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(54) **CARPET AIR KICKER**

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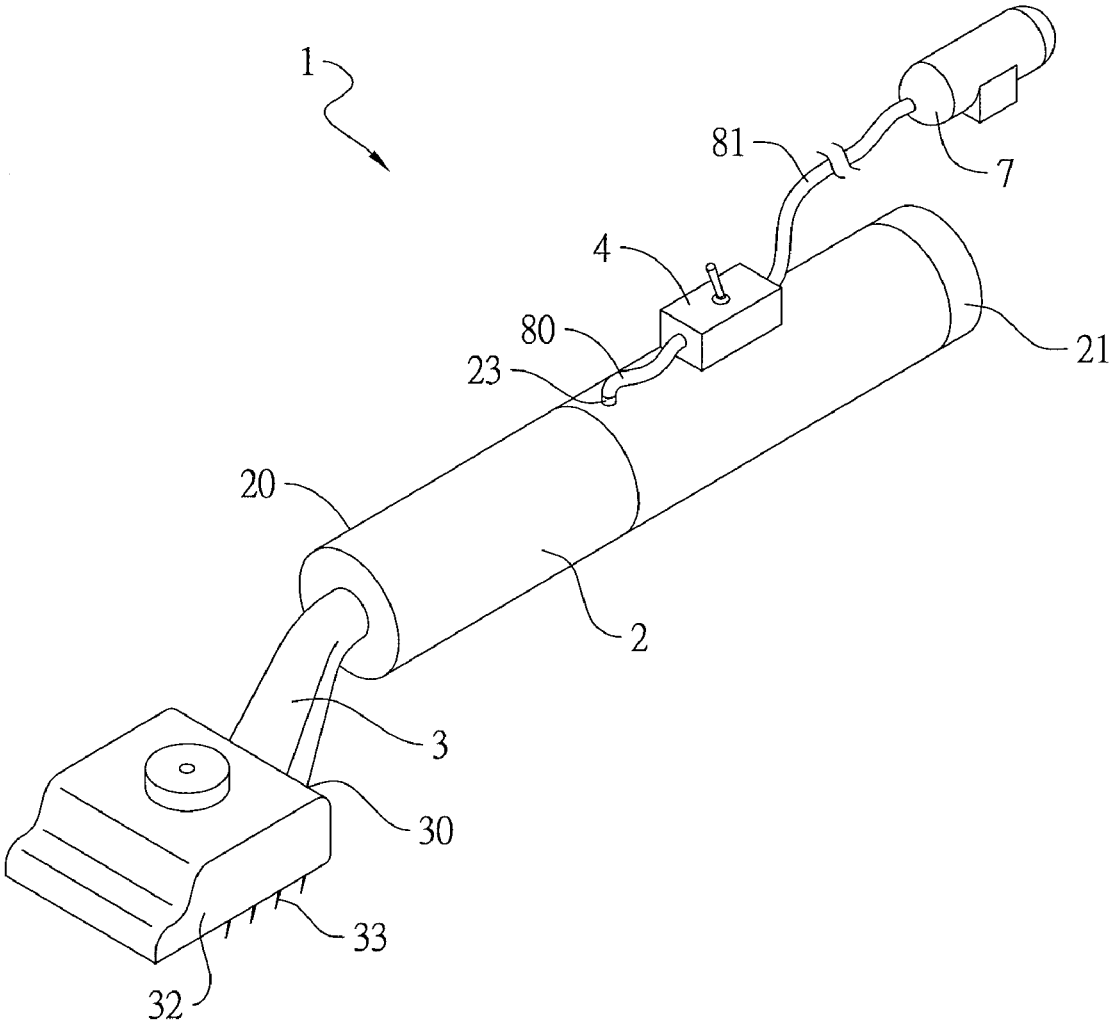
(57) **ABSTRACT**

A carpet air kicker comprises a body, a rod, a spring and a controlling switch. The body defines an interior chamber including a front chamber and a rear chamber. A front end and a rear end of the rod have a gripping head and a piston respectively. The piston is located in the interior chamber such that the front chamber is not communicated with the rear chamber. A piston assembly of the body is connected to the rod and located between a front end of the body and the front chamber. The spring is installed in the rear chamber. A communicating hole is communicated with the front chamber. The controlling switch controls the front chamber communicated with external air such that the spring pushes the rod moving forward or communicated with an air compressor such that an air pressure pushes the rod moving backward.



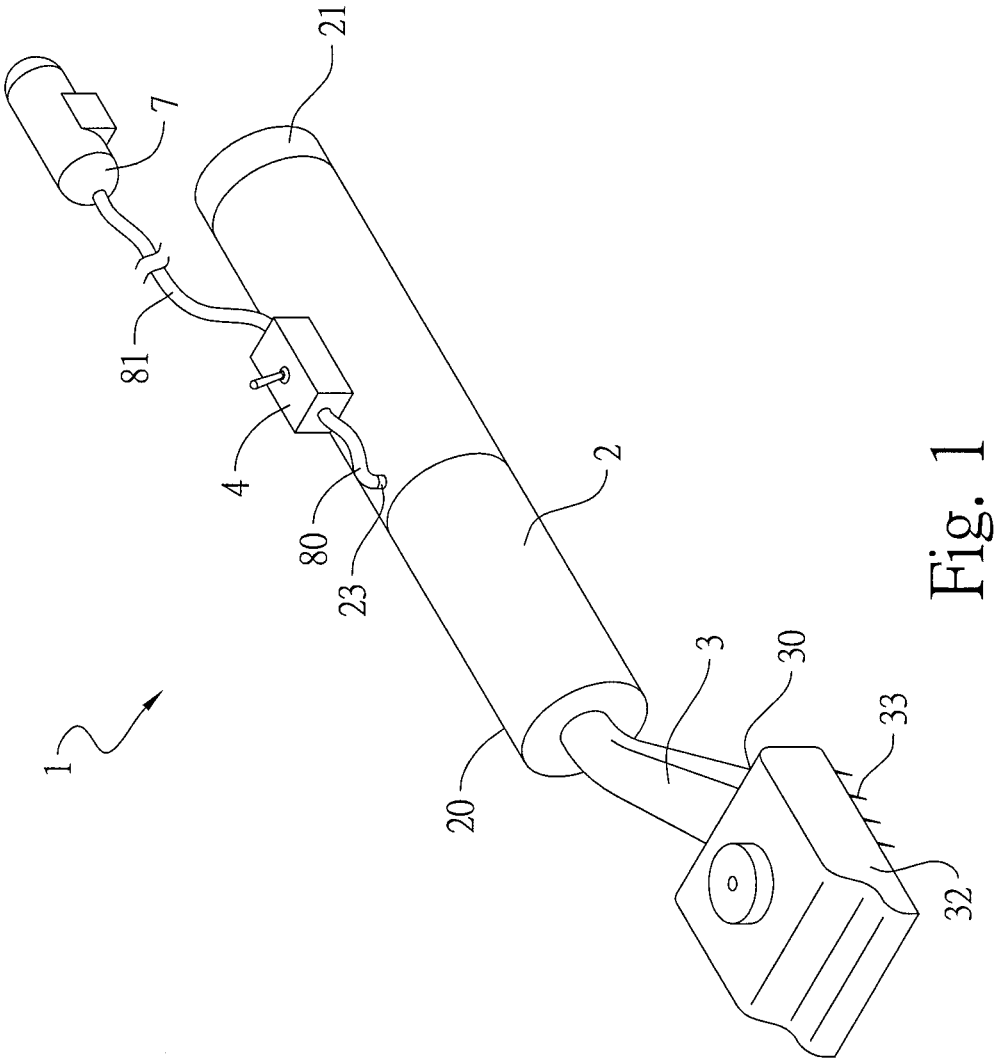


Fig. 1

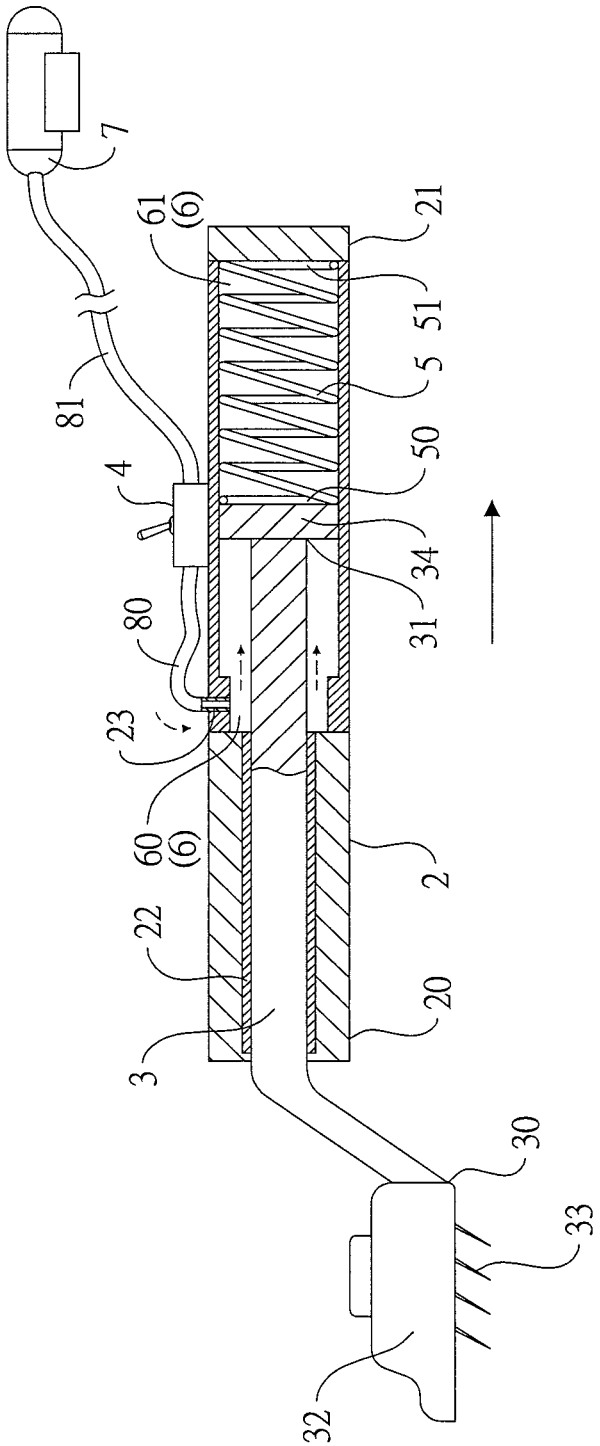


Fig. 2

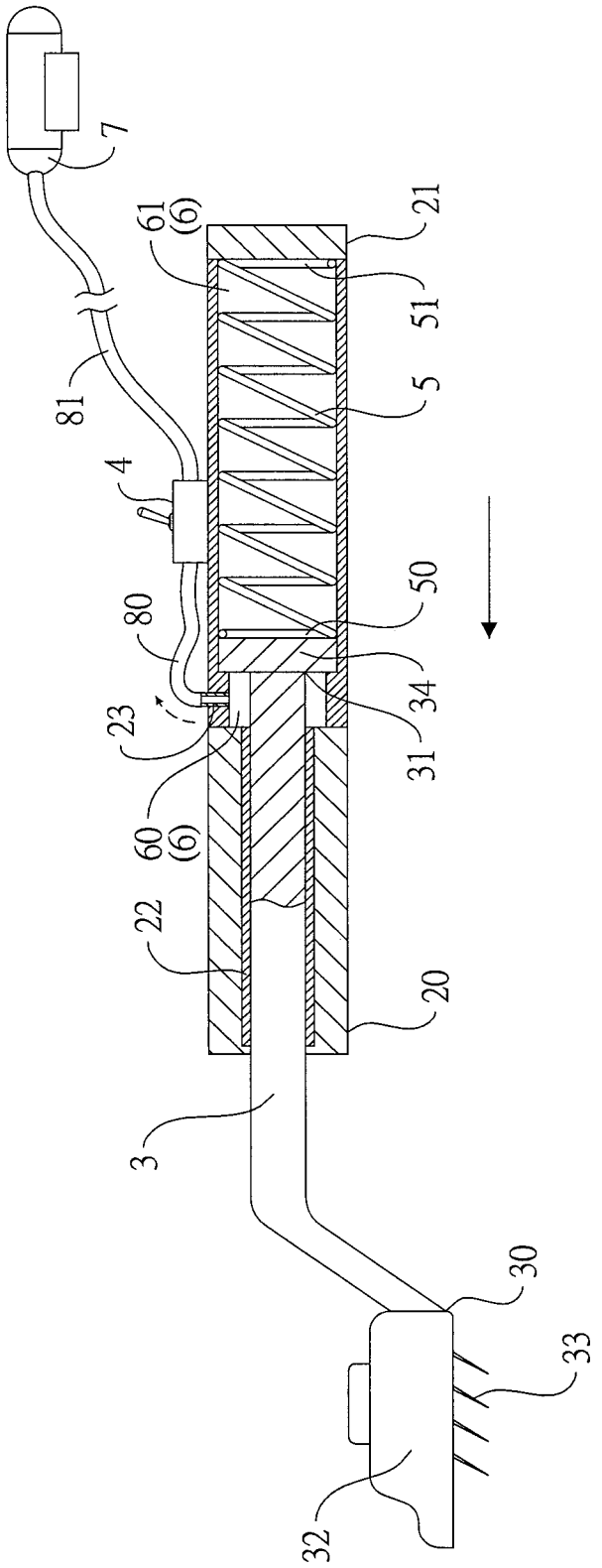


Fig. 3

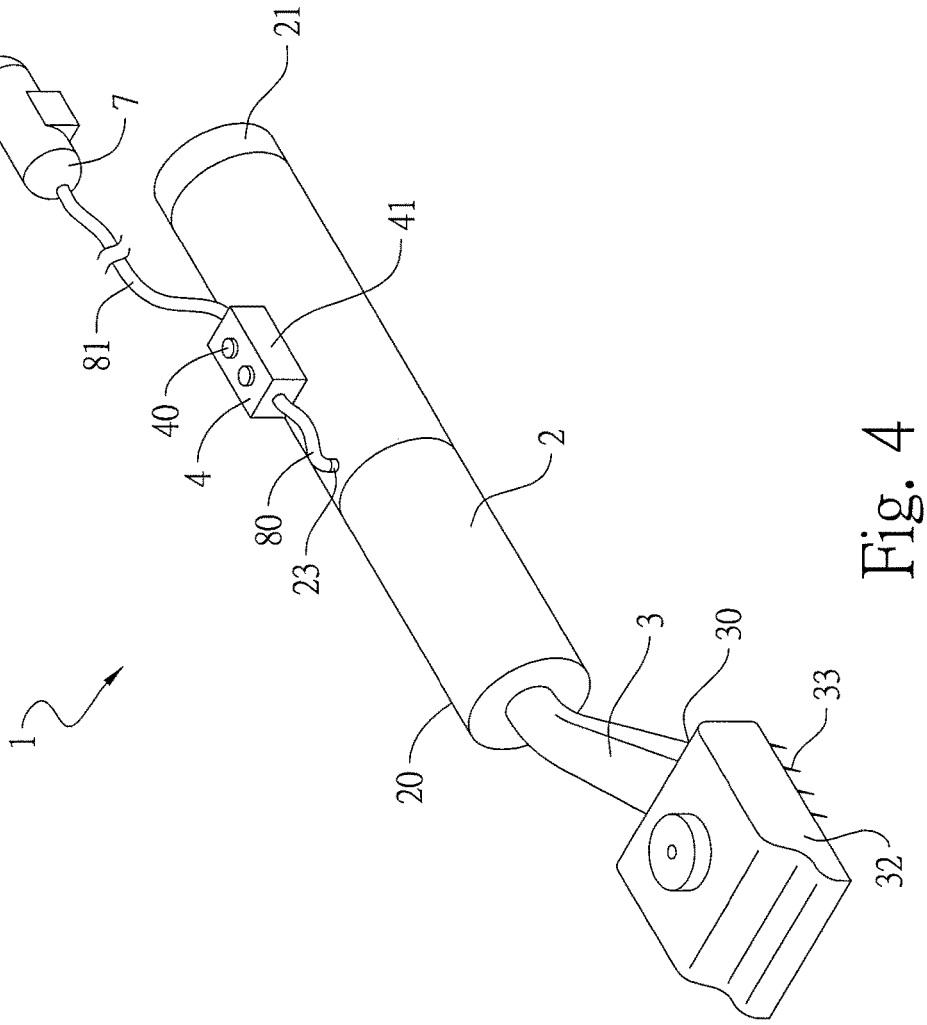


Fig. 4

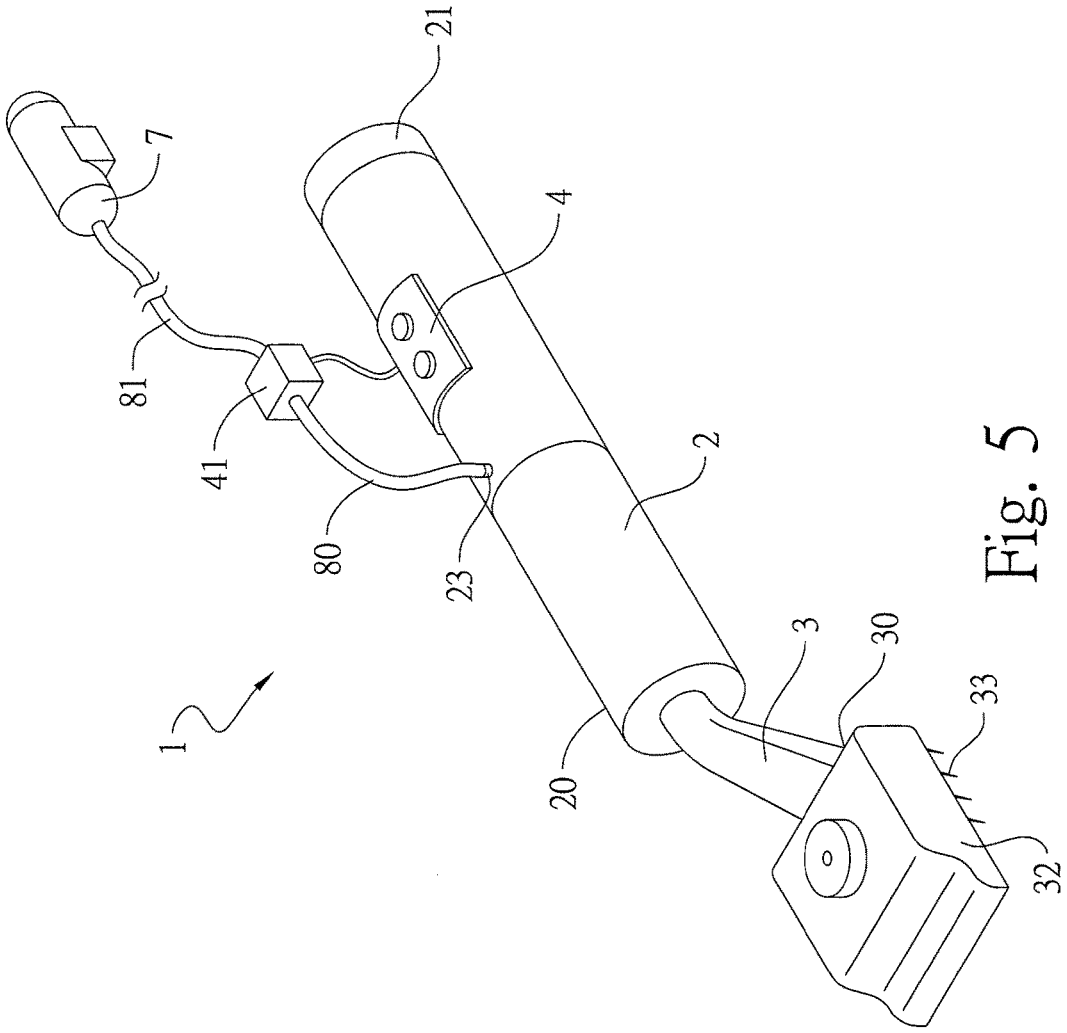


Fig. 5

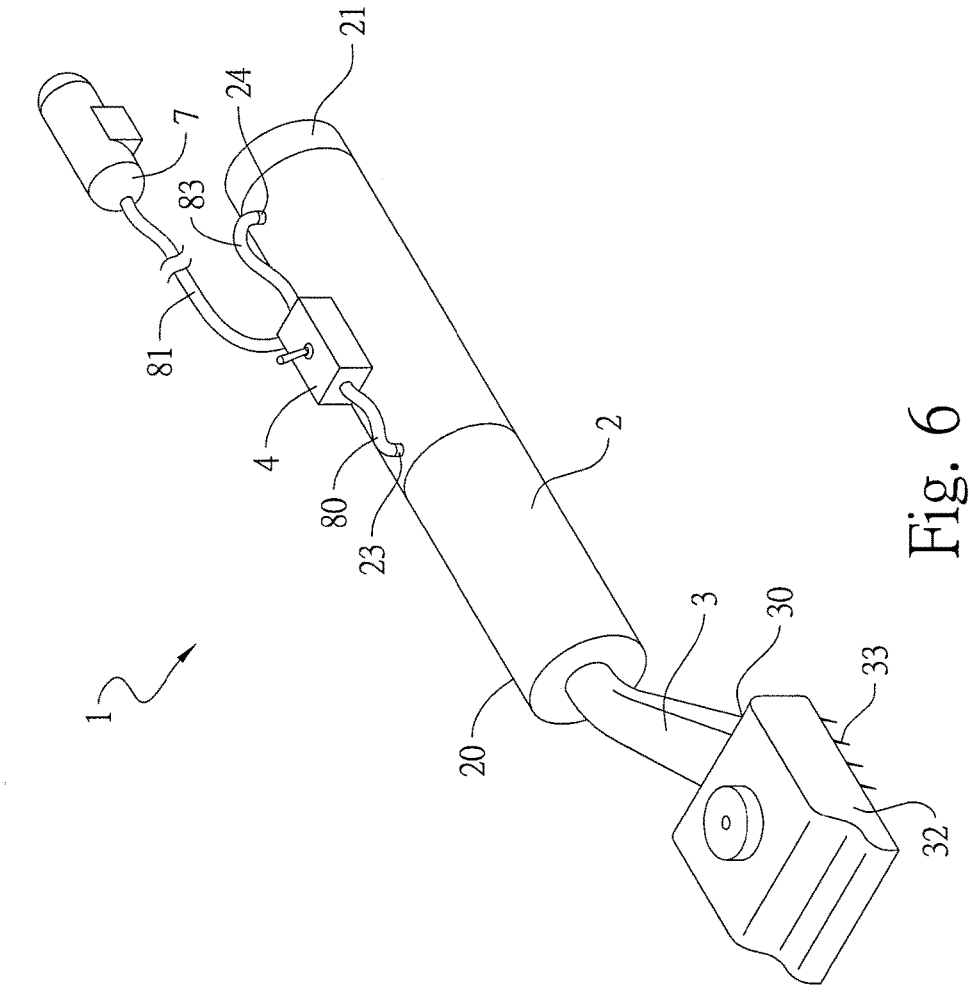


Fig. 6

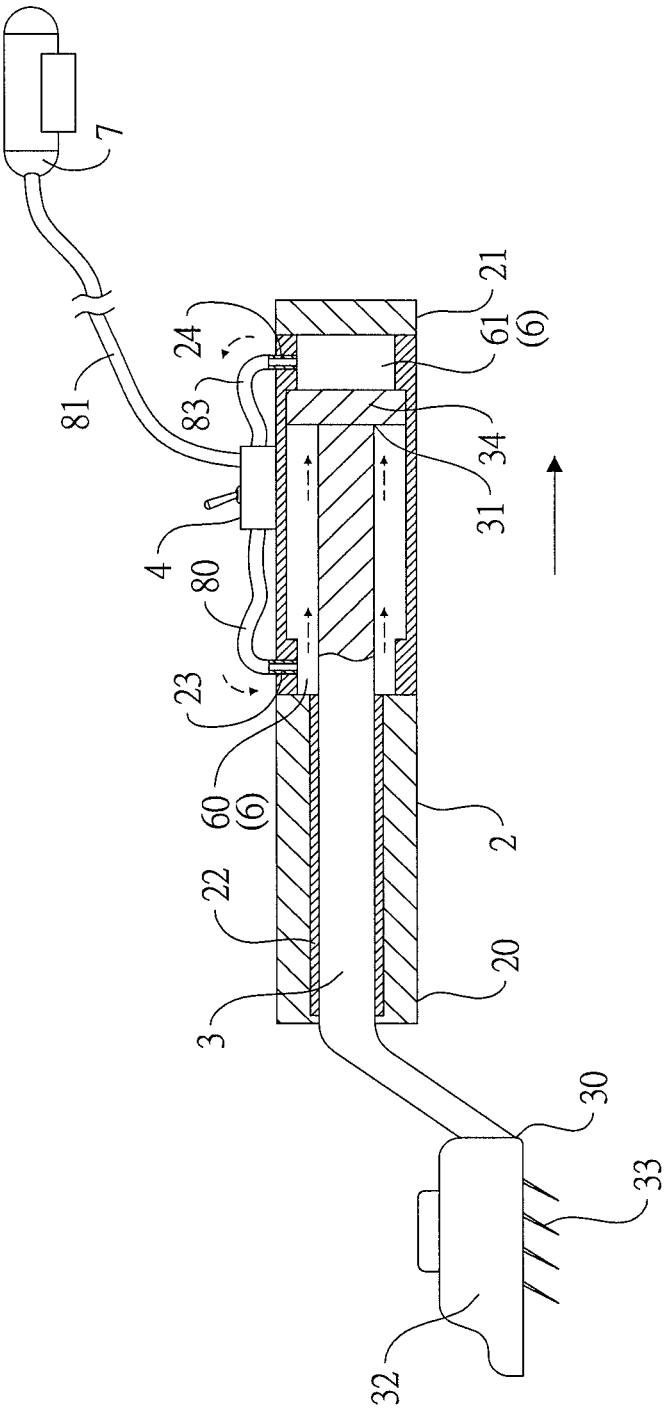


Fig. 7

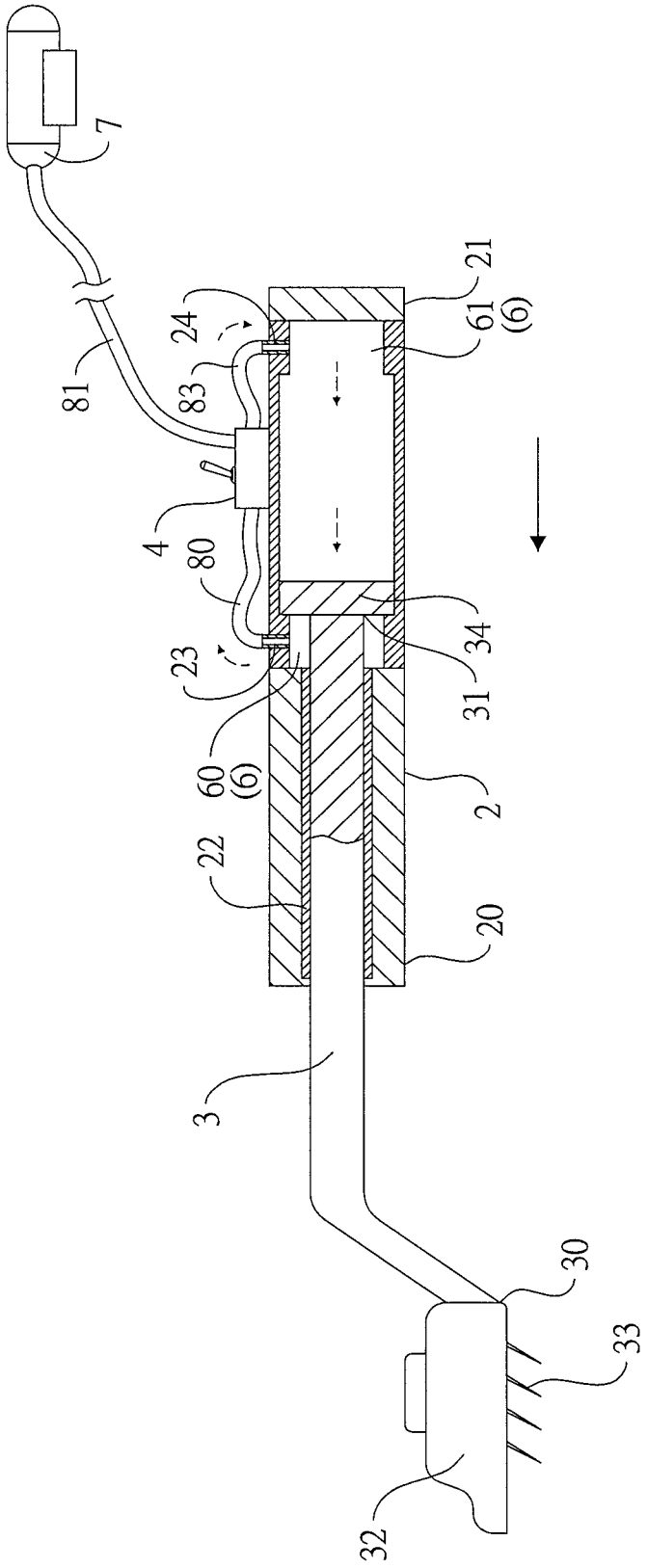


Fig. 8

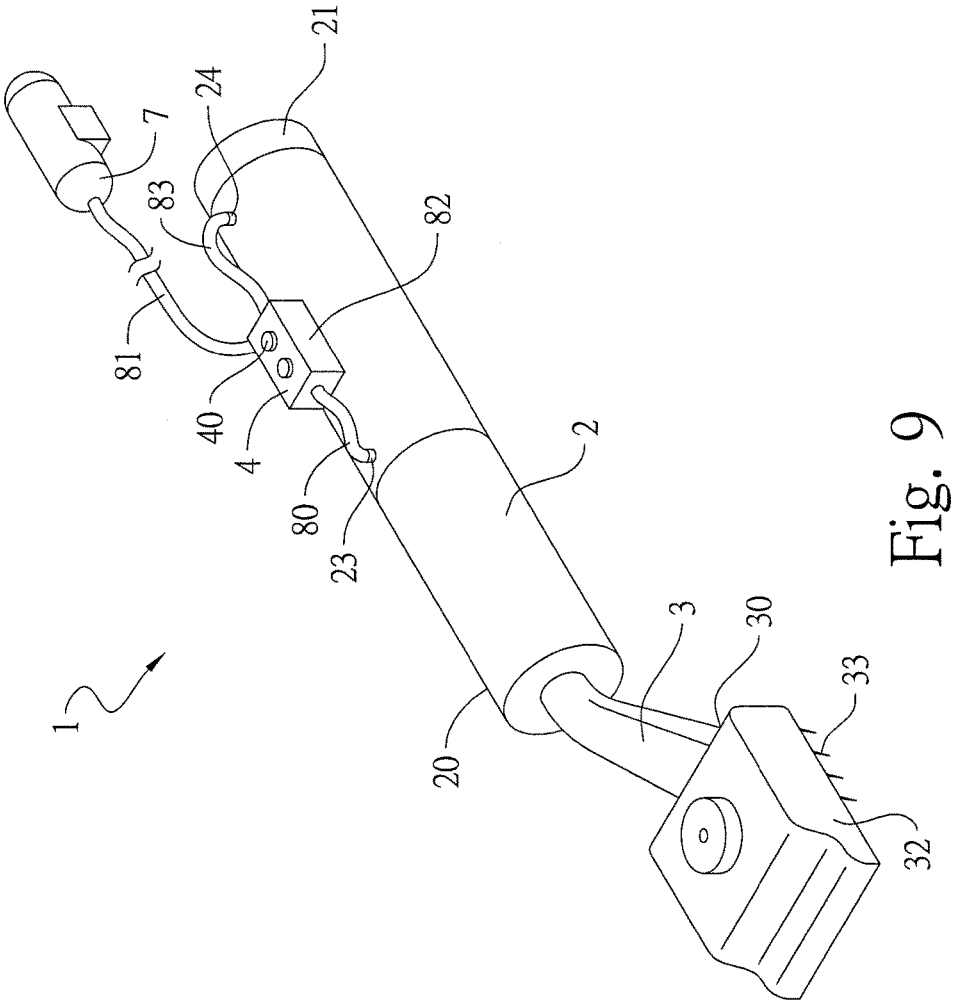


Fig. 9

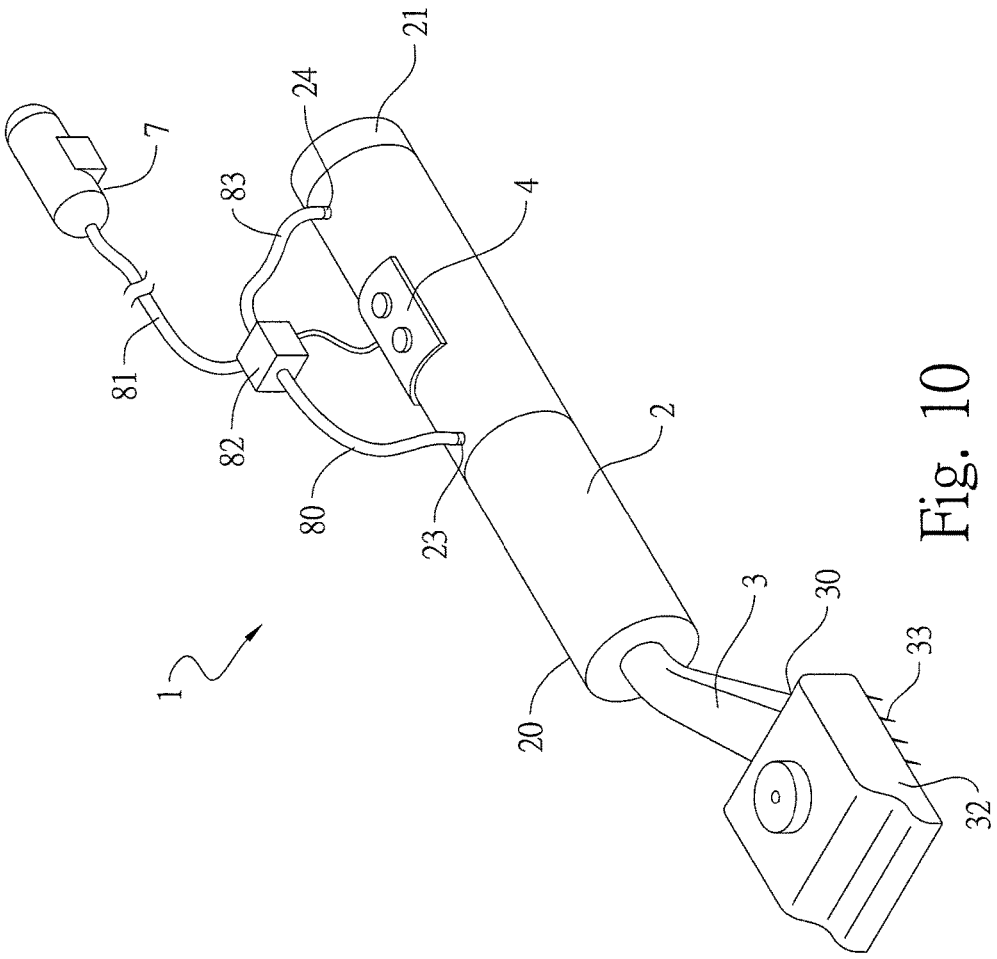


Fig. 10

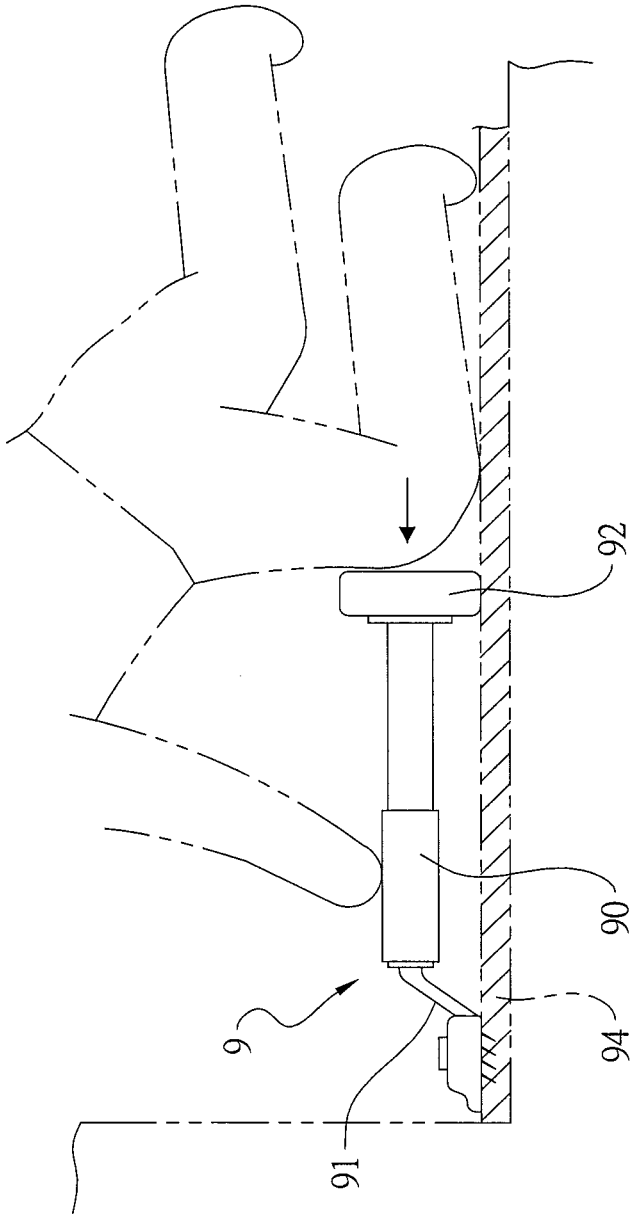


Fig. 11 (Prior Art)

CARPET AIR KICKER

FIELD OF THE INVENTION

[0001] The present invention relates to a carpet air kicker, especially a carpet air kicker using an air compressor.

BACKGROUND OF THE INVENTION

[0002] Please refer to FIG. **11**, which shows a perspective view of a carpet kicker of conventional technology. A carpet kicker **9** comprises a rod **90**, a gripping head **91** and a knee pad **92**. The gripping head **91** is located in a front end of the rod **90**. The knee pad **92** is located in a rear end of the rod **90**. A user uses his hand(s) to hold the rod **90**. The gripping head **91** engages a carpet **93**. And then the user uses his knee to kick the knee pad **92** to install the carpet **93**. The conventional carpet kicker **9** needs manpower for carpet **93** installation. The work efficiency is usually low. Furthermore, the use of the conventional carpet kicker **9** for a long time can cause injury to the user's knee, or other work damage. A new design to save manpower and to prevent the user from work damage, especially the injury of user's knee, is needed.

[0003] Accordingly, the present invention has developed a new design which may avoid the above mentioned drawbacks, may significantly enhance the performance of the devices and may take into account economic considerations. Therefore, the present invention then has been invented.

SUMMARY OF THE INVENTION

[0004] The main technical problem that the present invention is seeking to solve is: To save manpower and also to prevent the user from work damage during the installation of the carpet.

[0005] In order to solve the problems mentioned the above and to achieve the expected effect, the present invention provides a carpet air kicker comprising a body, a rod, a spring and a controlling switch. The body defines an interior chamber, wherein the interior chamber includes a front chamber and a rear chamber. The body has a communicating hole communicated with the front chamber. The rod has a front end and a rear end. The front end of the rod has a gripping head. The rear end of the rod has a piston. The piston is located in the interior chamber such that the front chamber is not communicated with the rear chamber. The body has a piston assembly located between a front end of the body and the front chamber. The rod is connected to the piston assembly such that the front chamber is not communicated with external air through the front end of the body. The spring having a front end and a rear end. The spring is located in the rear chamber. The front end of the spring is connected to the piston. The rear end of the spring is connected to a rear end of the body. The controlling switch is for controlling the communicating hole to communicate with external air or an air compressor. When the controlling switch is at a first state, the front chamber is switched to communicate with external air through said communicating hole, wherein the spring pushes the piston forward such that the rod moves forward; while the controlling switch is at a second state, the front chamber is switched to communicate with the air compressor through said communicating hole, wherein an air pressure from the air compressor pushes the piston backward such that the rod moves backward.

[0006] In an embodiment, the controlling switch comprises a manual air switching valve, the manual air switching valve is connected to the communicating hole and the air compressor; wherein when the manual air switching valve is at the first state, the front chamber is communicated with external air; while the manual air switching valve is at the second state, the front chamber is communicated with the air compressor.

[0007] In an embodiment, the controlling switch comprises a switch button and an air switching valve, the switch button is connected to the air switching valve, the air switching valve is connected to the communicating hole and the air compressor; wherein when the switch button is at the first state, the air switching valve is switched such that the front chamber is communicated with external air; while the switch button is at the second state, the air switching valve is switched such that the front chamber is communicated with the air compressor.

[0008] In an embodiment, the controlling switch comprises a switch button, the switch button is connected to an air switching valve, the air switching valve is connected to the communicating hole and the air compressor; wherein when the switch button is at the first state, the air switching valve is switched such that the front chamber is communicated with external air; while the switch button is at the second state, the air switching valve is switched such that the front chamber is communicated with the air compressor.

[0009] In an embodiment, the air switching valve is a solenoid valve.

[0010] In an embodiment, the controlling switch is located on the body.

[0011] In addition, the present invention further provides a carpet air kicker comprising a body, a rod and a controlling switch. The body defines an interior chamber, wherein the interior chamber includes a front chamber and a rear chamber. The body has a front communicating hole and a rear communicating hole communicated with the front chamber and the rear chamber respectively. The rod has a front end and a rear end. The front end of the rod has a gripping head. The rear end of the rod has a piston. The piston is located in the interior chamber such that the front chamber is not communicated with the rear chamber. The body has a piston assembly located between a front end of the body and the front chamber. The rod is connected to the piston assembly such that the front chamber is not communicated with external air through the front end of the body. The controlling switch is for controlling the communicating hole to communicate with external air or an air compressor. When the controlling switch is at a first state, the front chamber is switched to communicate with external air through the front communicating hole, the rear chamber is switched to communicate with the air compressor through the rear communicating hole, wherein an air pressure from the air compressor pushes the piston forward such that the rod moves forward; while the controlling switch is at a second state, the front chamber is switched to communicate with the air compressor through the front communicating hole, the rear chamber is switched to communicate with external air through the rear communicating hole, wherein the air pressure from the air compressor pushes the piston backward such that the rod moves backward.

[0012] In an embodiment, the controlling switch comprises a manual two-way air switching valve, the manual two-way air switching valve is connected to the front

communicating hole, the rear communicating hole and the air compressor; wherein when the manual two-way air switching valve is at the first state, the front chamber and the rear chamber are communicated with external air and the air compressor respectively; while the manual two-way air switching valve is at the second state, the front chamber and the rear chamber are communicated with the air compressor and external air respectively.

[0013] In an embodiment, the controlling switch comprises a switch button and a two-way air switching valve, the switch button is connected to the two-way air switching valve, the two-way air switching valve is connected to the front communicating hole, the rear communicating hole and the air compressor; wherein when the switch button is at the first state, the two-way air switching valve is switched such that the front chamber and the rear chamber are communicated with external air and the air compressor respectively; while the switch button is at the second state, the two-way air switching valve is switched such that the front chamber and the rear chamber are communicated with the air compressor and external air respectively.

[0014] In an embodiment, the controlling switch comprises a switch button, the switch button is connected to a two-way air switching valve, the two-way air switching valve is connected to the front communicating hole, the rear communicating hole and the air compressor; wherein when the switch button is at the first state, the two-way air switching valve is switched such that the front chamber and the rear chamber are communicated with external air and the air compressor respectively; while the switch button is at the second state, the two-way air switching valve is switched such that the front chamber and the rear chamber are communicated with the air compressor and external air respectively.

[0015] In an embodiment, the two-way air switching valve is a two-way solenoid valve.

[0016] In an embodiment, the controlling switch is located on the body.

[0017] For further understanding the characteristics and effects of the present invention, some preferred embodiments referred to drawings are in detail described as follows.

BRIEF DESCRIPTION OF DRAWINGS

[0018] FIG. **1** is a perspective view of an embodiment of a carpet air kicker of the present invention.

[0019] FIG. **2** and FIG. **3** are sectional views of an embodiment of a carpet air kicker of the present invention.

[0020] FIG. **4** and FIG. **5** are perspective views of embodiments of a carpet air kicker of the present invention.

[0021] FIG. **6** is a perspective view of an embodiment of a carpet air kicker of the present invention.

[0022] FIG. **7** and FIG. **8** are sectional views of another embodiment of a carpet air kicker of the present invention.

[0023] FIG. **9** and FIG. **10** are perspective views of embodiments of a carpet air kicker of the present invention.

[0024] FIG. **11** is a perspective view of a carpet kicker of conventional technology.

DETAILED DESCRIPTIONS OF PREFERRED EMBODIMENTS

[0025] Please refer to FIG. **1**, which shows a perspective view of an embodiment of a carpet air kicker of the present invention. And please also refer to FIG. **2** and FIG. **3**, which show sectional views of an embodiment of a carpet air kicker of the present invention. A carpet air kicker **1** comprises a body **2**, a rod **3**, a spring **5** and a controlling switch **4**. The body **2** has a front end **20** and a rear end **21**. The body **2** defines an interior chamber **6**. The interior chamber **6** includes a front chamber **60** and a rear chamber **61**. The body **2** has a communicating hole **23** communicated with the front chamber **60**. The rod **3** has a front end **30** and a rear end **31**. The front end **30** of the rod **3** has a gripping head **32**. The gripping head **32** has a plurality of carpet gripping pins **33** located at a bottom surface of the gripping head **32** for engaging a carpet. The rear end **31** of the rod **3** has a piston **34**. The piston **34** is located in the interior chamber **6** such that the front chamber **60** is not communicated with the rear chamber **61**. The body **2** has a piston assembly **22** located between the front end **20** of the body **2** and the front chamber **60**. The rod **3** is connected to the piston assembly **22** such that the front chamber **60** is not communicated with external air through the front end **20** of the body **2**. The spring **5** has a front end **50** and a rear end **51**. The sprint **5** is located in the rear chamber **61**. The front end **50** of the sprint **5** is connected to the piston **34**. The rear end **51** of the sprint **5** is connected to the rear end **21** of the body **2**. In current embodiment, the controlling switch **4** is a manual air switching valve. The communicating hole **23** is connected to the controlling switch **4** through a tube **80**. The controlling switch **4** is connected to an air compressor **7** through a tube **81**. When the controlling switch **4** is at a first state, the front chamber **60** is switched to communicate with external air through the communicating hole **23**. Therefore, the spring **5** pushes the piston **34** forward such that the rod **3** moves forward (as shown in FIG. **3**). Through the forward movement of the rod **3**, the carpet engaged by the gripping head **32** can be installed. While the controlling switch **4** is at a second state, the front chamber **60** is switched to communicate with the air compressor **7** through the front communicating hole **23**. Therefore, an air pressure from the air compressor **7** pushes the piston **34** backward such that the rod **3** moves backward (as shown in FIG. **2**). Then, it's ready for next installation. In current embodiment, the controlling switch **4** is located on the body **2**. In some other embodiments, the controlling switch **4** may be not located on the body **2** (not shown in the Figure).

[0026] Please refer to FIG. **4**, which shows a perspective view of another embodiment of a carpet air kicker of the present invention. The main structure of the embodiment in FIG. **4** is basically the same as the structure of the embodiment in FIG. **1**, except that the controlling switch **4** comprises a switch button **40** and an air switching valve **41**, wherein the communicating hole **23** is connected to the air switching valve **41** through the tube **80**; the air switching valve **41** is connected to the air compressor **7** through the tube **81**; the switch button **40** is connected to the air switching valve **41**. When the switch button **40** is at a first state, the air switching valve **41** is switched such that the front chamber **60** is communicated with external air. Therefore, the spring **5** pushes the piston **34** forward such that the rod **3** moves forward (please referring to FIG. **3**). While the switch button **40** is at a second state, the air switching valve **41** is switched such that the front chamber **60** is communicated with the air compressor **7**. Therefore, the air pressure from the air compressor **7** pushes the piston **34** backward such that the rod **3** moves backward (please referring to FIG. **2**). In current embodiment, the air switching valve **41** may

be a solenoid valve. In current embodiment, the controlling switch **4** is located on the body **2**. In some other embodiments, the controlling switch **4** may be not located on the body **2** (not shown in the Figure).

[0027] Please refer to FIG. **5**, which shows a perspective view of another embodiment of a carpet air kicker of the present invention. The main structure of the embodiment in FIG. **4** is basically the same as the structure of the embodiment in FIG. **1**, except that the controlling switch **4** is a switch button. The controlling switch **4** is connected to an air switching valve **41**, wherein the air switching valve **41** is not located on the body **2**; the air switching valve **41** is connected to the communicating hole **23** through the tube **80**; the air switching valve **41** is connected to the air compressor **7** through the tube **81**. When the controlling switch **4** is at a first state, the air switching valve **41** is switched such that the front chamber **60** is communicated with external air. Therefore, the spring **5** pushes the piston **34** forward such that the rod **3** moves forward (please referring to FIG. **3**). While the controlling switch **4** is at a second state, the air switching valve **41** is switched such that the front chamber **60** is communicated with the air compressor **7**. Therefore, the air pressure from the air compressor **7** pushes the piston **34** backward such that the rod **3** moves backward (please referring to FIG. **2**). In current embodiment, the air switching valve **41** may be a solenoid valve. In current embodiment, the controlling switch **4** is located on the body **2**. In some other embodiments, the controlling switch **4** may be not located on the body **2** (not shown in the Figure).

[0028] Please refer to FIG. **6**, which shows a perspective view of an embodiment of a carpet air kicker of the present invention. And please also refer to FIG. **7** and FIG. **8**, which show sectional views of an embodiment of a carpet air kicker of the present invention. A carpet air kicker **1** comprises a body **2**, a rod **3** and a controlling switch **4**. The body **2** has a front end **20** and a rear end **21**. The body **2** defines an interior chamber **6**. The interior chamber **6** includes a front chamber **60** and a rear chamber **61**. The body **2** has a front communicating hole **23** and a rear communicating hole **24** communicated with the front chamber **60** and the rear chamber **61** respectively. The rod **3** has a front end **30** and a rear end **31**. The front end **30** of the rod **3** has a gripping head **32**. The gripping head **32** has a plurality of carpet gripping pins **33** located at a bottom surface of the gripping head **32** for engaging a carpet. The rear end **31** of the rod **3** has a piston **34**. The piston **34** is located in the interior chamber **6** such that the front chamber **60** is not communicated with the rear chamber **61**. The body **2** has a piston assembly **22** located between the front end **20** of the body **2** and the front chamber **60**. The rod **3** is connected to the piston assembly **22** such that the front chamber **60** is not communicated with external air through the front end **20** of the body **2**. In current embodiment, the controlling switch **4** is a manual two-way air switching valve. The front communicating hole **23** is connected to the controlling switch **4** through a tube **80**. The rear communicating hole **24** is connected to the controlling switch **4** through a tube **83**. The controlling switch **4** is connected to an air compressor **7** through a tube **81**. When the controlling switch **4** is at a first state, the front chamber **60** is switched to communicate with external air through the front communicating hole **23**, the rear chamber **61** is switched to communicate with the air compressor **7** through the rear communicating hole **24**. Therefore, an air pressure from the air compressor **7** pushes the piston **34** forward such that the rod **3** moves forward (as shown in FIG. **8**). Through the forward movement of the rod **3**, the carpet engaged by the gripping head **32** can be installed. While the controlling switch **4** is at a second state, the front chamber **60** is switched to communicate with the air compressor **7** through the front communicating hole **23**, the rear chamber **61** is switched to communicate with external air through the rear communicating hole **24**. Therefore, the air pressure from the air compressor **7** pushes the piston **34** backward such that the rod **3** moves backward (as shown in FIG. **7**). Then, it's ready for next installation. In current embodiment, the controlling switch **4** is located on the body **2**. In some other embodiments, the controlling switch **4** may be not located on the body **2** (not shown in the Figure).

[0029] Please refer to FIG. **9**, which shows a perspective view of another embodiment of a carpet air kicker of the present invention. The main structure of the embodiment in FIG. **6** is basically the same as the structure of the embodiment in FIG. **1**, except that the controlling switch **4** comprises a switch button **40** and a two-way air switching valve **82**. The front communicating hole **23** is connected to the two-way air switching valve **82** through the tube **80**; the rear communicating hole **24** is connected to the two-way air switching valve **82** through the tube **83**; the two-way air switching valve **82** is connected to the air compressor **7** through the tube **81**; the switch button **40** is connected to the two-way air switching valve **82**. When the switch button **40** is at a first state, the two-way air switching valve **82** is switched such that the front chamber **60** and the rear chamber **61** are communicated with external air and the air compressor **7** respectively. Therefore, the air pressure from the air compressor **7** pushes the piston **34** forward such that the rod **3** moves forward (please referring to FIG. **8**). While the switch button **40** is at a second state, the two-way air switching valve **82** is switched such that the front chamber **60** and the rear chamber **61** are communicated with the air compressor **7** and external air respectively. Therefore, the air pressure from the air compressor **7** pushes the piston **34** backward such that the rod **3** moves backward (please referring to FIG. **7**). In current embodiment, the two-way air switching valve **82** may be a two-way solenoid valve. In current embodiment, the controlling switch **4** is located on the body **2**. In some other embodiments, the controlling switch **4** may be not located on the body **2** (not shown in the Figure).

[0030] Please refer to FIG. **10**, which shows a perspective view of another embodiment of a carpet air kicker of the present invention. The main structure of the embodiment in FIG. **6** is basically the same as the structure of the embodiment in FIG. **1**, except that the controlling switch **4** is a switch button. The controlling switch **4** is connected to an two-way air switching valve **82**, wherein the two-way air switching valve **82** is not located on the body **2**; the two-way air switching valve **82** is connected to the front communicating hole **23** through the tube **80**; the two-way air switching valve **82** is connected to the rear communicating hole **24** through the tube **83**; the two-way air switching valve **82** is connected to the air compressor **7** through the tube **81**. When the controlling switch **4** is at a first state, the two-way air switching valve **82** is switched such that the front chamber **60** and the rear chamber **61** are communicated with external air and the air compressor **7** respectively. Therefore, the air pressure from the air compressor **7** pushes the piston **34**

forward such that the rod **3** moves forward (please referring to FIG. **8**). While the controlling switch **4** is at a second state, the two-way air switching valve **82** is switched such that the front chamber **60** and the rear chamber **61** are communicated with the air compressor **7** and external air respectively. Therefore, the air pressure from the air compressor **7** pushes the piston **34** backward such that the rod **3** moves backward (please referring to FIG. **7**). In current embodiment, the two-way air switching valve **82** may be a two-way solenoid valve. In current embodiment, the controlling switch **4** is located on the body **2**. In some other embodiments, the controlling switch **4** may be not located on the body **2** (not shown in the Figure).

[0031] As disclosed in the above description and attached drawings, the present invention can provide a carpet air kicker. It is new and can be put into industrial use.

[0032] Although the embodiments of the present invention have been described in detail, many modifications and variations may be made by those skilled in the art from the teachings disclosed hereinabove. Therefore, it should be understood that any modification and variation equivalent to the spirit of the present invention be regarded to fall into the scope defined by the appended claims.

What is claimed is:

1. A carpet air kicker, comprising:

a body defining an interior chamber, wherein said interior chamber includes a front chamber and a rear chamber, said body has a communicating hole communicated with said front chamber;

a rod having a front end and a rear end, wherein said front end of said rod has a gripping head, said rear end of said rod has a piston, wherein said piston is located in said interior chamber such that said front chamber is not communicated with said rear chamber, said body has a piston assembly located between a front end of said body and said front chamber, said rod is connected to said piston assembly such that said front chamber is not communicated with external air through said front end of said body;

a spring having a front end and a rear end, wherein said spring is located in said rear chamber, said front end of said spring is connected to said piston, said rear end of said spring is connected to a rear end of said body; and

a controlling switch for controlling said front chamber to communicate with external air or an air compressor; wherein when said controlling switch is at a first state, said front chamber is switched to communicate with external air through said communicating hole, wherein said spring pushes said piston forward such that said rod moves forward; while said controlling switch is at a second state, said front chamber is switched to communicate with said air compressor through said communicating hole, wherein an air pressure from said air compressor pushes said piston backward such that said rod moves backward.

2. The carpet air kicker according to claim **1**, wherein said controlling switch comprises a manual air switching valve, said manual air switching valve is connected to said communicating hole and said air compressor; wherein when said manual air switching valve is at said first state, said front chamber is communicated with external air; while said manual air switching valve is at said second state, said front chamber is communicated with said air compressor.

3. The carpet air kicker according to claim **1**, wherein said controlling switch comprises a switch button and an air switching valve, said switch button is connected to said air switching valve, said air switching valve is connected to said communicating hole and said air compressor; wherein when said switch button is at said first state, said air switching valve is switched such that said front chamber is communicated with external air; while said switch button is at said second state, said air switching valve is switched such that said front chamber is communicated with said air compressor.

4. The carpet air kicker according to claim **3**, wherein said air switching valve is a solenoid valve.

5. The carpet air kicker according to claim **1**, wherein said controlling switch comprises a switch button, said switch button is connected to an air switching valve, said air switching valve is connected to said communicating hole and said air compressor; wherein when said switch button is at said first state, said air switching valve is switched such that said front chamber is communicated with external air; while said switch button is at said second state, said air switching valve is switched such that said front chamber is communicated with said air compressor.

6. The carpet air kicker according to claim **5**, wherein said air switching valve is a solenoid valve.

7. The carpet air kicker according to claim **1**, wherein said controlling switch is located on said body.

8. A carpet air kicker, comprising:

a body defining an interior chamber, wherein said interior chamber includes a front chamber and a rear chamber, said body has a front communicating hole and a rear communicating hole communicated with said front chamber and said rear chamber respectively;

a rod having a front end and a rear end, wherein said front end of said rod has a gripping head, said rear end of said rod has a piston, wherein said piston is located in said interior chamber such that said front chamber is not communicated with said rear chamber, said body has a piston assembly located between a front end of said body and said front chamber, said rod is connected to said piston assembly such that said front chamber is not communicated with external air through said front end of said body; and

a controlling switch for controlling said communicating hole to communicate with external air or an air compressor; wherein when said controlling switch is at a first state, said front chamber is switched to communicate with external air through said front communicating hole, said rear chamber is switched to communicate with said air compressor through said rear communicating hole, wherein an air pressure from said air compressor pushes said piston forward such that said rod moves forward; while said controlling switch is at a second state, said front chamber is switched to communicate with said air compressor through said front communicating hole, said rear chamber is switched to communicate with external air through said rear communicating hole, wherein said air pressure from said air compressor pushes said piston backward such that said rod moves backward.

9. The carpet air kicker according to claim **8**, wherein said controlling switch comprises a manual two-way air switching valve, said manual two-way air switching valve is connected to said front communicating hole, said rear com-

municating hole and said air compressor; wherein when said manual two-way air switching valve is at said first state, said front chamber and said rear chamber are communicated with external air and said air compressor respectively; while said manual two-way air switching valve is at said second state, said front chamber and said rear chamber are communicated with said air compressor and external air respectively.

10. The carpet air kicker according to claim **8**, wherein said controlling switch comprises a switch button and a two-way air switching valve, said switch button is connected to said two-way air switching valve, said two-way air switching valve is connected to said front communicating hole, said rear communicating hole and said air compressor; wherein when said switch button is at said first state, said two-way air switching valve is switched such that said front chamber and said rear chamber are communicated with external air and said air compressor respectively; while said switch button is at said second state, said two-way air switching valve is switched such that said front chamber and said rear chamber are communicated with said air compressor and external air respectively.

11. The carpet air kicker according to claim **10**, wherein said two-way air switching valve is a two-way solenoid valve.

12. The carpet air kicker according to claim **8**, wherein said controlling switch comprises a switch button, said switch button is connected to a two-way air switching valve, said two-way air switching valve is connected to said front communicating hole, said rear communicating hole and said air compressor; wherein when said switch button is at said first state, said two-way air switching valve is switched such that said front chamber and said rear chamber are communicated with external air and said air compressor respectively; while said switch button is at said second state, said two-way air switching valve is switched such that said front chamber and said rear chamber are communicated with said air compressor and external air respectively.

13. The carpet air kicker according to claim **12**, wherein said two-way air switching valve is a two-way solenoid valve.

14. The carpet air kicker according to claim **8**, wherein said controlling switch is located on said body.

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