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(54) CEILING-MOUNTED AIR-CONDITIONER INDOOR-UNIT SYSTEM

DECKENMONTIERTES KLIMAANLAGENINNENSYSTEM

SYSTÈME CLIMATISEUR À UNITÉ D'ENVIRONNEMENT INTÉRIEUR MONTÉE SUR PLAFOND

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Description

Technical field of the invention

[0001] The disclosure relates to the field of air conditioners, and in particular to a ceiling-type air-conditioner indoor unit system.

Background of the invention

[0002] With the improvement of people's living standards, decoration is required more and more highly, and hidden air conditioners are more and more welcomed by people. Compared with an all-ceiling type air conditioner, a partial-ceiling type air conditioner serving as one of the hidden air conditioners is more space-efficient. Conventional partial-ceiling type hidden indoor units on the market adopt an airflow circulating mode of laterally supplying air which is laterally returned or laterally supplying air which is downwardly returned. The mounting height of a unit is about 2.8m, so that during heating of the unit, after hot air is laterally supplied, the hot air floats over an air-conditioning room by following a principle of thermal expansion, the hot air cannot reach an active area of people, and therefore the thermal comfort of the room is bad. Moreover, engineering aluminium frame type air ports or guide blade plastic type air ports adopted for a traditional unit cannot be closed, insects and dust cannot be prevented from entering the unit, and therefore the reliability of the unit is low.

[0003] WO02086393 disclosed an indoor unit of air conditioner of the present invention includes air discharge units at left, right, and bottom of an outer case of the indoor unit oriented to blow air in forward outer sides, to prevent air blow to a suction side, thereby making air circulation smooth and fast air conditioning, and preventing infiltration of foreign matter in ordinary times to keep a tidy outer appearance because air suction, and the discharge units are only opened during operation of the air conditioner.

Summary of the invention

[0004] The disclosure aims to provide a ceiling-type air-conditioner indoor unit system, which is intended to solve the technical problem of bad thermal comfort of a room in a traditional unit air supply mode.

[0005] In order to achieve the aim, the disclosure provides a ceiling-type air-conditioner indoor unit system. An indoor unit may be provided in a ceiling. The system may further comprise: a return air inlet, provided on a side surface of the ceiling; and an air outlet, provided on a bottom surface of the ceiling. A closeable return air inlet apparatus may be provided at the return air inlet, and a closeable air outlet apparatus may be provided at the air outlet.

[0006] Furthermore, the air outlet apparatus may comprise an air output apparatus and an air guide portion movably sleeved inside the air output apparatus in a vertical direction.

[0007] Furthermore, the air guide portion may comprise a side wall, and a first air outlet may be formed at the bottom of the air guide portion.

[0008] Furthermore, the air guide portion may further comprise a second air outlet, provided on the side wall. When the air guide portion retracts into the air output apparatus, the second air outlet may be closed. When the air guide portion extends out of the air output apparatus, the second air outlet may be opened.

[0009] Furthermore, the side wall may comprise two first side walls which are provided oppositely and two second side walls which are provided between the two first side walls, and the second air outlet may be provided on at least one of the two first side walls.

[0010] Furthermore, a first air outlet and a second air outlet independent of each other may be provided on the air guide portion.

[0011] Furthermore, the first air outlet may be provided with an air guide blade. When the air guide blade is closed, the first air outlet is able to be closed by the air guide blade.

[0012] Furthermore, the first air outlet may be provided with a plurality of air guide blades. When the air guide blades are closed, the first air outlet is able to be closed by the air guide blades.

[0013] Furthermore, the indoor unit may be provided with a cross flow fan, comprising a volute and a fan blade. In a longitudinal section of the cross flow fan, a volute profile of the volute may comprise: a circular arc segment, provided at an air inlet of the fan; and a helix segment, smoothly connected to the circular arc segment and extending towards an air outlet direction of the fan, the helix segment and the circular arc segment being tangent to a first connecting point B.

[0014] Furthermore, the volute profile may further comprise a straight-line segment, provided at an air outlet of the cross flow fan, the straight-line segment and the helix segment being tangent to a second connecting point A.

[0015] Furthermore, an evaporator may be provided at a return air inlet of an inner cavity of the indoor unit and may be detachably provided in the indoor unit. The return air inlet of the inner cavity of the indoor unit may be configured to enable the evaporator to enter or exit from the inner cavity of the indoor unit.

[0016] Furthermore, the indoor unit may be provided with a centrifugal fan and a V-shaped evaporator matched with the centrifugal fan.

[0017] Furthermore, a sealing material may be provided at a joint of the indoor unit and the air outlet.

[0018] The disclosure has the beneficial effects as follows.

[0019] A air outlet direction of the air outlet is arranged to face the ground, so that hot air can be supplied to the lowest position in a room, the thermal comfort of the room is good, the size of a unit is smaller, the space is saved, much decoration space is reserved, and diversified de-

mands are met.

[0020] In addition to the aims, features and advantages described above, the disclosure also has other aims, features and advantages. The disclosure will be further described below in detail with reference to the drawings.

Brief description of the drawings

[0021] The drawings forming a part of the disclosure are intended to provide further understanding of the disclosure. The schematic embodiments and descriptions of the disclosure are intended to explain the disclosure, and do not form improper limits to the disclosure. In the drawings:

Fig. 1 is a diagram of a non-working state of a ceiling-type air-conditioner indoor unit system according to the disclosure;

Fig. 2 is a diagram of air output from a first air outlet of a ceiling-type air-conditioner indoor unit system according to the disclosure;

Fig. 3 is a diagram of air output from a first air outlet and a second air outlet of a ceiling-type air-conditioner indoor unit system according to the disclosure;

Fig. 4 is a diagram of air output from a second air outlet of a ceiling-type air-conditioner indoor unit system according to the disclosure;

Fig. 5 is a diagram of a first air outlet and a second air outlet of a ceiling-type air-conditioner indoor unit system according to the disclosure;

Fig. 6 is a diagram of a single air guide blade of a ceiling-type air-conditioner indoor unit system according to the disclosure;

Fig. 7 is a diagram of a plurality of air guide blades of a ceiling-type air-conditioner indoor unit system according to the disclosure;

Fig. 8 is a diagram of output airflow of a ceiling-type air-conditioner indoor unit system according to the disclosure;

Fig. 9 is a diagram of a sectional structure of an indoor unit of a ceiling-type air-conditioner indoor unit system according to the disclosure; and

Fig. 10 is a diagram of main control features of a volute profile of an indoor unit of a ceiling-type air-conditioner indoor unit system according to the disclosure.

[0022] The drawings comprise drawing marks: 10, indoor unit; 11, fan blade; 12, volute profile; 121, circular arc segment; 122, helix segment; 123, straight-line segment; 20, ceiling; 30, return air inlet; 31, return air inlet apparatus; 40, air outlet; 41, air outlet apparatus; 411, air output apparatus; 412, air guide portion; 4120, side wall; 4121, first air outlet; 4122, second air outlet; 42, air guide blade; and 50, sealing material.

Detailed description of the embodiments

[0023] The embodiments of the disclosure are described below in detail with reference to the drawings. However, the disclosure can be implemented in multiple different modes limited and covered by claims.

[0024] As shown in Fig. 1 to Fig. 10, according to a ceiling-type air-conditioner indoor unit system in the disclosure, an indoor unit 10 is provided in a ceiling 20. The system further comprises: a return air inlet 30, provided on a side surface of the ceiling 20; and an air outlet 40, provided on a bottom surface of the ceiling 20. A closeable return air inlet apparatus 31 is provided at the return air inlet 30, and a closeable air outlet apparatus 41 is provided at the air outlet 40. A air outlet direction of the air outlet is arranged to face the ground, so that hot air can be supplied to the lowest position in a room, the thermal comfort of the room is good, the width of the ceiling 20 is reduced, the space is saved, much decoration space is reserved, and diversified demands are met.

[0025] As shown in Fig. 1 to Fig. 5, the indoor unit 10 has the most important features that air is output downwardly; an air outlet of the indoor unit 10 is connected to the lower side of the ceiling 20 to form an air duct, a connection mode may be an first air duct flexible connection mode, or an air pipe specially configured to connect the air outlet of the indoor unit 10 and the air port 40 is designed and manufactured mainly in accordance with the sizes of the air outlet of the indoor unit 10 and the air port 40; one end of the air pipe is connected to the air outlet of the indoor unit 10, and the other end of the air pipe can be connected to the ceiling 20 and communicated with the air port 40, or the air duct is connected to a side, close to the indoor unit 10, of the air port 40; under the two situations, the size of the ceiling 20 will be relatively large; and in order to lower the ceiling 20, a mode of providing soft sponge between the indoor unit 10 and the air port 40 is also invented to achieve sealing, and the soft sponge can be replaced with other soft materials. Components of the air outlet 40 can be fixed to the ceiling 20 by using screws, can be fixed to the ceiling 20 by using clips, can be fixed to the ceiling 20 by the combination of the screws and the clips or can be fixed to the indoor unit 10. When a size difference is larger, the height of the indoor unit 10 can be adjusted by adjusting a lead screw which using lifting the indoor unit 10 at the position of the return air inlet 30 to achieve a needed size, and sealing sponge between the indoor unit 10 and the air outlet 40 also has a tiny height adjustment ability.

[0026] As shown in Fig. 1 to Fig. 5, a return air inlet of the indoor unit 10 is provided on the side surface of the indoor unit 10 and matched with an opening in the side surface of the ceiling 20 to form the return air inlet 30, an second air duct for connection can be provided between the return air inlet 30 of the ceiling 20 and the return air inlet of the indoor unit 10, and therefore it can be guaranteed that air is returned only from the position of the return air inlet 30 provided herein; when the partial ceiling

20 is well sealed, the air can be returned without the arrangement of the second air duct; when the indoor unit 10 operates, a centrifugal fan of the indoor unit 10 acts, and a negative pressure is formed at the return air inlet 30; and other parts of the partial ceiling 20, except the return air inlet 30, are sealed, and only the return air inlet 30 is not sealed, so that an air duct flow field is formed between the return air inlet of the indoor unit 10 and the return air inlet 30 of the ceiling 20 naturally by means of a pressure difference. Components of the return air inlet 30 are fixed to the ceiling 20 ordinarily. When the sizes of the ceiling 20 and the air port are quite accurate, the components can also be fixed to the indoor unit 10.

[0027] As shown in Fig. 1 to Fig. 5, the closeable return air inlet apparatus 31 is provided at the return air inlet 30. The closeable air outlet apparatus 41 is provided at the air outlet 40. Thus, insects and dust can be prevented from entering the indoor unit 10 when the indoor unit 10 is closed. The return air inlet 30 may be colsed in a single-panel type, a single panel is opened or closed by rotation, and the rotation of the panel is achieved by the associated movement of a connecting rod and a push rod. The return air inlet apparatus 31 and the air outlet apparatus 41 can be closed and opened by the rotation of a plurality of air guide blades. The air outlet 40 can be designed to have a single air guide blade. When the indoor unit 10 works, the blade extends out, and an air guide function is achieved by the rotation of the guide blade.

[0028] As shown in Fig. 1 to Fig. 7, the air outlet apparatus 41 comprises an air output apparatus 411 and an air guide portion 412 movably sleeved inside the air output apparatus 411 in a vertical direction. The air guide portion 412 comprises a side wall 4120, and a first air outlet 4121 is formed at the bottom of the air guide portion 412. The first air outlet 4121 and a second air outlet 4122 are provided on the air outlet apparatus 41. The first air outlet 40 is provided with an air guide blade 42, or the first air outlet 40 is provided with a plurality of air guide blades 42. In order to solve the problem that air blown from the indoor unit 10 makes people feel uncomfortable, the air outlet apparatus 41 is provided with double lift-type air outlets namely the first air outlet 4121 and the second air outlet 4122, which can be controlled to be closed and opened or can be partially closed or opened. The first air outlet 4121 can be closed and opened by the rotation of a plurality of air guide blades. The second air outlet 4122 can be closed and opened by lifting, is opened during stretching, and is closed during retraction. The second air outlet 4122 can be unidirectional or multidirectional.

[0029] An evaporator is provided at a return air inlet of an inner cavity of the indoor unit 10 and is detachably provided in the indoor unit 10. The return air inlet of the inner cavity of the indoor unit 10 is configured to enable the evaporator to enter or exit from the inner cavity of the indoor unit 10. The indoor unit 10 comprises a shell, the evaporator and a fixing assembly. The shell is provided with an inner shell cavity, an air outlet and the return air inlet. The evaporator is provided in the inner shell cavity and is located at the return air inlet. The fixing assembly detachably fixes the evaporator to the interior of the shell. The return air inlet is configured to enable the evaporator to enter or exit from the inner shell cavity, and the fixing assembly is configured to be suitable for operating from the return air inlet. By means of a structure of configuring the return air inlet to enable the evaporator to enter or exit from the inner shell cavity and configuring the fixing assembly to be suitable for operating from the return air inlet, an operator can disassemble the fixing assembly by means of the return air inlet, so that the evaporator provided at the return air inlet can be taken out, and an internal assembly of the air conditioner is maintained. Furthermore, service ports in the prior art can be saved, thereby achieving the aim of improving the overall appearance effect.

[0030] As shown in Fig. 1 to Fig. 4, the indoor unit may be provided with a cross flow fan or a centrifugal fan. The cross flow fan is designed to be in an air suction type, and the centrifugal fan may be designed to be in an air blowing type or an air suction type. Preferably, the cross flow fan is adopted for the indoor unit 10. The indoor unit 10 is provided with a V-shaped evaporator matched with the cross flow fan. The size of the ceiling 20 needed by the indoor unit 10 is small due to the fact that the size of the indoor unit 10 is small and a connecting size between the air outlet 40 and the indoor unit 10 is small. A traditional fan adopts the centrifugal fan, the size of the centrifugal fan is relatively large to achieve the needed air volume of the indoor unit 10, and centrifugal air output is intermittent. In order to more uniformly exchange hot air on the evaporator, it is necessary to reserve a certain uniform air outlet diffusion region between a fan outlet and the evaporator. The newly designed indoor unit 10 is provided with the cross flow fan and the V-shaped evaporator, the cross flow fan achieves the same air volume, the size of the fan is relatively small, the air volume of the cross flow fan is continuous, an air volume diffusion mixed region is not needed, the cross flow fan matchs with a V-shaped opening of the evaporator, and the size of the indoor unit 10 can be reduced.

[0031] As shown in Fig. 9 and Fig. 10, the indoor unit 10 is provided with the cross flow fan, comprising a volute and a fan blade 11. In a longitudinal section of the cross flow fan, a volute profile 12 of the volute comprises: a circular arc segment 121, provided at an air inlet of the fan; and a helix segment 122, smoothly connected to the circular arc segment and extending towards an air outlet direction of the fan, the helix segment and the circular arc segment being tangent to a first connecting point B. The volute profile further comprises a straight-line segment 123, provided at an air outlet of the cross flow fan, the straight-line segment 123 and the helix segment 122 being tangent to a second connecting point A. The cross flow fan comprises the volute and the fan blade 11. In the longitudinal section of the fan, the volute profile 12 of the volute comprises: the circular arc segment 121,

the helix segment 122 and the straight-line segment 123, wherein the circular arc segment 121 is provided at the air inlet of the fan. The helix segment 122 is smoothly connected to the circular arc segment 121. The straight-line segment 123 is provided at the air outlet of the fan and is smoothly connected to one end, away from the circular arc segment 121, of the helix segment 122.

[0032] By smoothly connecting the circular arc segment 121, the helix segment 122 and the straight-line segment 123 at each connecting point, the size of a sudden change structure generated at a joint can be reduced, or even the sudden change structure can be avoided, so that airflow can be prevented from eddying when flowing through the joint, and a ratio of the air volume of the fan to the noise is enabled to meet design requirements.

[0033] Preferably, the helix segment 122 and the circular arc segment 121 are tangent to the first connecting point B. The straight-line segment 123 and the helix segment 122 are tangent to the second connecting point A. The three segments are connected end to end to form a smooth airflow guide line, and therefore a turbulent flow is not easily generated when the airflow is flowing, thereby achieving the aim of noise reduction.

[0034] It is important to note that the helix segment 122 plays a role in fitting with the fan blade 11 to form a uniform outlet air containing space. The straight-line segment 123 is designed due to the fact that the fan blade 11 is no longer effective after the airflow passes through the helix segment 122, so it is necessary to design the straight-line segment 123 to guide the airflow to steadily flow out. The effects of the circular arc segment 121 are as follows. The helix segment 122 and the straight-line segment 123 of the fan belong to an air outlet segment, an air inlet segment corresponds to the air outlet segment, and an intersection point of the air inlet segment and the air outlet segment is a point closest to the fan blade 11 and also serves as a boundary point of air inlet and air outlet. In order to allow the entry of more streams of airflow in the air inlet segment in the embodiment of the disclosure, the circular arc segment 121 is designed to be of a reverse circular arc structure, namely the circular arc segment 121 bends and extends towards a direction away from the fan blade 11. Certainly, in order to widen the application range of the fan, the circular arc segment can be designed as some other smoothly transitional curves.

[0035] As shown in Fig. 1 to Fig. 4, a sealing material 50 is provided at a joint of the indoor unit 10 and the air outlet 40. The fit dimension of the indoor unit 10 and the air port 40 can be reduced by means of sponge since it is difficult to guarantee the avoidance of air leakage when two hard objects are connected. The surface of the air outlet of the newly designed indoor unit 10 is a plane, and the aligned connection of the air port and the air duct can be realized conveniently by sponge-based flexible connection. Compared with a traditional flexibly connected air duct, the ceiling 20 occupies a smaller space.

[0036] As shown in Fig. 1, when the indoor unit 10 does not work, the air port can be closed, insects and dust can be prevented from entering the indoor unit 10, and therefore the reliability of the indoor unit 10 is effectively improved.

[0037] From the above descriptions, it can be seen that the embodiment of the disclosure achieves the technical effects as follows.

[0038] The air outlet direction of the air outlet is set to face the ground, so that the hot air can be supplied to the lowest position in the room, and the thermal comfort of the room is good. When the unit is shut down, the air port is closed, the insects and the dust cannot enter the unit, and therefore the reliability of the unit is high. The size of the unit is smaller, the space is saved, much decoration space is reserved, and the diversified demands are met.

Claims

1. A ceiling-type air-conditioner indoor unit system, comprising an indoor unit (10) and a ceiling (20), wherein, the indoor unit (10) is provided in said ceiling (20), the system further comprising:

   a return air inlet (30), provided on a side surface of the ceiling (20); and
   an air outlet (40), provided on a bottom surface of the ceiling (20),
   a closeable return air inlet apparatus (31) is provided at the return air inlet (30), and a closeable air outlet apparatus (41) is provided at the air outlet (40), the air outlet apparatus (41) comprises an air output apparatus (411) and an air guide portion (412) movably sleeved inside the air output apparatus (411) in a vertical direction,
   the air guide portion (412) comprises a side wall (4120), and a first air outlet (4121) is formed at the bottom of the air guide portion (412), **characterized in that**
   the air guide portion (412) further comprises a second air outlet (4122), provided on the side wall (4120); when the air guide portion (412) retracts into the air output apparatus (411), the second air outlet (4122) is closed; and when the air guide portion (412) extends out of the air output apparatus (411), the second air outlet (4122) is opened.

2. The ceiling-type air-conditioner indoor unit system according to claim 1, wherein the side wall (4120) comprises two first side walls which are provided oppositely and two second side walls which are provided between the two first side walls, and the second air outlet (4122) is provided on at least one of the two first side walls.

3. The ceiling-type air-conditioner indoor unit system according to claim 1, wherein a first air outlet (4121)

and a second air outlet (4122) independent of each other are provided on the air guide portion (412).

4. The ceiling-type air-conditioner indoor unit system according to any one of claims 1 to 3, wherein the first air outlet (4121) is provided with an air guide blade (42), and when the air guide blade (42) is closed, the first air outlet (4121) is able to be closed by the air guide blade.

5. The ceiling-type air-conditioner indoor unit system according to any one of claims 1 to 3, wherein the first air outlet (4121) is provided with a plurality of air guide blades (42), and when the air guide blades (42) are closed, the first air outlet (4121) is able to be closed by the air guide blades (42).

6. The ceiling-type air-conditioner indoor unit system according to claim 1, wherein the indoor unit (10) is provided with a cross flow fan, comprising a volute and a fan blade (11); and in a longitudinal section of the cross flow fan, a volute profile (12) of the volute comprises: a circular arc segment (121), provided at an air inlet of the cross flow fan; and a helix segment (122), smoothly connected to the circular arc segment and extending towards an air outlet direction of the cross flow fan, the helix segment and the circular arc segment being tangent to a first connecting point B.

7. The ceiling-type air-conditioner indoor unit system according to claim 6, wherein the volute profile further comprises a straight-line segment (123), provided at an air outlet of the cross flow fan, the straight-line segment (123) and the helix segment (122) being tangent to a second connecting point A.

8. The ceiling-type air-conditioner indoor unit system according to claim 1, wherein an evaporator is provided at a return air inlet of an inner cavity of the indoor unit (10) and is detachably provided in the indoor unit (10); and the return air inlet of the inner cavity of the indoor unit (10) is configured to enable the evaporator to enter or exit from the inner cavity of the indoor unit (10).

9. The ceiling-type air-conditioner indoor unit system according to claim 1, wherein the indoor unit (10) is provided with a centrifugal fan and a V-shaped evaporator matched with the centrifugal fan.

10. The ceiling-type air-conditioner indoor unit system according to claim 1, wherein a sealing material (50) is provided at a joint of the indoor unit and the air outlet (40).

Patentansprüche

1. Deckenmontiertes Klimaanlagen-Innensystem, umfassend eine Inneneinheit (10) und ein Deckenteil (20), wobei die Inneneinheit (10) in dem Deckenteil (20) bereitgestellt ist, wobei das System ferner umfasst:

einen Rücklufteinlass (30), der an einer seitlichen Oberfläche des Deckenteils (20) bereitgestellt ist; und
einen Luftauslass (40), der an einer unteren Oberfläche des Deckenteils (20) bereitgestellt ist,
wobei eine verschließbare Rücklufteinlassvorrichtung (31) an dem Rücklufteinlass (30) bereitgestellt ist und eine verschließbare Luftauslassvorrichtung (41) an dem Luftauslass (40) bereitgestellt ist, die Luftauslassvorrichtung (41) eine Luftabgabevorrichtung (411) und einen Luftleitabschnitt (412) umfasst, der in vertikaler Richtung beweglich in der Luftabgabevorrichtung (411) gelagert ist,
der Luftleitabschnitt (412) eine Seitenwand (4120) umfasst und ein erster Luftauslass (4121) am Boden des Luftleitabschnitts (412) ausgebildet ist,
dadurch gekennzeichnet, dass
der Luftleitabschnitt (412) ferner einen zweiten Luftauslass (4122) umfasst, der an der Seitenwand (4120) bereitgestellt ist; wenn der Luftleitabschnitt (412) in die Luftabgabevorrichtung (411) einfährt, der zweite Luftauslass (4122) geschlossen wird; und wenn der Luftleitabschnitt (412) aus der Luftabgabevorrichtung (411) ausfährt, der zweite Luftauslass (4122) geöffnet wird.

2. Deckenmontiertes Klimaanlagen-Innensystem nach Anspruch 1, wobei die Seitenwand (4120) zwei erste Seitenwände, die gegenüberliegend bereitgestellt sind, und zwei zweite Seitenwände, die zwischen den beiden ersten Seitenwänden bereitgestellt sind, umfasst und der zweite Luftauslass (4122) an mindestens einer der beiden ersten Seitenwände bereitgestellt ist.

3. Deckenmontiertes Klimaanlagen-Innensystem nach Anspruch 1, wobei ein erster Luftauslass (4121) und ein zweiter Luftauslass (4122) unabhängig voneinander an dem Luftleitabschnitt (412) bereitgestellt sind.

4. Deckenmontiertes Klimaanlagen-Innensystem nach einem der Ansprüche 1 bis 3, wobei der erste Luftauslass (4121) mit einer Luftleitschaufel (42) bereitgestellt ist, und wenn die Luftleitschaufel (42) geschlossen wird, der erste Luftauslass (4121) durch

die Luftleitschaufel geschlossen werden kann.

5. Deckenmontiertes Klimaanlagen-Innensystem nach einem der Ansprüche 1 bis 3, wobei der erste Luftauslass (4121) mit einer Vielzahl von Luftleitschaufeln (42) bereitgestellt ist, und wenn die Luftleitschaufeln (42) geschlossen werden, der erste Luftauslass (4121) durch die Luftleitschaufeln (42) geschlossen werden kann.

6. Deckenmontiertes Klimaanlagen-Innensystem nach Anspruch 1, wobei die Inneneinheit (10) mit einem Querstromventilator bereitgestellt ist, der eine Spirale und eine Ventilatorschaufel (11) umfasst; und wobei in einem Längsschnitt des Querstromventilators ein Spiralprofil (12) der Spirale umfasst: ein Kreisbogensegment (121), das an einem Lufteinlass des Querstromventilators bereitgestellt ist; und ein Helixsegment (122), das glatt mit dem Kreisbogensegment verbunden ist und sich in eine Richtung des Luftauslasses des Querstromventilators erstreckt, wobei das Helixsegment und das Kreisbogensegment tangential zu einem ersten Verbindungspunkt B verlaufen.

7. Deckenmontiertes Klimaanlagen-Innensystem nach Anspruch 6, wobei das Spiralprofil ferner ein geradliniges Segment (123) umfasst, das an einem Luftauslass des Querstromventilators bereitgestellt ist, wobei das geradlinige Segment (123) und das Helixsegment (122) tangential zu einem zweiten Verbindungspunkt A verlaufen.

8. Deckenmontiertes Klimaanlagen-Innensystem nach Anspruch 1, wobei ein Verdampfer an einem Rücklufteinlass eines inneren Hohlraums der Inneneinheit (10) bereitgestellt ist und abnehmbar in der Inneneinheit (10) bereitgestellt ist; und wobei der Rücklufteinlass des inneren Hohlraums der Inneneinheit (10) so konfiguriert ist, dass er dem Verdampfer ermöglicht, in den inneren Hohlraum der Inneneinheit (10) einzutreten oder aus diesem auszutreten.

9. Deckenmontiertes Klimaanlagen-Innensystem nach Anspruch 1, wobei die Inneneinheit (10) mit einem Zentrifugalventilator und einem V-förmigen Verdampfer, der an den Zentrifugalventilator angepasst ist, bereitgestellt ist.

10. Deckenmontiertes Klimaanlagen-Innensystem nach Anspruch 1, wobei ein Dichtungsmaterial (50) an einer Verbindung der Inneneinheit und des Luftauslasses (40) bereitgestellt ist.

Revendications

1. Système d'unité intérieure de climatiseur de type au plafond, comprenant une unité intérieure (10) et un plafond (20), dans lequel, l'unité intérieure (10) est fournie dans ledit plafond (20), le système comprenant en outre :

une entrée d'air de retour (30), fournie sur une surface latérale du plafond (20) ; et
une évacuation d'air (40), fournie sur une surface inférieure du plafond (20),
un dispositif d'entrée d'air de retour pouvant être fermé (31) est fourni au niveau de l'entrée d'air de retour (30), et un dispositif d'évacuation d'air pouvant être fermé (41) est fourni au niveau de l'évacuation d'air (40), le dispositif d'évacuation d'air (41) comprend un dispositif de sortie d'air (411) et une partie de guidage d'air (412) gainée de manière mobile à l'intérieur du dispositif de sortie d'air (411) dans une direction verticale,
la partie de guidage d'air (412) comprend une paroi latérale (4120), et une première évacuation d'air (4121) est formée au fond de la partie de guidage d'air (412),
caractérisé en ce que
la partie de guidage d'air (412) comprend en outre une deuxième évacuation d'air (4122), fournie sur la paroi latérale (4120) ; lorsque la partie de guidage d'air (412) se rétracte dans le dispositif de sortie d'air (411), la deuxième évacuation d'air (4122) est fermée ; et lorsque la partie de guidage d'air (412) s'étend à l'extérieur du dispositif de sortie d'air (411), la deuxième évacuation d'air (4122) est ouverte.

2. Système d'unité intérieure de climatiseur de type au plafond selon la revendication 1, dans lequel la paroi latérale (4120) comprend deux premières parois latérales qui sont fournies de façon opposée et deux deuxièmes parois latérales qui sont fournies entre les deux premières parois latérales, et la deuxième évacuation d'air (4122) est fournie sur au moins l'une des deux premières parois latérales.

3. Système d'unité intérieure de climatiseur de type au plafond selon la revendication 1, dans lequel une première évacuation d'air (4121) et une deuxième évacuation d'air (4122) indépendamment l'une de l'autre sont fournies sur la partie de guidage d'air (412).

4. Système d'unité intérieure de climatiseur de type au plafond selon l'une quelconque des revendications 1 à 3, dans lequel la première évacuation d'air (4121) comporte une lamelle de guidage d'air (42), et lorsque la lamelle de guidage d'air (42) est fermée, la première évacuation d'air (4121) est apte à être fer-

mée par la lamelle de guidage d'air.

5. Système d'unité intérieure de climatiseur de type au plafond selon l'une quelconque des revendications 1 à 3, dans lequel la première évacuation d'air (4121) comporte une pluralité de lamelles de guidage d'air (42), et lorsque les lamelles de guidage d'air (42) sont fermées, la première évacuation d'air (4121) est apte à être fermée par les lamelles de guidage d'air (42).

6. Système d'unité intérieure de climatiseur de type au plafond selon la revendication 1, dans lequel l'unité intérieure (10) comporte un ventilateur à circulation transversale, comprenant une volute et une pale de ventilateur (11) ; et dans une coupe longitudinale du ventilateur à circulation transversale, un profil de volute (12) de la volute comprend : un segment d'arc circulaire (121), fourni au niveau d'une entrée d'air du ventilateur à circulation transversale ; et un segment hélicoïdal (122), raccordé de façon régulière au segment d'arc circulaire et s'étendant en direction d'une direction d'évacuation d'air du ventilateur à circulation transversale, le segment hélicoïdal et le segment d'arc circulaire étant tangents à un premier point de raccordement B.

7. Système d'unité intérieure de climatiseur de type au plafond selon la revendication 6, dans lequel le profil de volute comprend en outre un segment en ligne droite (123), fourni au niveau d'une évacuation d'air du ventilateur à circulation transversale, le segment en ligne droite (123) et le segment hélicoïdal (122) étant tangents à un deuxième point de raccordement A.

8. Système d'unité intérieure de climatiseur de type au plafond selon la revendication 1, dans lequel un évaporateur est fourni au niveau d'une entrée d'air de retour d'une cavité interne de l'unité intérieure (10) et est fourni de façon détachable dans l'unité intérieure (10) ; et l'entrée d'air de retour de la cavité interne de l'unité intérieure (10) est configurée pour permettre à l'évaporateur d'entrer dans ou de sortir de la cavité interne de l'unité intérieure (10).

9. Système d'unité intérieure de climatiseur de type au plafond selon la revendication 1, dans lequel l'unité intérieure (10) comporte un ventilateur centrifuge et un évaporateur en forme de V en correspondance avec le ventilateur centrifuge.

10. Système d'unité intérieure de climatiseur de type au plafond selon la revendication 1, dans lequel un matériau d'étanchéité (50) est fourni au niveau d'un joint de l'unité intérieure et de l'évacuation d'air (40).

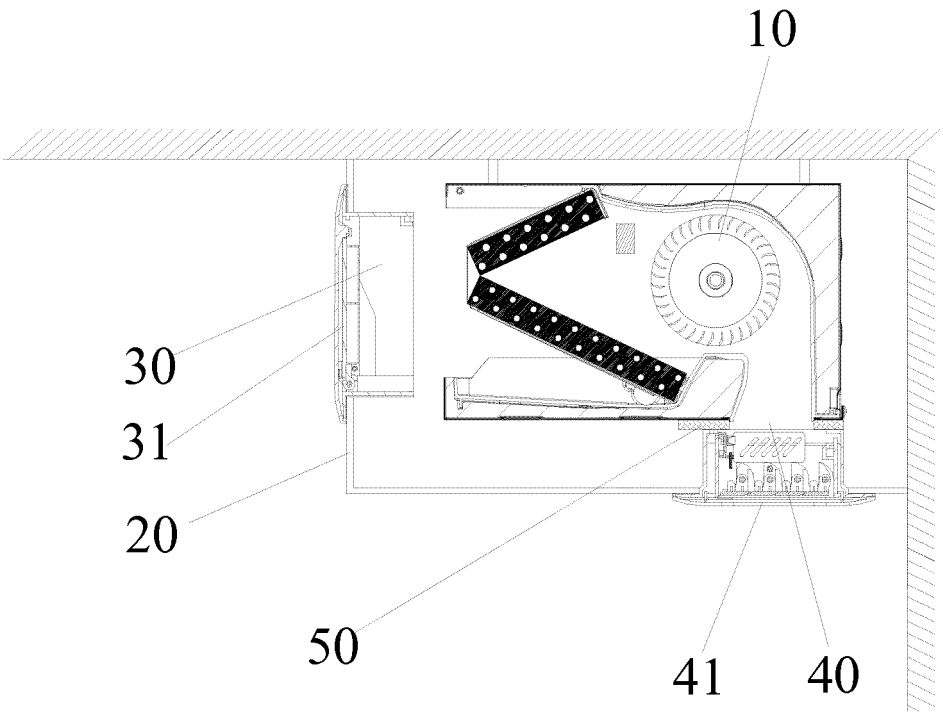


Fig. 1

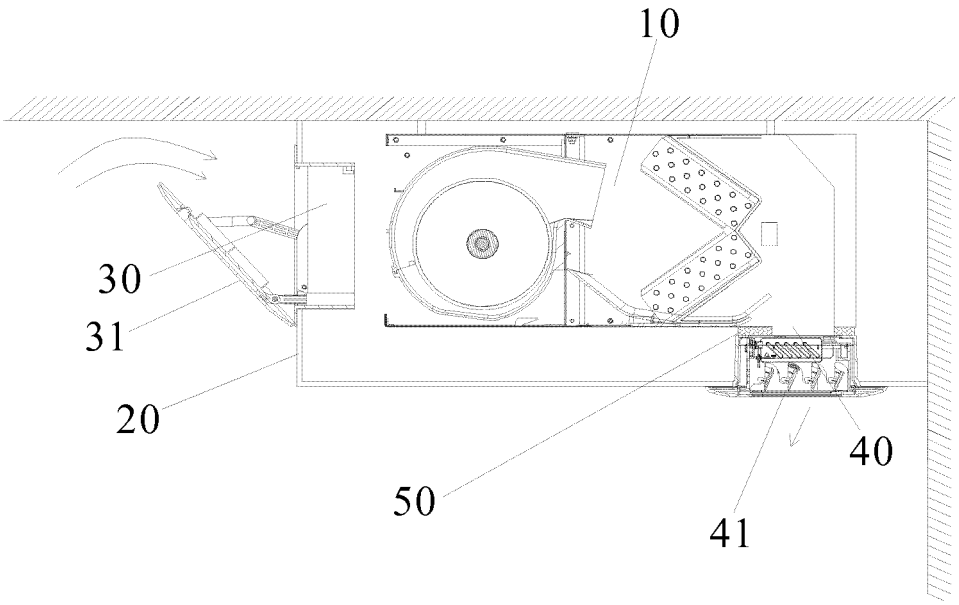


Fig. 2

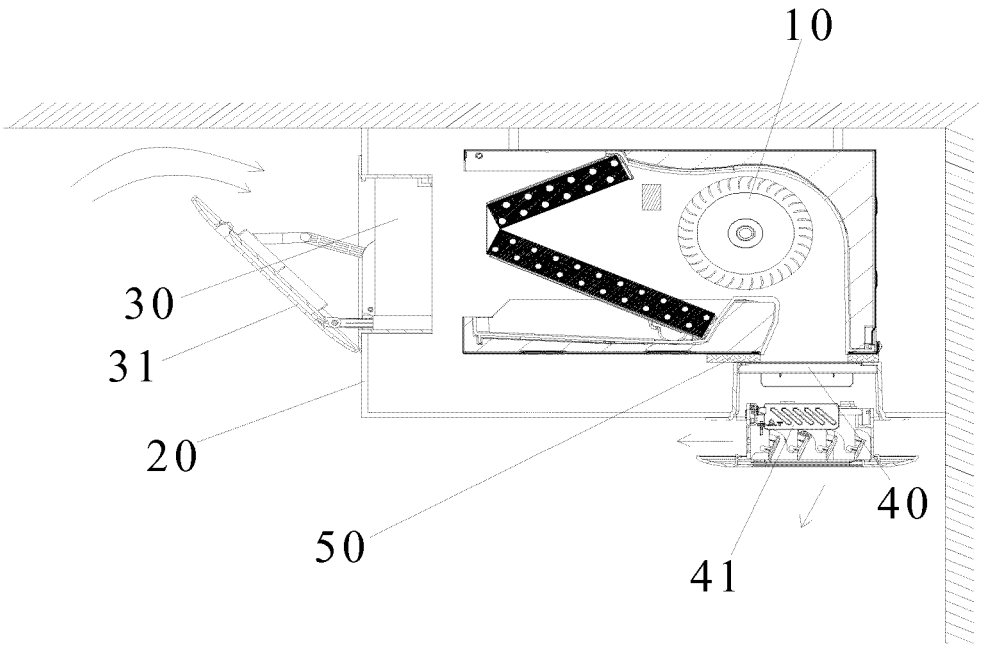


Fig. 3

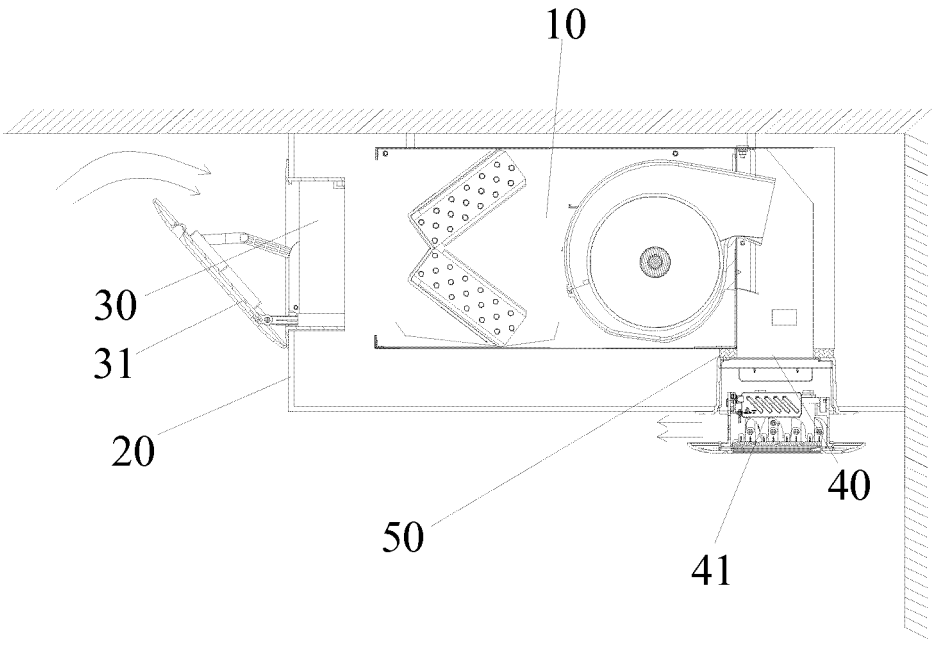
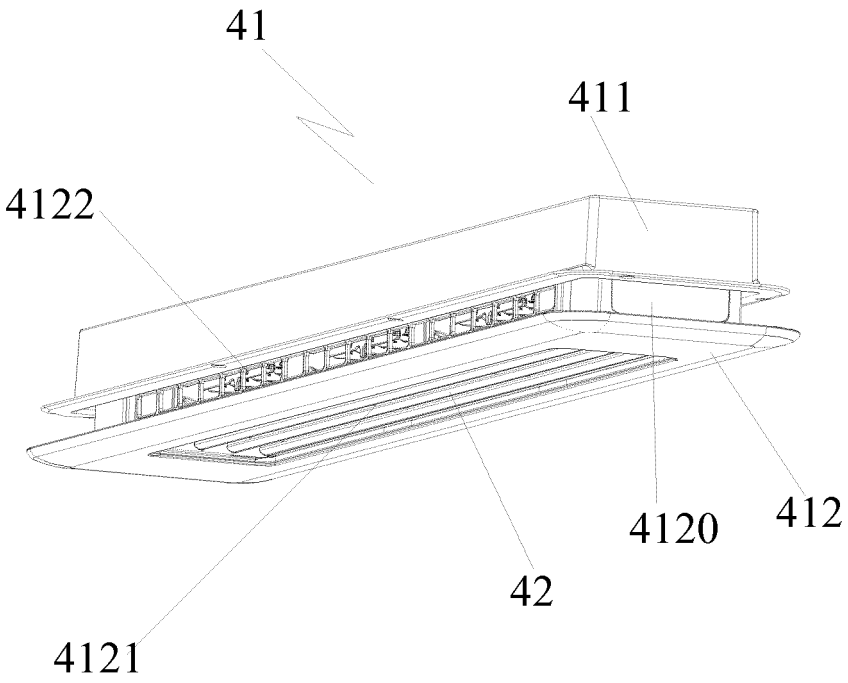


Fig. 4



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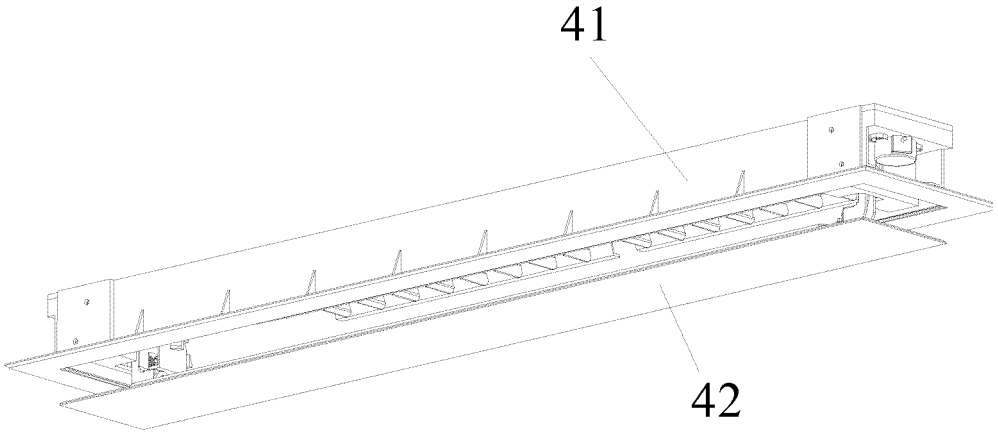

Fig. 6

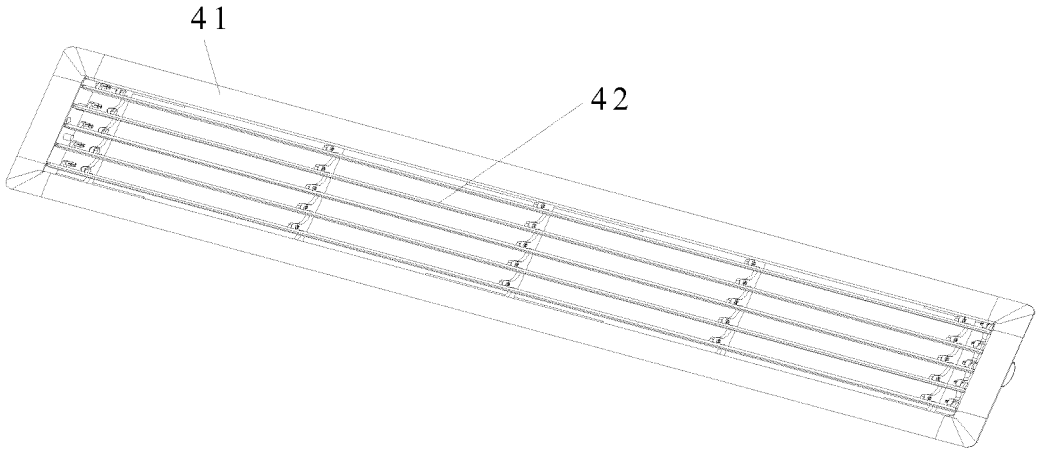

Fig. 7

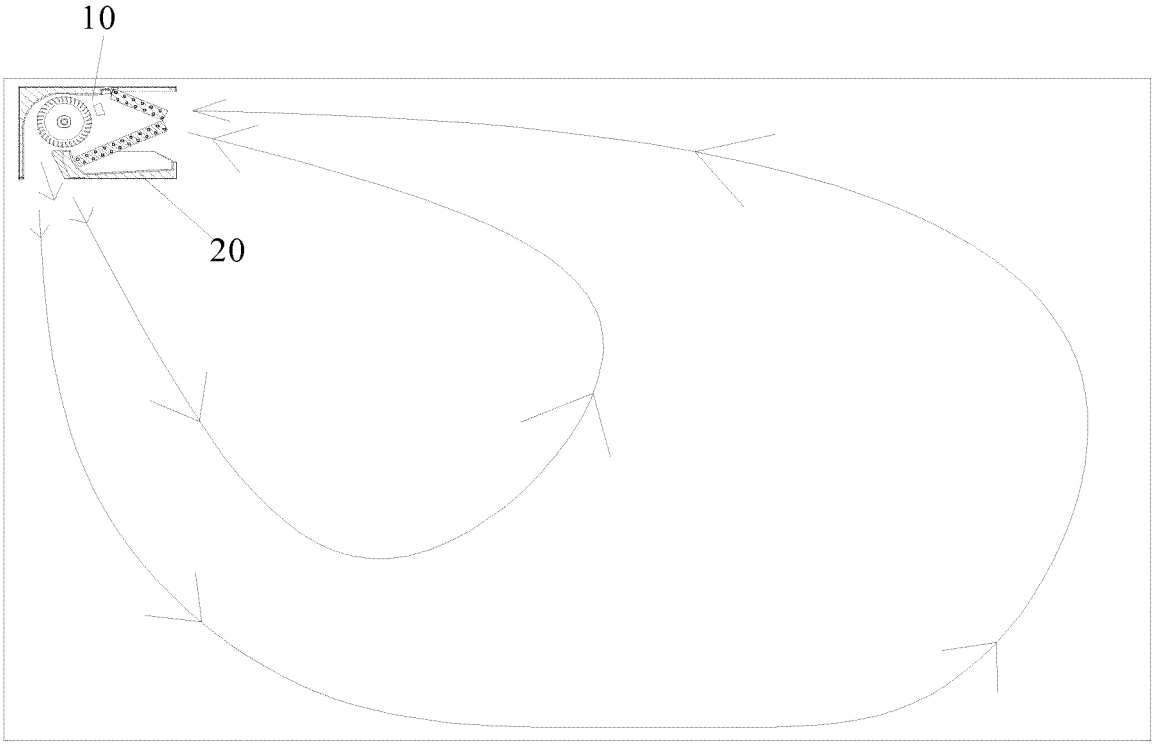

Fig. 8

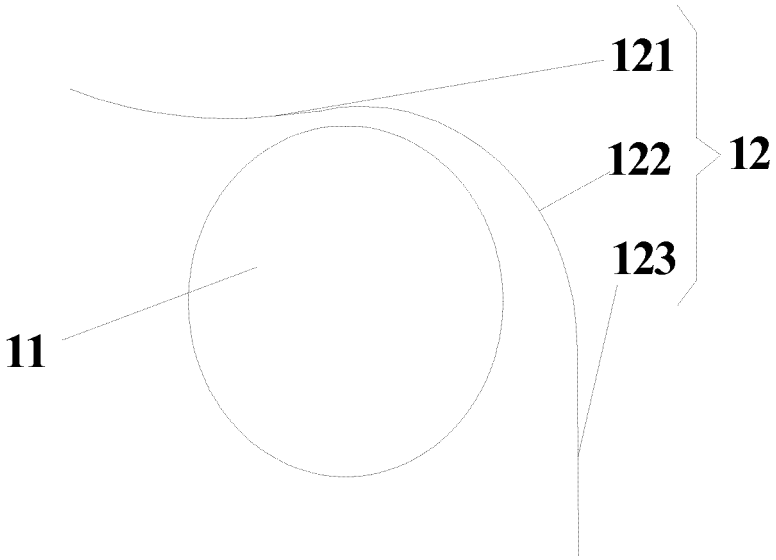

Fig. 9

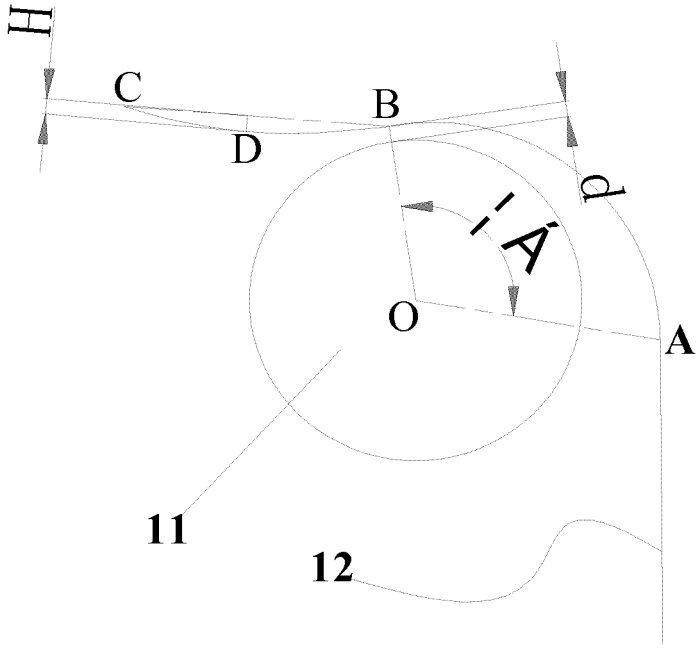

Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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