solved.

[0005] Thus, the main advantage is that the present invention eliminates the limitation of the physical cable connection between the control electronics and the activation element, eliminating its necessary and unavoidable installation in the cistern itself or the installation work and concealment of the activator wiring. As there is no such limitation, its location allows a much wider range of possibilities and, above all, makes the installation much faster and cheaper.

[0006] In addition, another aspect that is improved with the present invention is related to the use of an electronic control board that controls the activator of the device, considering that, in addition to this, it can be used to expand its digital features, especially when it comes to of toilets in public or crowded places, for example, in commercial establishments, workplaces, etc., to have tools to control the use and/or ensure greater hygiene thereof. For example, the flushing device of the present invention allows the digital regulation of the number of liters to be flushed in each flush, that is to say, without the need to access the flushing mechanism.

[0007] Likewise, another of the advantages and improvements found in the present invention is in the mechanical element that serves as a hook between the lifting mechanism of the device and the means of flushing the cistern, normally consisting of a tube or a plug that, through a closing joint, is attached to the hole in the lower part of the cistern and, when lifted, flushes the water contained with each flush, considering that it could be easier to adapt to different types of flushing means and, above all, easier to place.

[0008] Finally, another of the advantages is the fact that, in one of its preferred embodiments, the device of the present invention is designed to be able to adapt universally to any type of cistern, both a surface or a "backpack" type, as well as to built-in type cisterns regardless of their dimensions.

DESCRIPTION OF THE INVENTION

[0009] The contactless flushing device for a toilet cistern that the invention proposes is configured as an ideal solution to the aforementioned objectives, with the characterizing details that make it possible and that distinguish it conveniently included in the final claims that accompany this description.

[0010] Specifically, what the invention proposes, as noted above, is a flushing device, from the type that comprises a lifting mechanism that can be attached to the inside of a toilet cistern, to cause the flushing of the same through an element of activation of the "touchless" or contactless type, and it is essentially distinguished by the fact that the aforementioned lifting mechanism is wirelessly linked to the aforementioned contactless activation element, in such a way that said activator can be positioned without limitation and in an easy and simple way, without the need for wiring, in any convenient or desired area of the room wherein the toilet in which the device is installed is located.

[0011] More specifically, the device of the invention comprises, in a known manner, a lifting mechanism that is coupled, through a mechanical hooking element, on the means of flushing, such as a tube or cap, coupled, in turn, with a closing joint, to the lower hole of the cistern, and wherein said lifting mechanism is linked to a touchless activation element, which preferably incorporates a proximity sensor connected to a small electronic control

board and at least one battery housed in a sealed box, so that when passing the hand in front of said sensor, it activates the lifting mechanism that moves the tube, opening the passage of water in the lower part of them towards the lower hole, causing the flushing of the cistern.

[0012] And, based on said configuration, the device of the present invention is distinguished, essentially, by the fact that the described lifting mechanism is linked wirelessly, for example via Bluetooth or via Wi-Fi, to the contactless activation element.

[0013] In a preferred embodiment, that is to say optionally, the flushing device comprises a memory that stores information about the flushes made, for example, the frequency, the type of long/short flush carried out, or the number of liters spent. Said memory is preferably housed in the same box that incorporates the electronic control board and the battery that allow the operation of the described contactless activation element, although it can also be next to the activation element.

[0014] In a preferred embodiment, that is to say optionally, the flushing device allows the digital regulation of the quantity of liters to be flushed in each flushing, that is to say, without the need to access the flushing mechanism.

[0015] Still according to another optional characteristic of the invention, the aforementioned electronic control board housed in the aforementioned box wherein the electronic components for operating the device are housed or housed next to the activation element, is a programmable board that can be programmed to carry out flushes autonomously, without the need to activate the contactless activation element by the user. For example, so that a flush is carried out at the end of the working day or a hygienic flush after several days without use.

[0016] Likewise, preferably, the device also includes a communication module, preferably incorporated into the box provided together with the other electronic components aforementioned, which allows the information stored in the memory to be sent to another external device when a specific action is performed, for example a fast flush.

[0017] Additionally, in a preferred embodiment of the invention, the lifting mechanism that is coupled inside the cistern is made up of an extensible assembly in an adjustable manner that is fixed under pressure between two support points inside the cistern, in such a way that its length can be adapted to the space that exists in each cistern model, wherein the flushing device becomes a universal system suitable for adaptation to all types of cisterns, both a surface or a "backpack" type, as well as to built-in type cisterns regardless of their dimensions.

[0018] In addition, said lifting mechanism can be placed, attached to the flushing tube, in two different positions:

- a horizontal one, so that it expands between the front and back walls of the cistern, normally for surface or "backpack" type cisterns, so that it adapts to any bottom it may have; and

- another vertical one, in this case to expand and be fixed between the upper and lower edges of the window that are usually present in built-in cisterns to allow access to the interior thereof, so that it is also adaptable to any size that said window has.

[0019] Logically, it must be understood that the maximum and minimum expansion in which this piece can be adjusted is always included within certain limits, but that in any case, they are calculated for the approximate dimensions that all cistern manufacturers usually present.

[0020] On the other hand, in an embodiment of the invention, the mechanical element for hooking to the flushing means comprises a claw, defined by two arms articulated together like a clamp, that adjusts to different diameters of the flushing tube (when used horizontally) or hooked to the cap handle (when used vertically). In an alternative embodiment, instead of a claw, a spring is use, which is inserted into the upper end of the flushing tube and it is released so that the spring is fixed to the tube from the inside. This embodiment is interesting since it works over a wide range of flushing tube diameters.

[0021] Preferably, said claw or spring is slidable along a bar of the mechanical hooking element, which allows the activation of the flush by pulling the claw or the spring itself by the user, for example, with a cable attached to the claw or the spring.

[0022] For the mechanical flushing, the bar has a stop at the end of the bar, in this way, when it is raised by the lifting mechanism, the claw or the spring rises and performs the flushing.

[0023] On the other hand, it should be noted that, preferably, all the elements of the device that are incorporated into the cistern can be submersible, including the box in which the electronic components are incorporated, for which said box is specially sealed.

[0024] The mounting method is as follows: the claw or the spring is fixed to the flushing means, such as a flushing tube or plug, the bar is placed and subsequently the lifting mechanism is fixed to the cistern.

DESCRIPTION OF THE DRAWINGS

[0025] To complement the description that is being made and in order to help achieve a better understanding of the characteristics of the invention, the present specification is attached, as an integral part of it, some plans in which, with an illustrative and non-limiting nature, the following has been represented:

Figure No. 1.- Shows a perspective view of a first embodiment of the contactless flushing device for a toilet cistern object of the present invention, which has been represented schematically including the flushing means and the contactless activation ele-

ment, appreciating its general configuration and the main parts and elements that it comprises;

Figure No. 2.- Shows a perspective view of the example of the contactless flushing device for a toilet cistern, according to the invention, shown in Figure 1, appreciating from another angle, the parts and elements thereof;

Figure No. 3.- Shows a schematic view in a sectioned front elevation, according to a vertical cut, of an example of a surface-type or a "backpack" cistern equipped with another example of the flushing device object of the invention, appreciating the main parts and elements that It includes, as well as the configuration and arrangement thereof inside the cistern;

Figure No. 4.- Shows a view in a side elevation and in a section, according to a vertical section, of the example of the cistern with the example of the device of the invention shown in Figure 3;

Figure No. 5.- Shows a schematic view in perspective and section, according to the truncated section A-A indicated in Figure 3, of the cistern with the example of the device of the invention;

Figure No. 6.- Shows a front elevation view and a section, according to a vertical section, of another example of a cistern, in this case a built-in cistern, provided with the example of the device object of the invention shown in Figures 3 to 5, appreciating the parts and elements that it comprises and their arrangement for adaptation to this other type of cistern, in particular the central element that constitutes the lifting mechanism; and

Figures No. 7 and No. 8.- Show respective sectional views, one in a side elevation and the other in perspective according to the truncated cut B-B indicated in Figure 6, of the example of a built-in cistern with the device object of the invention represented in said Figure 6.

PREFERRED EMBODIMENT OF THE INVENTION

[0026] In view of the aforementioned figures, and in accordance with the numbering adopted, two non-limiting embodiment examples of the contactless flushing device for toilet cistern of the invention can be seen, which includes what is described in detail below.

[0027] Thus, as can be seen in said figures, the device (1) of the invention comprises, in a known manner, a lifting mechanism (2) to ensure a flushing that is coupled, through a mechanical hooking element (3), on the flushing means (4), such as a flushing tube or a plug, which, in turn, is coupled with a closure joint (5) to the lower hole (6) of the cistern (7) in which the device is installed (1), in which said lifting mechanism (2) is linked to a contactless or touchless activation element (8), located externally to the cistern (7) and which, in turn, is connected to an electronic control board of the lifting mechanism (2) and at least one power supply battery housed in a sealed box (10), essentially differing in that said electronic control board for the lifting mechanism (2) is linked wirelessly, for example either via Bluetooth or Wi-Fi, to the activation element (8).

[0028] Preferably, the contactless touchless activation element (8), incorporates a proximity sensor (not shown in the figures), in such a way that when passing the hand in front of the activation element (8), it activates the lifting mechanism (2) that acts on the mechanical hooking element (3) causing the displacement of the flushing means (14), in this case configured as a flushing tube opening the passage of water through the lower part thereof towards the lower hole (6) causing the flushing of the cistern (7).

[0029] And, preferably, the sealed box (10) with the electronic control board and the power supply battery to which the contactless activation element (8) is wirelessly connected is located in the upper internal part of the cistern (7) wherein the water level cannot reach it (n).

[0030] In any case, preferably, the device (1) also includes a memory, connected to the electronic control board housed in the sealed box (10), that stores information on the flushing made by the lifting mechanism (2), for example, on the frequency, the type of long/short flush carried out or the number of liters spent.

[0031] This electronic control board allows, preferably, the digital regulation of the quantity of liters to be flushed in each flush, that is to say, without the need to access the flushing mechanism.

[0032] Preferably, the electronic control board for the activator of the lifting mechanism (2) that is housed in the sealed box (10), is a programmable board to carry out flushes without the need to activate the activation element (8) without contact by the user. For example, so that a flush is carried out at the end of the working day, or a hygienic flush after several days without use.

[0033] Preferably, the device (1) also includes, housed in the sealed box (10) and connected to the control board, a communication module that allows the information stored in the memory to be sent to another external device when a specific action is performed, for example, a fast flush.

[0034] On the other hand, the device (1) is also distinguished because, preferably, the lifting mechanism (2) has fixing means in the form of adjustable extensible elements (13, 15) to which it is fixed by pressure between at least two opposite support points of the cistern (7) that make it a device for universal use, allowing its length to be adapted to the space that exists in each case.

[0035] In addition, the lifting mechanism (2) can be placed, coupled to the tube or flushing means (4), both in a horizontal and vertical position, to allow the use of

the device in both a surface or a "backpack" type of cisterns (7), as shown in Figures 3 to 5, as well as to built-in type cisterns (7) in Figures 6 to 8.

[0036] For this, preferably, the extensible assembly that constitutes the lifting mechanism (2) comprises, in one end of its central body (11), a spring (12) housed in a fixing piece (13) with a shoe piece (14), and, at the opposite end of said central body (11), a regulating screw (15), whose screwing/unscrewing causes the extension or retraction of the assembly to adapt it to the existing space.

[0037] Thus, as can be seen in Figures 3 to 5, the device (1) can be installed in a cistern (7) of a surface or a "backpack" type, for which the lifting mechanism (2) is arranged in a horizontal position and its extension is adjustable, through the regulating screw (15), so that it is held by pressure and adjusted between the front (7a) and back (7b) walls of the cistern (7).

[0038] As can be seen in Figures 6 to 8, the device (1) of the invention is also suitable for installation in a built-in cistern (7), for which the lifting mechanism (2) is arranged in a vertical position and Its extension is adjustable, through the regulating screw, so that it is held by pressure and adjusted between the upper (7c) and lower (7d) edges of the window that this type of built-in cisterns (7) has.

[0039] In addition, in either of the two cases, in one embodiment, the mechanical hooking element (3), with which the lifting mechanism (2) is coupled to the flushing tube (4), comprises a rack (16) which fits into the central body (11) of the lifting mechanism (2) and a lifting lever (17) which is attached above to said rack (16) and below to the top of the flushing tube (4).

[0040] On the other hand, in another embodiment option, shown in the example of Figures 1 and 2, the mechanical hooking element (3) that is coupled to the lifting mechanism (2) comprises a claw (18) or a spring, defined by two arms articulated together as a clamp, that adjusts to different diameters of the flushing tube (4) (when used horizontally) or that is hooked to the plug handle (when used vertically).

[0041] Preferably, said claw (18) or spring is slidable along a bar (19) of the mechanical hooking element (3), that allows the activation of the flushing by pulling the claw (18) or the spring itself by the user, for example, with a cable attached to the claw (18) or the spring.

[0042] To carry out said mechanical flushing, the bar (19) preferably has a stop (20) at the end of it, thus, when it is lifted by the lifting mechanism (2), the claw (18) or the spring, and it flushes.

[0043] The way of assembling the device, according to this embodiment variant, will be as follows:
The claw (18) or spring is fixed to the flushing means (4), such as a flushing tube or plug, the bar (19) is placed and, subsequently, the lifting mechanism (2) is fixed to the cistern.

[0044] For this, the lifting mechanism (2) is fixed to the cistern with fixing means, such as shoe pieces (14) provided at the respective ends of a fixing piece made up of respective fixing pieces (13), configured as of threaded rods, which emerge from opposite sides of a central body (11), in which said shoe pieces(14) are threaded, being fixed in an adjustable manner through regulating screws (15).

[0045] In addition, preferably, the claw (18) has protuberances (21), on the opposite side of each of the clamp-like arms that make up said claw (18), with holes (22) provided for inserting the sharp edged elements of a tool and to be able to pry open the claw (18) more easily.

[0046] Lastly, it should be noted that, preferably, all the elements of the device (1) that are incorporated into the cistern, including the watertight box (10) in which the electronic control board and other operating electronic components are incorporated, can be submersible and be below the flushing water level.

[0047] Having sufficiently described the nature of the present invention, as well as the way of putting it into practice, it is not considered necessary to make its explanation more extensive so that any expert in the field understands its scope and the advantages derived from it.

Claims

1. A contactless flushing device for a toilet cistern, comprising a lifting mechanism (2) coupled, through a mechanical hooking element (3), on flushing means (4), such as a flushing tube or a plug, which, in turn, are coupled with a closure joint (5) to the lower hole (6) of the cistern (7) both of a surface or a "backpack" type, as well as a built-in type in which it is installed, wherein the lifting mechanism (2) has fixing means, and in which the lifting mechanism (2) is linked to a contactless activation element (8) connected to an electronic control board and a power supply battery housed in a sealed box (10), **characterized in that** the electronic control board of the lifting mechanism (2) is wirelessly linked to the activation element (8).

2. The contactless flushing device for a toilet cistern, according to claim 1, **characterized in that** it comprises a memory that stores information about the flushes made by the lifting mechanism (2), for example, on the frequency, the type of long/short flush carried out or the number of liters spent.

3. The contactless flushing device for a toilet cistern, according to any of claims 1 or 2, **characterized in that** the electronic control board of the lifting mechanism (2) is a programmable board to carry out flushes without the need to activate the activation element (8) without contact by the user and to allow the digital regulation of the number of liters to be flushed in each flush.

4. The contactless flushing device for a toilet cistern, according to the preceding claims, **characterized in that** it comprises a communication module that allows the information stored in the memory to be sent to another external device when a specific action is performed, for example, a fast flush.

5. The contactless flushing device for a toilet cistern, according to any of the preceding claims, **characterized in that** the contactless activation element (8) incorporates a proximity sensor.

6. The contactless flushing device for a toilet cistern, according to any of the preceding claims, **characterized in that** the sealed box (10) with the electronic control board and the power supply battery to which the activation element is wirelessly connected to (8) without contact is located in the upper internal part of the cistern (7) wherein the water level cannot reach it (n).

7. The contactless flushing device for a toilet cistern, according to any of the preceding claims, **characterized in that** the lifting mechanism (2) has fixing means in the form of adjustable extensible elements (13, 15),) to which it is fixed by pressure between at least two opposite support points of the cistern (7), that make it a device for universal use, allowing its length to be adapted to the space that exists in each case

8. The contactless flushing device for a toilet cistern, according to claim 7, **characterized in that** the lifting mechanism (2) is capable of being placed coupled to the tube or flushing means (4), both in a horizontal and vertical position.

9. The contactless flushing device for a toilet cistern, according to claims 7 and 8, **characterized in that** the extensible assembly that constitutes the lifting mechanism (2) comprises, at one end of its central body (11), a spring (12) housed in a fixing piece (13) with a shoe piece (14), and, at the opposite end of said central body (11), a regulating screw (15), whose screwing/unscrewing causes the extension or retraction of the set to adapt it to the existing space.

10. The contactless flushing device for a toilet cistern, according to claims 7 to 9, **characterized in that** for the installation thereof in a cistern (7) of a surface or a "backpack" type, the lifting mechanism (2) is arranged in a horizontal position and its extension is adjustable, through the regulating screw (15), so that it is held by pressure and adjusted between the front (7a) and back (7b) walls of the cistern (7).

11. The contactless flushing device for a toilet cistern, according to claims 7 to 9, **characterized in that** for the installation thereof in a built-in cistern (7), the lifting mechanism (2) is arranged in a vertical position and Its extension is adjustable, through the regulating screw, so that it is held by pressure and adjusted between the upper (7c) and lower (7d) edges of the window that this type of built-in cisterns (7) has.

12. The contactless flushing device for a toilet cistern, according to any of the preceding claims, **characterized in that** the mechanical hooking element (3) by which the lifting mechanism (2) is coupled to the flushing tube (4), comprises a rack (16) which fits into the central body (11) of the lifting mechanism (2) and a lifting lever (17) which is attached above to said rack (16) and below to the top of the flushing tube (4).

13. The contactless flushing device for a toilet cistern, according to any of claims 1 to 11, **characterized in that** the mechanical hooking element (3) comprises a claw (18) or spring that adjusts to the flushing means (4), either to different diameters of the flushing tube or that is hooked to the plug handle.

14. The contactless flushing device for a toilet cistern, according to claim 13, **characterized in that** the claw (18) or spring is slidable along a bar (19) of the mechanical hooking element (3), that allows an activation of the flush by pulling the claw (18) or spring itself by the user, for example, with a cable attached to the claw (18) or spring.

15. The contactless flushing device for a toilet cistern, according to claim 14, **characterized in that** the bar (19) has a stop (20) at the end of it.

16. The contactless flushing device for a toilet cistern, according to any of claims 13-15, **characterized in that** the claw (18) has protuberances (21) on the opposite side of each of the clamp-like arms that make up said claw (18), with some holes (22) provided for inserting some elements of a tool and to be able to pry open the claw (18) more easily.

17. The contactless flushing device for a toilet cistern, according to any of the previous claims, **characterized in that** all the elements that it comprises and that are incorporated into the cistern (7), including the sealed box (10) in which the electronic control board and other operating electronic components are submersible.

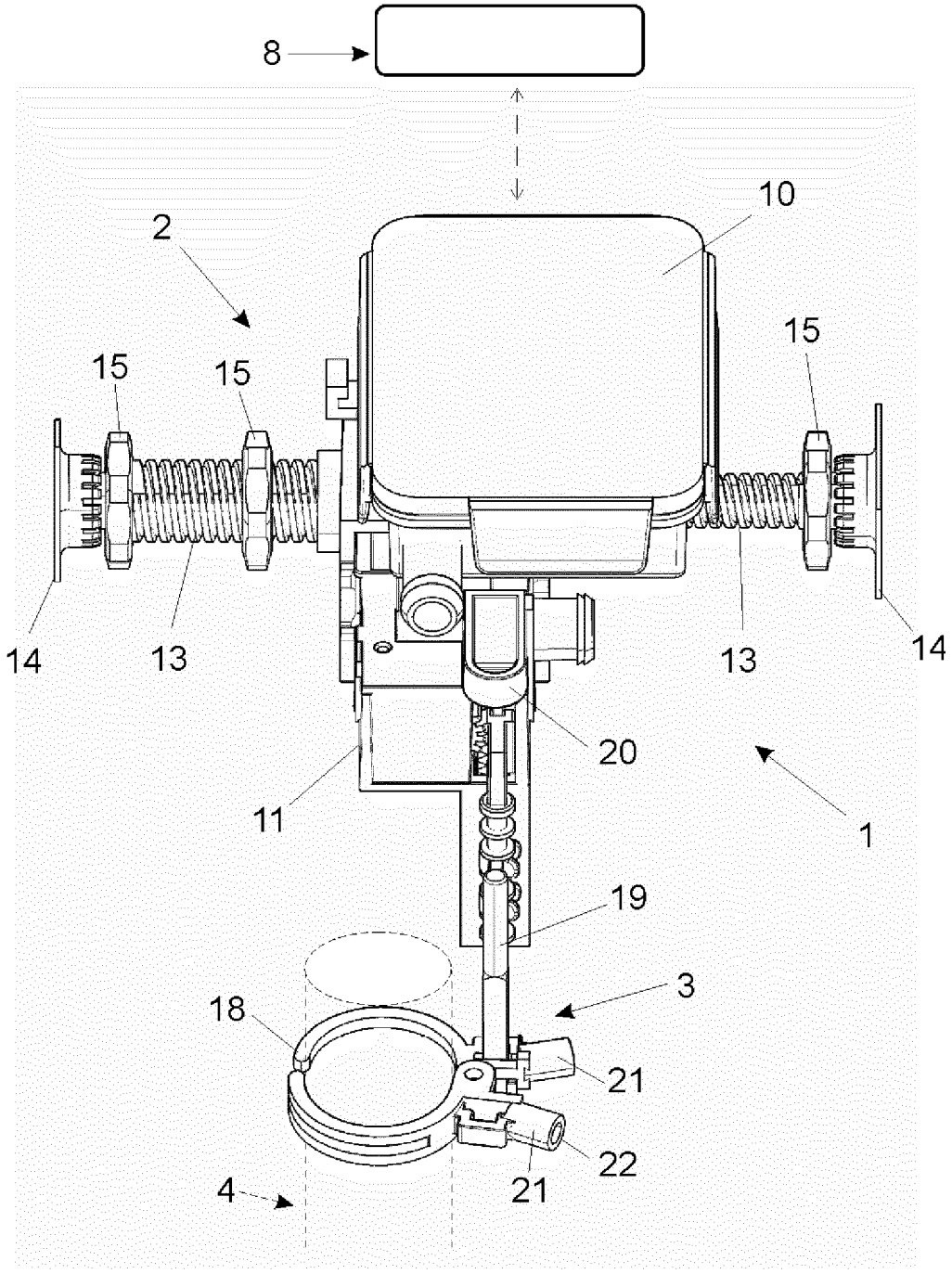

FIG. 1

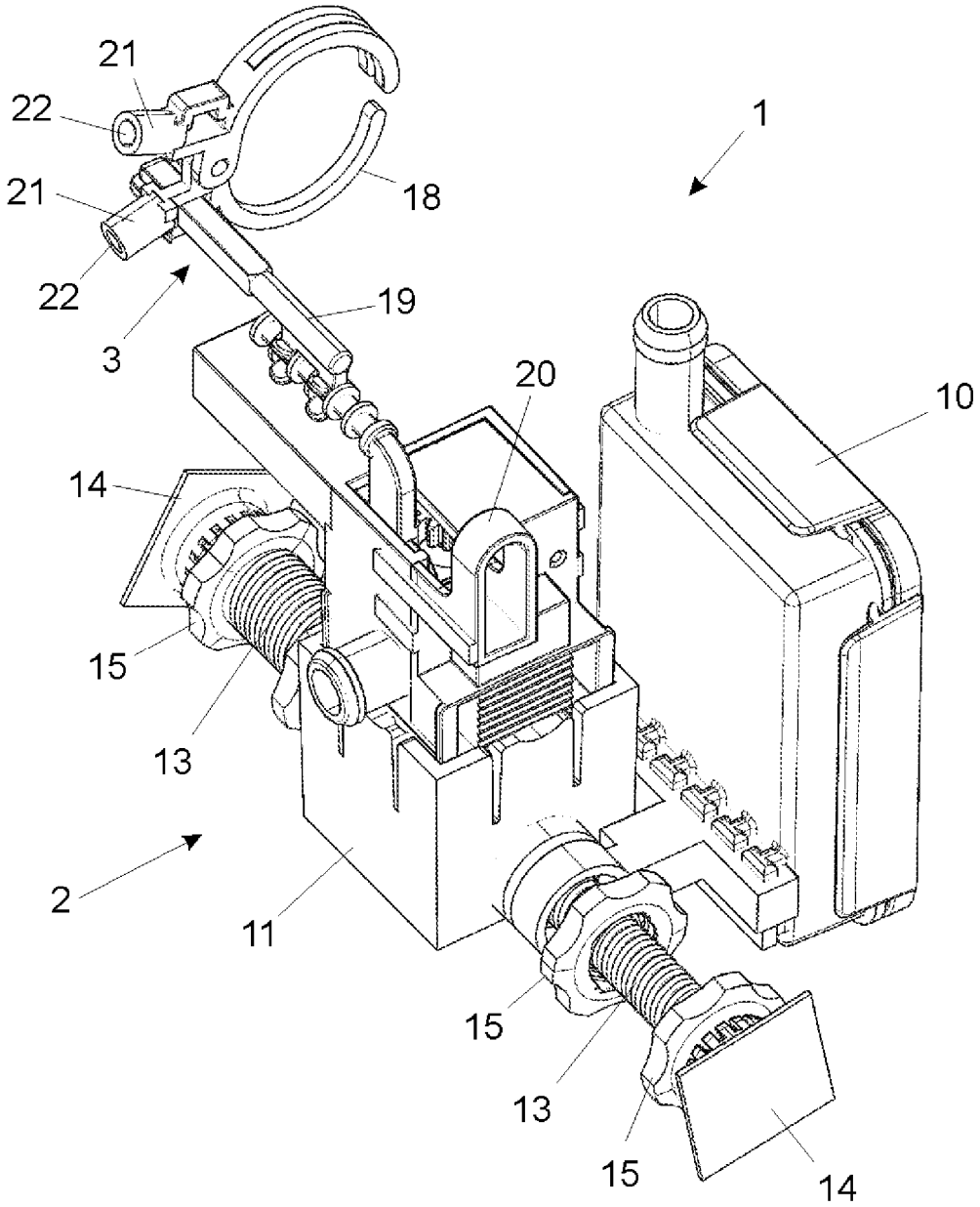

FIG. 2

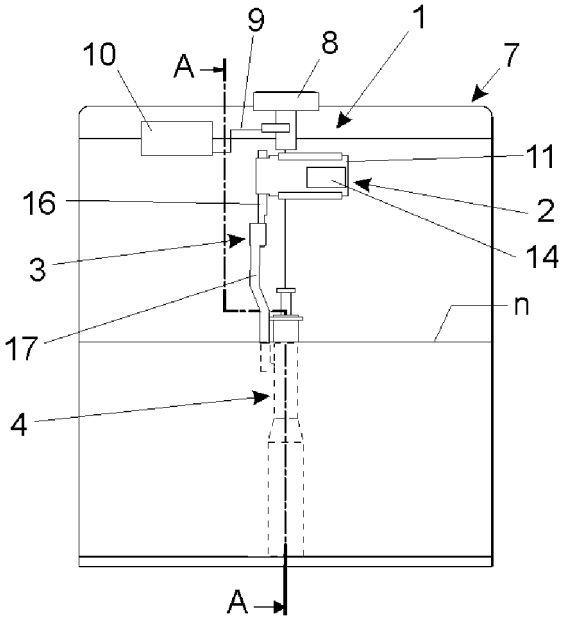

FIG. 3

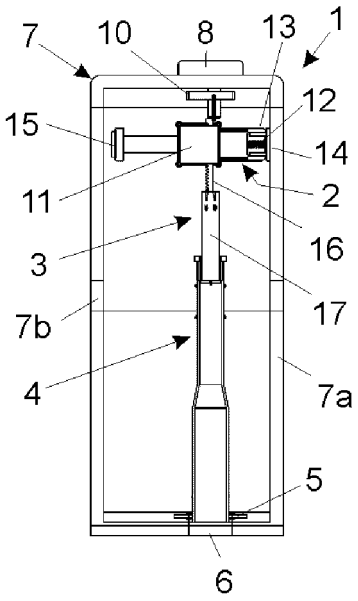

FIG. 4

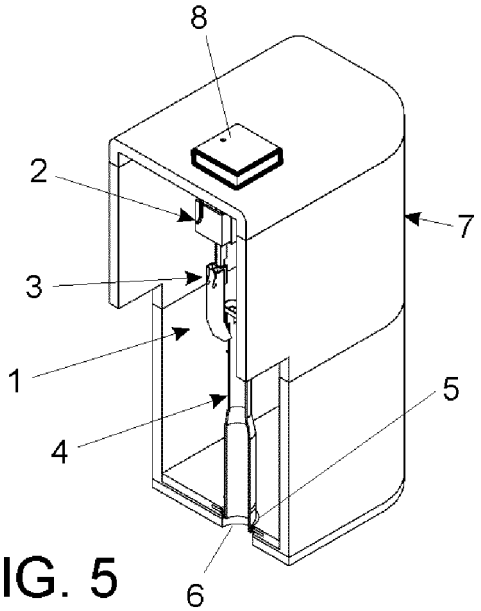

FIG. 5

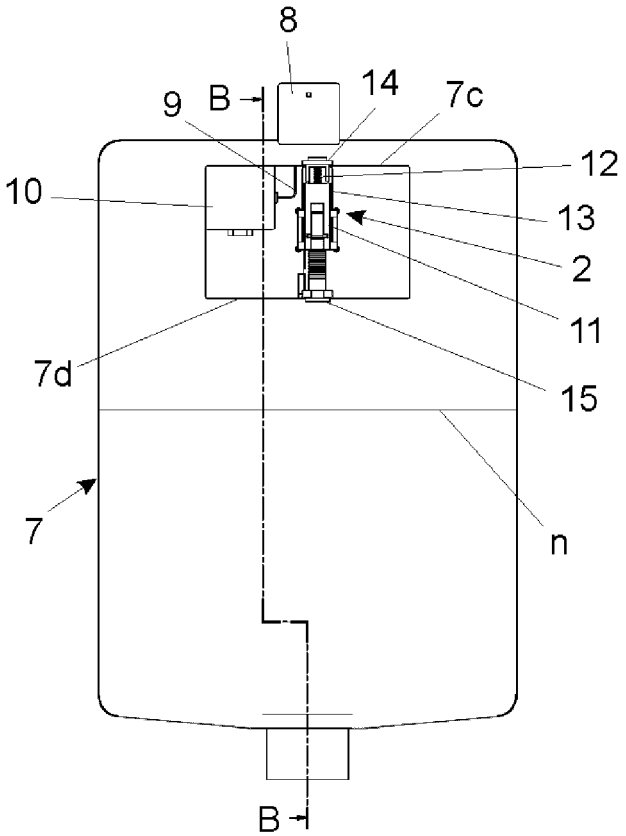

FIG. 6

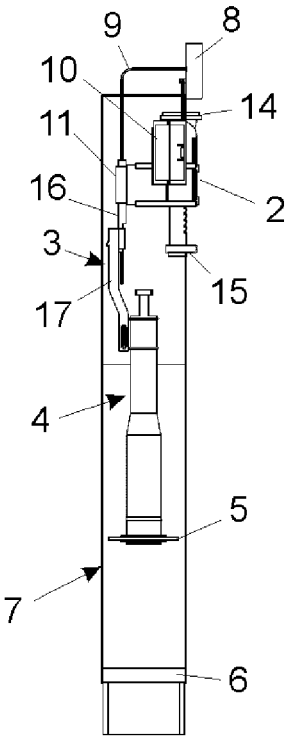

FIG. 7

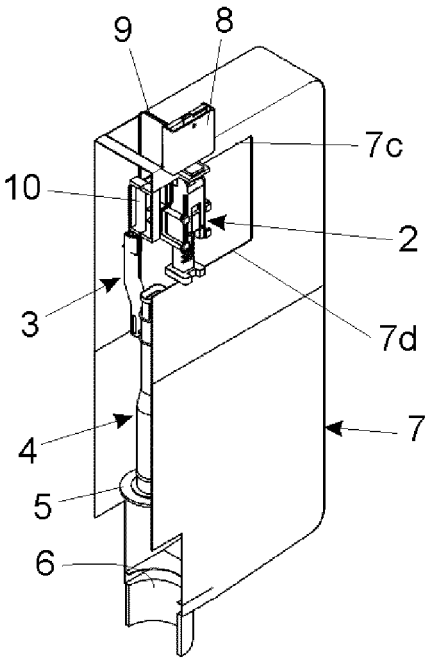

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2021/070698

A. CLASSIFICATION OF SUBJECT MATTER

E03D5/10 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI, INTERNET

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
14/01/2022	**(18/01/2022)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer R. Bozal Callejo Telephone No. 91 3498581

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International application No.
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