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(54) **AIR CONTROL DEVICE**

(57) Disclosed is an air control device, comprising an air pump (3) and at least one electromagnetic valve (2), and further comprising a connecting piece (1), wherein the connecting piece (1) is provided with at least one first airflow passage (11) and at least one second airflow passage (12), an air inlet end of the first airflow passage (11) is sheathed with an air outlet (31) of the air pump (3) in a sealing manner, an air outlet end of the first airflow passage (11) is sheathed with an air inlet (21) of the electromagnetic valve (2) in a sealing manner, an air inlet end of the second airflow passage (12) is sheathed with the air outlet (31) of the electromagnetic valve (2) in a sealing manner, and an air outlet end of the second airflow passage (12) opens into the outside. The present invention adopts a connecting piece to realize the connection fit of an air pump and an electromagnetic valve, thereby not only solving the problem of difficult and complex connection caused by the inconsistent calibre sizes of the air pump and the electromagnetic valve, but also making the structure of the whole assembly after installation more compact with less occupied space.

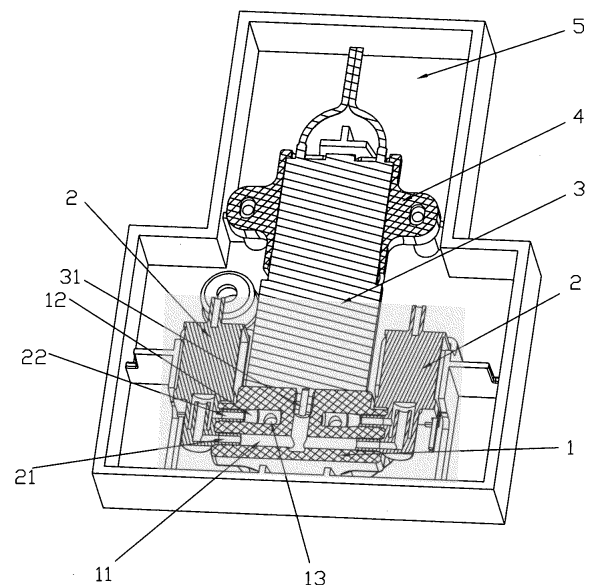


FIG. 2

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Description

Field of the invention

[0001] The present invention relates to a pneumatic device, especially to a pneumatic device, which can be connected conveniently without limit of the diameter size and has more compact spatial arrangement.

Background of the invention

[0002] There are many kinds of pneumatic products mainly comprising an air pump and an electronic valve in the market, the air pump supplies air, the electronic valve is used to control the on-off of the airway and/or the exhaust of the airway, it usually uses a flexible air pipe to connect the air pump and the electromagnetic valve, the flexible air pipe is made of PVC, PU or rubber, etc. As the air outlet of the air pump and the air inlet of the electromagnetic valve have different diameter size, it can not directly use a flexible pipe to connect the both, that is to say, it needs at least two flexible pipes with different diameter size and a joint to connect the air pump and the electromagnetic valve, so that it is complicated to connect and operate. Besides, as the housing to fix the air pump and the electromagnetic valve is usually small, it makes the connecting more difficult, especially when the air pump is connected to at least two electromagnetic valve, misjoint may happen when connecting with the flexible air pipes.

Summary of the invention

[0003] The object of the present invention is to overcome the disadvantages of the existing known technology and to provide a pneumatic device, which can be connected conveniently without limit of the diameter size, has more compact spatial arrangement and would not be connected in a wrong way.

[0004] The technical proposal of the present invention to solve the technical proposal is that: a pneumatic device, comprising an air pump and at least an electromagnetic valve; it further comprises a connecting element, the connecting element is provided with at least one first airflow passage and at least one second airflow passage, the air inlet end of the first airflow passage is connected to the air outlet of the air pump in a sealing manner, the air outlet end of the first airflow passage is connected to the air inlet of the electromagnetic valve in a sealing manner, the air inlet end of the second airflow passage is connected to the air outlet of the electromagnetic valve in a sealing manner, the air outlet end of the second airflow passage is connected to the outer side.

[0005] In another preferred embodiment, the air inlet end of the first airflow passage is interference fit to the air outlet of the air pump, the air outlet end of the first airflow passage is interference fit to the air inlet of the electromagnetic valve.

[0006] In another preferred embodiment, the air inlet end of the first airflow passage is sealing fit to the air outlet of the air pump by a sealing ring, the air outlet end of the first airflow passage is sealing fit to the air inlet of the electromagnetic valve by a sealing ring.

[0007] In another preferred embodiment, the air inlet end of the second airflow passage is interference fit to the air outlet of the electromagnetic valve.

[0008] In another preferred embodiment, the air inlet end of the second airflow passage is sealing fit to the air outlet of the electromagnetic valve.

[0009] In another preferred embodiment, it comprises at least two electromagnetic valves and at least two first airflow passages of the connecting element, the at least two first airflow passages are connected and share the same air inlet end.

[0010] In another preferred embodiment, it comprises at least two electromagnetic valves and at least two first airflow passages and at least two second airflow passage of the connecting element, the at least two first airflow passages are connected and share the same air inlet end.

[0011] In another preferred embodiment, it further comprises a housing, the air pump, the electronic valve and the connecting element are respectively assembled in the housing.

[0012] The present invention has advantages: a connecting element is configured to connect the air pump and the electromagnetic valve, it, firstly, solves the problem that it is difficult and complicated to connect the air pump and the electromagnetic valve due to different diameter sizes, so that with the connecting element, it is more convenient, fast and seldom in misjoint to connect both, secondly, with the connecting element, the air pump and the electromagnetic valve have more compact structure after assembled that it occupies smaller space.

[0013] The present invention will be further described with the drawings and the embodiments; it should be noted that the present invention of a pneumatic device is not limited to the embodiment.

Brief description of the drawings

[0014]

FIG. 1 illustrates a schematic diagram of the present invention.

FIG.2 illustrates a partial sectional diagram of the present invention.

Detailed description of the embodiments

[0015] In the preferred embodiment, please referring to FIG. 1 and FIG.2, the pneumatic device of the present invention comprises an air pump 3, two electromagnetic valves 2 and a connecting element 1. The connecting element 1 is disposed with two first airflow passages 11 that are connected together and share the same air inlet

end, in detailed, two first airflow passages 11 are respectively disposed with an air inlet section and an air outlet section, two first airflow passages 11 share the same air inlet section, the air outlet sections of the two first airflow passages 11 are respectively disposed at the right and left sides of the air inlet section, and the air outlet sections are respectively connected to the air inlet section. The air inlet end of the two first airflow passage 11 is connected to the air outlet 31 of the air pump 3 in a sealing manner, two air outlets of the two first airflow passage 11 are respectively connected to the air inlets 21 of the two electromagnetic valve 2 in a sealing manner.

[0016] Preferred, the connecting element 1 is further disposed with two second airflow passages 12 that are respectively disposed at the left and right side of the air inlet section of the two first airflow passage 11, the air inlet ends of the two second airflow passage 12 are respectively connected to the air outlets 22 of the two electromagnetic valves in a sealing manner, the air outlet ends 13 of the two second airflow passages 12 are respectively connected to the outer side. Preferred, the air inlet end of the two first airflow passages 11 of the connecting element 1 is interference fit to the air outlet 31 of the air pump, the air outlet ends of the two first airflow passages 11 are respectively interference fit to the air inlets 21 of the two electromagnetic valves, so as to ensure the sealing of the connecting element 1 and the air pump 3 and the connecting element 1 and the electromagnetic valves 2. it should be noted that, sealing rings can be applied for sealing between the air inlet end of the first airflow passages 11 and the air outlet 31 of the air pump and between the air outlet ends of the first airflow passages 11 and the air inlets 21 of the electromagnetic valves.

[0017] Preferred, the air inlet ends of the two second airflow passages 12 of the connecting element 1 are respectively interference fit to the air outlets of the two electromagnetic valves, so as to ensure the sealing of the connecting element 1 and the two electromagnetic valves 2. At the same way, sealing rings can be also applied between the air inlet ends of the second airflow passages 12 and the air outlets 22 of the electromagnetic valves.

[0018] The present invention further comprises a housing 5, the above mentioned air pump 3, two electromagnetic valves 2 and the connecting element 1 are respectively assembled inside the housing 5, in detailed, a fixing sleeve 4 is used to assemble the air pump 1 in the housing 5, two electromagnetic valves 2 are respectively assembled at the left and right side of the air pump 3, the connecting element 1 is assembled to the side the air outlet 31 of the air pump is located.

[0019] The pneumatic device of the present invention is applied with the connecting element i to connect the air pump and the electromagnetic valve, it, firstly, solves the problem that it is difficult and complicated to connect the air pump and the electromagnetic valve due to different diameter sizes, secondly, the air pump and the electromagnetic valve have more compact structure after assembled that it occupies smaller space.

[0020] Although the present invention has been described with reference to the preferred embodiments thereof for carrying out the patent for invention, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the patent for invention which is intended to be defined by the appended claims.

Industrial applicability

[0021] The present invention is applied with the connecting element i to connect the air pump and the electromagnetic valve, it, firstly, solves the problem that it is difficult and complicated to connect the air pump and the electromagnetic valve due to different diameter sizes, secondly, the air pump and the electromagnetic valve have more compact structure after assembled that it occupies smaller space.

Claims

1. A pneumatic device, comprising an air pump and at least one electromagnetic valve; wherein further comprising a connecting element, the connecting element is provided with at least one first airflow passage and at least one second airflow passage, the air inlet end of the first airflow passage is connected to the air outlet of the air pump in a sealing manner, the air outlet end of the first airflow passage is connected to the air inlet of the electromagnetic valve in a sealing manner, the air inlet end of the second airflow passage is connected to the air outlet of the electromagnetic valve in a sealing manner, the air outlet end of the second airflow passage opens into the outside.
2. The pneumatic device according to claim 1, wherein the air inlet end of the first airflow passage is interference fit to the air outlet of the air pump, the air outlet end of the first airflow passage is interference fit to the air inlet of the electromagnetic valve.
3. The pneumatic device according to claim 1, wherein the air inlet end of the first airflow passage is sealing fit to the air outlet of the air pump by a sealing ring, the air outlet end of the first airflow passage is sealing fit to the air inlet of the electromagnetic valve by a sealing ring.
4. The pneumatic device according to claim 1, wherein the air inlet end of the second airflow passage is interference fit to the air outlet of the electromagnetic valve.
5. The pneumatic device according to claim 1, wherein the air inlet end of the second airflow passage is sealing fit to the air outlet of the electromagnetic

valve.

6. The pneumatic device according to claim 1, claim 2 or claim 3, wherein comprising at least two electromagnetic valves and at least two first airflow passages of the connecting element, the at least two first airflow passages are connected and share the same air inlet end. 5
7. The pneumatic device according to claim 1, claim 4 or claim 5, wherein comprising at least two electromagnetic valves and at least two first airflow passages and at least two second airflow passage of the connecting element, the at least two first airflow passages are connected and share the same air inlet end. 10 15
8. The pneumatic device according to any of claims 1~5, wherein further comprising a housing, the air pump, the electronic valve and the connecting element are respectively assembled in the housing. 20

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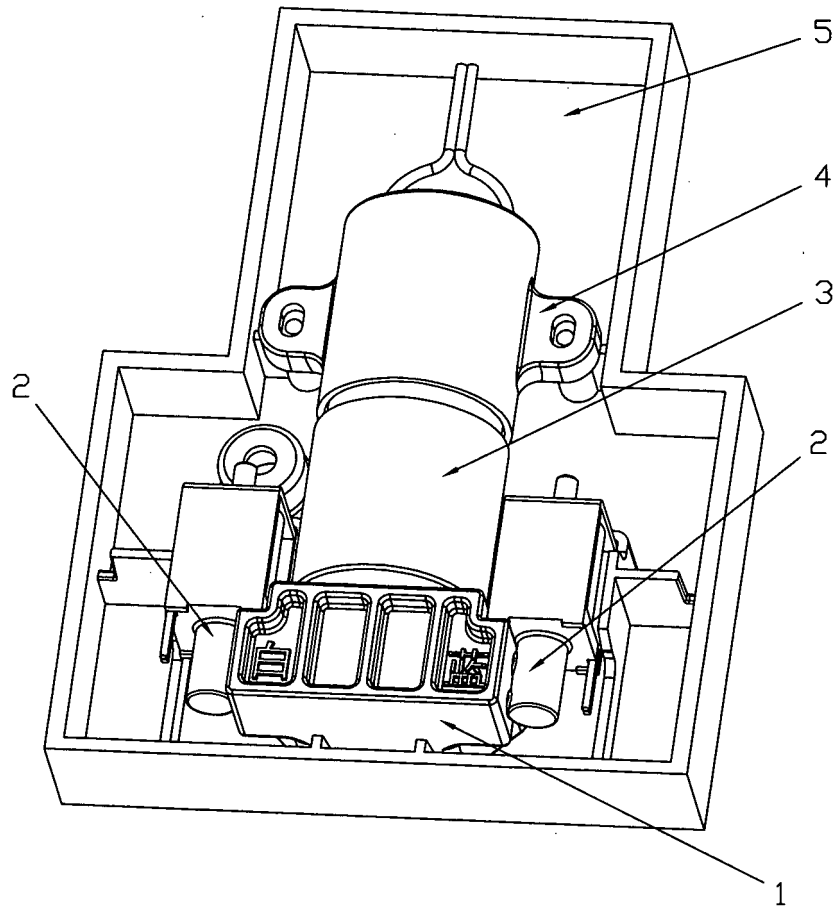


FIG. 1

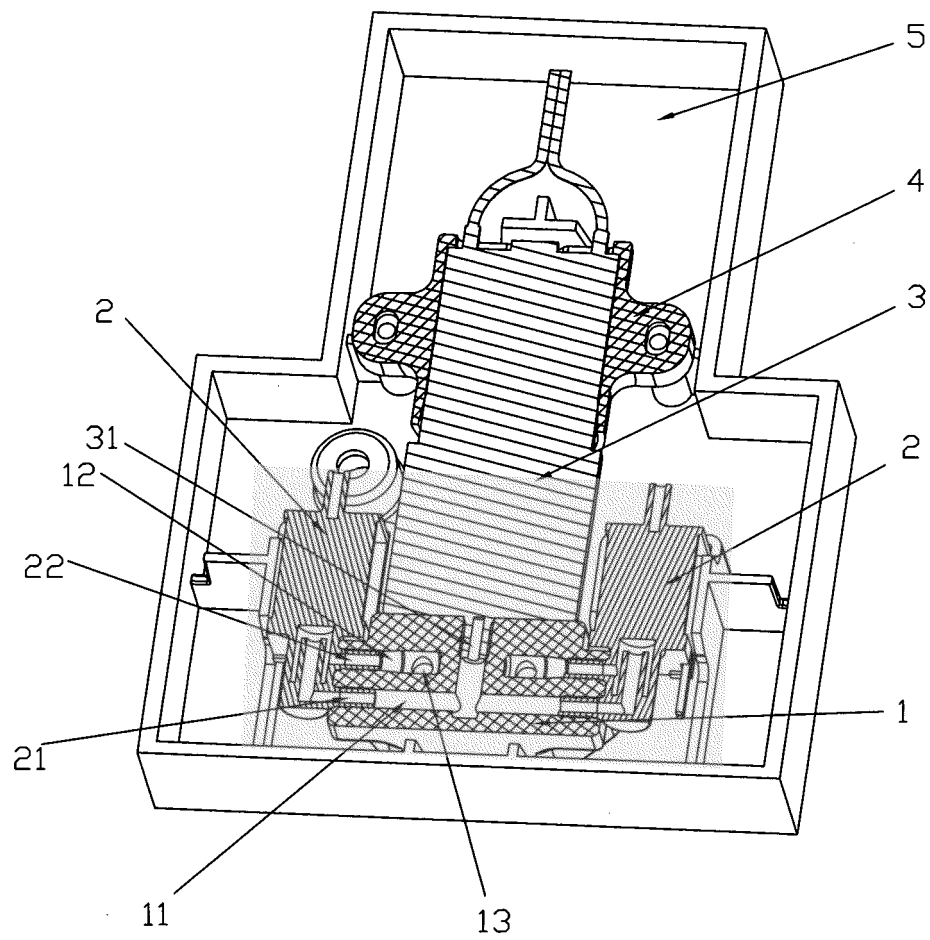


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2014/079454

A. CLASSIFICATION OF SUBJECT MATTER

F16K 51/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: F16K; A61F; A61H; B67D; G01N; A61B; F04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, CNKI, WPI, EPODOC: air control, air pump, electromagnetic valve, connecting piece, outlet, air, control+, pump+, electromagnetic, valve?, connect+, piece, channel, passage, inlet, in, out+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 203348719 U (LI, Feiyu), 18 December 2013 (18.12.2013), claims 1-8	1-8
X	CN 200968942 Y (WANG, Baoqi et al.), 31 October 2007 (31.10.2007), description, embodiment 1, and figures 1-2	1-8
X	CN 2930666 Y (LU, Yinchun), 08 August 2007 (08.08.2007), description, page 2, the penultimate paragraph to page 3, paragraph 1, and figures 1-2	1-8
A	CN 201049044 Y (SHANDONG KANGTAI INDUSTRY CO., LTD.), 23 April 2008 (23.04.2008), the whole document	1-8
A	CN 201240830 Y (TAN, En), 20 May 2009 (20.05.2009), the whole document	1-8
A	CN 101003403 A (LI, Wenqing), 25 July 2007 (25.07.2007), the whole document	1-8
A	DE 202005013309 U1 (CHANG, C.T.), 29 December 2005 (29.12.2005), the whole document	1-8

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
22 July 2014 (22.07.2014)Date of mailing of the international search report
06 August 2014 (06.08.2014)Name and mailing address of the ISA/CN:
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INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4576650 A (OLYMPUS OPTICAL CO.), 18 March 1986 (18.03.1986), the whole document	1-8

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Form PCT/ISA/210 (patent family annex) (July 2009)