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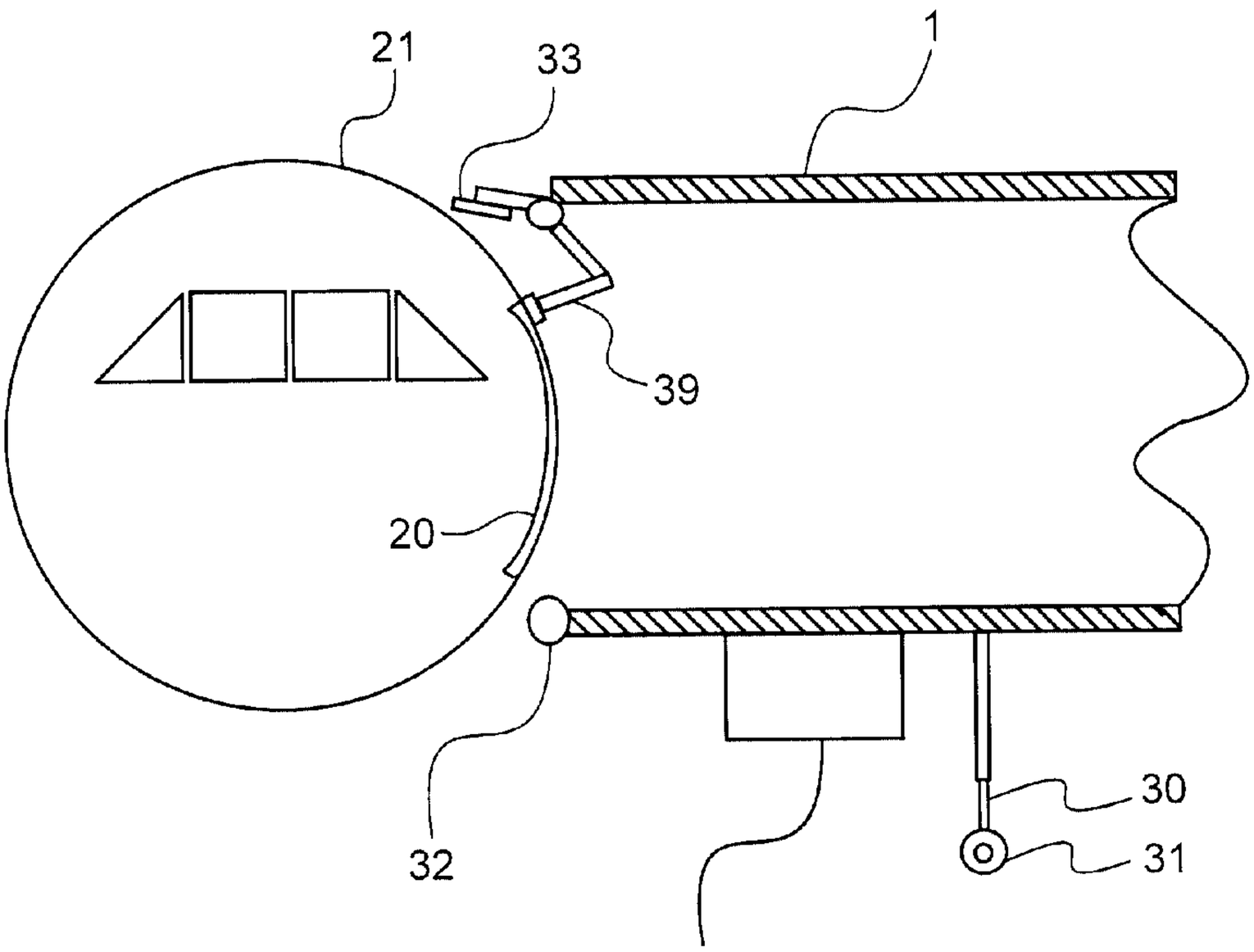
(54) Titre : SYSTEME INDIQUANT L'ETAT D'ALIGNEMENT D'UNE PASSERELLE PASSAGERS
(54) Title: SYSTEM FOR INDICATING AN ALIGNMENT STATUS OF A PASSENGER BRIDGE



(57) Abrégé/Abstract:
Disclosed is an apparatus and a method for providing a human sensable indication to an occupant of an aircraft that it is safe to open a door of the aircraft. An indication generator is provided for receiving a control signal in dependence upon a passenger bridge being correctly aligned with the door of the aircraft. More particularly, the passenger bridge is aligned with the door of the aircraft in one of a semi-automated and a fully-automated manner. The indication generator is also for providing the human sensable indication in dependence upon receiving the control signal.

Abstract

Disclosed is an apparatus and a method for providing a human sensable indication to an occupant of an aircraft that it is safe to open a door of the aircraft. An indication generator is provided for receiving a control signal in dependence upon a passenger bridge being correctly aligned with the door of the aircraft. More particularly, the passenger bridge is aligned with the door of the aircraft in one of a semi-automated and a fully-automated manner. The indication generator is also for providing the human sensable indication in dependence upon receiving the control signal.

System for Indicating an Alignment Status of a Passenger Bridge

Field of the Invention

This application claims priority from U.S. Provisional Application Serial No. 60.352,852 filed February 1, 2002.

[001] The instant invention relates generally to passenger bridges and more particularly to a system for indicating an alignment status of a passenger bridge with respect to an aircraft, absent the intervention of a bridge-operator.

Background of the Invention

[002] In order to make aircraft passengers more comfortable, and in order to transport them between the airport terminal and the aircraft in such a way that they are protected from weather and other environmental influences, passenger bridges are used which can be telescopically extended and the height of which is adjustable. Passenger bridges in present day use comprise a plurality of adjustable modules, including: a rotunda, a telescopic tunnel, a bubble section, a cabin, and elevating columns with wheel carriage. Advantageously, the modular design of prior art passenger bridges allows the passenger bridge to be adjusted in order to service a wide range of aircraft models. Manual, semi-automated and fully-automated systems are known for adjusting the passenger bridge in order to compensate for different sized aircraft and to compensate for imprecise parking of the aircraft at the airport terminal, etc.

[003] Typically in a manual system, a bridge-operator uses a control panel located within the cabin of the passenger bridge to adjust the passenger bridge such that it engages the fuselage of the aircraft. After visually inspecting the alignment of the passenger bridge with respect to the aircraft, the bridge-operator may signal to an occupant of the aircraft that the alignment process is complete. For instance, the bridge-operator "bangs" on the door of the aircraft. Optionally, the bridge-operator relies upon electromagnetic sensors that are mounted near the cabin end of the passenger bridge to confirm the visual inspection of the alignment.

[004] Schoenberger et al. in U.S. Patent 5,226,204 disclose a tele-robotic/fully-automated passenger bridge control system comprising sensors, a display, a set of operator command input devices and a computer to implement the system. The display includes video from a camera, a graphic representation of the relative position of the passenger bridge and system status data. In one embodiment an operator controls the passenger bridge from a remote location, wherein the computer interprets the commands and then modifies them greatly, slightly or not at all based upon sensor data, the situation and control algorithms. Suggestions are made in the patent specification that the system could be arranged to operate fully automatically using image-processing of the recorded video images to calculate the distance between the bridge and the aircraft.

[005] WO 01/34467, filed November 8, 2000 in the name of Anderberg, teaches another automated passenger bridge alignment system. According to Anderberg, electromagnetic sensors are disposed along the cabin end of a passenger bridge for transmitting a set of electromagnetic pulses in different directions and for detecting electromagnetic pulses after reflection on a craft. Based on the elapsed time between transmitting and detecting the electromagnetic pulses in different directions, a profile of distance as a function of direction is obtained. From the measured distance versus direction profile and the information stored in the computer, it is possible to maneuver the bridge to the door of the craft.

[006] It is a disadvantage of the prior art semi-automated and fully-automated systems that there is no one on the outside of the aircraft, such as for instance a bridge-operator within the cabin of the passenger bridge, to verify that the passenger bridge alignment is completed and that the passenger bridge has actually stopped at the correct position relative to the aircraft. As such, there is no one to provide an indication to an occupant of the aircraft that it is safe to open the door and begin deplaning. For example, a flight attendant viewing the passenger bridge from inside the aircraft has a severely limited field of view of the bridge structure through a window, or even no view at all, and may mistakenly open the door of the aircraft before the passenger bridge has engaged the aircraft fuselage, in which case a gap may exist which could allow a person to fall to the tarmac below.

[007] What is required is a system for automatically indicating an alignment status of a passenger bridge relative to an aircraft. Such a system would be particularly advantageous when the passenger bridge is aligned to the aircraft in one of a semi-automated and a fully-automated manner.

Object of the Invention

[008] In an attempt to overcome these and other limitations of the prior art it is an object of the instant invention to provide an apparatus for automatically providing [automatically] an indication to an occupant of an aircraft that it is safe to open a door.

[009] It is another object of the instant invention to provide an apparatus for automatically providing an indication to an occupant of an aircraft that a passenger bridge is correctly aligned with a door of the aircraft.

Summary of the Invention

[0010] In accordance with an embodiment of the instant invention there is provided an apparatus for indicating an alignment status of a passenger bridge relative to an aircraft comprising:

a controller for providing a control signal in dependence upon the passenger bridge being in a predetermined aligned relationship with a door of an aircraft; and,

an indication generator in operative communication with the controller for receiving the control signal from the controller and for providing an indication in dependence thereon.

[0011] In accordance with another aspect of the instant invention there is provided a method of indicating an alignment status of a passenger bridge relative to an aircraft comprising the steps of:

guiding the passenger bridge to a position for aligning a cabin end of the passenger bridge to a door of the aircraft;

detecting alignment of the cabin end of the passenger bridge relative to the door of the aircraft and providing a control signal in dependence thereon; and,

providing a predetermined indication to an occupant of the aircraft in dependence upon the control signal.

[0012] In accordance with yet another aspect of the instant invention there is further provided a method of indicating an alignment status of a passenger bridge relative to an aircraft comprising the steps of:

receiving a control signal indicative of alignment of the passenger bridge relative to the door of the aircraft; and,

automatically providing a predetermined human sensable indication to an occupant of the aircraft in dependence upon the control signal.

Brief Description of the Drawings

[0013] Exemplary embodiments of the invention will now be described in conjunction with the following drawings, in which similar reference numbers designate similar items:

[0014] Figure 1 shows a simplified top view of an automated passenger bridge for use with the instant invention;

[0015] Figure 2a is a detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a first embodiment of the instant invention, prior to engaging the aircraft fuselage;

[0016] Figure 2b is a more detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a first embodiment of the instant invention, after engaging the aircraft fuselage;

[0017] Figure 3a is a detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a second embodiment of the instant invention, prior to engaging the aircraft fuselage;

[0018] Figure 3b is a more detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a second embodiment of the instant invention, after engaging the aircraft fuselage;

[0019] Figure 4a is a detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a third embodiment of the instant invention, prior to engaging the aircraft fuselage;

[0020] Figure 4b is a more detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a third embodiment of the instant invention, after engaging the aircraft fuselage;

[0021] Figure 5a is a detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a fourth embodiment of the instant invention, prior to engaging the aircraft fuselage;

[0022] Figure 5b is a more detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a fourth embodiment of the instant invention, after engaging the aircraft fuselage; and,

[0023] Figure 6 is a simplified flow diagram of a method of providing an indication to an occupant of an aircraft according to the instant invention.

Detailed Description of the Invention

[0024] The following description is presented to enable a person skilled in the art to make and use the invention, and is provided in the context of a particular application and its requirements. Various modifications to the disclosed embodiments will be readily apparent to those skilled in the art, and the general principles defined herein may be applied to other embodiments and applications without departing from the spirit and the scope of the invention. Thus, the present invention is not intended to be limited to the embodiments disclosed, but is to be accorded the widest scope consistent with the principles and features disclosed herein.

[0025] Referring to Figure 1, shown is a schematic top view of a prior art passenger bridge for use with the instant invention. The passenger bridge 1, shown in an aircraft engaging position, comprises a rotunda 2, which is connected to a terminal building 3 and from which extends a passageway 4. The passageway 4 ends with a pivotable cabin 5 and includes inner 16 and outer 17 passageway elements, wherein the inner element 16 is

telescopically received within the outer element 17 such that the length of the passageway 4 is variable. Of course, each passageway element includes a left sidewall, a right sidewall, a floor member and a ceiling member. Optionally, a number of passageway elements other than two are provided. A control panel 8 is disposed within the cabin 5 for use by a bridge-operator to adjust the passenger bridge manually.

[0026] The passenger bridge 1 is adjustable for connection to a door 20 of an aircraft 21. To this end, and as shown in Figures 2-5, the passenger bridge 1 includes a bogie 30 with driving wheels 31 for achieving angular displacement of the passenger bridge as well as for telescoping of the passageway elements to alter the length of the passenger bridge 1. Referring again to Figure 1, the passageway 4 is suspended from a frame 6 for adjusting the height of the passenger bridge 1. Finally, the passenger bridge 1 includes an actuator (not shown) for pivoting the cabin 5. Accordingly, the cabin 5 is alignable with a door opening of a plurality of different aircraft models by adjusting the height, length, etc. of the passenger bridge 1.

[0027] The passenger bridge 1 further comprises a device 9 for aligning the passenger bridge 1 to the aircraft 21 in one of a semi-automated and a fully-automated manner. Such devices are known in the art, and a detailed description is herein omitted in the interest of brevity. Preferably, the passenger bridge 1 further comprises sensors that are independent of the device 9. For instance, as shown in Figure 1 a non-contact proximity sensor 14, such as for example a non-contact inductive proximity sensor, is optionally provided for sensing the close approach of the passenger bridge 1 to the aircraft 21. Further optionally, a pressure sensor 15 is provided at the cabin end of the floor member of the passenger bridge 1 for sensing physical contact with the aircraft 21. The independent sensors 14 and/or 15 preferably sense a predetermined contiguity of the floor member of the passenger bridge 1 to the aircraft door 20, such that when the passenger bridge 1 is determined to be engaged with the aircraft 21, any gaps remaining therebetween are too small to allow a passenger to fall through. The independent sensors 14 and/or 15 provide a control signal in dependence upon sensing the predetermined contiguity of the floor member of the passenger bridge 1 to the aircraft door 20.

[0028] Referring now to Figures 2a and 2b, shown is a detailed view of a part of a passenger bridge 1 close to the body of an aircraft 21, including an apparatus according to a first embodiment of the instant invention. The passenger bridge 1 includes a bogie 30 with driving wheels 31 for achieving angular displacement of the passenger bridge as well as for telescoping of the passageway elements to alter the length of the passenger bridge 1. A bumper 32 is disposed along a cabin end of the floor member of the passenger bridge 1 for engaging an outer surface of the aircraft 21 and to thereby reduce the possibility of causing damage when the passenger bridge 1 is aligned with the aircraft 21. Most preferably, the inductive sensor 14 and the pressure sensor 15 are disposed along the bumper 32. A flexible apron 33 is disposed along the cabin end of the ceiling member of the passenger bridge 1 for frictionally engaging the fuselage of the aircraft 21 when the passenger bridge 1 is in an aircraft engaging position. For instance, the apron 33 bridges a gap between the ceiling member and the aircraft 21, so as to protect passengers from the weather and other environmental influences.

[0029] Still referring to Figures 2a and 2b, the device 9 for aligning the passenger bridge with the aircraft 21 in one of a semi-automatic and a fully-automatic manner is shown as an integrated unit disposed adjacent to an outer surface of the floor member and near the cabin end of the passenger bridge 1. The device 9 includes a sensor (not shown), a processor (not shown) and a memory (not shown). Optionally, the elements of device 9 are implemented as separate components. The device 9 is also for providing a control signal in dependence upon detecting an aligned engagement between the passenger bridge 1 and the aircraft 21. In communication with the device 9 is an acoustic signal generator 39 in the form of a knocker for providing an acoustic signal in dependence upon receiving the control signal from the device 9. In a preferred embodiment, the acoustic signal generator 39 is in the form of a speaker coil having an optional medium for engaging the aircraft fuselage and for transmitting efficiently the acoustic signal through the aircraft fuselage. Preferably, the acoustic signal generator 39 in the form of a speaker coil is moved automatically into acoustic coupling with the fuselage during the alignment operation. In a less preferred embodiment, the acoustic signal generator 39 is in the form of a percussive mechanical device, such as for example a knocker, for physically impacting the fuselage to provide the acoustic signal.

[0030] In use, the passenger bridge 1 is aligned with the aircraft, absent a bridge-operator being present in the cabin to visually inspect the alignment and provide an indication upon the successful completion thereof. A sensor of the device 9 senses engagement of the passenger bridge with the aircraft 21 and provides a control signal in dependence thereof to the processor. The processor transmits a second control signal to the acoustic signal generator 39. In dependence upon receiving the second control signal from the processor, the acoustic signal generator 39 provides an acoustic signal to an occupant of the aircraft 21. Preferably, the acoustic signal is in a form that simulates the sound of a bridge-operator "banging" on the door 20 following manual alignment of the passenger bridge. Optionally, the acoustic signal is in the form of a buzzing, ringing or other identifiable audible signal.

[0031] Further optionally, a bridge-operator at a location remote from the bridge provides a control signal to the processor, for instance using a tele-robotic control panel. The control signal is, for example, generated in response to the bridge-operator pressing a switch or button on the tele-robotic control panel, or in response to the bridge-operator disengaging control of the bridge upon completion of the passenger bridge alignment operation. In dependence upon receiving the control signal, the processor transmits a second control signal to the acoustic signal generator 39, which subsequently provides an acoustic signal to an occupant of the aircraft 21.

[0032] Still further optionally, one of the independent sensors 14 and 15 provides a control signal to the acoustic signal generator 39, in dependence upon sensing the predetermined contiguity of the floor member of the passenger bridge 1 to the aircraft door 20. In this case, the sensor of the device 9 is used to align the passenger bridge 1 to the aircraft door 20 and the independent sensors are used to sense engagement therebetween.

[0033] Advantageously, an occupant of the aircraft 21 is provided with an acoustic signal indicative of an aligned status of the passenger bridge 1 relative to the aircraft 21. Further advantageously, the provided acoustic signal simulates existing signals that are currently provided by a bridge-operator when the passenger bridge alignment operation is

complete. As such, the probability that the apparatus according to the first preferred embodiment of the instant invention causes confusion is reduced. Still further advantageously, the apparatus according to the first preferred embodiment of the instant invention does not depend upon using language or symbols from any particular region, which could cause confusion upon the arrival of international flights.

[0034] Referring now to Figures 3a and 3b, shown is a detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a second embodiment of the instant invention. Drawing elements shown in Figures 3a and 3b having identical form and function as those drawing elements described previously with reference to Figures 2a and 2b have been assigned identical reference numerals, and their description is omitted here in the interest of brevity. According to the second embodiment of the instant invention, a visual signal generator 34 is in communication with the device 9 for receiving the control signal therefrom and for providing a visual signal in dependence upon receiving the control signal. In a preferred embodiment, the visual signal generator 34 is in the form of a "traffic light" signal, including a red lens 35 and a green lens 36. Of course, other types and/or other numbers of visual signal generators are optionally used to generate the visual signal. Preferably, the visual signal generator 34 is disposed within the passageway 4 of the passenger bridge 1 at a position that is easily viewed through a window of the aircraft door 20 or through another window.

[0035] Optionally, one of the independent sensors 14 and 15 provides a control signal to the visual signal generator 34, in dependence upon sensing the predetermined contiguity of the floor member of the passenger bridge 1 to the aircraft door 20. In this case, the sensor of the device 9 is used to align the passenger bridge 1 to the aircraft door 20 and the independent sensors are used to sense engagement therebetween.

[0036] In use, the visual signal generator 34, such as for example the "traffic light" signal, is positioned within a passenger loading bridge structure for convenient viewing by an occupant of an aircraft through a window portion of a door 20. When the passenger bridge 1 is at a position that is remote from the door 20, in which case a gap

exists between the cabin 5 and the aircraft 21, the visual signal generator 34 displays a recognizable visual cue to indicate that it is unsafe for the occupant to open the door. For instance, the red light 35 is illuminated to indicate that the bridge is at a location remote from the aircraft. When the sensor senses that the passenger bridge 1 is properly aligned with the aircraft 21, the sensor provides a control signal to the processor, which in turn provides a second control signal to the visual signal generator 34 for switching off the red light 35 and for approximately simultaneously switching on the green light 36. When the green light 36 is illuminated, the occupant of the aircraft 21 may safely open the door 20, for example to allow passenger deplaning to begin.

[0037] Optionally, the visual signal generator 34 is disposed exterior to the passenger bridge 1, such as for example on an outer surface of the passenger bridge or even on an outside surface of the terminal building 3. For instance, the visual signal generator 34 is disposed at a position on an exterior wall of the terminal building 3 such that it is visible to an operator of the aircraft 21 after the aircraft 21 has come to a stop at an expected stopping position. When the red light 35 is switched off and the green light 36 is illuminated to indicate that the bridge is properly aligned and that it is safe for an occupant of the aircraft 21 to open the door 20, the operator of the aircraft broadcasts a message to a flight attendant using an intercom system of the aircraft 21. The flight attendant opens the door 20, having been instructed to do so.

[0038] Of course, due to the international nature of airline travel, such visual cues should be widely recognizable and should not be based on any symbols of regional origin.

[0039] Referring now to Figures 4a and 4b, shown is a detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a third embodiment of the instant invention. Drawing elements shown in Figures 4a and 4b having identical form and function as those drawing elements described previously with reference to Figures 2a and 2b have been assigned identical reference numerals, and their description is omitted here in the interest of brevity. In the third embodiment of the instant invention, a visual signal generator 37 is provided in the form of a bank of

fluorescent lights, which fluorescent lights provide interior lighting for the passenger bridge 1. In use, the visual signal generator 37 is selectively switched on or off to indicate the alignment status of the passenger bridge 1 with respect to the aircraft 21. More particularly, when the sensor senses that the passenger bridge 1 is correctly aligned with the aircraft 21, the sensor provides a control signal to the processor, which in turn provides a second control signal to the visual signal generator 37. In response to the second control signal the visual signal generator 37, in the form of interior lighting fixtures, is switched from an off state to an on state, thereby illuminating the interior of passageway 4. Certainly, an occupant of the aircraft would not be motivated to open the door into a dark passageway 4, but would be more likely to wait until illumination is provided. Of course, the actual lighting tubes need not be observed directly in order for an occupant of the aircraft 21 to determine a current alignment status of the bridge. The occupant simply by noting that the passageway 4 is "lighted" or "dark" will be able to determine whether the passenger bridge 1 is aligned or not, respectively.

[0040] Optionally, one of the independent sensors 14 and 15 provides a control signal to the visual signal generator 37, in dependence upon sensing the predetermined contiguity of the floor member of the passenger bridge 1 to the aircraft door 20. In this case, the sensor of the device 9 is used to align the passenger bridge 1 to the aircraft door 20 and the independent sensors are used to sense engagement therebetween.

[0041] Referring now to Figures 5a and 5b, shown is a detailed view of a part of a passenger bridge close to the body of an aircraft, including an apparatus according to a fourth embodiment of the instant invention. Drawing elements shown in Figures 5a and 5b having identical form and function as those drawing elements described previously with reference to Figures 2a and 2b have been assigned identical reference numerals, and their description is omitted here in the interest of brevity. In communication with the device 9 is a wireless signal generator 38 for transmitting automatically an indication signal to a flight deck of the aircraft 21. The automated signal is transmitted and received using a predetermined frequency for each different passenger bridge 1. Preferably, the indication signal is received using existing aircraft communications equipment. Upon receiving the indication signal, an operator of the aircraft 21 broadcasts a message to a

flight attendant using an intercom system of the aircraft 21. The flight attendant opens the door 21, having been instructed to do so. Optionally, the indication signal activates a visual indicator within the aircraft 21, which requires that each aircraft be retrofitted with the visual indicator for receiving the automated signal. Further optionally, the wireless signal generator 38 is in the form of a wireless transmitter integrated into the device 9.

[0042] Optionally, one of the independent sensors 14 and 15 provides a control signal to the wireless signal generator 38, in dependence upon sensing the predetermined contiguity of the floor member of the passenger bridge 1 to the aircraft door 20. In this case, the sensor of the device 9 is used to align the passenger bridge 1 to the aircraft door 20 and the independent sensors are used to sense engagement therebetween.

[0043] Referring now to Figure 6, shown is a method of providing an indication to an occupant of an aircraft according to the instant invention. At step 100 the passenger bridge 1 is aligned with the aircraft 21 in one of a semi-automated and a fully-automated manner, for instance under the control of the device 9. At decision step 101 an alignment status of the passenger bridge 1 is determined, for example in dependence upon sensed data provided by proximity and or pressure sensors mounted at a cabin end of the passenger bridge 1. When it is determined at step 101 that the passenger bridge 1 is aligned correctly with the aircraft 21, the device 9 provides a control signal to an alignment-status signal generator at step 102. Optionally, independent sensors 14 and/or 15 provide the control signal to the alignment-status signal generator. The alignment-status signal generator is in the form of one of an acoustic signal generator 39, a visual signal generator 34 or 37, and a wireless signal generator 38 or another convenient signal provider. At step 103 the alignment-status signal generator receives the control signal and provides a predetermined alignment-status signal to an occupant aboard the aircraft 21. At step 104 the occupant aboard the aircraft 21 receives the alignment-status signal and opens the aircraft door. The method of Figure 6 terminates at step 105.

[0044] Existing semi-automated and fully-automated passenger bridge systems can be easily retrofitted to include an alignment-status signal generator according to the instant invention. In a semi-automated or tele-robotic system, a bridge-operator at a

remote location provides a control signal to the alignment-status signal generator to confirm that the bridge is aligned correctly. For example, the control signal is provided in response to the bridge-operator pressing a switch or button on a control panel, or in response to the bridge-operator disengaging control of the bridge. Of course, in a fully-automated system, independent sensors 14 and/or 15 disposed near the cabin end of the passenger bridge 1 are used to detect correct alignment of the passenger bridge 1 with the aircraft 21 and to provide a control signal to the status-signal generator. Optionally, the sensors are selected from a group comprising: mechanical, optical, electronic etc. non-contact proximity sensors and pressure sensors. Further optionally, a system according to the instant invention is provided as a kit for retrofitting an existing passenger bridge, the kit comprising a sensor, a controller and an indication generator. The kit is for retrofitting one of an existing manual, semi-automated and a fully-automated passenger bridge. Preferably, the kit operates independently of any existing passenger bridge control system.

[0045] Further optionally, a combination of visual and audible signals are provided. For instance providing a "banging" sound in addition to a traffic-light signal "green light" indication.

[0046] Numerous other embodiments may be envisaged without departing from the spirit and scope of the invention.

Claims

What is claimed is:

1. An apparatus for indicating an alignment status of a passenger bridge relative to an aircraft having a door, the passenger bridge including a passenger bridge alignment mechanism for guiding the passenger bridge to a position for aligning a cabin end of the passenger bridge to the door of the aircraft, the apparatus comprising:

a controller for providing a control signal in dependence upon the passenger bridge being in a predetermined aligned relationship with the door of the aircraft; and,

an indication generator in operative communication with the controller for receiving the control signal from the controller and for providing an indication in dependence thereon.

2. An apparatus according to claim 1, wherein the controller comprises a sensor for sensing an aligned relationship between the door of the aircraft and the passenger bridge and for providing the control signal to the indication generator in dependence thereon.

3. An apparatus according to claim 2, wherein the sensor is independent of the passenger bridge alignment mechanism.

4. An apparatus according to claim 3, wherein the sensor comprises a pressure sensor.

5. An apparatus according to claim 3, wherein the sensor comprises a non-contact inductive sensor.

6. An apparatus according to claim 2, wherein the apparatus operates independently of the passenger bridge alignment mechanism.

7. An apparatus according to claim 1, comprising a sensor in operative communication with the controller for sensing an aligned relationship between the door

of the aircraft and the passenger bridge and for providing to the controller a signal indicative of the passenger bridge being in a predetermined aligned relationship with the door of the aircraft.

8. An apparatus according to claim 7, wherein the sensor is independent of the passenger bridge alignment mechanism.

9. An apparatus according to claim 1, wherein the passenger bridge alignment mechanism includes a sensor in operative communication with the controller, the sensor for sensing an aligned relationship between the door of the aircraft and the passenger bridge and for providing to the controller a signal indicative of the passenger bridge being in a predetermined aligned relationship with the door of the aircraft.

10. An apparatus according to claim 1, wherein the indication generator includes a wireless receiver for receiving the control signal and wherein the controller comprises a wireless transmitter for transmitting the control to the indication generator.

11. An apparatus according to claim 1, wherein the indication generator comprises an acoustic indicator.

12. An apparatus according to claim 11, wherein the acoustic indicator comprises a knocker and an actuator, the actuator responsive to the control signal for moving the knocker into contact with an outside surface of the aircraft.

13. An apparatus according to claim 1, wherein the indication generator comprises a visual indicator.

14. An apparatus according to claim 13, wherein the visual indicator comprises a light signal for displaying a visual indication in the form of at least one of a predetermined pattern and color of light.

15. An apparatus according to claim 13, wherein the visual indicator comprises interior lighting fixtures of the passenger bridge, and wherein the interior lighting fixtures are selectively switchable between a first mode in which the light is on and a second other mode wherein the light is off for providing a visual indication.

16. A method of indicating an alignment status of a passenger bridge relative to an aircraft comprising the steps of:

guiding the passenger bridge to a position for aligning a cabin end of the passenger bridge to a door of the aircraft using a passenger bridge alignment mechanism of the passenger bridge;

detecting alignment of the cabin end of the passenger bridge relative to the door of the aircraft and providing a control signal in dependence thereon; and,

providing a predetermined indication to an occupant of the aircraft in dependence upon the control signal.

17. A method according to claim 16, wherein the predetermined indication is an acoustic indication.

18. A method according to claim 17, wherein the acoustic indication is generated by the step of releasably engaging a knocker with an outside surface of the aircraft.

19. A method according to claim 16, wherein the predetermined indication is a visual indication.

20. A method according to claim 16, wherein the step of guiding the cabin end of the passenger bridge is performed absent a bridge-operator being present at the cabin end of the passenger bridge.

21. A method according to claim 16, wherein the step of detecting alignment of the cabin end of the passenger bridge includes the step of:

sensing the position of the cabin end of the passenger bridge relative to the aircraft door; and,

registering an alignment when the cabin end of the passenger bridge approaches to within a predetermined distance of the aircraft.

22. A method according to claim 21, wherein the step of sensing the position of the cabin end of the passenger bridge relative to the aircraft door is performed using a sensor independent of the passenger bridge alignment mechanism to sense a predetermined contiguity of a floor surface of the cabin end of the passenger bridge with a floor surface of the aircraft door.

23. A method according to claim 22, wherein the sensor independent of the passenger bridge alignment mechanism comprises a pressure sensor.

24. A method according to claim 22, wherein the sensor independent of the passenger bridge alignment mechanism comprises a non-contact inductive sensor.

25. A method according to claim 22, wherein the step of guiding the passenger bridge to a position for aligning a cabin end of the passenger bridge to a door of the aircraft is performed independently of the step of detecting alignment of the cabin end of the passenger bridge relative to the door of the aircraft and providing a control signal in dependence thereon.

26. A method of indicating an alignment status of a passenger bridge relative to an aircraft, the passenger bridge including a passenger bridge alignment mechanism for guiding the passenger bridge to a position for aligning a cabin end of the passenger bridge to a door of the aircraft, comprising the steps of:

receiving a control signal indicative of alignment of a cabin end of the passenger bridge relative to the door of the aircraft; and,

automatically providing a predetermined human sensable indication to an occupant of the aircraft in dependence upon the control signal.

27. A method according to claim 26, wherein the received control signal is provided from a remote location by a bridge-operator.

28. A method according to claim 26, wherein the received control signal is provided by a sensor independent of the passenger bridge alignment mechanism, the sensor for sensing a predetermined contiguity of a floor surface of the cabin end of the passenger bridge with a floor surface of the aircraft door.

29. A method according to claim 28, wherein the sensor independent of the passenger bridge alignment mechanism comprises a pressure sensor.

30. A method according to claim 28, wherein the sensor independent of the passenger bridge alignment mechanism comprises a non-contact inductive sensor.

31. An apparatus for being attached to a passenger bridge equipped with a passenger bridge alignment mechanism, the apparatus for indicating an alignment status of a cabin end of the passenger bridge relative to a door of an aircraft, the apparatus comprising:

a sensor disposed on the passenger bridge for sensing an aligned relationship between a floor surface of the door of the aircraft and a floor surface of the cabin end of the passenger bridge and for providing a signal in dependence thereon;

a controller in operative communication with the sensor for receiving the signal therefrom and for providing a second signal in dependence thereon; and,

an indication generator in operative communication with the controller for receiving the second signal from the controller and for providing an indication in dependence thereon.

32. An apparatus according to claim 31, wherein the apparatus operates independently of the passenger bridge alignment mechanism.

33. An apparatus according to claim 31, wherein the indication generator includes a wireless receiver for receiving the second signal and wherein the controller comprises a wireless transmitter for transmitting the second signal to the indication generator.

34. An apparatus according to claim 31, wherein the indication generator comprises an acoustic indicator.

35. An apparatus according to claim 34, wherein the acoustic indicator comprises a knocker and an actuator, the actuator responsive to the second signal for moving the knocker into contact with an outside surface of the aircraft.

36. An apparatus according to claim 31, wherein the indication generator comprises a visual indicator.

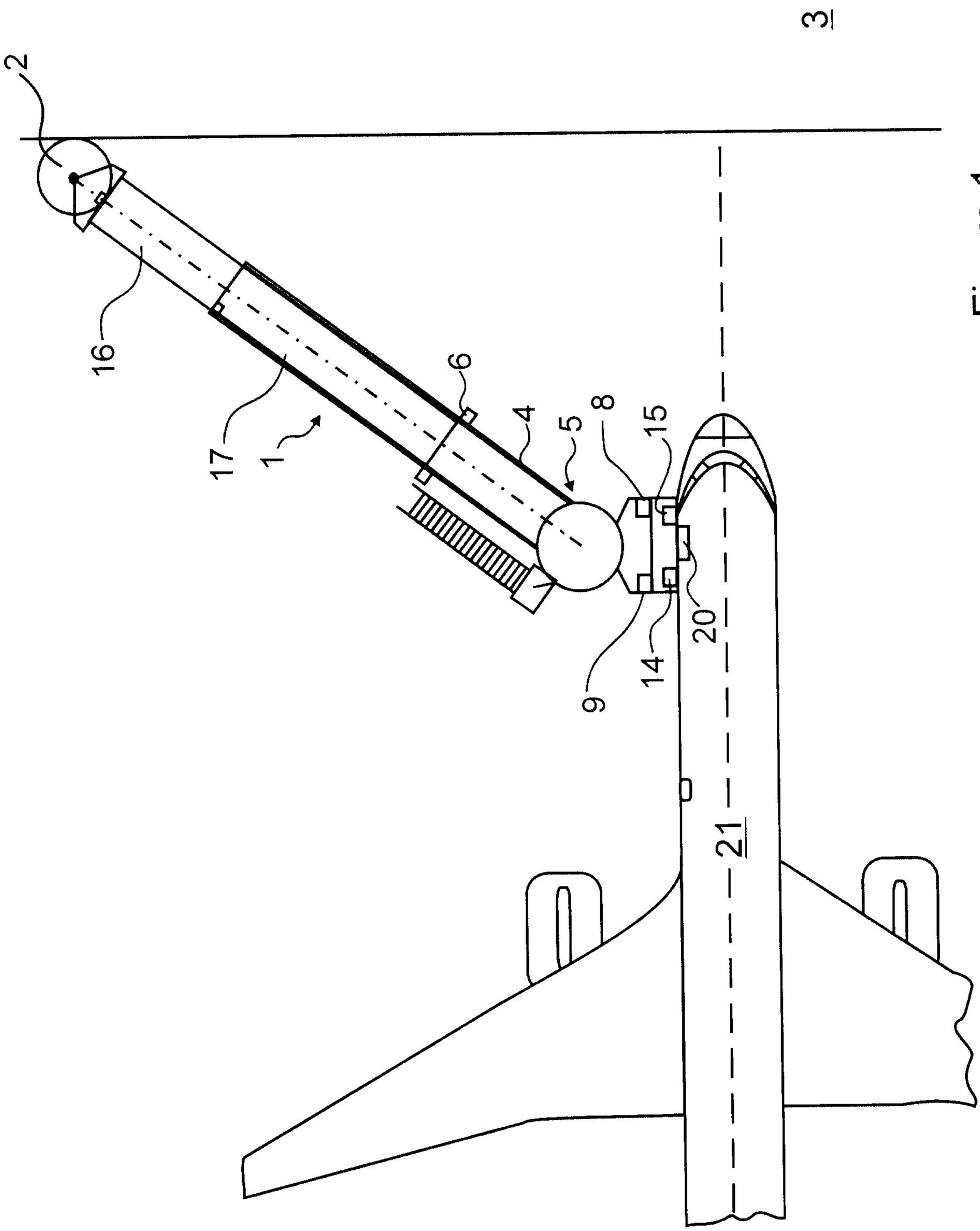


Figure 1
PRIOR ART

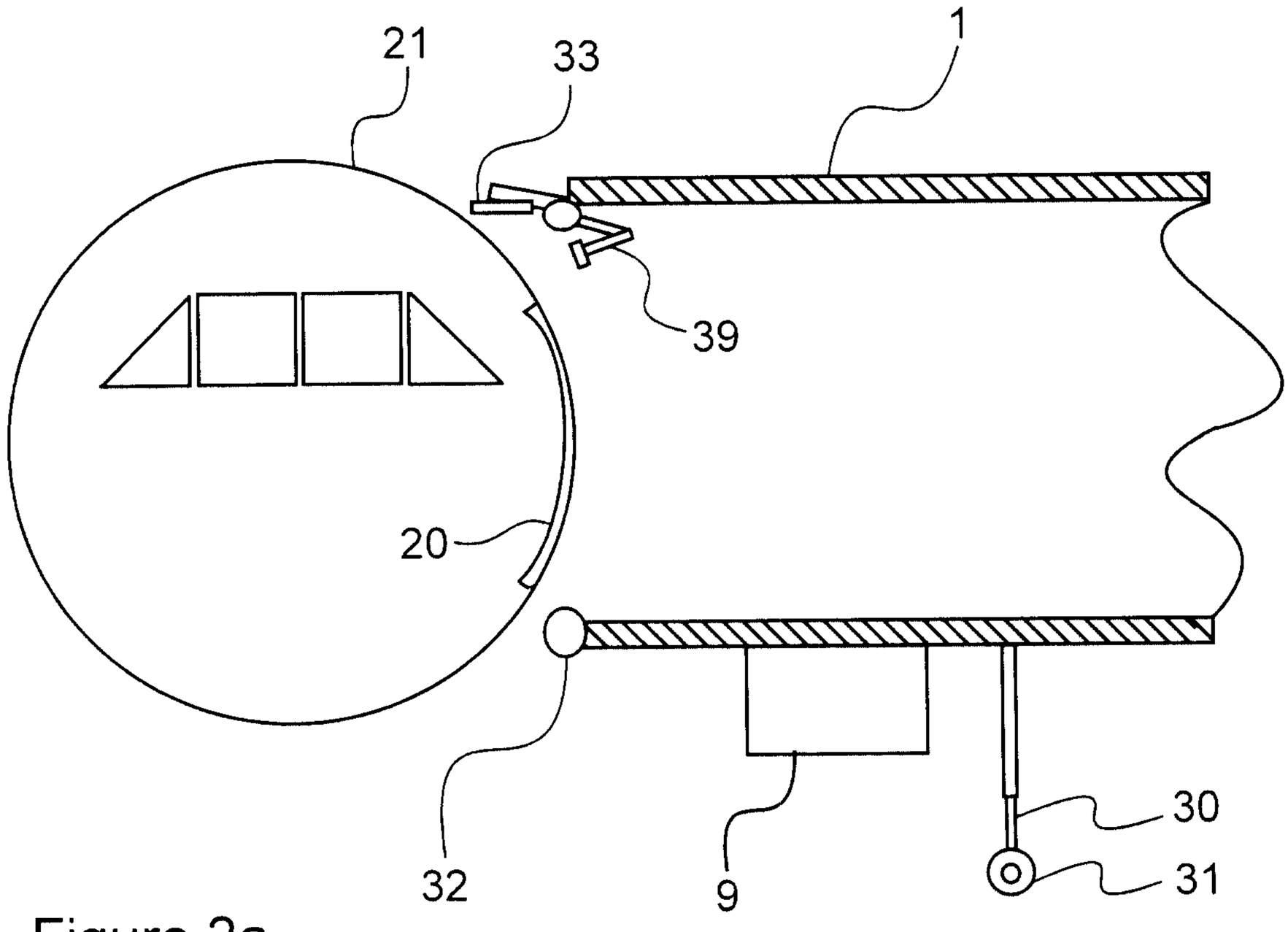


Figure 2a

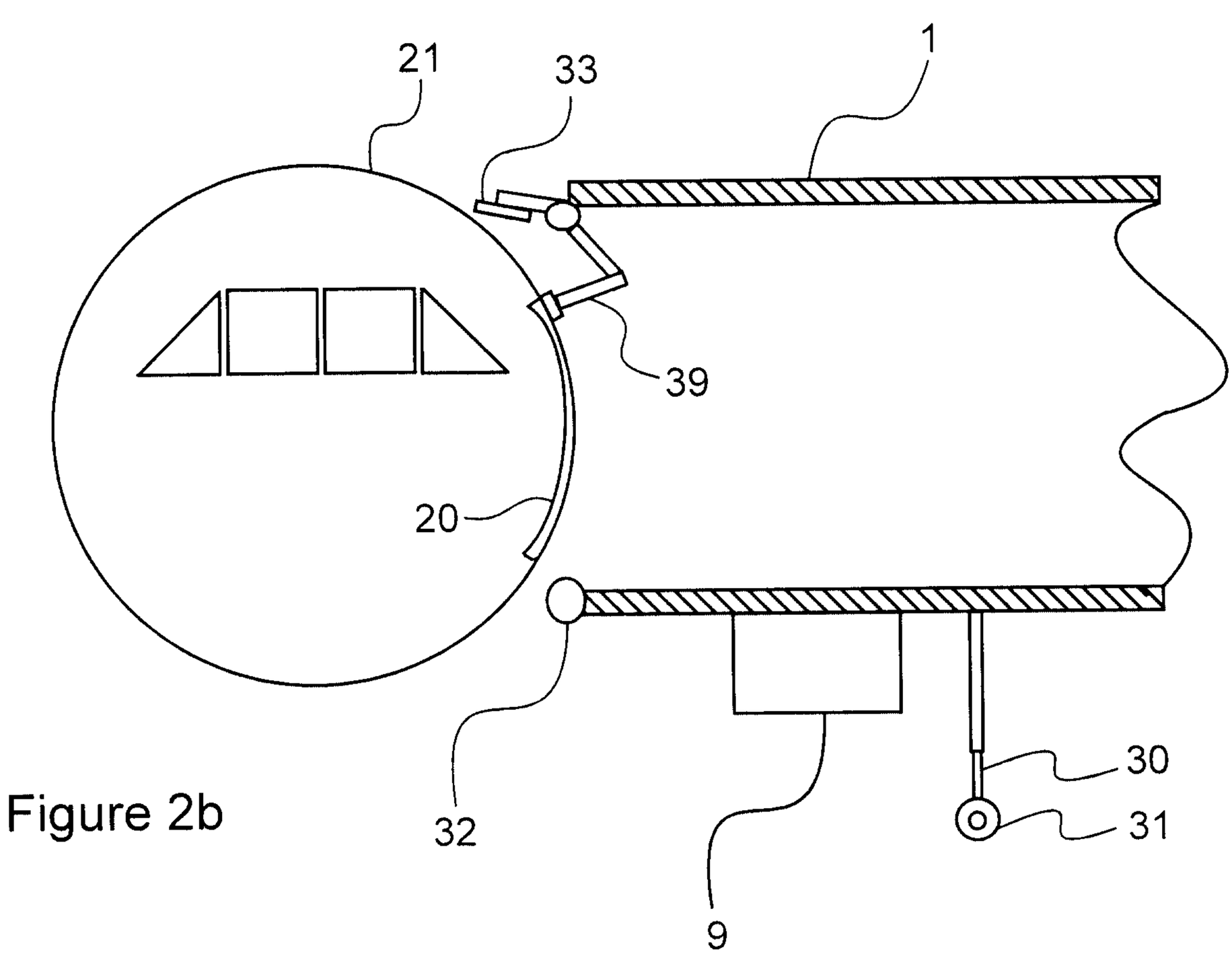


Figure 2b

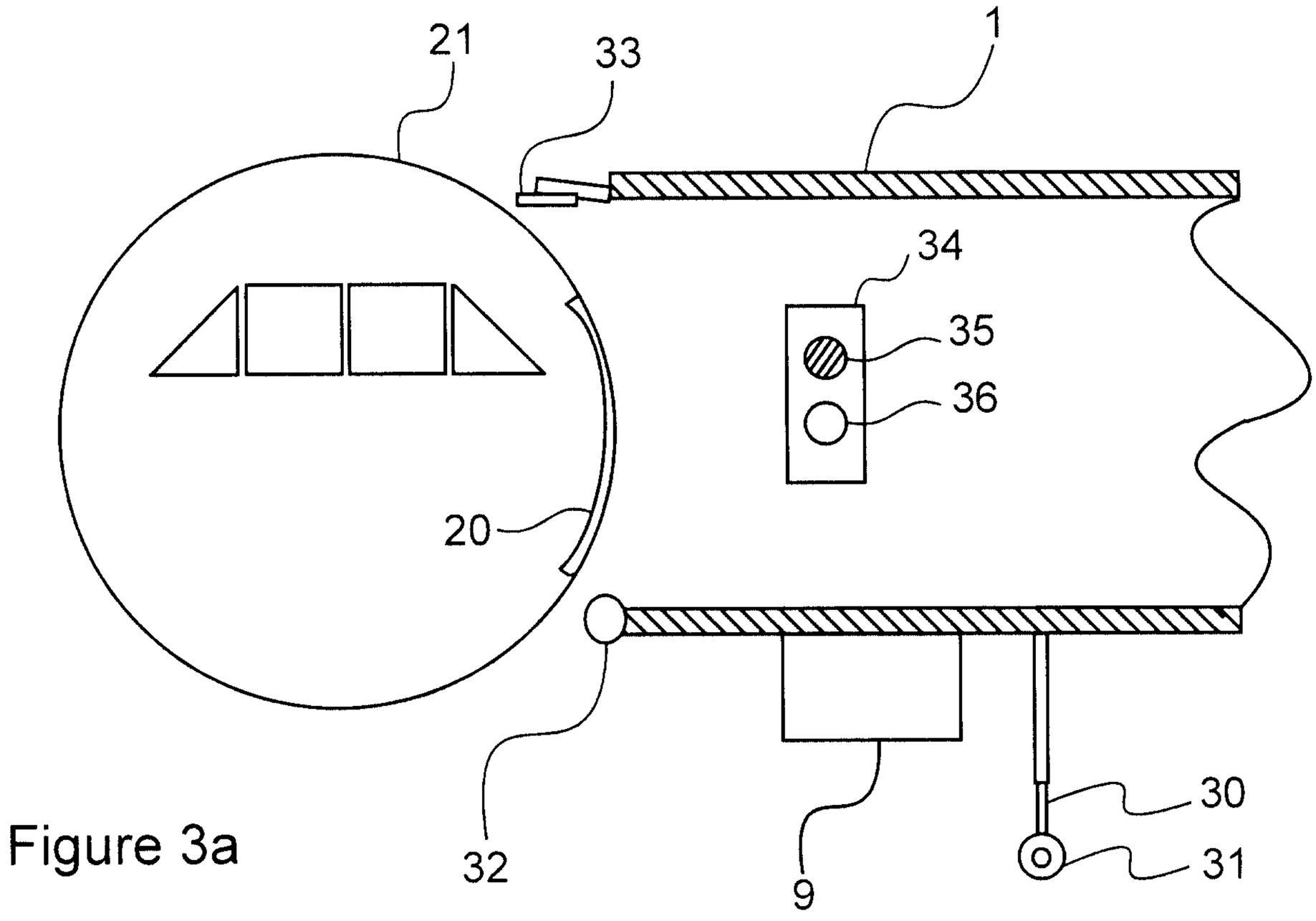


Figure 3a

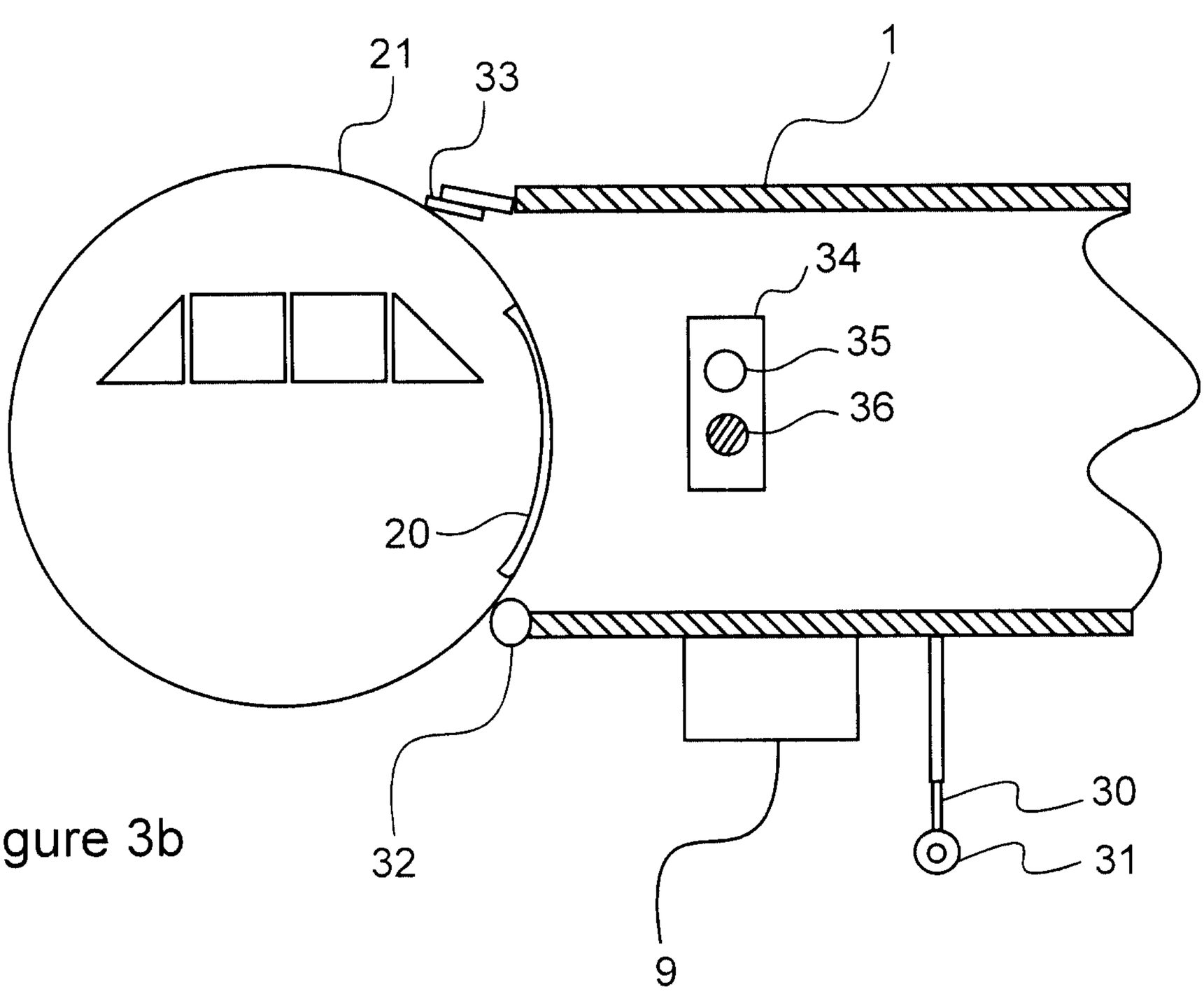


Figure 3b

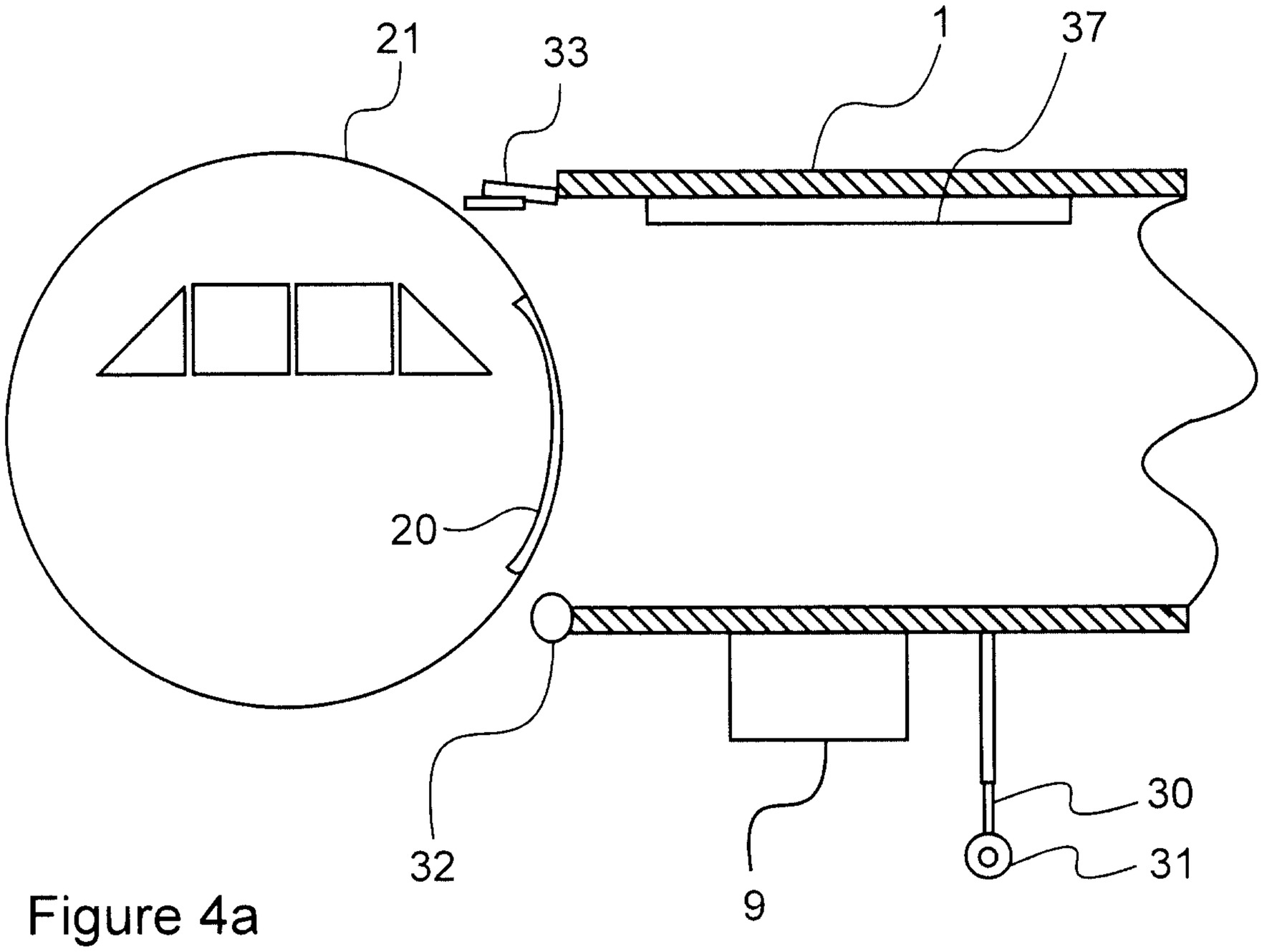


Figure 4a

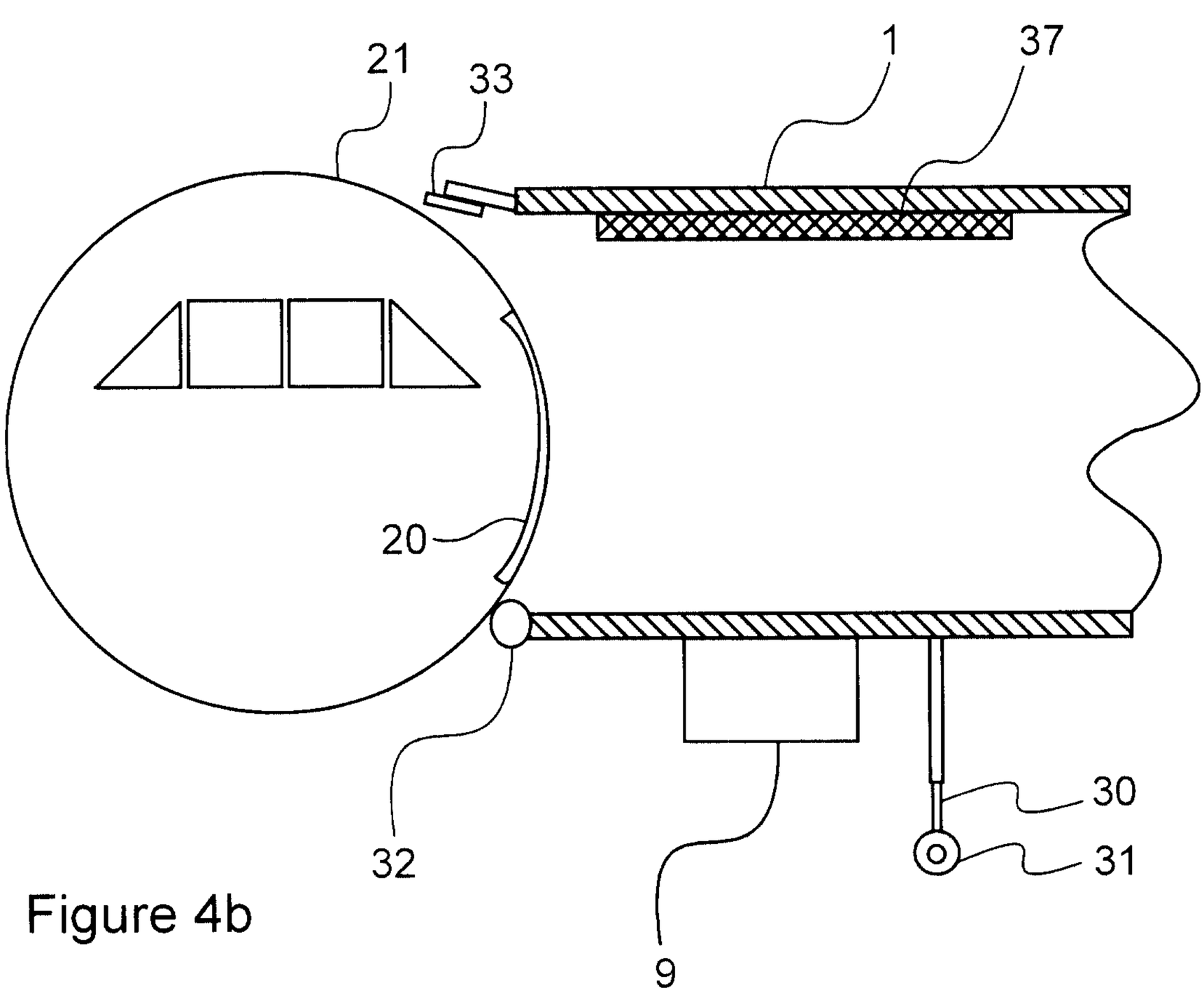


Figure 4b

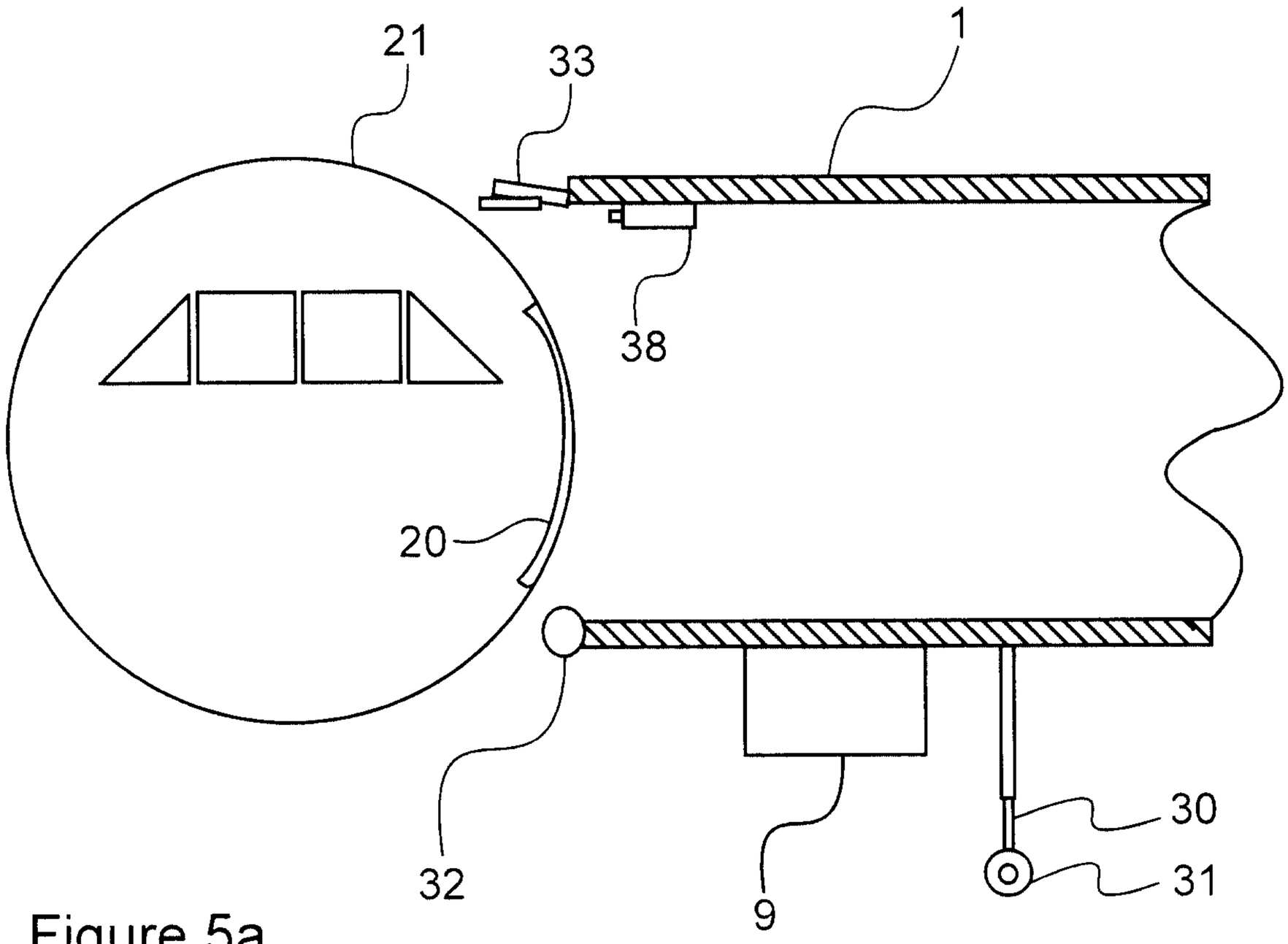


Figure 5a

Figure 5b

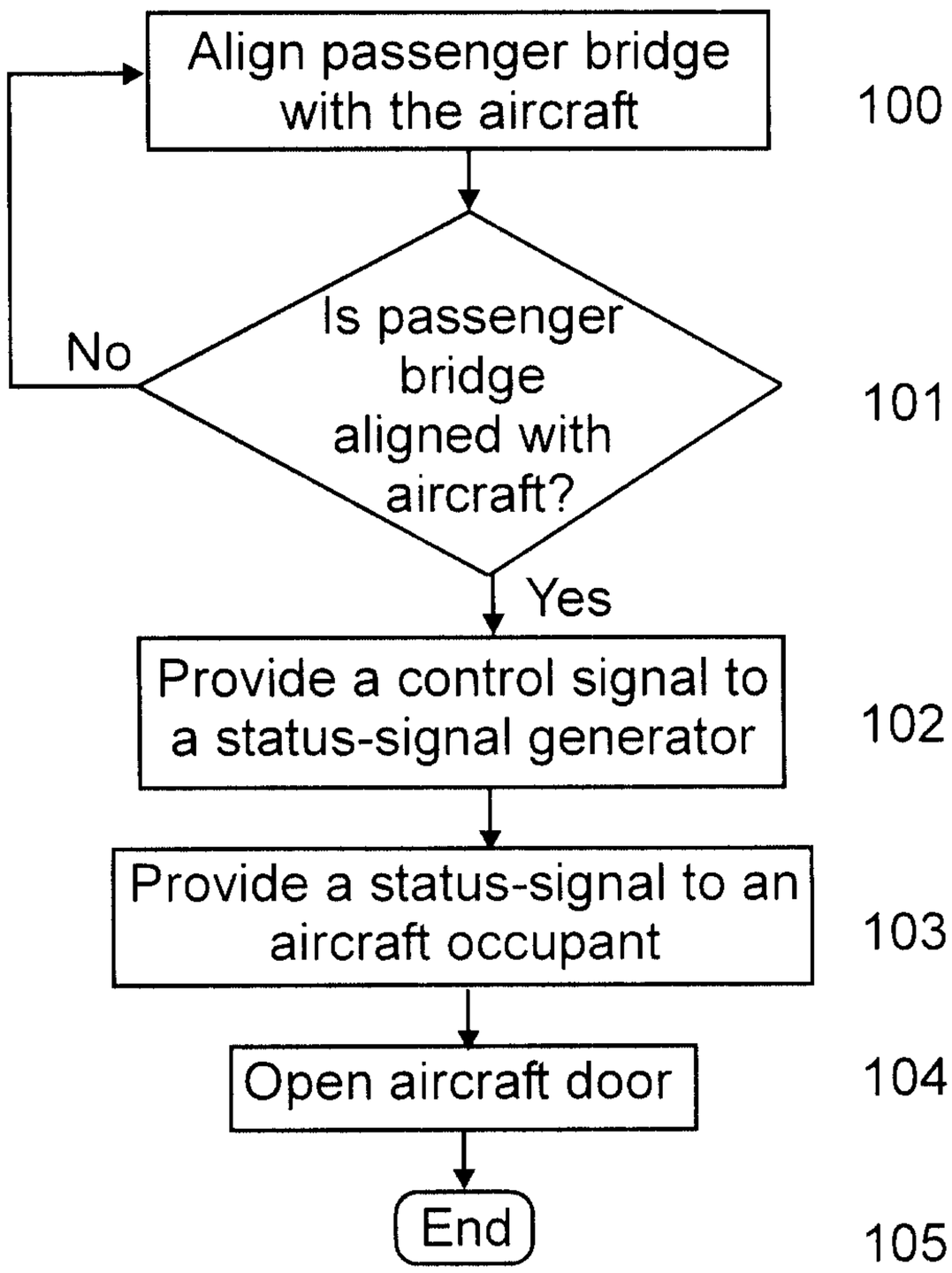
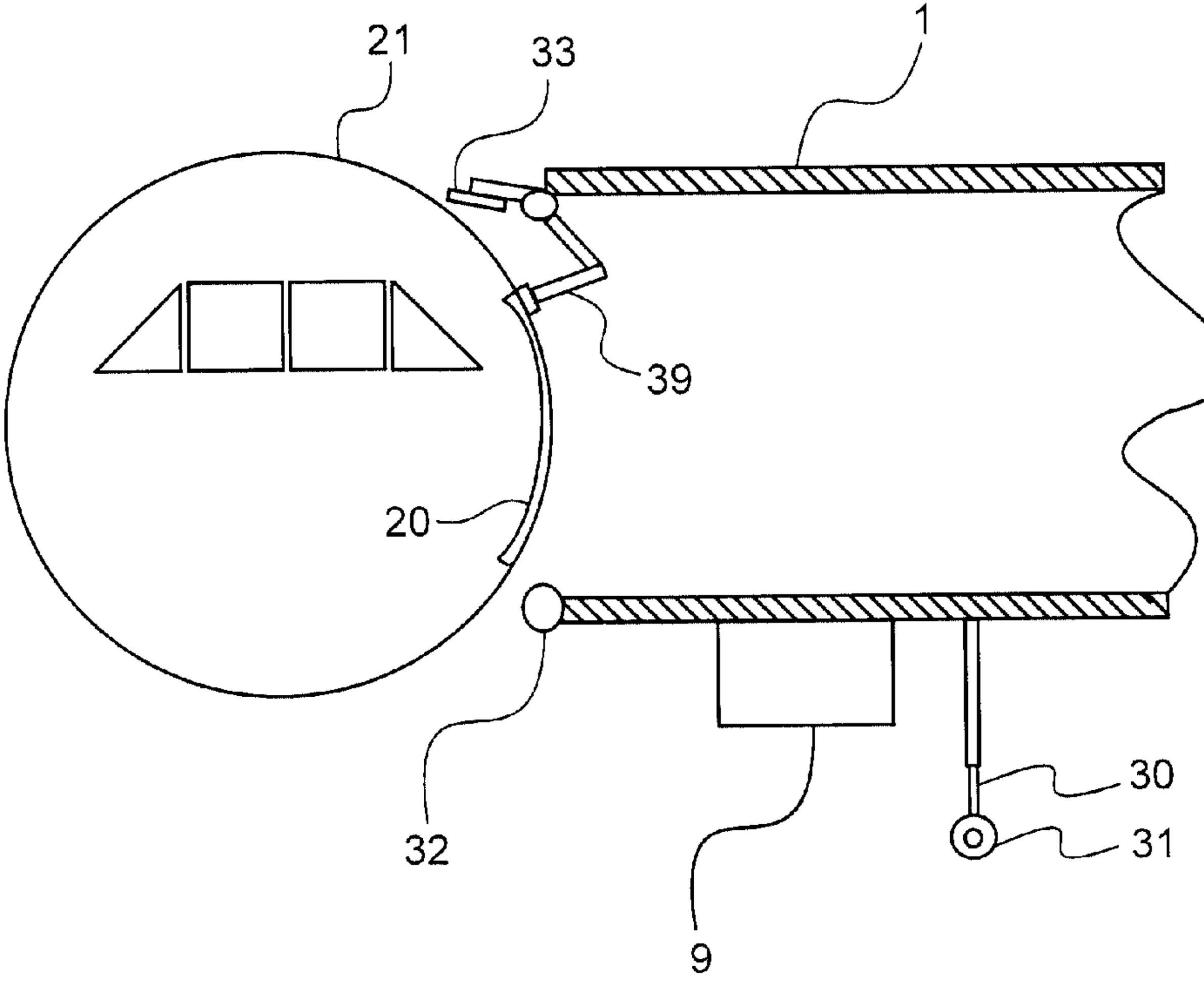

Align passenger bridge with the aircraft
100
Is passenger bridge aligned with aircraft?
101
No
Yes
Provide a control signal to a status-signal generator
102
Provide a status-signal to an aircraft occupant
103
Open aircraft door
104
End
105

Figure 6


21
33
1
39
20
32
9
30
31