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(54) **Enhanced system for vertically adjusting a deposit container in a door of a household appliance**

(57) The present invention refers to a system for vertically adjusting a deposit container in a door (1) of a household appliance, particularly cooling and/or freezing apparatus, comprising a body with a compartment for accepting goods to be cooled, a door (1) for opening and closing said compartment with at least one deposit container (9), said door (1) comprising on the inner wall thereof at least one fastening rib (7, 8) for fixing said deposit container (9). It is provide for according to the present invention that each fastening rib (7, 8) which is arranged on a rail shaped projection (5, 6) formed in each vertical marginal area (3, 4) on an inner wall (2) of said door (1) cooperates with a deposit container (9) and at least one snap-action means (25, 26) inserted into a corresponding receptacle (21, 22) of said container (9).

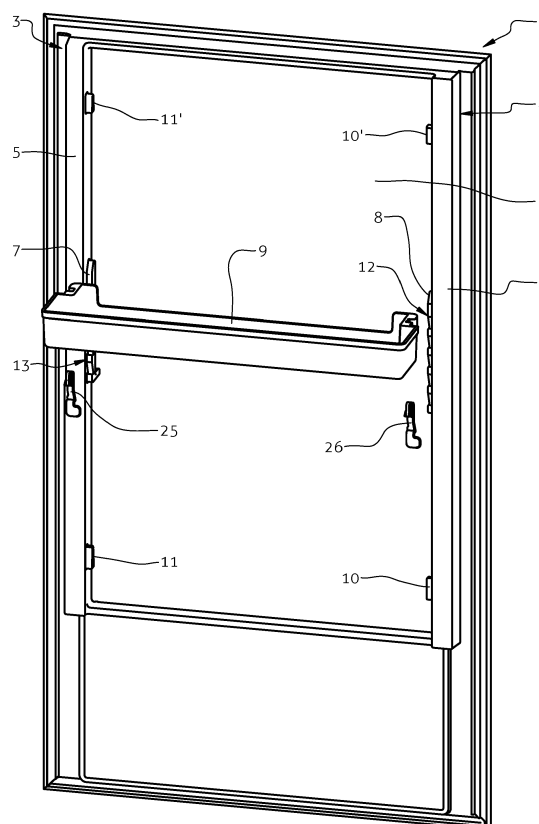


Fig. 1

Description

[0001] The present invention refers to a system for vertically adjusting a deposit container in a door of a household appliance, particularly cooling and/or freezing apparatus, comprising a body with a compartment for accepting goods to be cooled, a door for opening and closing said compartment with at least one deposit container, said door comprising on the inner wall thereof at least one fastening rib for fixing said deposit container.

[0002] A deposit container on a door of a household appliance is intended for depositing and/or storing food, bottles and similar, which may in turn comprise different heights. In order to enable a distance adjustment between two neighbouring deposit containers, several solutions are available enabling the adjustment of the deposit container to a new position. A patent application No. EP 2 108 907 A1 discloses a solution comprising a mechanism with several parts and a plastic spring which enables relocation of a pawl on a wave-shaped section and, thus, a vertical adjustment of the deposit container. Said solution is relatively complex and makes cleaning of the parts rather difficult.

[0003] The object of the present invention is to create a system for vertically adjusting a deposit container in a door of a household appliance, particularly cooling and/or freezing apparatus which remedies drawbacks of known solutions.

[0004] The object as set above is solved with characteristics as set forth in claim 1. Details of the invention are disclosed in dependent claims. It is provided for according to the present invention that each fastening rib, which is arranged on a rail shaped projection formed in each vertical marginal area in an inner wall of said door, cooperates with a deposit container and at least one snap-action means inserted into a correspondent receptacle of said container.

[0005] Furthermore, it is provided for according to the invention that each transversal confine of said container is formed over the entire height thereof, in the area of the association with a back wall of the deposit container, with a vertical groove fitted to receive and to cooperate by means of a loose fit with each said fastening rib. Each said groove is provided in the area of the transition to said transversal confine with a hollow box-shaped receptacle, each of said receptacles being formed at the side of each transversal confine with a through-hole into which snaps-in a transversal projection of the snap-action means.

[0006] The invention is further described in detail by way of non-limiting preferred embodiment, and with a reference to the accompanying drawing, where

Fig. 1 shows a three-dimensional exploded view of a system for vertically adjusting a deposit container in a door of a household appliance;

Fig. 2 shows a three-dimensional view of a snap-action means of a system of Fig. 1;

Fig. 3 shows a three-dimensional view of a deposit container of a system of Fig. 1;

Fig. 4 shows a sectional view of a system of Fig. 1 through a snap-action means in a vertical plane.

[0007] A system for vertically adjusting a deposit container in a door of a household appliance, particularly cooling and/or freezing apparatus is formed on the side of a door 1 facing the interior of a household appliance not shown. Said door 1 comprises at the side facing the interior of cooling and/or freezing apparatus an inner wall 2 which is formed in each vertical marginal area 3, 4 thereof with a rail shaped projection 5, 6 extending, essentially, over the entire height of the door 1. Each said projection 5, 6 comprises at the side facing the opposite projection 5, 6 a fastening rib 7, 8 in order to vertically fix a deposit container 9. Said fastening rib 7, 8 is arranged on each projection 5, 6 spaced from the inner wall, in the present preferred embodiment it is arranged in the central area between the association of each projection 5, 6 with the inner wall 2 and the free end of each projection 5, 6. In the present embodiment said inner wall is made of plastic material with each said fastening rib 7, 8 being formed by means of a blow moulding. In the lowest and in the highest portions of each rail shaped projection 5, 6 is formed in a similar manner as said fastening rib 7, 8 an end stop 10, 11; 10', 11' preventing positioning the deposit container 9 to close to the lower edge of the door 1. It is provided for according to the present invention that each fastening rib 7, 8 is formed essentially over the entire length thereof with fastening means 12, 13. With the present embodiment, said fastening means 12, 13 are formed on each fastening rib 7, 8 at the side facing away from said inner wall 2 of the door 1. Further, an embodiment is possible where said fastening means 12, 13 are formed on each fastening rib 7, 8 at the facing side each other. Furthermore, with the present embodiment said fastening means 12, 13 are formed in a manner of a rack with a mutually equidistant spaced peaks and troughs. Obviously, alternative embodiments of the rack are possible such as the fastening ribs 7, 8 with recesses, raises and similar spaced more or less equidistantly in height. According to the invention, said fastening rib 7, 8 is preferably formed integrally with said inner wall 2 of said door 1, preferably by means of a blow moulding. Additionally, each said fastening rib 7, 8 is provided at the top free end thereof with a convenient chamfer which facilitates accommodation of the deposit container 9 on the fastening ribs 7, 8.

[0008] Longitudinally, said deposit container 9 is formed specular symmetrically with respect to the vertical, and accommodated on said door 1 in a longitudinal area between said rail-shaped projections 5, 6 and fastening ribs 7, 8, respectively. To this end, each transversal confine 14, 15 of said container 9 is formed over the entire height thereof and in the area of the association with a back wall 16, i.e. in the area located close to said wall 2 of the door 1, with a vertical groove 17, 18 the

transversal dimension thereof being fitted to accept and to cooperate by means of a loose fit with each fastening rib 7, 8. Optionally, said groove 17, 18 can be formed in a manner to extend in the transversal direction of said container 9 up to said back wall 16, thus, creating a step 19, 20 between said back wall 16 and each said transversal confine 14, 15. Said groove 17, 18 is provided in the transitional area to said transversal confine 14, 15 with a hollow box-shaped receptacle 21, 22, each one thereof being formed at the side of each transversal confine 14, 15 with a through-hole 23, 24. Each receptacle 21, 22 is provided for the accommodation of a snap-action means 25, 26 cooperating with the fastening means 12, 13 of each fastening rib 7, 8. Although the present embodiment is described on the basis of two snap-action means 25, 26 it is possible, in essence, that said deposit container 9 is provided with only one snap-action means. Preferably, said snap-action means 25, 26 are of identical shape, an embodiment is possible, though, with said snap-action means 25, 26 shaped differently with regard to the position thereof in the deposit container 9, where in such a case the second snap-action means is shaped specular symmetrically with respect to the first snap-action means in a manner as described above for said deposit container 9. Therefore, only the first snap-action means 25 is described in the foregoing.

[0009] Said first snap-action means 25 is formed as a two-legged fastener with a first flat leg 27 thereof being longer than a second flat leg 28. The transversal dimension of said two-legged fastener is such that said fastener cooperates by means of a loose fit with said receptacle 21, 22 of the deposit container 9. Essentially, said flat legs 27, 28 extend in parallel and are associated by means of a web 29 which enables a flexible movement of the legs 27, 28 against each other. Said second leg 28 is formed in the area of the free end thereof and at least at one side of said free end with a transversally extending projection 30 intended to cooperate with the through-hole 23, 24 of said container 9. The free end of said projection 30 is preferably formed with a slanted surface 31 the inclination thereof decreases in the direction from said free end of the second leg 28 towards said web 29. Said first leg 27 is formed at the free end thereof with a transversal enlargement 32 intended to facilitate the cooperation with a user. Said first leg is formed in the area between said web 29 and said transversal enlargement 32 with a convexity 33 which is intended to engage the trough of the rack formed fastening means 12, 13 when the snap-action means 25 is installed. Said convexity 33 extends approximately in the direction perpendicular to the surface-wide portion of said flat first leg 27 and is formed at the free end thereof with a projection 34 which extends approximately transversal and faces said web 29. According to the present invention it is provided for that both the convexity 33 of each snap-action means 25, 26 and the corresponding troughs of each fastening means 12, 13 are formed with an undercut, thus, enabling a safe accommodation of the deposit container 9 on said

fastening means 12, 13.

[0010] In order to prevent an unwanted disengagement of the deposit container 9 off the fastening rib 7, 8 when moving said container 9 towards the upper end of the cooling and/or freezing apparatus, each fastening rib 7, 8 comprises in the area below said chamfer, when observing in direction of the extension of each rib 7, 8, an additional fastening means 35. The latter is formed in a manner that said transversal projection 34 of the convexity 33 snaps into the depression 36 of the fastening means 35 when said deposit container 9 reaches the extreme upper position thereof, said depression 36 being undercut in the direction opposite to the direction of the undercut of each fastening means 12, 13.

[0011] Said deposit container 9 is placed on to the inner side of said door 1 of a cooling and/or freezing apparatus in the following way. Said snap-action means 25, 26 is inserted into at least one said receptacle 21, 22 of the deposit container 9, preferably into both receptacles 21, 22. Since the transversal dimension of the projection 31 is bigger than the inner dimension of the receptacle 21, 22, said snap-action means slips by means of said slanted surface 31' of the projection 31 over the inner wall of said receptacle 21, 22, which in turn results in the second leg 28 of each snap-action means 25, 26 to be elastically deformed in the transversal direction of the second leg 28 due to said cut 30. When the snap-action means 25, 26 reaches the final position thereof, said transversal projection 31 snaps into said through-hole 23, 24 of each receptacle 21, 22, thus, enabling the safe securing. The assembly container 9 - snap-action means 25, 26 is placed on the door 1 in a manner that each vertical groove 17, 18 of the container 9 locks by means of the loose fit to the corresponding fastening rib, whereas said convexity 33 of the snap-action means 25, 26 engages the trough of the rack formed fastening means 12, 13. When the deposit container 9 is to be adjusted on the door 1 vertically downwards, said convexity 33 disengages said trough of the rack formed fastening means 12, 13 by means of pushing each transversal enlargement 32 of each first leg 27 of the two-legged fastener in the direction away from said wall of the door 1. Thus, the deposit container 9 is released and ready to be vertically adjusted in the door 1. In order to adjust a deposit container 9 vertically upwards in the door 1 only a push upwards of the container 9 is sufficient and said convexity 33 in a manner of a ratchet slides up and over each peak/trough of the rack formed fastening means 12, 13. When said deposit container 9 reaches the extreme upper position thereof, said transversal projection 34 of the convexity 33 snaps into the depression 36 which is undercut in the direction opposite to the direction of the undercut of each fastening means 12, 13 thus, preventing any further movement of the deposit container 9. If the deposit container 9 is to be completely removed off the fastening ribs 7, 8, said transversal enlargement 32 is to be pushed away from the ribs 7, 8. Thus, said transversal projection 34 disengages said depression 36 and, respectively, additional fasten-

ing means 35, enabling further movement of the deposit container 9 towards the free end of each rib 7, 8.

Claims

1. System for vertically adjusting a deposit container in a door (1) of a household appliance, particularly cooling and/or freezing apparatus, comprising a body with a compartment for accepting goods to be cooled, a door (1) for opening and closing said compartment with at least one deposit container (9), said door (1) comprising on the inner wall thereof at least one fastening rib (7, 8) for fixing said deposit container (9), **characterized in that** each fastening rib (7, 8) which is arranged on a rail shaped projection (5, 6) formed in each vertical marginal area (3, 4) on an inner wall (2) of said door (1) cooperates by means of fastening means (12, 13; 35) with a deposit container (9) and at least one snap-action means (25, 26) inserted into a corresponding receptacle (21, 22) of said container (9). 5 10 15 20
2. System according to claim 1, **characterized in that** each transversal confine (14, 15) of said container (9) is formed over the entire height thereof and in the area of the association with a back wall (16) with a vertical groove (17, 18) being fitted to accept and to cooperate by means of a loose fit with each fastening rib (7, 8), each groove (17, 18) being provided in the transitional area to said transversal confine (14, 15) with a hollow box-shaped receptacle (21, 22), each one thereof being formed at the side of each transversal confine (14, 15) with a through-hole (23, 24). 25 30 35
3. System according to claims 1 and 2, **characterized in that** said snap-action means (25, 26) is formed as a two-legged fastener with a first flat leg (27) thereof being longer than a second flat leg (28), said flat legs (27, 28) extending essentially in parallel and being associated by means of a web (29) which enables a flexible movement of the legs (27, 28) against each other. 40 45
4. System according to claims 1 to 3, **characterized in that** said second leg (28) is formed in the area of the free end thereof and at least at one side of said free end with a transversally extending projection (30) intended to cooperate with said through-hole (23, 24) of said container (9), the free end of said projection (30) being preferably formed with a slanted surface (31). 50
5. System according to claim 4, **characterized in that** the inclination of said slanted surface (31) decreases in the direction from said free end of the second leg (28) towards said web (29). 55
6. System according to claims 1 to 3, **characterized in that** said first leg (27) is formed at the free end thereof with a transversal enlargement (32) intended to facilitate the cooperation with a user, and said first leg (27) is formed in the area between said web (29) and said transversal enlargement (32) with a convexity (33) which is intended to engage the trough of a rack formed fastening means (12, 13) when the snap-action means (25, 26) is installed.
7. System according to claim 6, **characterized in that** said convexity (33) which resembles an approximate V shape extends approximately in the direction perpendicular to the surface-wide portion of said flat first leg (27).
8. System according to any of the preceding claims, **characterized in that** the fastening rib (7, 8) is arranged on each rail shaped projection (5, 6) spaced from said inner wall (2), preferably in the central area between the association of each projection (5, 6) with the inner wall (2) and the free end of each projection (5, 6).
9. System according to any of the preceding claims, **characterized in that** said two-legged fastener is formed in a manner to cooperate by means of a loose fit with said receptacle (21, 22) of the deposit container (9).
10. System according to any of the preceding claims, **characterized in that** said deposit container (9) is formed specular symmetrically with respect to the vertical.
11. System according to any of the preceding claims, **characterized in that** the second snap-action means is formed specular symmetrically to the first snap-action means in a similar manner as said deposit container (9).
12. System according to any of the preceding claims, **characterized in that** both the convexity (33) of each snap-action means (25, 26) and the corresponding troughs of each fastening means (12, 13; 35) are formed with an undercut.

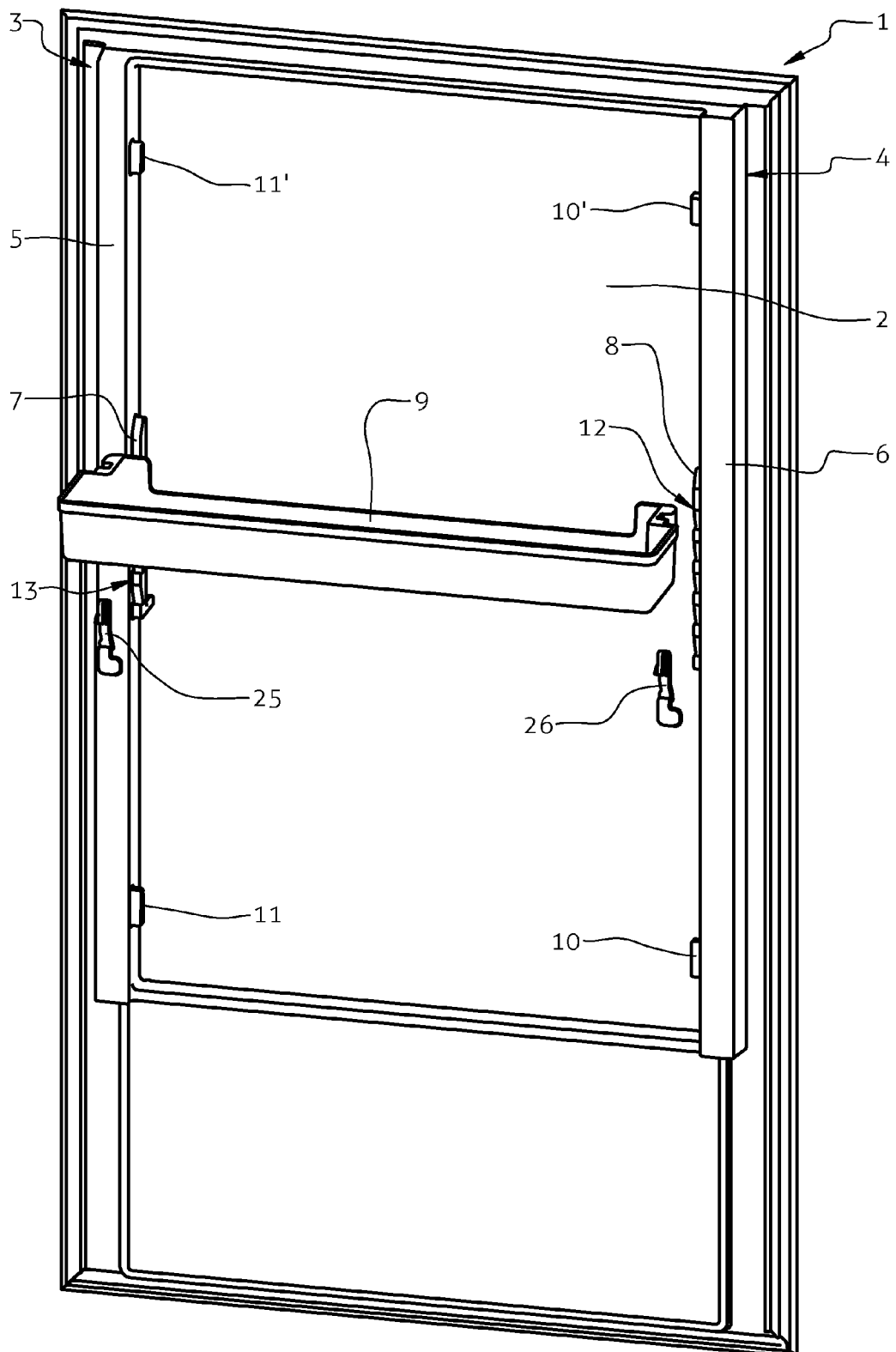
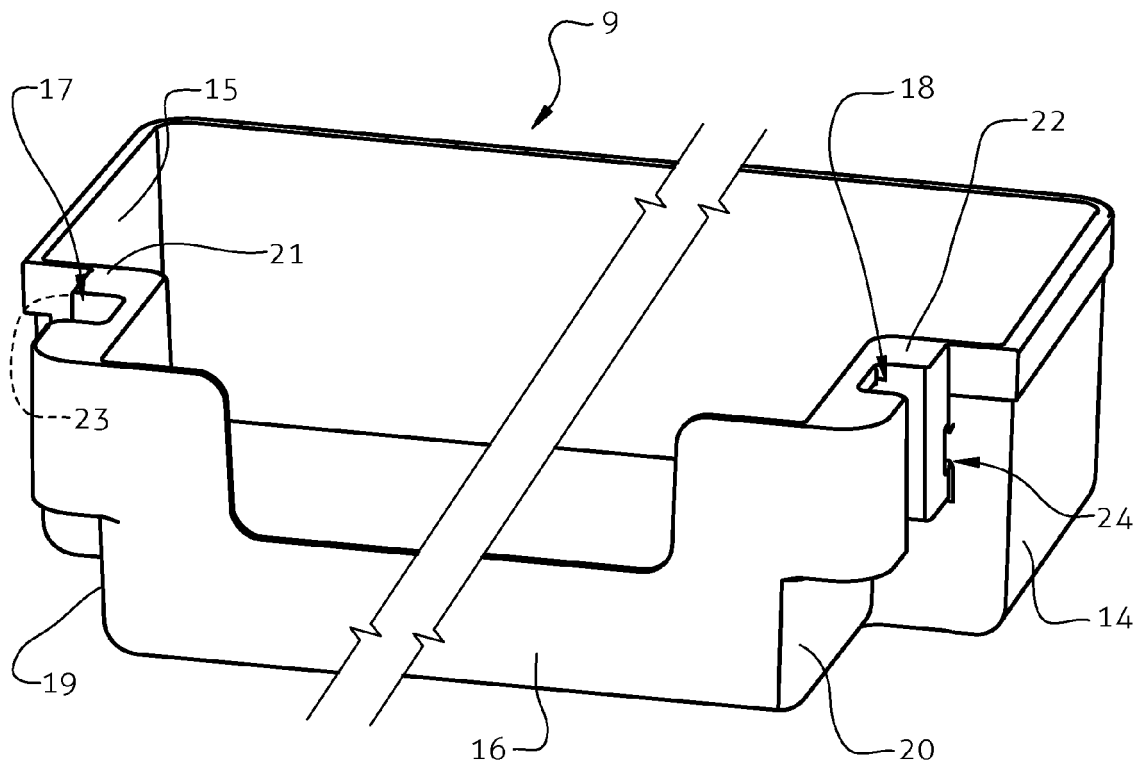
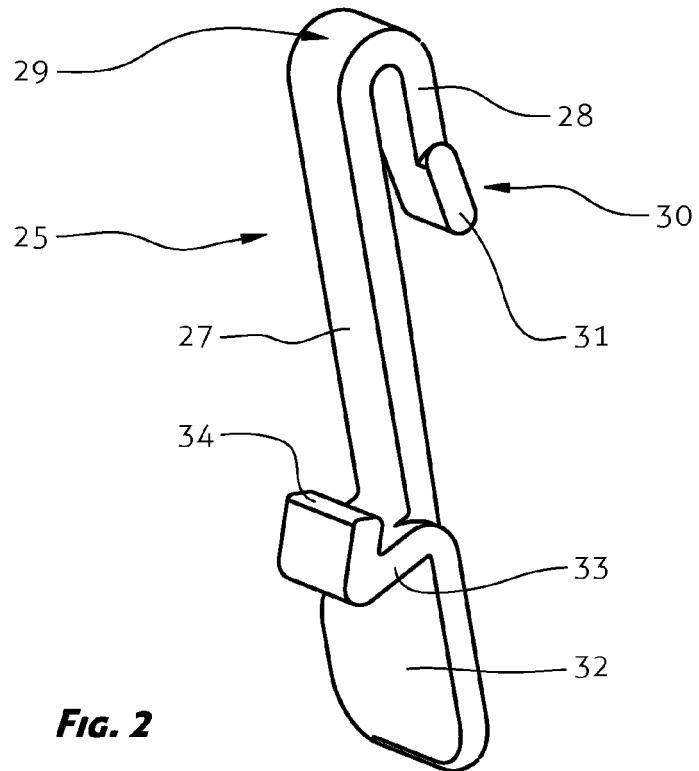


FIG. 1



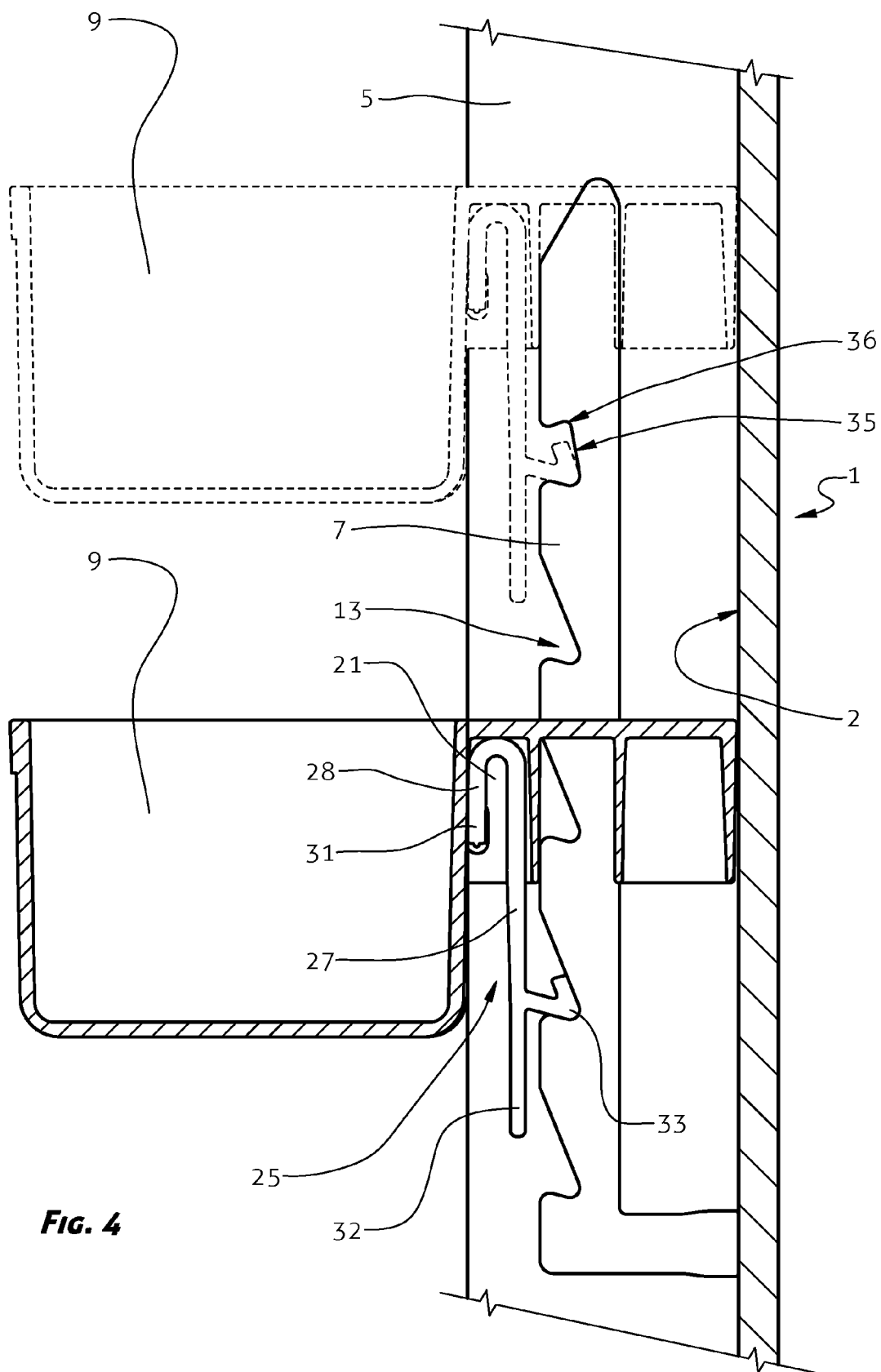


FIG. 4



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Application Number
EP 14 17 8112

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		28 November 2014	Bejaoui, Amin
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			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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