

(19)



(11)

EP 3 912 730 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.11.2021 Bulletin 2021/47

(51) Int Cl.:
B05B 9/01 (2006.01) **B05B 1/16 (2006.01)**
B05B 12/00 (2018.01)

(21) Application number: **20175574.1**

(22) Date of filing: **19.05.2020**

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

(72) Inventor: **CHENG, CHI-HAN**
LUGANG TOWNSHIP, CHANGHUA COUNTY 505
(TW)

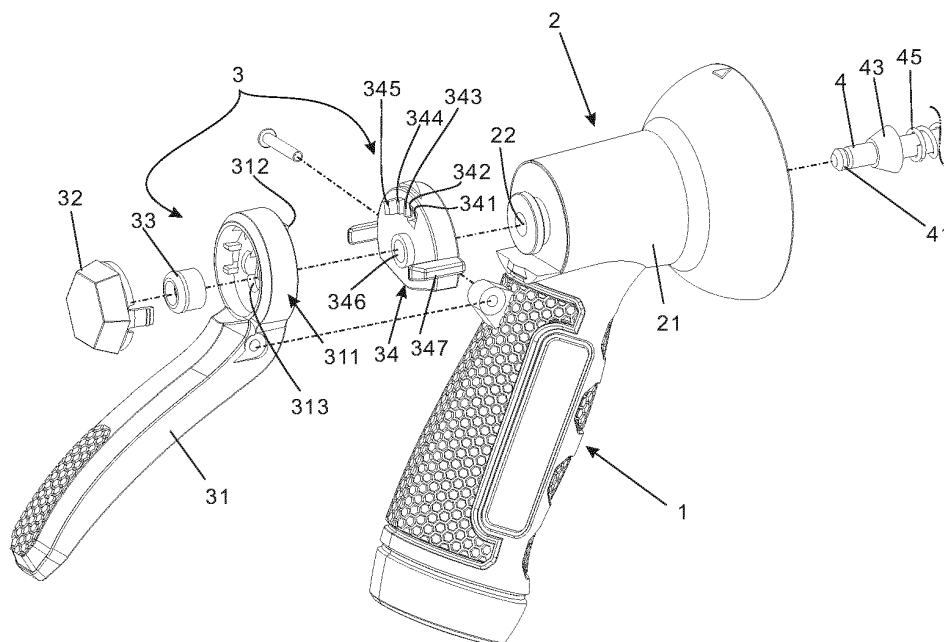
(74) Representative: **Lang, Christian**
LangPatent Anwaltskanzlei IP Law Firm
Ingolstädter Straße 5
80807 München (DE)

(71) Applicant: **Yuan Mei Corp.**
LuKang Township, Changhua County 50547 (TW)

(54) **WATER SPRAY GUN FOR CONTROL OF OUTFLOW OF WATER AND ADJUSTMET OF OUTFLOW**

(57) A water spray gun for control of an outflow of water and adjustment of the amount of the outflow is revealed. The water spray gun includes a handle portion, a pipe portion connected to the handle portion and used for spraying water, and a control device arranged at the position where the pipe portion meets the handle portion.

The control device consists of a press part and a rotary control member. The amount of the water outflow is controlled by the rotary control member. The amount of the outflow sprayed out from the pipe portion at respective stages is continuously controlled and regulated by the control device.

**FIG 1****EP 3 912 730 A1**

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a water spray gun, especially to a water spray gun with a control device for control of an outflow of water and adjustment of the amount of the outflow by selecting different amount of the water outflow at various stages.

Description of Related Art

[0002] Generally, a conventional water spray gun includes two members—a control member for adjustment of the amount of water sprayed and a fixing member for fixing the outflow control member, separated from each other. Referring to Taiwanese Pat. Pub. No. 203775, a water spray gun with flow regulation is revealed. The control member for flow regulation includes a water-control valve stem, a valve stem spring, and an adjusting nut. The water-control valve stem is driven to move by rotation of the adjusting nut. With reference to Taiwanese Pat. No. M293796, crack resistant structure of water spray gun is revealed. The water spray gun includes a control member pivotally connected to an outer surface of a frame, a spray head connected to the frame and having a chamber with an water passage opening communicating with a water outlet of the frame, a piston movably mounted in the chamber and provided with a through hole and a seal ring therearound for abutting against an inner wall of the chamber, a movable valve stem disposed in a water channel of the frame and having one end inserted out of the frame to be connected to the control member and a stopper end on the other end, and a restoring spring arranged at the chamber of the spray head and having one end thereof abutting against the piston. A support spring is disposed between the movable valve stem and the frame to push the movable valve stem and allow the stopper end to be mounted into the through hole of the piston for waterproofing. As shown in figures, a press part is arranged at an outer surface of the frame. The press part and a water control valve of the frame are connected to each other and provided with an adjustment member and a positioning member. The adjustment member and the positioning member are two control members arranged separately. The adjustment member is used to adjust the amount of water outflow while the positioning member is used for control of continuous water outflow. Thus users need to operate the respective control members separately for adjustment of the amount of the water outflow and control of continuous water outflow. There is room for improvement and there is a need to provide a water spray gun which overcomes the above shortcoming.

SUMMARY OF THE INVENTION

[0003] Therefore it is a primary object of the present invention to provide a water spray gun in which two control members are integrated into one control part for control of an outflow of water and adjustment of the amount of the outflow by only a single operation of the control member.

[0004] In order to achieve the above object, a water spray gun for control of an outflow of water and adjustment of the amount of the outflow according to the present invention includes a handle portion, a pipe portion connected to the handle portion and used for spraying water, a control device arranged at the position where the pipe portion meets the handle portion, and a movable valve stem. A water inlet channel of the handle portion is communicating with a water outlet channel of the pipe portion. The movable valve stem is mounted in the water outlet channel. The control device consists of a rotary control member provided with a plurality of step-like parts and a press part having one end connected to one end of the movable valve stem. The press part is further provided with a positioning part corresponding to the step-like parts of the rotary control member. The rotary control member is rotated to select one of the step-like parts corresponding to the positioning part for adjusting the movable valve stem to move forward or backward axially. Thus a gap for the water outflow is further adjusted finely. Thereby the amount of the outflow from the water outlet channel is under control and multi-stage outflow from the pipe portion is achieved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

- Fig. 1 is an explosive view of an embodiment according to the present invention;
- Fig. 2 is another explosive view of an embodiment according to the present invention viewed from another angle;
- Fig. 3 is a perspective view of an embodiment according to the present invention;
- Fig. 4 is a partial enlarged view of an embodiment showing a rotary control member assembled on a tail end of the pipe portion and rotated around a central line of the rotary control member according to the present invention;
- Fig. 5 is a perspective view of another embodiment according to the present invention;
- Fig. 6 is a side view of the embodiment in Fig. 5 according to the present invention;
- Fig. 7 is a sectional view of an embodiment in a closed state without outflow according to the present

invention;

Fig. 8 is a sectional view of an embodiment in which an outflow of water is at the first stage according to the present invention;

Fig. 9 is a sectional view of an embodiment in which an outflow of water is at the second stage according to the present invention;

Fig. 10 is a sectional view of an embodiment in which an outflow of water is at the third stage according to the present invention;

Fig. 11 is a sectional view of an embodiment in which an outflow of water is at the fourth stage according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0006] Referring to Fig. 1-4, a water spray gun for control of an outflow of water and adjustment of the amount of the outflow includes a handle portion 1, a pipe portion 2 for spraying water, a control device 3 and a movable valve stem 4. The pipe portion 2 includes a pipe body 21 with a water outlet channel, a through hole 22 arranged at a tail end thereof, and a spray head 23 disposed on a front end thereof. The water outlet channel of the pipe body 21 is separated into a first chamber 211 and a second chamber 232 by a partition 212 while the partition 212 is provided with a passage 231, as shown in Fig. 7. The through hole 22 is communicating with the first chamber 211. The movable valve stem 4 is mounted in the first chamber 211 and is composed of a first end 41, a second end 42 formed by extension of the first end 41, a sleeve part 43 disposed on the first end 41, an enlarged member 44 arranged close to the second end 42, and a spring 45. The second end 42 is projecting from the enlarged member 44 and a seal ring 421 is fit on the second end 42 while the spring 45 is set between the first end 41 and the second end 42. The second end 42 with the right shape just fits the passage 231 and the second end 42 can be mounted into the passage 231 closely and the passage 231 is sealed by the seal ring 421.

[0007] The pipe portion 2 is connected to the handle portion 1 while the control device 3 is disposed on the position where the pipe portion 2 meets the handle portion 1. The handle portion 1 is provided with a water inlet channel 11 which is connected to and communicating with the water outlet channel of the pipe portion 2.

[0008] As to the control device 3, it consists of a press part 31, a cover part 32, a limit member 33 and a rotary control member 34. The press part 31 includes an assembly end 311, a positioning part 312 and an insertion hole 313. The assembly end 311 has one end pivotally connected to the handle portion 1 while the positioning part 312 is disposed on one side of the assembly end 311 facing and corresponding to the rotary control member 34. The rotary control member 34 consists of a slot 341, an axial hole 346, a push part 347, and a plurality of step-like parts 342, 343, 344, 345. The number of the

step-like parts is not limited. In this embodiment, the step-like parts include a first step-like part 342, a second step-like part 343, a third step-like part 344 and a fourth step-like part 345. There are at least two step-like parts and the height of the fourth step-like part 345 is larger than that of the third step-like part 344 while the height of the third step-like part 344 is larger than that of the second step-like part 343. Similarly, the height of the second step-like part 343 is larger than that of the first step-like part 342. Briefly, the height of the respective step-like parts is increased in turn. There is at least one push part 347 disposed on one side of the rotary control member 34 for allowing users to adjust and rotate the rotary control member 34.

[0009] The first end 41 of the movable valve stem 4 is inserted through the through hole 22, the axial hole 346 of the rotary control member 34, and the insertion hole 313 of the assembly end 311 to be fixed on and connected to the assembly end 311 by the limit member 33. Thereby the first end 41 of the movable valve stem 4 is limited on the assembly end 311, without being released from the assembly end 311 while the assembly end 311 is closed by the cover part 32. As shown in Fig. 4, the rotary control member 34 is disposed on the tail end of the pipe portion 2 and able to be rotated around a central line 34a for selecting one of the step-like parts or the slot 341 which is corresponding to the positioning part 312. In this embodiment, a limited rotation around the movable valve stem 4 is carried out yet this is not used to limit the features of the rotary control member 34. The positioning part 312 is abutting against one of the step-like parts of the rotary control member 34 being selected by rotation of the rotary control member 34. Thereby the movable valve stem 4 can be adjusted to move forward or backward axially and the second end 42 of the movable valve stem 4 is further adjusted slightly to be away from the passage 231. Thus the first chamber 211 is communicating with the second chamber 232 for control of the amount of water coming out from the water outlet channel. According to the selected step-like part which the positioning part 312 is abutting against, the amount of the water outflow sprayed out from the pipe portion 2 at the respective stages is determined.

[0010] As shown in Fig. 5 and Fig. 6, another embodiment is revealed. In this embodiment, the step-like parts are arranged at the assembly end 311 while the positioning part 312a is disposed on the rotary control member 34. The step-like parts include a first step-like part 342a, a second step-like part 343a, a third step-like part 344a and a fourth step-like part 345a. The positioning part 312a of the rotary control member 34 is abutting against one of the step-like parts (the first step-like part 342a, the second step-like part 343a, the third step-like part 344a and the fourth step-like part 345a) correspondingly. The step-like part 342a, 343a, 344a, 345a is selected by rotation of the rotary control member 34. Thereby the movable valve stem 4 is adjusted to move forward/or backward axially and the second end 42 of the movable valve

stem 4 is further adjusted slightly to be away from the passage 231. Thus the first chamber 211 is communicating with the second chamber 232 for control of the amount of water coming out from the water outlet channel. According to the selected step-like part which the positioning part 312a is abutting against, the amount of water sprayed out from the pipe portion 2 at the respective stages is determined and regulated continuously.

[0011] Referring to Fig. 7-11, the water spray gun is operated as following while in use. Referring to Fig. 7, the water spray gun is in a closed state, without any water outflow. The press part 31 is pressed to move the movable valve stem 4 and the push part 347 is pushed for adjusting and rotating the rotary control member 34. The rotary control member 34 is rotated so that the positioning part 312 is moved into the slot 341 correspondingly. Then the press part 31 is released and the movable valve stem 4 is also moved so that the passage 231 is sealed by the second end 42 of the movable valve stem 4. Thereby water in the first chamber 211 will not flow into the second chamber 232.

[0012] In this embodiment, there are four stages of the continuous outflow of the water divided according to the amount of the water flowing from the spray water gun. The Fig. 8 shows the first stage outflow of the water. According to the amount of water users need to spray out, the press part 31 is pressed to move the movable valve stem 4 so that the second end 42 of the movable valve stem 4 is away from the passage 231 and the water in the first chamber 211 is flowing into the second chamber 232. The press part 31 is pressed to move the movable valve stem 4 and the push part 347 is pushed for adjusting and rotating the rotary control member 34 so as to make the positioning part 312 of the press part 31 abut against the first step-like part 342 correspondingly. At the moment, the movable valve stem 4 is moved backward axially by the assembly end 311 of the press part 31 so that the second end 42 of the movable valve stem 4 is gradually moved away from the passage 231. Then the press part 31 is released and the movable valve stem 4 is pulled forward a bit by the spring 45 of the movable valve stem 4 so that the positioning part 312 is abutting against the first step-like part 342 and the rotary control member 34 is temporarily positioned. Now there is a little gap formed between the assembly end 311 of the press part 31 and the rotary control member 34 due to the positioning part 312 abutting against the first step-like part 342. The second end 42 of the movable valve stem 4 is a bit away from the passage 231 and there is a small amount of water at the first stage (limited amount of water) flowing from the first chamber 211 to the second chamber 232. Lastly the water in the second chamber 232 is sprayed out through the spray head 23.

[0013] Referring to Fig. 9, the second stage outflow of the water is disclosed. The same as the settings and operations at the first stage, the press part 31 is pressed to move the movable valve stem 4 and the push part 347 is pushed for adjusting and rotating the rotary control

member 34 to make the positioning part 312 abut against the second step-like part 343. Now the movable valve stem 4 is moved backward axially by the assembly end 311 of the press part 31 so that the second end 42 of the movable valve stem 4 is moved a bit further away from the passage 231. Then the press part 31 is released and the movable valve stem 4 is pulled forward a bit by the spring 45 of the movable valve stem 4 so that the positioning part 312 is abutting against the second step-like part 343 and the rotary control member 34 is temporarily positioned. At the moment, the gap between the assembly end 311 of the press part 31 and the rotary control member 34 is larger than before. Thus the waterway space is increased and the quantity/volume of the fluid passed through per unit of time is further increased. At the second stage, a medium amount of water is flowing from the first chamber 211 to the second chamber 232 and then flowing out of the spray head 23.

[0014] The Fig. 10 shows the third stage outflow of the water. The same as the settings and operations at the second stage, the press part 31 is pressed to move the movable valve stem 4 and the push part 347 is pushed for adjusting and rotating the rotary control member 34 to make the positioning part 312 abut against the third step-like part 344. Now the movable valve stem 4 is moved backward axially by the assembly end 311 of the press part 31 so that the second end 42 of the movable valve stem 4 is moved further away from the passage 231. Then the press part 31 is released and the movable valve stem 4 is pulled forward a bit by the spring 45 of the movable valve stem 4 so that the positioning part 312 is abutting against the third step-like part 344 and the rotary control member 34 is temporarily positioned. At the moment, the gap between the assembly end 311 of the press part 31 and the rotary control member 34 is getting larger than before. Thus the waterway space is increased and the quantity/volume of the fluid passed through per unit of time is further increased. At the third stage, a large amount of water is flowing from the first chamber 211 to the second chamber 232 and then flowing out of the spray head 23.

[0015] Referring to Fig. 11, the fourth stage outflow of the water is revealed. The same as the settings and operations at the third stage, the press part 31 is pressed to move the movable valve stem 4 and the push part 347 is pushed for adjusting and rotating the rotary control member 34 to make the positioning part 312 abut against the fourth step-like part 345. Now the movable valve stem 4 is moved backward axially by the assembly end 311 of the press part 31. The press part 31 is released and the movable valve stem 4 is pulled forward a bit by the spring 45 of the movable valve stem 4 so that the positioning part 312 is abutting against the fourth step-like part 345 and the rotary control member 34 is temporarily positioned. At the moment, the gap between the assembly end 311 of the press part 31 and the rotary control member 34 is much larger than before. And the second end 42 of the movable valve stem 4 is moved much further

away from the passage 231. Thus the waterway space is increased and the quantity/volume of the fluid passed through per unit of time is further increased. At the fourth stage, a very large amount of water is flowing from the first chamber 211 to the second chamber 232 and then flowing out of the spray head 23.

[0016] Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, and representative devices shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalent.

Claims

1. A water spray gun for control of an outflow of water and adjustment of the amount of the outflow comprising:

a pipe portion 2 which includes a pipe body 21 with a water outlet channel, a through hole 22 and a spray head 23 while the water outlet channel having a partition 212 which is provided with a passage 231 and used for separating the water outlet channel into a first chamber 211 and a second chamber 232;

a handle portion 1 connected to the pipe portion 2 and provided with a water inlet channel 11 which is communicating with the water outlet channel of the pipe portion 2;

a movable valve stem 4 which is mounted in the water outlet channel and including a first end 41, a second end 42 formed by extension of the first end and matching shape of the passage 231 for being mounted into the passage 231 to close the passage 231, a sleeve part 43 disposed on the first end 41, an enlarged member 44 arranged close to the second end 42 and the second end 42 projecting from the enlarged member 44, and a spring 45 set between the first end 41 and the second end 42; and a control device 3 which is disposed on a connection between the pipe portion 2 and the handle portion 1;

wherein the control device 3 includes a press part 31, a limit member 33 and a rotary control member 34; the press part 31 is composed of an assembly end 311, a positioning part 312 and an insertion hole 313 mounted on the assembly end 311 while the rotary control member 34 consists of a slot 341 and a plurality of step-like parts;

wherein the first end 41 of the movable valve stem 4 is inserted through the through hole 22, the axial hole 346 of the rotary control member 34 and mounted into the assembly end 311 and

then being connected firmly to the assembly end 311 by the limit member 33; thereby the first end 41 of the movable valve stem 4 is limited on the assembly end 311, without being released from the assembly end 311; wherein the rotary control member 34 is disposed on a tail end of the pipe portion 2 and able to be rotated around a central line 34a of the rotary control member 34; wherein the positioning part 312 is disposed on one side of the assembly end 311 of the press part 31 facing the rotary control member 34 and is abutting against one of the step-like parts of the rotary control member 34 being selected by rotation of the rotary control member 34; the rotary control member 34 is able to be rotated for selecting one of the step-like parts or the slot 341 which is corresponding to the positioning part 312; thereby the movable valve stem 4 can be adjusted to move forward or backward axially and the second end 42 of the movable valve stem 4 is further adjusted slightly to be away from the passage 231; thus the first chamber 211 is communicating with the second chamber 232 for control of the outflow of water and adjustment of the amount of the outflow; wherein the amount of the outflow from the pipe portion 2 at different stages is determined according to the selected step-like part of the rotary control member 34 the positioning part 312 abuts against.

2. The device as claimed in claim 1, wherein a height of the respective step-like parts is increased in turn.

3. The device as claimed in claim 1, wherein the step-like parts are able to be arranged at the assembly end 311 while the positioning part 312 is able to be disposed on the rotary control member 34 and is abutting against one of the step-like parts.

4. A water spray gun for control of an outflow of water and adjustment of the amount of the outflow comprising:

a pipe portion 2 which includes a pipe body 21 with a water outlet channel, a through hole 22 and a spray head 23 while the water outlet channel having a partition 212 which is provided with a passage 231 and used for separating the water outlet channel into a first chamber 211 and a second chamber 232;

a movable valve stem 4 which is mounted in the water outlet channel and including a first end 41, a second end 42 formed by extension of the first end and matching shape of the passage 231 for being mounted into the passage 231 to close the passage 231, a sleeve part 43 disposed on the first end 41, an enlarged member 44 ar-

ranged close to the second end 42 and the second end 42 projecting from the enlarged member 44, and a spring 45 set between the first end 41 and the second end 42;

a handle portion 1 connected to the pipe portion 2 and provided with a water inlet channel 11 which is communicating with the water outlet channel of the pipe portion 2; and

a control device 3 disposed on a connection between the pipe portion 2 and the handle portion 1 and having a limit member 33, a rotary control member 34 provided with a slot 341 and a plurality of step-like parts, and a press part 31 composed of an assembly end 311, a positioning part 312 and an insertion hole 313 mounted on the assembly end 311;

wherein the first end 41 of the movable valve stem 4 is inserted through the through hole 22, the axial hole 346 of the rotary control member 34 and mounted into the assembly end 311, and then being connected to the assembly end 311 firmly by the limit member 33; thereby the first end 41 of the movable valve stem 4 is limited on the assembly end 311, without being released from the assembly end 311; wherein the rotary control member 34 is disposed on a tail end of the pipe portion 2 and able to be rotated around a central line 34a of the rotary control member 34; wherein the positioning part 312 is disposed on one side of the assembly end 311 of the press part 31 facing the rotary control member 34 and is abutting against one of the step-like parts of the rotary control member 34 being selected by rotation of the rotary control member 34;

the rotary control member 34 is able to be rotated for selecting one of the step-like parts or the slot 341 which is corresponding to the positioning part 312; thereby the movable valve stem 4 can be adjusted to move forward or backward axially and the second end 42 of the movable valve stem 4 is further adjusted slightly to be away from the passage 231; thus the first chamber 211 is communicating with the second chamber 232 for control of the outflow of water and adjustment of the amount of the outflow; wherein the amount of the outflow from the pipe portion 2 at different stages is determined according to the selected step-like part of the rotary control member 34 the positioning part 312 abuts against.

5. The device as claimed in claim 4, wherein a height of the respective step-like parts is increased in turn.
6. The device as claimed in claim 4, wherein the step-like parts are able to be arranged at the assembly end 311 while the positioning part 312 is able to be disposed on the rotary control member 34 and is

abutting against one of the step-like parts.

7. A water spray gun for control of an outflow of water and adjustment of the amount of the outflow comprising:

a pipe portion 2 which includes a pipe body 21 with a water outlet channel, a through hole 22 and a spray head 23 while the water outlet channel having a partition 212 which is provided with a passage 231 and used for separating the water outlet channel into a first chamber 211 and a second chamber 232;

a movable valve stem 4 which is mounted in the water outlet channel and including a first end 41, a second end 42 formed by extension of the first end and matching shape of the passage 231 for being mounted into the passage 231 to close the passage 231;

a handle portion 1 connected to the pipe portion 2; and

a control device 3 disposed on a connection between the pipe portion 2 and the handle portion 1 and having a press part 31 provided with an assembly end 311 pivotally connected to the handle portion 1 and a positioning part 312, and a rotary control member 34 provided with a slot 341 and a plurality of step-like parts, and

wherein the first end 41 of the movable valve stem 4 is inserted through the through hole 22 and the control member 34 to be connected to the assembly end 311, without being released easily; wherein the positioning part 312 is disposed on one side of the assembly end 311 of the press part 31 facing the rotary control member 34 and is abutting against one of the step-like parts of the rotary control member 34 being selected by rotation of the rotary control member 34; the movable valve stem 4 can be adjusted to move forward or backward axially by the selected step-like part corresponding to the positioning part 312; wherein the rotary control member 34 is disposed on a tail end of the pipe portion 2 and able to be rotated around a central line 34a of the rotary control member 34; the rotary control member 34 is rotated to select one of the step-like parts or the slot 341 corresponding to the positioning part 312 and the second end 42 of the movable valve stem 4 is further adjusted slightly to be away from the passage 231; thus the first chamber 211 is communicating with the second chamber 232 for control of the outflow of water and adjustment of the amount of the outflow; wherein the amount of the outflow from the pipe portion 2 at different stages is determined according to the selected step-like part of the rotary control member 34 the positioning part 312 abuts against.

8. The device as claimed in claim 7, wherein a height of the respective step-like parts is increased in turn.
9. The device as claimed in claim 7, wherein the step-like parts are able to be arranged at the assembly end 311 while the positioning part 312 is able to be disposed on the rotary control member 34 and is abutting against one of the step-like parts.

10

15

20

25

30

35

40

45

50

55

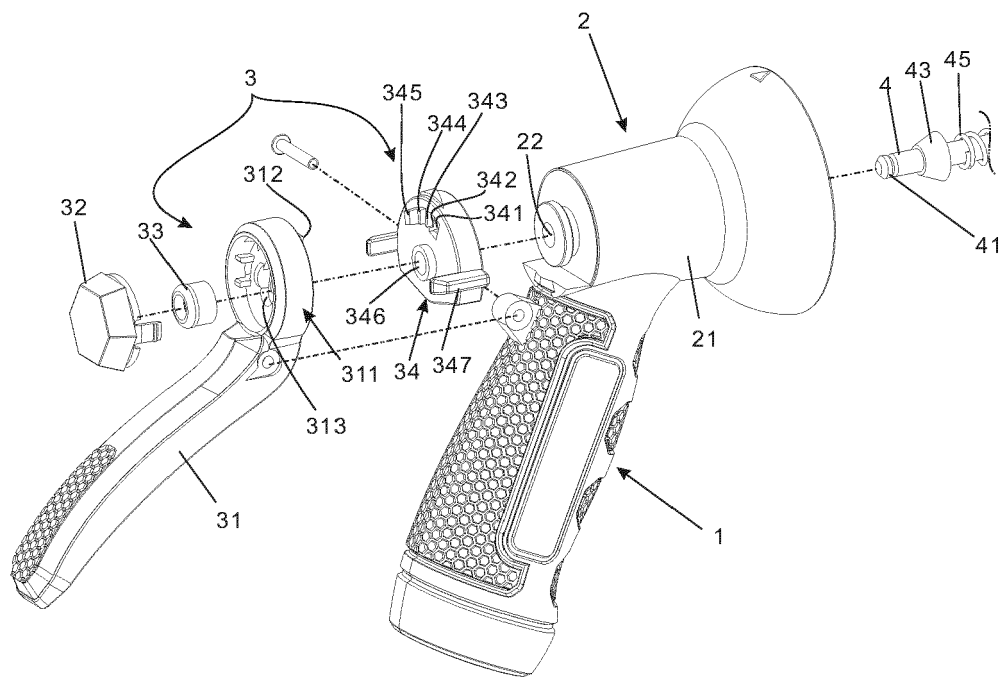
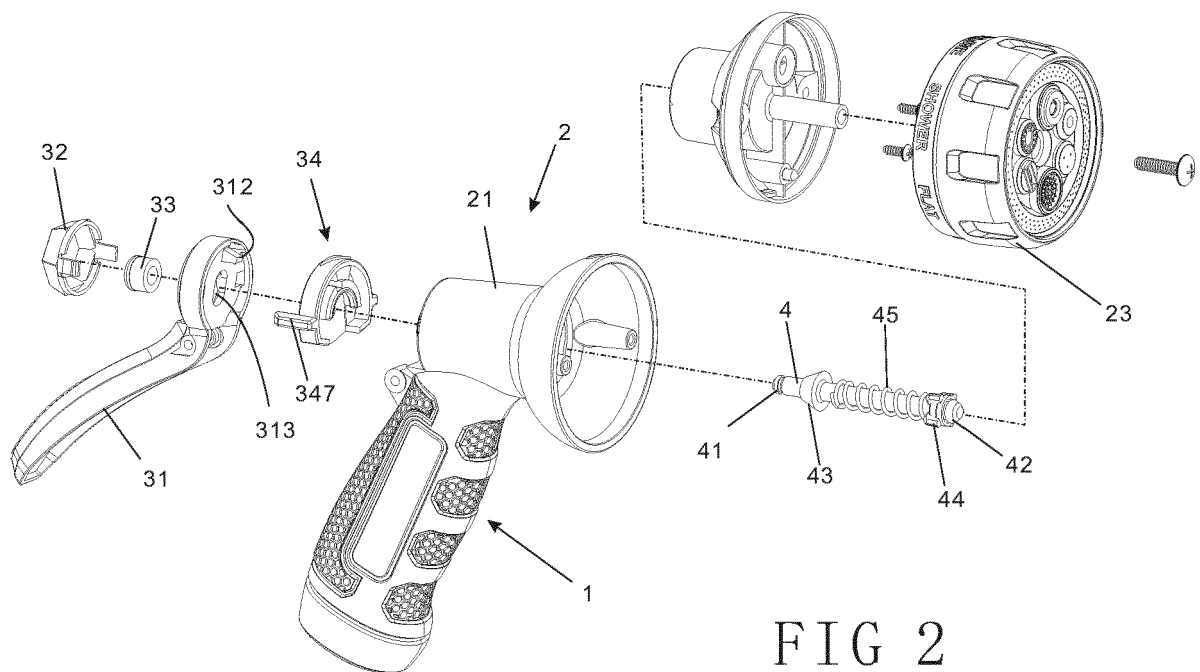


FIG 1



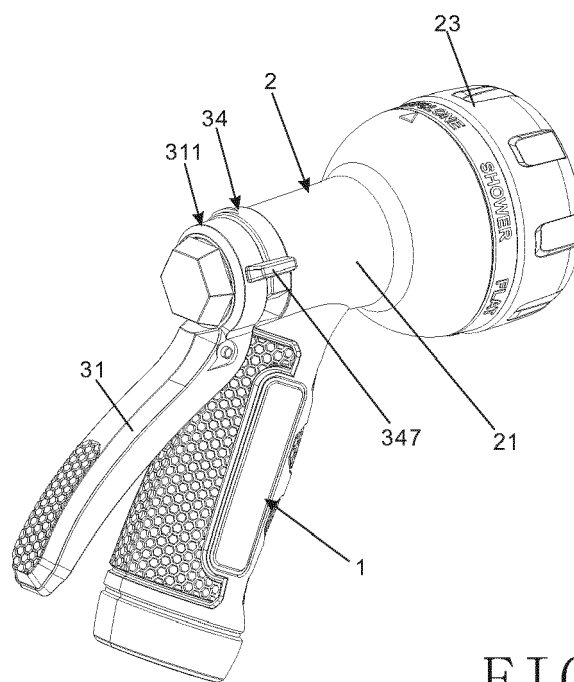


FIG 3

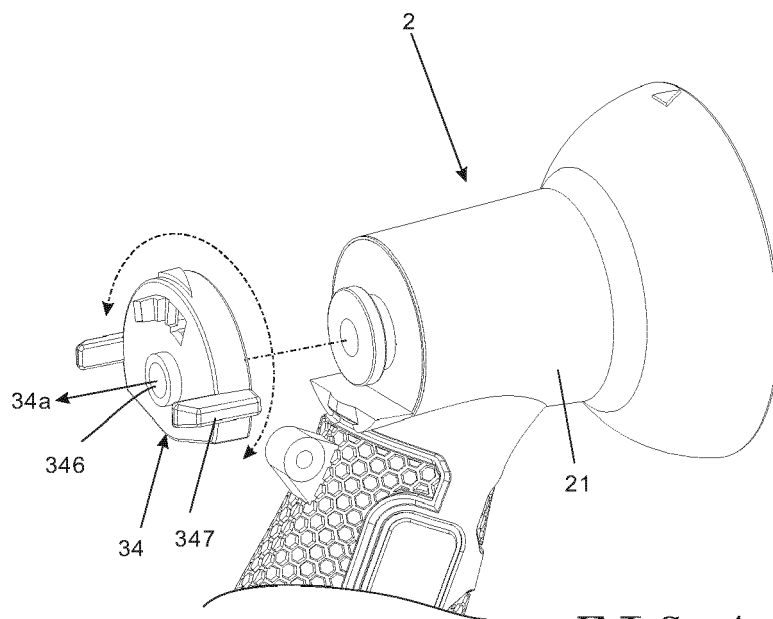


FIG 4

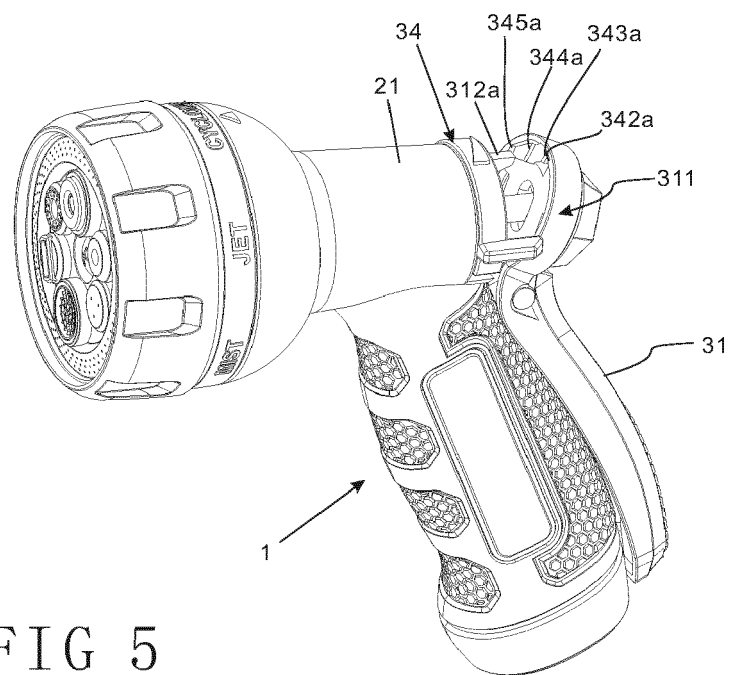


FIG 5

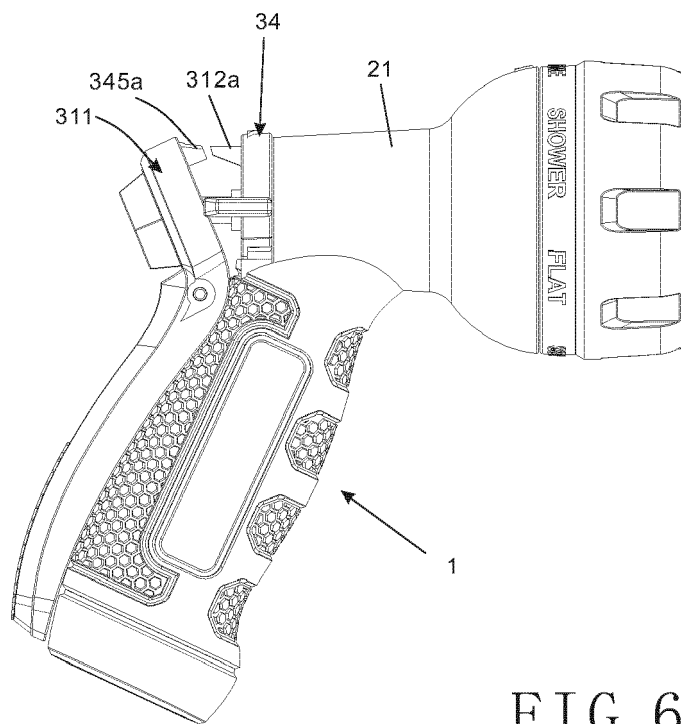


FIG 6

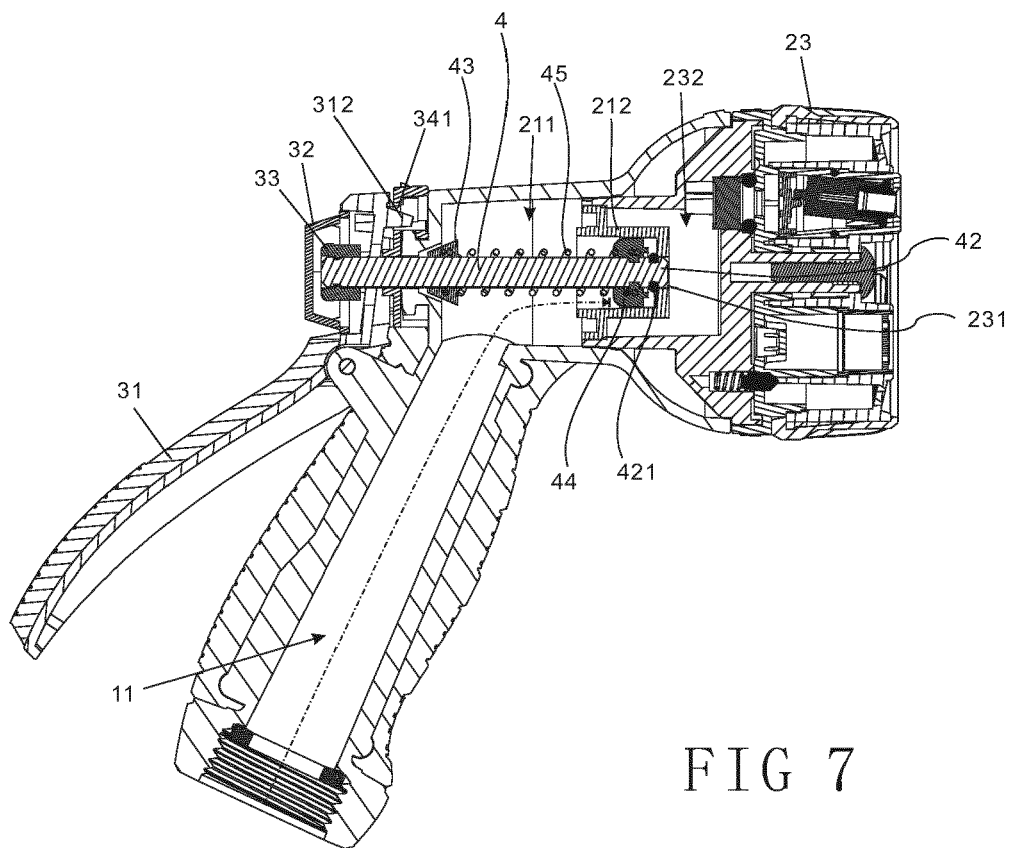
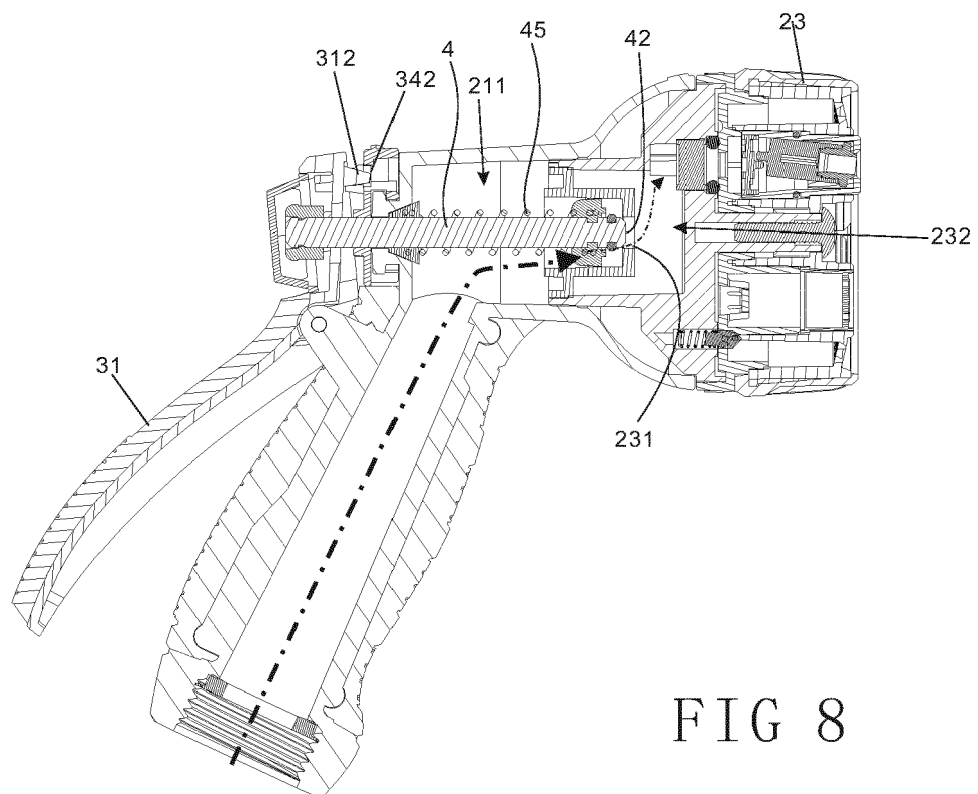
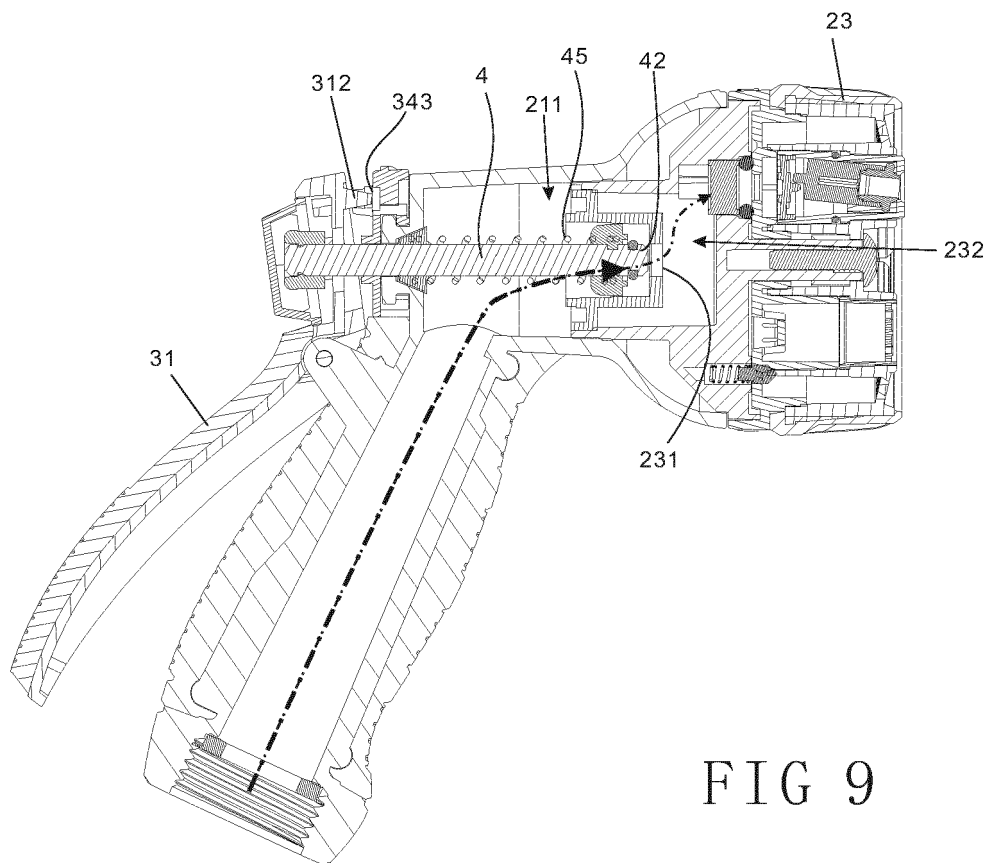


FIG 7





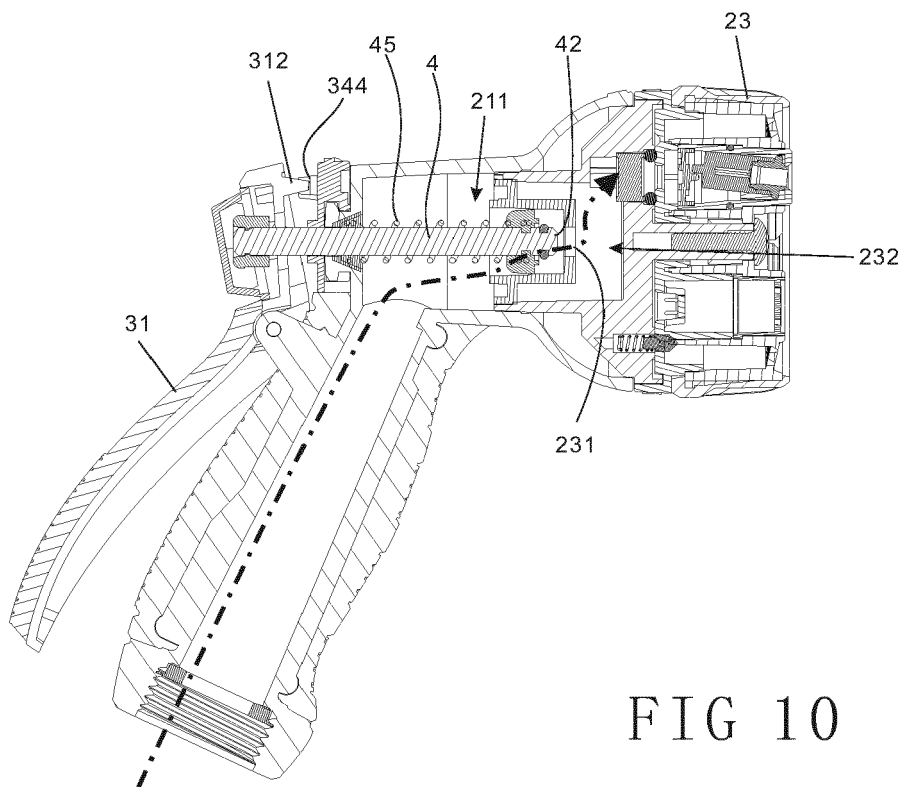


FIG 10

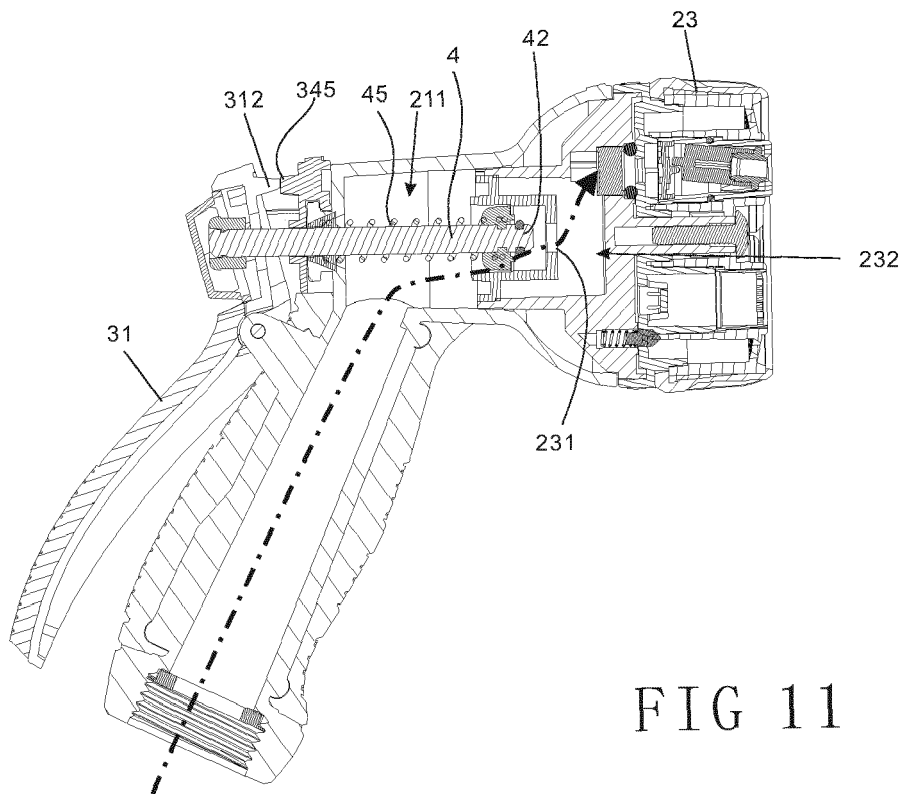


FIG 11



EUROPEAN SEARCH REPORT

Application Number
EP 20 17 5574

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 20 2015 100240 U1 (WANG KUAN HSIUNG [TW]) 18 February 2015 (2015-02-18) * figure 4 *	1-9	INV. B05B9/01 B05B1/16 B05B12/00
A	US 6 427 931 B1 (GUO WEN LI [TW]) 6 August 2002 (2002-08-06) * figures 1-7 *	1-9	
A	US 2007/278442 A1 (WANG HSIN-FA [TW]) 6 December 2007 (2007-12-06) * figures 1-9 *	1-9	
A	KR 2015 0127810 A (YAMAHO INDUSTRY CO LTD [JP]) 18 November 2015 (2015-11-18) * figures 1-13 *	1-9	
A	US 2013/168471 A1 (CHEN CHIN-YUAN [TW]) 4 July 2013 (2013-07-04) * figures 1-9 *	1-9	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B05B
Place of search		Date of completion of the search	Examiner
Munich		20 October 2020	Rente, Tanja
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

 1
EPO FORM 1503 03.82 (P04C01)

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

EP 20 17 5574

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-10-2020

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202015100240 U1	18-02-2015	NONE	
US 6427931 B1	06-08-2002	CA 2355032 A1 US 6427931 B1	14-02-2003 06-08-2002
US 2007278442 A1	06-12-2007	NONE	
KR 20150127810 A	18-11-2015	JP 5412659 B2 JP 2013136043 A KR 20150127810 A	12-02-2014 11-07-2013 18-11-2015
US 2013168471 A1	04-07-2013	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- TW 203775 [0002]
- TW 293796 M [0002]