

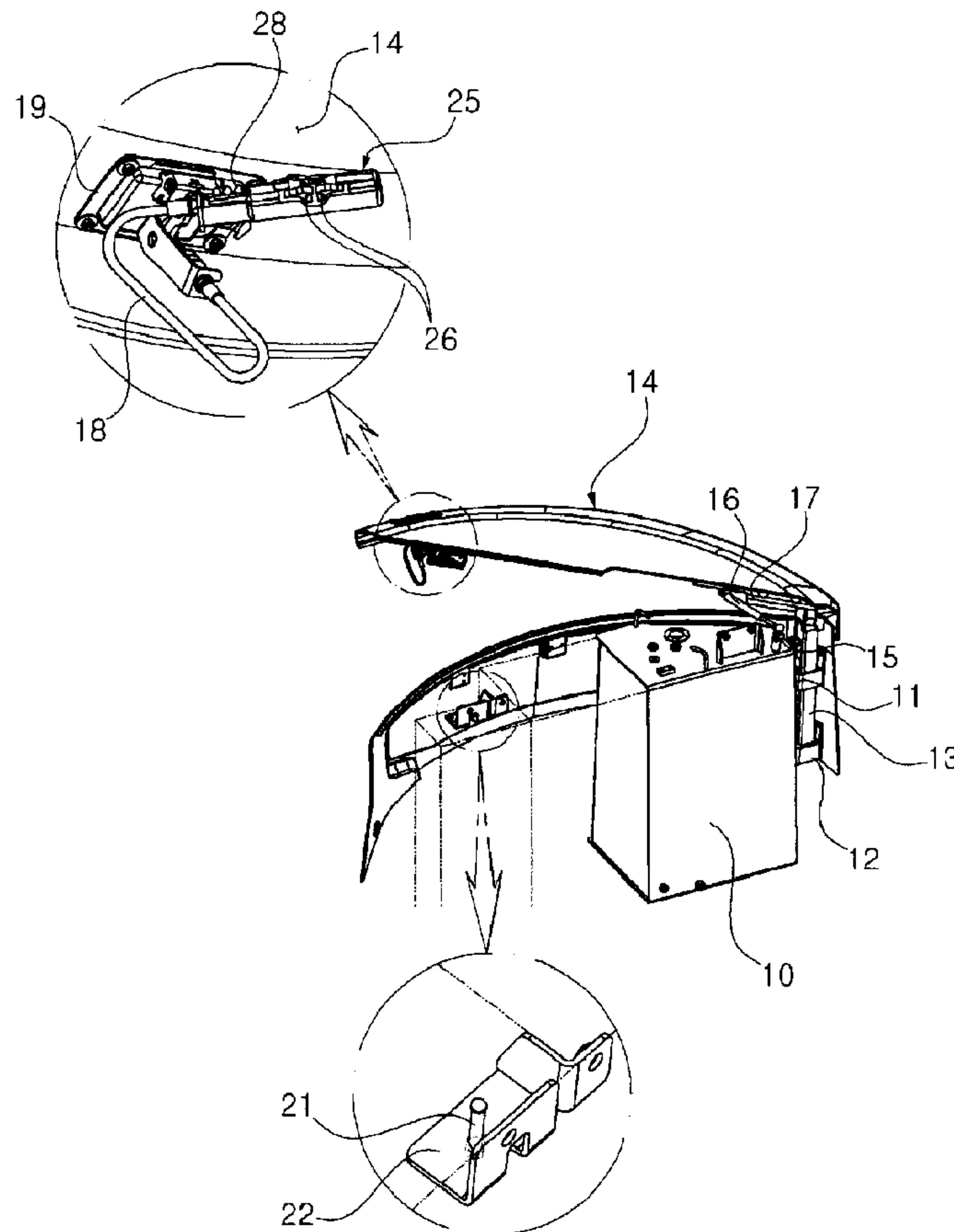


(86) **Date de dépôt PCT/PCT Filing Date:** 2012/10/25  
 (87) **Date publication PCT/PCT Publication Date:** 2014/05/01  
 (45) **Date de délivrance/Issue Date:** 2017/08/15  
 (85) **Entrée phase nationale/National Entry:** 2015/04/10  
 (86) **N° demande PCT/PCT Application No.:** KR 2012/008802  
 (87) **N° publication PCT/PCT Publication No.:** 2014/065450

(51) **Cl.Int./Int.Cl. E02F 9/08** (2006.01),  
**B62D 25/12** (2006.01)  
 (72) **Inventeurs/Inventors:**  
KIM, SEOK-WON, KR;  
LEE, TAEK-WOO, KR  
 (73) **Propriétaire/Owner:**  
VOLVO CONSTRUCTION EQUIPMENT AB, SE  
 (74) **Agent:** OYEN WIGGS GREEN & MUTALA LLP

(54) **Titre : DISPOSITIF D'OUVERTURE ET DE FERMETURE DE CAPOT POUR ENGIN DE CONSTRUCTION SANS DEPORT ARRIERE**

(54) **Title: HOOD OPENING AND CLOSING DEVICE FOR ZERO TAIL TYPE CONSTRUCTION MACHINERY**



(57) **Abrégé/Abstract:**

The present invention relates to a hood opening and closing device for zero tail type construction machinery that is used to open and close a swing type hood, at which a hinge portion is mounted on a fuel tank. The device includes: a first seat that is mounted

**(57) Abrégé(suite)/Abstract(continued):**

on an outer surface of a fuel tank; a rotary plate that is rotatably mounted to the hinge portion installed on the first seat; the swing type hood that is connected to an upper end of the rotary plate and is opened and closed through a circular movement around the hinge portion; a second seat installed on a top surface of the fuel tank; a gas spring which has one end fixed to the second seat and an end fixed to an underside of the swing hood and supports, opens, and closes the swing hood; and a locking device for opening and closing the swing hood.

**ABSTRACT**

The present invention relates to a hood opening and closing device for zero tail type construction machinery that is used to open and close a swing type hood, at which a hinge portion is mounted on a fuel tank. The device includes: a first seat that is mounted on an outer surface of a fuel tank; a rotary plate that is rotatably mounted to the hinge portion installed on the first seat; the swing type hood that is connected to an upper end of the rotary plate and is opened and closed through a circular movement around the hinge portion; a second seat installed on a top surface of the fuel tank; a gas spring which has one end fixed to the second seat and an end fixed to an underside of the swing hood and supports, opens, and closes the swing hood; and a locking device for opening and closing the swing hood.

## DESCRIPTION

### TITLE OF THE INVENTION

Hood Opening and Closing Device for Zero Tail Type Construction Machinery

### TECHNICAL FIELD

The present invention relates to a hood opening and closing apparatus for a small swing radius construction machine (as used herein, a small swing radius construction machine refers to a construction machine of a type having a small swing radius at the rear). More particularly, the present invention relates to such a hood opening and closing apparatus for a small swing radius construction machine, which enables a swing hood to be opened by means of a hinge portion fixed to a fuel tank.

### BACKGROUND OF THE INVENTION

In general, a small swing radius construction machine has been developed such that an operator can perform a work while maintaining the radius of gyration of an operator's cab or a swing structure small. The small swing radius construction machine is configured to have an arc shape in which an outer wall or a door of the operator's cab is curved outwardly. The door of the operator's cab is opened and closed in a sliding manner while forming a constant radius on the outer wall of the operator's cab.

A hood of a fuel tank for an engine installed on the small swing radius construction machine can be opened from the front to the rear of the construction machine by means of a hinge portion fixed to the rear surface of the fuel tank. As a result, in the case where fuel is injected into the fuel tank or a filter or the like is inspected and replaced with a new one, it is not easy for an operator to access the fuel tank due to the hood opened toward the operator. Thus, the operator suffers from an inconvenience of having to climb a track from a side of the construction machine to inspect the filter or the like.



Meanwhile, another hood of a fuel tank for an engine installed on the small swing radius construction machine can be opened from the rear to the front of the construction machine by means of a hinge portion fixed to the top surface of the fuel tank. In this case, when the hood is opened at a maximum angle, an interference occurs between the hood and the operator's cab. This makes it difficult for the operator to access the fuel tank during the post-maintenance operation such as the replacement of the filter of the fuel tank in a state in which the hood is opened at a maximum angle of approximately 60°.

## **SUMMARY OF THE INVENTION**

Accordingly, the present invention has been made to solve the aforementioned problems occurring in the prior art, and it is an object of the present invention to provide a hood opening and closing apparatus for a small swing radius construction machine, which enables a swing hood to be opened by means of a hinge portion fixed to a fuel tank so that an operator can easily access the fuel tank or the like.

Another object of the present invention is to provide a hood opening and closing apparatus for a small swing radius construction machine, in which seats are weldingly fixed to a fuel tank and a hood, and then a gas spring and a hinge portion are fixedly fastened to the seats by means of bolts so that the strength of the hood or the like can be reinforced.

## **TECHNICAL SOLUTION**

To achieve the above object, in accordance with an embodiment of the present invention, there is provided a hood opening and closing apparatus for a small swing radius construction machine, the apparatus including:

a first seat installed on an outer surface of a fuel tank;

a rotary plate rotatably mounted to a hinge portion installed on the first seat;

a swing hood connected to an upper end of the rotary plate and configured to perform a circular motion around the hinge portion so as to be opened and closed;

a second seat installed on a top surface of the fuel tank;

a gas spring fixed at one end thereof to the second seat and fixed at an end thereof to an underside of the swing hood, the gas spring being configured to openably and closeably support the swing hood; and

a locking device for opening and closing the swing hood, wherein the locking device includes:

a latch knob unit installed on one side of the swing hood and having an inner side to which one end of a wire cable is connected;

a latch unit including a latch bracket installed on the fuel tank or a counterweight and a striker installed on the latch bracket; and

a catch unit including first and second catch brackets installed on an inner side of the swing hood to face each other, a lock guard rotatably installed between the first and second catch brackets and so as to be locked on or unlocked from the striker depending on the opening and closing of the swing hood, a catch lever rotatably installed on an outer surface of the second catch bracket and connected to the other end of the wire cable, a locker operated in cooperation with the rotation of the catch lever to cause the lock guard to be unlocked from the striker when the locked state of the locker is released, and an elastic member provided on the wire cable and configured to elastically support an initial locking state in which the lock guard is locked on the striker by pressing the catch lever.

In a preferred embodiment of the present invention, the hood opening and closing apparatus may further include a strength reinforcement plate which is installed on the underside of the swing hood and to which the other end of the gas spring is fixed.

The hinge portion may be securely fixed to the first seat by means of a bolt, and the gas spring may be fixed at the one end thereof to the second seat by means of a bolt.

### **ADVANTAGEOUS EFFECT**

The hood opening and closing apparatus for a small swing radius construction machine in accordance with an embodiment of the present invention as constructed above has the following advantages.

The swing hood is opened and closed by means of a hinge portion securely fixed to the fuel tank so that an operator can easily access the fuel tank or the like so as to replace a filter or the like with a new one, thereby ensuring convenience.

The seats are weldingly fixed to the fuel tank and the hood, and then the gas spring and the hinge portion are fixedly fastened to the seats by means of bolts so that the strength of the hood or the like can be reinforced.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The above objects, other features and advantages of the present invention will become more apparent by describing the preferred embodiments thereof with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view showing the installation of a swing hood in a hood opening and closing apparatus for a small swing radius construction machine in accordance with an embodiment of the present invention;

Fig. 2 is a top plan view showing the opening and closing of a swing hood in a hood opening and closing apparatus for a small swing radius construction machine in accordance with an embodiment of the present invention;

Fig. 3 is a schematic view showing main elements of a hinge portion as shown in Fig. 2 in a hood opening and closing apparatus for a small swing radius construction machine in accordance with an embodiment of the present invention;

Figs. 4(a) and 4(b) are schematic views showing the locking and unlocking



operations of a swing hood in a hood opening and closing apparatus for a small swing radius construction machine in accordance with an embodiment of the present invention; and

Fig. 5 shows the opening and closing of a swing hood and a locking means in a hood opening and closing apparatus for a small swing radius construction machine in accordance with an embodiment of the present invention.

\* Explanation on reference numerals of main elements in the drawings \*

4: hood

10: fuel tank

11: first seat

12: hinge portion

13: rotary plate

14: swing hood

15: second seat

16: gas spring

17: strength reinforcement plate

18: wire cable

19: latch knob unit

20: counterweight

21: latch bracket

22: striker

23: latch unit

24: first catch bracket

25: second catch bracket

26: lock guard

27: catch lever

28: elastic member

29: catch unit



## DETAILED DESCRIPTION OF THE INVENTION

Now, a swing control apparatus for construction machine in accordance with preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings. The matters defined in the description, such as the detailed construction and elements, are nothing but specific details provided to assist those of ordinary skill in the art in a comprehensive understanding of the invention, and the present invention is not limited to the embodiments disclosed hereinafter.

Fig. 1 is a perspective view showing the installation of a swing hood in a hood opening and closing apparatus for a small swing radius construction machine in accordance with an embodiment of the present invention, Fig. 2 is a top plan view showing the opening and closing of the swing hood shown in Fig. 1, Fig.3 is a schematic view showing main elements of a hinge portion as shown in Fig. 2, Figs. 4(a) and 4(b) are schematic views showing the locking and unlocking operations of the swing hood shown in Fig. 1, and Fig. 5 shows the opening and closing of a swing hood and a locking means in a hood opening and closing apparatus for a small swing radius construction machine in accordance with an embodiment of the present invention.

Referring to Figs. 1 to 5, in accordance with an embodiment of the present invention, in a small swing radius construction machine including an upper swing structure mounted on an lower traveling structure, an attachment mounted to the upper swing structure, an operator's cab, a fuel tank for an engine, and a counterweight, a hood opening and closing apparatus for the construction machine includes:

a first seat 11 that is installed on an outer surface of the fuel tank 10;

a rotary plate 13 that is rotatably mounted to a hinge portion 12 installed on the first seat 11;

a swing hood 14 that is connected to an upper end of the rotary plate 13 and is configured to perform a circular motion around the hinge portion 12 so as to be opened and

closed;

a second seat 15 that is installed on a top surface of the fuel tank 10;

a gas spring 16 that is fixed at one end thereof to the second seat 15 and is fixed at an end thereof to an underside of the swing hood 14, the gas spring being configured to openably and closeably support the swing hood 14; and

a locking device for opening and closing the swing hood 14, wherein the locking device includes:

a latch knob unit 19 installed on one side of the swing hood 14 and having an inner side to which one end of a wire cable 18 is connected;

a latch unit 23 including a latch bracket 21 installed on the fuel tank 10 or a counterweight 20 and a striker 22 installed on the latch bracket 21; and

a catch unit 29 including first and second catch brackets 24 and 25 installed on an inner side of the swing hood 14 to face each other, a lock guard (26) rotatably installed between the first and second catch brackets 24 and 25 so as to be locked on or unlocked from the striker 22 depending on the opening and closing of the swing hood 14, a catch lever 27 rotatably installed on an outer surface of the second catch bracket 25 and connected to the other end of the wire cable 18, a locker (not shown) operated in cooperation with the rotation of the catch lever 27 to cause the lock guard 26 to be unlocked from the striker 22 when the locked state of the locker is released, and an elastic member 28 (e.g., a compression coil spring) provided on the wire cable 18 and configured to elastically support an initial locking state in which the lock guard 26 is locked on the striker 22 by pressing the catch lever 27.

The hood opening and closing apparatus may further include a strength reinforcement plate 17 which is installed on the underside of the swing hood 14 and to which the other end of the gas spring 16 is fixed.



The hinge portion 12 is securely fixed to the first seat 11 by means of a bolt, and the gas spring 16 is fixed at the one end thereof to the second seat 15 by means of a bolt.

In the drawings, a non-explained reference numeral 25a denotes a fixing piece that extends to the second catch bracket 25 and supports the elastic member 28 so that an elastic force of the elastic member 28 provided at one end of the wire cable 18 is transferred to the catch lever 27 side to maintain a state in which the lock guard 26 is locked on the striker 22.

In accordance with the construction as described above, in the case where fuel is replenished in the fuel tank 10 for an engine, which is installed on the upper swing structure, or a filter is inspected and replaced with a new one, the swing hood 14 is opened as shown in Fig. 1. In other words, when the latch knob unit 19 installed on one side of the swing hood 14 is pulled by a user toward the user, the elastic member 28 provided at one end of the wire cable 18 receives a compressive force and the catch lever 27 connected to one end of the wire cable 18 is rotated in a counterclockwise direction about a fixed pin as shown in Fig. 4b.

The rotation of the catch lever 27 releases the locked state of the locker (not shown) constituting the catch unit 29. In this case, since the lock guard 26 is unlocked from the striker 22 so as to be converted into an unlocked state, the locked state of the catch unit 29 to the latch unit 23 is released. Meanwhile, in the case where an external force from the striker 22 installed on the upper swing structure is not applied to the inner periphery 26a of the lock guard 26, the lock guard 26 is maintained in a state of being unlocked from the striker 22.

Thus, the gas spring 16 mounted at one end thereof to the swing hood 14 is driven to extend to cause the swing hood 14 to perform a circular motion in a clockwise direction around the hinge portion 12. As a result, the swing hood 14 is swung from the right to the left on the drawing sheet so that the swing hood 14 can be opened as shown in Figs. 1 and 2. On the other hand, in the case where the external force applied to the latch knob unit 19 when pulling the latch knob unit 19 is removed, the catch lever 27 is pushed by an

elastic restoring force of the elastic member 28 to cause the catch lever 27 to be rotated about the fixed pin 30 in a clockwise direction on the drawing sheet.

Meanwhile, when the user presses the periphery of the latch knob unit 19 to push the latch knob unit 19 to the upper swing structure so as to close the swing hood 14, the gas spring 16 is driven to retract. In this case, since the external force from the striker 22 installed on the upper swing structure is pressingly applied to the inner periphery 26a of the lock guard 26, the lock guard 26 maintained in a state of being unlocked from the striker 22 is converted into a locked state of being locked on the striker 22. At this time, since the catch lever 27 is pressed by the elastic force of the elastic member 28 provided on one end of the wire cable 18, the locker converted into a locked state can maintain a locked state of the lock guard 26 to the striker 22 as shown in Fig. 4a.

As described above, the hood opening and closing apparatus for a small swing radius construction machine enables the swing hood 14 to perform a circular motion around the hinge portion 12 so as to be opened in a swing manner. Resultantly, in the case where the swing hood 14 is opened to replenish fuel in the fuel tank 10 or inspect a filter or the like, no interference occurs owing to the swing hood 14 opened. Thus, an operator easily accesses the swing hood 14, thereby ensuring workability and convenience.

## **INDUSTRIAL APPLICABILITY**

In accordance with the hood opening and closing apparatus for a small swing radius construction machine of the present invention as constructed above, the swing hood is opened by means of the hinge portion fixed to the fuel tank of the small swing radius construction machine so that the operator can easily access the fuel tank or the like.

While the present invention has been described in connection with the specific embodiments illustrated in the drawings, they are merely illustrative, and the invention is not limited to these embodiments. It is to be understood that various equivalent modifications and variations of the embodiments can be made by a person having an ordinary skill in the art without departing from the scope of the present invention.



Therefore, the true technical scope of the present invention should not be defined by the above-mentioned embodiments but should be defined by the appended claims and equivalents thereof.

## Claims

1. A hood opening and closing apparatus for a construction machine of a type having a small swing radius at the rear, the apparatus comprising:

5 a first seat installed on an outer surface of a fuel tank;

a rotary plate rotatably mounted to a hinge portion installed on the first seat;

a swing hood connected to an upper end of the rotary plate and configured to perform a circular motion around the hinge portion so as to be opened and closed;

a second seat installed on a top surface of the fuel tank;

10 a gas spring fixed at one end thereof to the second seat and fixed at an end thereof to an underside of the swing hood, the gas spring being configured to openably and closeably support the swing hood; and

a locking device for opening and closing the swing hood;

wherein the locking device comprises:

15 a latch knob unit installed on one side of the swing hood and having an inner side to which one end of a wire cable is connected;

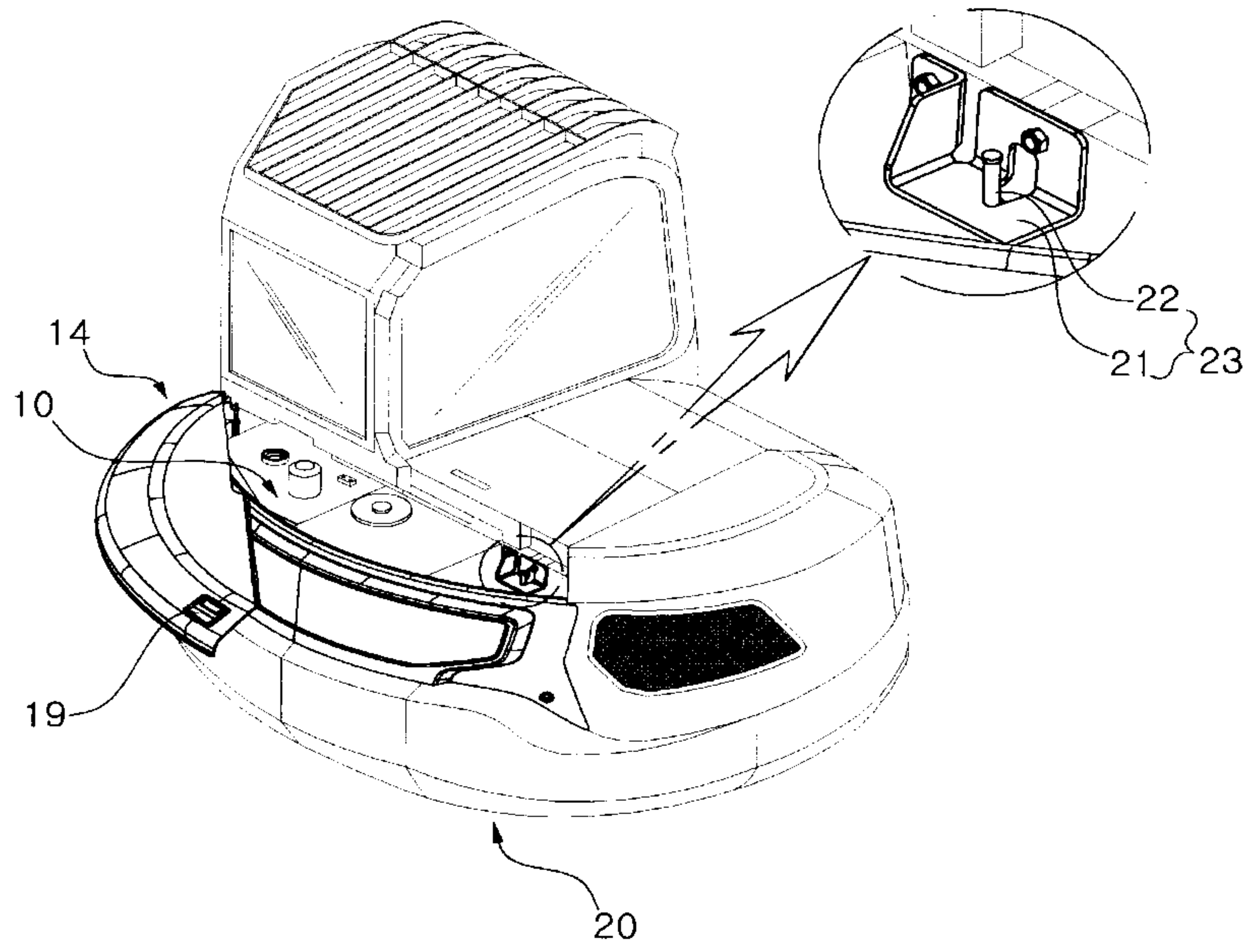
a latch unit including a latch bracket installed on the fuel tank or a counterweight and a striker installed on the latch bracket; and

20 a catch unit including first and second catch brackets installed on an inner side of the swing hood to face each other, a lock guard rotatably installed between the first and second catch brackets so as to be locked on or unlocked from the striker depending on the opening and closing of the swing hood, a catch lever rotatably installed on an outer surface of the second catch bracket and connected to the other end of the wire cable, a locker operated in cooperation with a rotation of the catch lever to cause the lock guard to be  
25 unlocked from the striker when the locked state of the locker is released, and an elastic member provided on the wire cable and configured to elastically support an initial locking state in which the lock guard is locked on the striker by pressing the catch lever.

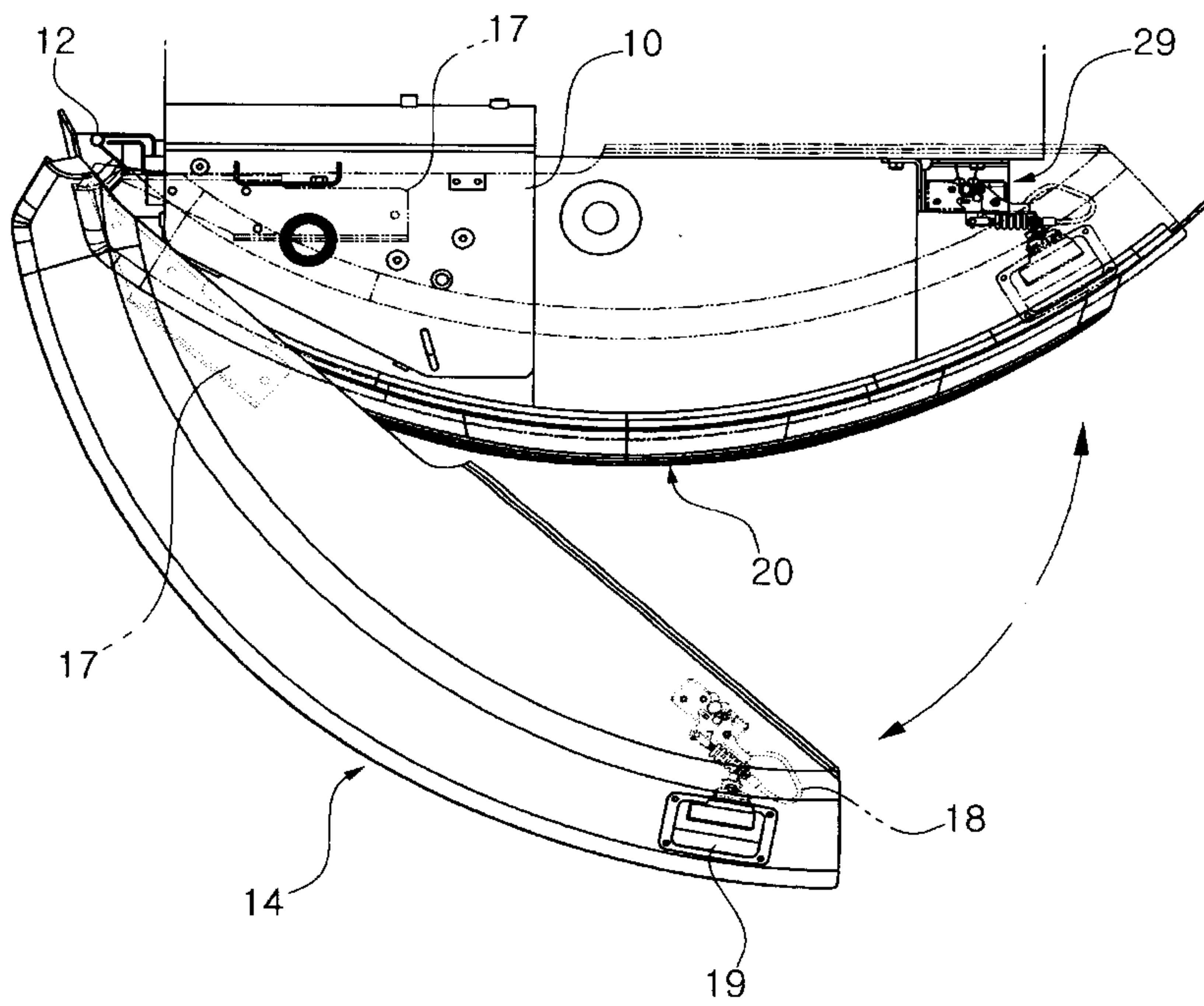
2. The hood opening and closing apparatus according to claim 1, further comprising a strength reinforcement plate which is installed on the underside of the swing hood and to which the other end of the gas spring is fixed.

5 3. The hood opening and closing apparatus according to claim 1, wherein the hinge portion is securely fixed to the first seat by means of a bolt, and the gas spring is fixed at the one end thereof to the second seat by means of a bolt.

**【FIG. 1】**

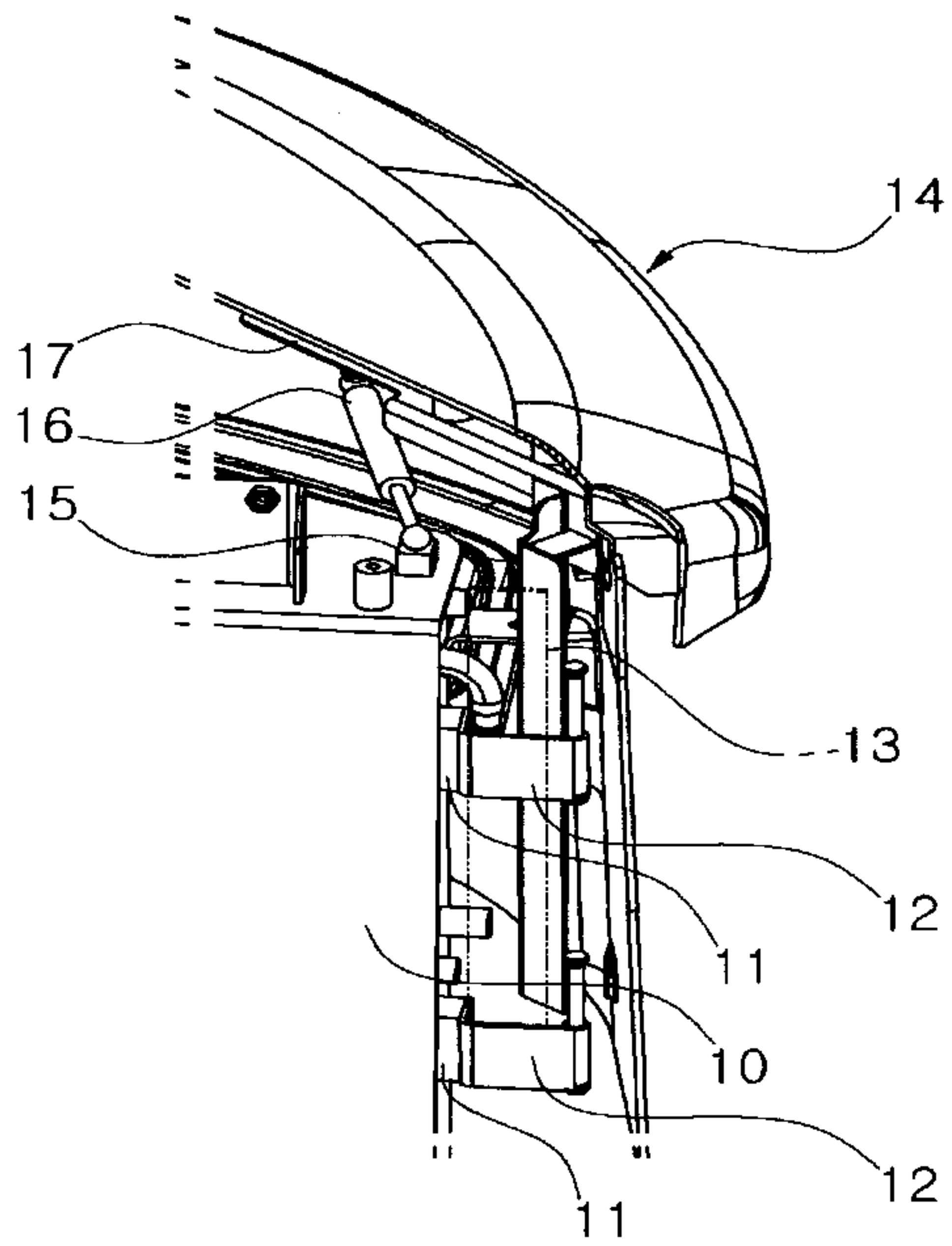


**【FIG. 2】**

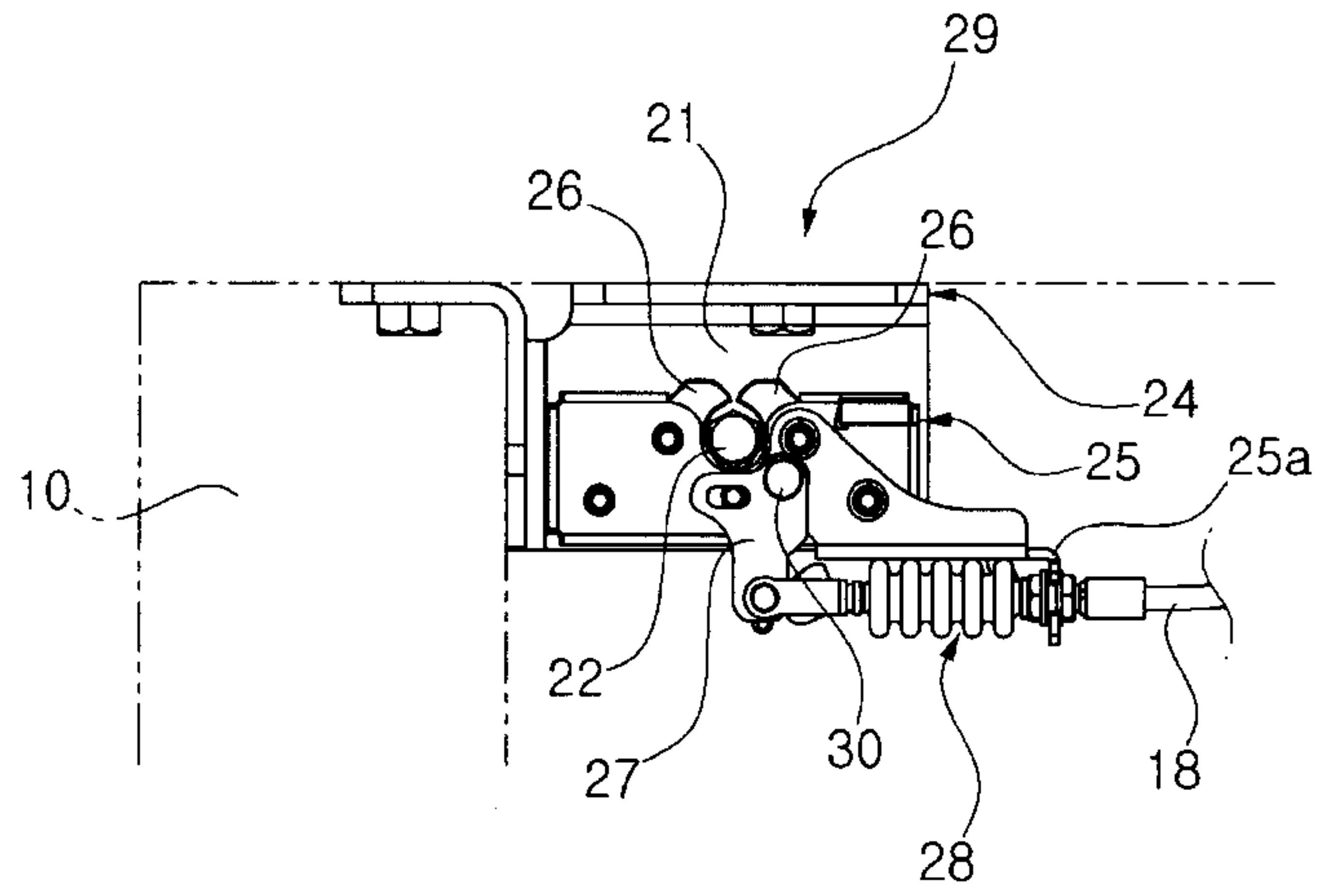




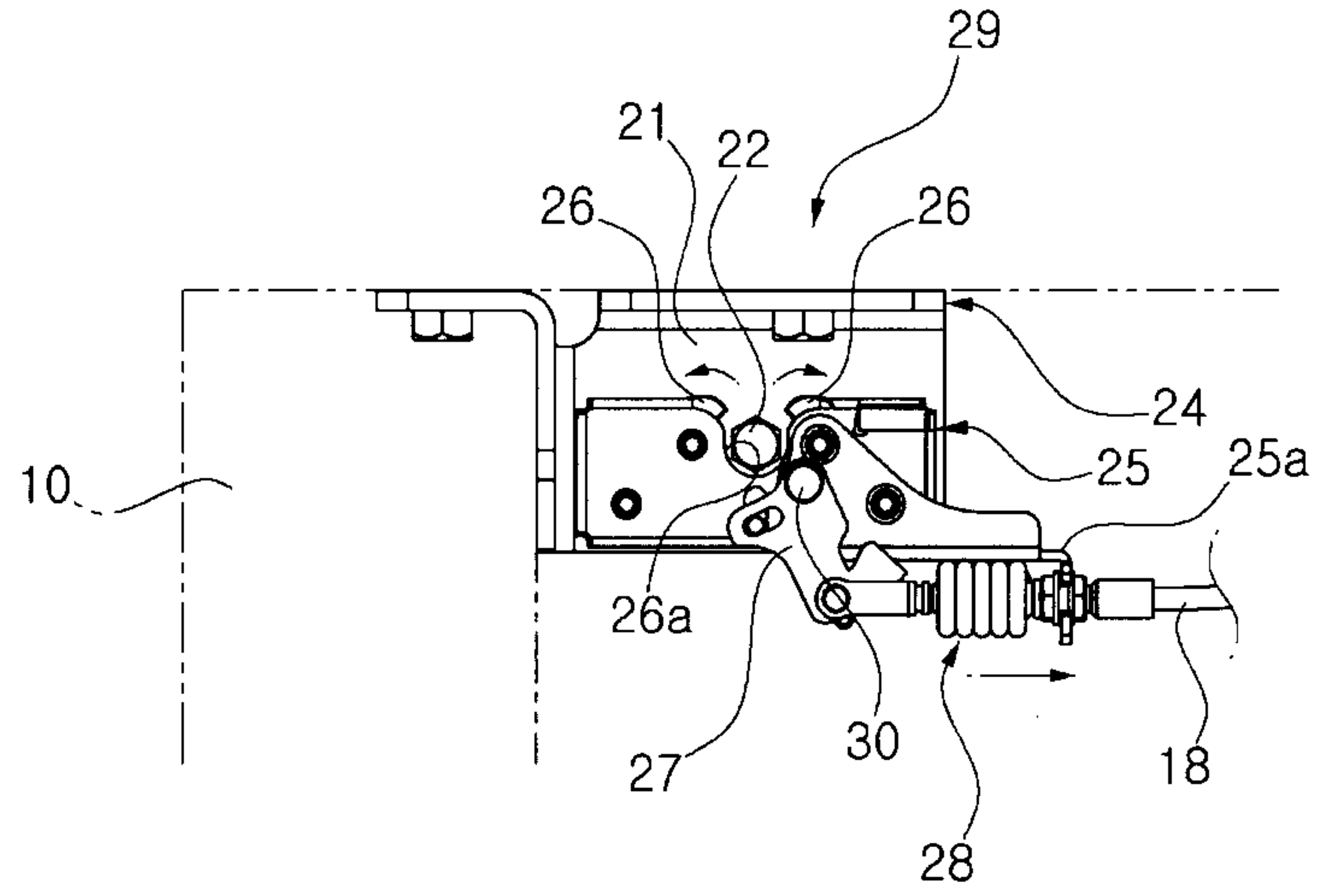
**【FIG. 3】**



**【FIG. 4a】**



**【FIG. 4b】**



**【FIG. 5】**

