

SPECIFICATION

TITLE OF THE INVENTION: NOZZLE HOOK OF FUELING
APPARATUS

TECHNICAL FIELD

[0001.] The present invention relates to a nozzle hook of fueling apparatus installed in a gas station or the like, to the nozzle hook is hooked (hanged) a fueling nozzle provided at the tip of a fueling hose, and when fueling a vehicle, the engagement with the fueling nozzle is released (the fueling nozzle is unhooked).

BACKGROUND ART

[0002.] In a fueling apparatus installed in a gas station or the like, a fueling nozzle provided at the tip of a fueling hose is unhooked from a nozzle hook, and the fueling nozzle is inserted into a fueling port of a vehicle to fuel a fuel tank of the vehicle. In the fueling apparatus, a nozzle hook for the fueling nozzle is provided with a nozzle switch that detects that the fueling nozzle is hooked or unhooked (hanged or unhanged), and a control part of the fueling apparatus starts or stops a fueling pump based on ON/OFF of the nozzle switch. As a nozzle hook according to a prior art, it has been proposed that the nozzle switch is provided on a housing side of the fueling apparatus and the movement of a switch operating lever moving in conjunction with the hook/unhook of the fueling nozzle is transmitted to the nozzle switch via a link mechanism (refer to Patent Document 1).

[0003.] However, in the prior art described in the document, the operation of the switch operating lever provided on the nozzle hook is transmitted to the nozzle switch via the link mechanism, so that it is required to determine its mounting position with high accuracy when the nozzle hook is mounted. This is because if the mounting position of the nozzle hook is not accurate, the nozzle switch may not be turned on and off normally, which may interfere with fueling work with the fueling apparatus. Further, repeatedly opening and closing the panel of the fueling apparatus cause the relative position between a sensing part of the nozzle switch and a member in contact with the nozzle switch to change. On the other hand, in order to prevent the relative position between the sensing part of the nozzle switch and the member in contact with the nozzle switch from changing, if the nozzle hook and the nozzle switch are integrated, it is required to remove and reassemble the link mechanism, cables, and so on during maintenance, which deteriorates maintainability. Further, in the prior art, since the nozzle switch is arranged on a front side of a frame of a housing body, the nozzle switch has a structure in which the nozzle switch protrudes on the front side of the frame. Therefore, during maintenance work or the like, an operator may come into contact with the protruding nozzle switch and be injured.

PRIOR ART DOCUMENT

PATENT DOCUMENT

[0004.] Patent Document 1: International Publication WO/2018/025455A1
gazette

OUTLINE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0005.] The present invention has been proposed in view of the above-mentioned problems of the prior art, and the object thereof is to provide a nozzle hook of fueling apparatus in which a nozzle switch always operates normally; fueling work in the fueling apparatus is always performed properly; complicated work such as removal and reassembly of parts is not required; and a nozzle switch is in a position where an operator is not injured.

MEANS OF SOLVING THE PROBLEMS

[0006.] A nozzle hook (1) of a fueling apparatus (100) according to the present invention includes: a nozzle hook body (2) for holding a discharge pipe of a fueling nozzle; a receiving part (3) for holding a lever guard of the fueling nozzle; a switch part (4) operated by the lever guard; a rotating member (5), when the fueling nozzle is hooked on the nozzle hook (1), to a driven gear (5A) formed on the rotating member (5) is transmitted a rotation of the switch part (4) with a drive gear (4B) formed on a back surface of the switch part (4); a driving member (6) disposed at a position away from the nozzle hook body (2), the driving member (6) driving a nozzle switch (10) attached to a housing body (101); and a connecting member (7) for transmitting a rotation of the rotating member (5) to the driving member (6). Here, the connecting member (7) is preferably a flexible liner material such as a wire.

[0007.] In the present invention, it is preferable that the rotating member (5) includes: the driven gear (5A) driven by the drive gear (4B) integrally configured with the switch part (4); a first rotating shaft (5B) about which the rotating member (5) is rotated by driving of the driven gear (5A); and a first connecting part (5C) to which an end (7C) of the connecting member (7) is preferably connected at a position separated from the first rotating shaft (5B).

[0008.] In addition, in the present invention, it is preferable that the driving member (6) includes: a second rotating shaft (6D) with a spring for urging another end (7D: the end connected to a second connecting part (6E)) of the connecting member (7) in a pulling direction; a working piece (6C: leaf spring) provided at an end to operate the nozzle switch (10); and the second connecting part (6E) provided at another end to connect the connecting member (7).

[0009.] Further, in the present invention, the driving member (6) is preferably provided with a notch (6F) that contacts with a stopper pin (9). In carrying out the present invention, it is preferable to change the amount of movement of the first connecting part (5C) connected to the

connecting member (7) through the amplification ratio between the drive gear (4B: for example, the number of teeth is 40) of the switch part (4) and the driven gear (5A: for example, the number of teeth is 30) of the rotation member (5). For example, it is preferable when the drive gear (4B) rotates (rotates by 15 degrees), the driven gear (5A) rotates more than that (for example 20 degrees), and the movement amount of the first connecting part (5C) of the rotating member (5) connected to the connecting member (7) can be appropriately changed. Further, it is preferable to provide a spring (urging to become a state where a fuel nozzle is unhooked for example) in the rotating part (4A) of the switch part (4) to assist the return operation of the connecting member (7).

EFFECTS OF THE INVENTION

[0010.] In the present invention with the above construction, when a fueling nozzle is hooked on the nozzle hook (1), the drive gear (4B) formed on a back surface of the switch part (4) transmits the rotation of the switch part (4) to the rotating member (5), and the rotation of the rotating member (5) drives the driving member (6) via the connecting member (7) to drive the nozzle switch (10), so that the nozzle switch (10) can reliably be operated by hooking or unhooking the fueling nozzle (20).

[0011.] In the present invention, with the rotating member (5) including: the driven gear (5A) driven by the drive gear (4B) integrally configured with the switch part (4); a first rotating shaft (5B) about which the rotating member (5) is rotated by driving of the driven gear (5A); and a first connecting part (5C) to which an end (7C) of the connecting member (7) is connected at a position separated from the first rotating shaft (5B), the rotation of the switch part (4) is converted into the rotation of the rotating member (5) with high efficiency through the engagement of the gears. Further, the rotation amount of the rotating member (5) can appropriately be changed to the displacement amount of the connecting member (7) according to the distance between the first rotation shaft (5B) and the first connecting part (5C).

[0012.] In the present invention, with the driving member (6) including: a second rotating shaft (6D) with a spring for urging another end (7D) of the connecting member (7) in a pulling direction; a working piece (6C: leaf spring) provided at an end to operate the nozzle switch (10); and a second connecting part (6E) provided at another end to connect the connecting member (7), the movement of the switch part (4) at hooking/unhooking of a fueling nozzle can be reliably transmitted to the nozzle switch (10).

[0013.] Further, in the present invention, with the driving member (6) with a notch (6F) that contacts with a stopper pin (9), an excessive force is prevented from being applied to the working piece (6C), and the nozzle switch 10 is prevented from being damaged.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014.] [Figure 1] An explanatory cross-sectional view showing a condition that a fueling nozzle is not hooked on a nozzle hook in an embodiment of the present invention.

[Figure 2] An explanatory cross-sectional view showing a condition that a fueling nozzle is hooked.

[Figure 3] A partially enlarged cross-sectional view showing the vicinity of a switch part in a state where a fueling nozzle is not hooked.

[Figure 4] A partially enlarged cross-sectional view showing the vicinity of a switch part in a state where a fueling nozzle is hooked.

[Figure 5] A partially enlarged sectional view showing the vicinity of a nozzle switch in a state where a fueling nozzle is not hooked.

[Figure 6] A partially enlarged sectional view showing the vicinity of a nozzle switch in a state where a fueling nozzle is hooked.

[Figure 7] An explanatory view showing a condition that the nozzle switch does not work even though a fueling nozzle is hooked.

[Figure 8] An explanatory view showing the relative positional relationship, for preventing the condition that the nozzle switch does not work even though the fueling nozzle is hooked, between a leaf spring and a nozzle switch detecting part.

MODE FOR CARRYING OUT THE INVENTION

[0015.] Hereinafter, an embodiment of the present invention will be described with reference to the accompanying drawings. In the accompanying drawings, a fueling apparatus to which the present invention is applied is indicated with the reference numeral 100. In Figs. 1 and 2, the fueling apparatus indicated with the reference numeral 100 is provided with a nozzle hook 1, and a fueling nozzle (not shown) is hooked on and unhooked from the nozzle hook 1. The fueling nozzle is provided at the tip of a fueling hose (not shown). When fueling a vehicle (not shown), the fueling nozzle is unhooked from the nozzle hook 1, and the fueling nozzle is inserted into a fueling port (not shown) of the vehicle to fuel the fuel tank of the vehicle. In Fig. 1 showing a state in which the fueling nozzle is not hooked on the nozzle hook 1, and Fig. 2 showing a state in which the fueling nozzle is hooked on the nozzle hook 1, the nozzle hook 1 includes a nozzle hook body 2 with a hood part 2A, a receiving part 3, a switch part 4, a rotating member 5, a driving member 6, and a connecting member 7 connecting the rotating member 5 and the driving member 6.

[0016.] The hood part 2A of the nozzle hook body 2 is configured to support a discharge pipe (not shown) of a fueling nozzle. The receiving part 3 is configured to hold a lever guard (not shown) of a fueling nozzle. When a fueling nozzle is hooked (hanged) on the nozzle hook 1, the switch part 4 is pressed by the lever guard and moves. The movement of the switch part 4 is transmitted to the rotating member 5 through the driven gear 5A to drive the rotating member 5. When the switch part 4

moves (rotates in Fig. 3), a drive gear 4B integrally formed with the switch part 4 also moves (Fig. 3), and the rotation thereof is transmitted to the rotating member 5 through the driven gear 5A engaging the drive gear 4B to rotate the rotating member 5. The driving member 6 is arranged at a position apart from the nozzle hook body 2, and is driven by the rotating member 5 through the connecting member 7 to drive the nozzle switch 10. The nozzle switch 10 is mounted to an upper panel 102 of a housing body 101.

[0017.] In Fig. 1, the switch part 4 is rotatably supported by a rotating shaft 4A, and the rotating shaft 4A is fixed to the nozzle hook body 2. The switch part 4 protrudes from an opening 2B (Fig. 1) of the nozzle hook body 2 to the outside of the nozzle hook body 2 (to the left in Fig. 1) due to a repulsive force of urging means not shown. As shown in Fig. 2, when a fueling nozzle (not shown) is hooked on the nozzle hook 1, the switch part 4 is pressed by a lever guard (not shown) of the fueling nozzle, and rotates counterclockwise around the rotating shaft 4A (arrow A1 in Fig. 3), and is accommodated in the nozzle hook body 2 (a state in which the switch part 4 does not protrude outward from the body 2 from the opening 2B). As described above, the drive gear 4B is integrally formed with the switch part 4. More specifically, the drive gear 4B may be integrally configured with the switch part 4, or the drive gear 4B may be separate from the switch part 4 but may rotate integrally with the switch part 4.

[0018.] In Figs. 1 and 2, a rotating member 5 is arranged on the back surface side (the side opposite to the side that is pressed by a lever guard, the right side in Figs. 1 and 2), and is attached to the nozzle hook body 2 via a locking member 11. The rotating member 5 is configured to be a plate-shaped member with semicircular both end portions with different radius. The rotating member 5 includes a driven gear 5A, a first rotating shaft 5B, and a first connecting part 5C. The driven gear 5A is attached to an end (the end with larger diameter, the left side end in Fig. 1) of the rotating member 5, and is engaged with the drive gear 4B of the switch part 4. The driven gear 5A may be integrally configured with the rotating member 5, or may be separate from the rotating member 5 but may rotate integrally with the rotating member 5.

[0019.] The first rotation shaft 5B is mounted in the vicinity of an end portion on the side where the driven gear 5A is formed (the end portion with larger diameter, the left side end portion in Fig. 1), and the first rotation shaft 5B is a rotation center when the driven gear 5A is driven by the drive gear 4B of the switch part 4, and the rotation member 5 rotates with respect to the locking member 11 (nozzle hook body 2). The first connection part 5C is provided near the other end portion (the end portion with the smaller diameter: the end portion on the right side in Fig. 1) and at a position separated from the first rotation shaft 5B, and

is connected to an end 7C of the connecting member 7. In Fig. 1, the reference numeral 13 indicates a stopper for limiting the rotation of the switch part 4 when a fueling nozzle (not shown) is hooked on the nozzle hook 1, the stopper 13 limits the rotation of the rotating member 5. The stopper 13 is provided on the locking member 11 or the nozzle hook body 2.

[0020.] In Figs. 1 and 2, the connecting member 7 includes a wire 7A as a liner material with resiliency and a sheath 7B (cover member), and an end 7C of the connecting member 7 is connected to the first connecting part 5C of the rotating member 5, and the other end 7D of the connecting member 7 is connected to the second connecting part 6E of the driving member 6. The connecting member 7 has a function of transmitting the rotation of the rotating member 5 to the driving member 6. The driving member 6 has a body part 6A which is a rectangular plate-shaped member, a working piece mounting part 6B, and a working piece 6C (leaf spring). The working piece mounting part 6B is connected to an end part of the body part 6A (the end part on the side separated from the connecting member 7). The working piece 6C is fixed to the tip of the working piece mounting part 6B by a fixing means 6G, and presses the nozzle switch 10 to turn on or off the switch 10. As described above, when a fueling nozzle not shown is hooked on the nozzle hook 1, the switch part 4 rotates counterclockwise around the rotation shaft 4A, and the rotating member 5 rotates around the rotation shaft 5B, and the drive member 6 rotates around the second rotation shaft 6D by the wire 7A of the connecting member 7, and as shown in Fig. 2, the working piece mounting part 6B is also rotated to contact with on the sensing part 10A of the nozzle switch 10.

[0021.] The body part 6A of the driving member 6 is rotatably supported with the mounting bracket 12 fixed to the upper portion of the nozzle hook body 2 with the second rotating shaft 6D. Although not explicitly shown, the second rotating shaft 6D includes a spring that urges the other end 7D of the connecting member 7 in a pulling direction to maintain the state of Fig. 1. A notch 6F (Fig. 1) is formed in the body part 6A of the driving member 6, and a stopper pin 9 is located in the notch 6F. The stopper pin 9 is fixed to the mounting bracket 12, and is located in the notch 6F when the driving member 6 is assembled to the mounting bracket 12. When the notch 6F comes into contact with the stopper pin 9, it is prevented from applying an excessive force to the working piece 6C, and the nozzle switch 10 is prevented from being damaged. In Figs. 1 and 2, a stopper 14 is provided on the mounting bracket 12, and the stopper 14 is used to limit the rotation of the driving member 6 or the working piece mounting part 6B when a fueling nozzle is unhooked from the nozzle hook 1.

[0022.] When the working piece 6C and the sensing part 10A are not in contact with each other as shown in Fig. 1, the nozzle switch 10 generates an ON signal indicating that a fueling nozzle is unhooked from the nozzle hook 1 to a control device (not shown) of the fueling apparatus 100. On the other hand, as shown in Fig. 2, in the state where the working piece 6C and the sensing part 10A are in contact with each other, the nozzle switch 10 generates an OFF signal indicating that a fueling nozzle is hooked on the nozzle hook 1 to a control device (not shown) of the fueling apparatus 100. Although not shown, an elastic body is provided in the rotating part 4A of the switch part 4, and the elastic body assists that the connecting member 7 returns to the state shown in Fig. 1 when a fueling nozzle is not hooked on the nozzle hook 1.

[0023.] The structure in the vicinity of the switch part 4 will be described with reference to Figs. 3 and 4. In Fig. 3, when a fueling nozzle not shown is hooked on the nozzle hook 1 (see Figs. 1 and 2), the switch part 4 is pressed in the direction of the arrow A1, and rotates counterclockwise around the rotating part 4A in the direction of the arrow A2. Since the drive gear 4B of the switch part 4 and the driven gear 5A of the rotating member 5 engage with each other, the rotation of the switch part 4 (drive gear 4B) in the arrow A2 direction is transmitted via the driven gear 5A to the rotating member 5, and the rotating member 5 rotates about the first rotating shaft 5B in the direction of the arrow A3. Here, the rotation of the switch part 4 is converted into the rotation of the rotating member 5 by the engagement of the drive gear 4B and the driven gear 5A, so that the conversion efficiency is high and the rotation of the switch part 4 is converted into the tensile force of the connecting member 7 with high efficiency. Since an end 7C of the connecting member 7 (wire 7A) is connected to the first connecting part 5C of the rotating member 5, when the rotating member 5 rotates in the direction of the arrow A3, the connecting member 7 is pulled in the direction of the arrow A4. The tensile force acting on the wire 7A of the connecting member 7 is transmitted to the nozzle switch 10 via the driving member 6 (Figs. 1 and 2). This transmission will be described later with reference to Figs. 5 and 6.

[0024.] When a fueling nozzle is unhooked from the nozzle hook 1 from the state of Fig. 4, the switch part 4 rotates in the direction opposite to the arrow A1 (Fig. 3), and the rotating member 5 rotates in the direction opposite to the arrow A3 (Fig. 3). When the rotating member 5 rotates in the direction opposite to the arrow A3, the connecting member 7 moves in the direction opposite to the arrow A4. Here, appropriately setting the gear ratio (amplification ratio) between the drive gear 4B (for example, the number of teeth is 40) of the switch part 4 and the driven gear 5A (for example, the number of teeth is 30) of the rotating member 5 allows the amount of movement of the first connecting part 5C in the

rotating member 5, that is, the amount of tension of the connecting member 7 at the hooking/unhooking of a fueling nozzle (not shown) on/off the nozzle hook 1 to change. For example, if the numbers of teeth of the drive gear 4B and the driven gear 5A are 40 and 30 respectively, when the drive gear 4B rotates (rotates by 15 degrees), the driven gear 5A rotates more than that (20 degrees), and the movement amount of the first connecting part 5C of the rotating member 5 connected to the connecting member 7 (movement amount in the arrow A4 direction) becomes larger than the movement amount of the switch part 4 (movement amount in the arrow A1 direction). With this, the detection accuracy of the nozzle switch 10 (Figs. 1 and 2) is improved. Further, in order to increase the amount of movement of the first connecting part 5C in the rotating member 5 when a fueling nozzle (not shown) is hooked on or unhooked from the nozzle hook 1, the distance between the driven gear 5A of the rotating member 5 (the engaging portion with the drive gear 4B) and the first rotating shaft 5B can be made shorter than the distance between the first rotating shaft 5B and the first connecting part 5C.

[0025.] The structure in the vicinity of the nozzle switch will be described mainly with reference to Figs. 5 and 6. In Fig. 5, since the second rotating shaft 6D of the driving member 6 is provided with a spring (not shown) that urges the other end 7D of the connecting member 7 through its elastic repulsive force so as to pull the other end 7D in the direction opposite to the arrow A41, the conditions shown in Figs. 1 and 5 are maintained when a fueling nozzle is not hooked on the nozzle hook 1. In Fig. 5, when a fueling nozzle not shown is hooked on the nozzle hook 1, and the wire 7A of the connecting member 7 is pulled in the direction of the arrow A4 (Fig. 3), the driving member 6 (body part 6A) connected to the wire 7A of the connecting member 7 with the second connecting part 6E rotates in the arrow A5 direction centered on the second rotating shaft 6D.

[0026.] When the driving member 6 rotates in the direction of the arrow A5 about the second rotating shaft 6D, the working piece mounting part 6B side of the driving member 6 rotates in the direction of the arrow A6, and the working piece 6C attached to the working piece mounting part 6B contacts with and presses against the sensing part 10A of the nozzle switch 10 attached to the upper panel 102 (Fig. 6). When the sensing part 10A is pressed, the nozzle switch 10 generates an OFF signal (the signal indicating that a fueling nozzle is hooked on the nozzle hook 1) in a control device (not shown) of the fueling apparatus 100. In Fig. 6, when a fueling nozzle is unhooked, the wire 7A of the connecting member 7 moves in the opposite direction of the arrow A41 direction (Fig. 5), the driving member 6 rotates in the opposite direction of the arrow A5, the working piece mounting part 6B side of the driving member 6 rotates in

the reverse direction of the arrow A6, and the working piece 6C departs from the sensing part 10A of the nozzle switch 10. As described above, the driving member 6 is provided with the notch 6F that contacts with the stopper pin 9 fixed to the mounting bracket 12, so that a force is not excessively applied to the working piece 6C. In addition, when a fueling nozzle is unhooked from the nozzle hook 1, the stopper 14 provided on the mounting bracket 12 limits the rotation of the working piece mounting part 6B of the driving member 6.

[0027.] Here, regarding the relative position between the working piece 6C and the sensing part 10A of the nozzle switch 10, as shown in Fig. 7, even if a fueling nozzle is hooked on the nozzle hook 1, there is a possibility that the working piece 6C attached to the working piece attachment part 6B of the driving member 6 will not come into contact with the sensing part 10A of the nozzle switch 10 (so-called “submerged” state). If the panel is opened and closed with a fueling nozzle hooked on the nozzle hook 1, there is a risk of the state shown in Fig. 7 (so-called “submerged” state). In the state shown in Fig. 7, even though a fueling nozzle is hooked on the nozzle hook 1, the working piece 6C is not in contact with the sensing part 10A of the nozzle switch 10, so that the nozzle switch 10 and a control device (not shown) of the fueling apparatus 100 misjudge that a fueling nozzle is not hooked on the nozzle hook 1. When the state shown in Fig. 7 (“submerged” state) happens, after that, even if a fueling nozzle is subsequently unhooked from the nozzle hook 1 and hooked again, the working piece 6C does not touch the sensing part 10A of the nozzle switch 10.

[0028.] In the state shown in Fig. 8 (when the state shown in Fig. 7 does not happen), when a fueling nozzle is hooked on the nozzle hook 1, the working piece 6C comes into contact with the nozzle switch 10 at the position P1 shown by the solid line. The inventors found that if the position of the working piece 6C was set to the position P2 shown by the dotted line when it was assumed that the nozzle switch 10 did not exist, the state shown in Fig. 7 (“submerged” state) could be prevented. In other words, the inventors found that setting the projection position of the working piece 6C in the arrow A61 viewing (the same arrow viewing direction as the arrow A88 in Fig. 8) in Fig. 6 in which a fueling nozzle was hooked on the nozzle hook 1 to coincide with the projection position of the working piece 6C in the arrow A51 viewing (the same arrow viewing direction as the arrow A88 in Fig. 8) in Fig. 5 when a fueling nozzle was not hooked on the nozzle hook 1 allowed the state shown in Fig. 7 (“submerged” state) not to reach. Here, the directions of the arrow A51 (Fig. 5), the arrow A61 (Fig. 6), and the arrow A88 (Fig. 8) are all directions horizontally seen from the side opposite to the nozzle switch 10 of the upper panel 102 to which the nozzle switch 10 is

attached, and the directions of the arrow A51 (Fig. 5), the arrow A61 (Fig. 6), and the arrow A88 (Fig. 8) are the same direction.

[0029.] According to the embodiment of the present invention shown in Figs. 1 to 8, when a fueling nozzle (not shown) is hooked on the nozzle hook 1, the switch part 4 is pressed in the arrow A1 direction (Fig. 3) by a lever guard (not shown) of the fueling nozzle, and the switch part 4 rotates around the rotating shaft 4A in the direction of the arrow A2 (Fig. 3). The rotation of the drive gear 4B of the switch part 4 in the arrow A2 direction is transmitted to the rotating member 5 via the driven gear 5A engaging the driving gear 4B, and the rotating member 5 rotates about the first rotating shaft 5B in the direction of the arrow A3 (Fig. 3). As a result, the wire 7A of the connecting member 7 is pulled in the direction of the arrow A4 (Fig. 3) via the first connecting part 5C, and the tensile force is transmitted to the driving member 6 via the second connecting part 6E. With this, the drive member 6 rotates in the direction of the arrow A5 (Fig. 5) about the second rotation shaft 6D, and the working piece mounting part 6B of the drive member 6 rotates in the direction of the arrow A6, and the actuating piece 6C attached to an end of the part 6B contacts with and presses against the sensing part 10A of the nozzle switch 10 to drive the nozzle switch 10. Here, the rotation of the switch part 4 is converted into the rotation of the rotating member 5 through the engagement between the drive gear 4B and the driven gear 5A, so that conversion efficiency is high and the rotation of the switch part 4 is converted into the tensile force of the connecting member 7 with high efficiency. When a fueling nozzle is unhooked from the nozzle hook 1, the switch part 4 is pressed in the opposite direction of the arrow A1 (Fig. 3), and rotates in the opposite direction of the arrow A2 (Fig. 3); the rotating member 5 rotates in the opposite direction of the arrow A3 (Fig. 3); the wire 7A of the connecting member 7 moves in the reverse direction of the arrow A4 (Fig. 3) or the reverse direction of the arrow A41 (Fig. 5); the drive member 6 moves in the reverse direction of the arrow A5 (Fig. 5); and the working piece 6C separates from the sensing part 10A of the nozzle switch 10. As a result, hooking or unhooking a fueling nozzle reliably performs the operation (ON/OFF operation) of the nozzle switch 10.

[0030.] In the illustrated embodiment, appropriately setting the distance between the first rotating shaft 5B and the first connecting part 5C allows the rotation amount of the rotating member 5 and the displacement amount (movement amount) of the connecting member 7 to be set appropriately. And, in the illustrated embodiment, appropriately setting the gear ratio (amplification ratio) between the drive gear 4B of the switch part 4 and the driven gear 5A of the rotation member 5 allows the amount of movement of the first connecting part 5C in the rotation member 5, that is, the amount of tension of the connecting member 7

when a fueling nozzle is hooked or unhooked to the nozzle hook 1 to change.

[0031.] Further, in the illustrated embodiment, since the driving member 6 has the second rotating shaft 6D with the spring for urging the other end 7D of the connecting member 7 in the pulling direction, and the working piece 6C for operating the nozzle switch 10 at an end, and the second connecting part 6E for connecting the connecting member 7 at the other end, the operation of the switch part 4 can be reliably transmitted to the nozzle switch 10. Here, the nozzle switch 10 is attached to the upper panel 102 of the housing body 101, and the horizontal arrow projection position, of the working piece 6C in the state where a fueling nozzle is hooked on the nozzle hook 1, from the side opposite to the nozzle switch 10 of the upper panel 102 to which the nozzle switch 10 is attached, coincides with that of the working piece 6C in the state where a fueling nozzle is not hooked on the nozzle hook. Therefore, it is possible to prevent the working piece 6C (leaf spring) from not coming into contact with the nozzle switch 10 even if a fueling nozzle is hooked on the nozzle hook 1 (see Fig. 9: so-called "submerged" state).

[0032.] Further, in the illustrated embodiment, the driving member 6 is provided with the notch 6F that contacts with the stopper pin 9 fixed to the nozzle hook body 2 side, so that a force is not excessively applied to the working piece 6C, which prevents the nozzle switch 10 from being damaged.

[0033.] It is added that the illustrated embodiments are merely examples and are not a description intended to limit the technical scope of the present invention.

DESCRIPTION OF THE REFERENCE NUMERALS

[0034.]

- 1 nozzle hook
- 2 nozzle hook body
- 3 receiving part
- 4 switch part
- 4A rotating part
- 4B drive gear
- 5 rotating member
- 5A driven gear
- 5B first rotating shaft
- 5C first connecting part
- 6 driving member
- 6A body part
- 6B working piece mounting part
- 6C working piece (leaf spring)
- 6D second rotating shaft
- 6E second connecting part

6F notch
7 connecting member
7C an end of the connecting member
7D the other end of the connecting member
9 stopper pin
10 nozzle switch
100 fueling apparatus
101 housing body

CLAIMS

[Claim 1] A nozzle hook of fueling apparatus comprising:

- a nozzle hook body for holding a discharge pipe of a fueling nozzle;

- a receiving part for holding a lever guard of the fueling nozzle;

- a switch part operated by the lever guard;

- a rotating member, when the fueling nozzle is hooked on the nozzle hook, to a driven gear formed on said rotating member is transmitted a rotation of the switch part with a drive gear formed on a back surface of the switch part;

- a driving member disposed at a position away from the nozzle hook body, said driving member driving a nozzle switch attached to a housing body; and

- a connecting member for transmitting a rotation of the rotating member to the driving member.

[Claim 2] The nozzle hook of fueling apparatus as claimed in claim 1, wherein said rotating member comprising:

- the driven gear driven by the drive gear integrally configured with the switch part;

- a first rotating shaft about which the rotating member is rotated by driving of the driven gear; and

- a first connecting part to which an end of the connecting member is connected at a position separated from the first rotating shaft.

[Claim 3] The nozzle hook of fueling apparatus as claimed in claim 1 or 2, wherein said driving member comprising:

- a second rotating shaft with a spring for urging another end of the connecting member in a pulling direction;

- a working piece provided at an end to operate the nozzle switch; and

- a second connecting part provided at another end to connect the connecting member.

[Claim 4] The nozzle hook of fueling apparatus as claimed in claim 1, 2 or 3, wherein said driving member is provided with a notch that contacts with a stopper pin.