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(54) Means for heating rooms

(57) An apparatus for heating rooms comprises brazier means (5) provided with hearth means (22) in which the combustion of fuel materials takes place, containing means (4) suitable for containing said fuel materials and transferring means (8) arranged in an operative position between said containing means (4) and said brazier means (5) for transferring said fuel materials from said containing means (4) to said hearth means (22), said transferring means (8) being associated with displacement promoting means (25) arranged for allowing said transferring means (8) to be moved from said operative position to a rest position in which said transferring means (8) is not arranged between said brazier means (5) and said containing means (4), and vice versa; the apparatus may be furthermore provided with exhaust means (30) interposed between said transferring means (8) and said brazier means (5) and arranged for conveying towards said hearth means (22) the smokes produced by the combustion of said fuel materials.

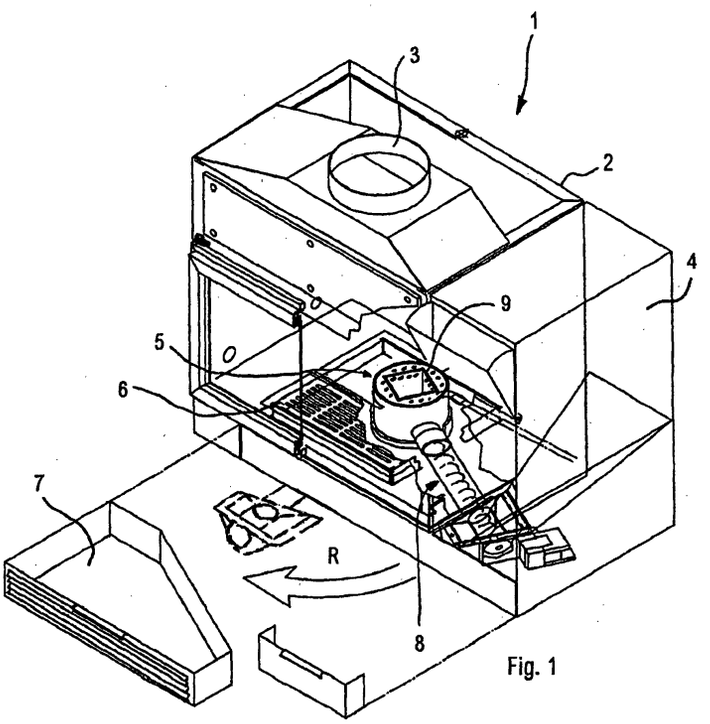

Fig. 1

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Description

[0001] The invention relates to means for heating rooms, particularly an insert suitable for being positioned into a fireplace, or a boiler, or a heating stove, fed with a solid fuel.

[0002] Prior art comprises devices for heating rooms using as fuel the so-called "pellets" of wood. Such pellets are obtained from residual products of wood processing (sawdust or chips) which are subjected to a high pressure for obtaining solid products having a substantially cylindrical shape. In particular, a device is known comprising a container suitable for containing the pellets which are collected from a lower portion of said container and transferred to a hearth by means of a conveyor screw actuated by a respective motor. The device further comprises a fan arranged for blowing air into a feeding duct arranged for feeding the pellets, said air, passing from the feeding duct to the hearth, promoting the combustion.

[0003] The hearth consists of a fixed metallic bowl provided with a plurality of small bores arranged for allowing part of the air blown by the fan to enter into said bowl, and with a further bore, having a greater size, through which the fuel is introduced into the bowl together with the remaining part of the air blown by the fan. The above-mentioned hearth is further provided with an electrical heating resistor arranged for starting the combustion, which, once started, is fed by the constant supply of further pellets.

[0004] A drawback of such device is a remarkable difficulty of maintaining the component parts thereof. Such device, in fact, has to be extracted from the fireplace or the stove in which it is positioned when portions thereof not easy to be reached, such as the conveyor screw and the feeding duct, have to be repaired o substituted.

[0005] For the same reason, furthermore, it is quite complex to carry out regular cleaning operations of the apparatus previously described and to remove from the apparatus the products of the combustion.

[0006] Finally, in case of obstruction of the pellets at the inside of the conveyor screw, near the outlet of the container, or in an internal section of the feeding duct, it is necessary to disassemble the device for restoring correct working thereof, by removing the fuel pieces causing the obstruction.

[0007] Another drawback of such device is that the pellets, after being carried by the conveyor screw into the metallic bowl, tend to accumulate in the combustion region of the aforesaid hearth so forming a kind of "plug" which partially or even completely prevents the smokes, generated by the combustion of the pellets, from outflowing. In this manner, the natural escape way for the above mentioned smokes is precluded; the smokes, therefore, tends to migrate into the feeding duct arranged for feeding the pellets and from said feeding duct into the above mentioned inlet tube of the air. If the combustion region is almost completely obstructed, the smokes can proceed along a back path inside the feeding duct until they reach the container containing the pellets and from the container the smokes can pass into the surrounding environment with serious trouble for the users which are so forced to suffer the unpleasant smell thereof. Such smokes, furthermore, are potentially dangerous for the users since they can contain damaging elements, having been generated by a combustion occurred with a deficit in oxygen due to the obstruction of the brazier.

[0008] A further drawback is that the efficiency of the device is remarkably reduced since the flow of the smokes directing towards the feeding duct prevents supplying of air designed for promoting the combustion.

[0009] An object of the present invention is to improve the known heating apparatuses.

[0010] Another object of the invention is to provide an apparatus for heating rooms which allows an efficient maintaining together with a remarkable easy cleaning.

[0011] A further object of the invention is to provide an apparatus for heating rooms in which the evacuation of the smokes generated by the combustion is facilitated.

[0012] A still further object of the invention is to obtain an apparatus for heating rooms in which the emission of smokes generated by the combustion into the environment in which such apparatus is installed is almost negligible.

[0013] In a first aspect of the invention, an apparatus for heating rooms is provided, comprising brazier means provided with hearth means in which the combustion of fuel materials takes place, containing means suitable for containing said fuel materials and transferring means arranged in an operative position between said containing means and said brazier means for transferring said fuel materials from said containing means to said hearth means, characterized in that said transferring means is associated with displacement promoting means arranged for allowing said transferring means to be moved from said operative position to a rest position in which said transferring means is not arranged between said brazier means and said containing means, and vice versa.

[0014] Advantageously, said displacement promoting means comprises hinge means such to allow said brazier means to be subjected to a rotation of limited width in order to rotate said transferring means from said operative position to said rest position, and vice versa.

[0015] In a preferred version, said hinge means comprises sliding surface means delimited by guide means for said brazier means.

[0016] In this manner, the brazier means, by sliding on the sliding surface means, may carry out a rotation of about 90° around a vertical axis thereof so simultaneously causing a corresponding rotation of the transferring means fixed thereto.

[0017] In a further preferred version, the apparatus further comprises exhaust means interposed between

the transferring means and the brazier means and arranged for conveying towards the hearth means smokes produced by the combustion of said fuel materials.

[0018] In a further preferred version, the transferring means comprises conveyor screw means placed inside feeding duct means for feeding said fuel materials and rotated by respective driving means.

[0019] The feeding duct means comprises, at one end thereof, connecting means arranged for allowing the feeding duct means to be connected with the containing means, and supporting means arranged for supporting the aforesaid driving means. The connecting means may be connected with said containing means and then easily disconnected therefrom for allowing the transferring means to be transferred from the operative position to the rest position.

[0020] Owing to this aspect of the invention, it is possible to obtain an apparatus which is easily accessible for an operator for carrying out maintenance, repair, substitution and/or cleaning operations.

[0021] Furthermore, owing to this aspect of the invention, it is sufficient to move the transferring means in the accessible position thereof in order to remove possible obstructions of material or to repair, or substitute, the feeding duct means, or the driving means of the aforesaid transferring means, or portions thereof.

[0022] In a second aspect of the invention, an apparatus for heating rooms is provided, comprising brazier means provided with hearth means in which the combustion of fuel materials takes place, containing means suitable for containing said fuel materials and transferring means arranged between said containing means and said brazier means for transferring said fuel materials from said containing means to said hearth means, characterized in that exhaust means arranged for conveying the smokes produced by said combustion towards said hearth means is interposed between said transferring means and said brazier means.

[0023] In a preferred version, the exhaust means comprises duct means having a first end opening into the transferring means and a second end opening into the brazier means.

[0024] In another preferred version, the brazier means comprises cavity means arranged for receiving said fuel materials, at the outside of which clearance means is obtained suitable for allowing circulation of air arranged for promoting the combustion of said fuel materials. Advantageously, the exhaust means connects the transferring means with said clearance means.

[0025] In a further advantageous version, the clearance means is provided with a plurality of bores arranged near said hearth means.

[0026] In a still further preferred version, displacement promoting means is associated with the transferring means, arranged for allowing the transferring means to be moved from an operative position in which said transferring means is arranged between the containing means and the brazier means and a rest position in which said transferring means is not arranged between the brazier means and the containing means, and vice versa.

[0027] Owing to this aspect of the invention, it is possible to obtain an apparatus for heating rooms in which migration of smokes into the transferring means is substantially prevented, even in presence of partial obstructions of the hearth means.

[0028] Furthermore, owing to this aspect of the invention, it is possible to obtain an apparatus in which evacuation of the smokes produced by the combustion is particularly efficient.

[0029] The invention may be better understood and carried out with reference to the enclosed drawings, which illustrate some exemplifying and not restrictive embodiments thereof, in which:

Figure 1 is a perspective view of the apparatus according to the invention;
Figure 2 is a top view of the brazier means and the transferring means of the apparatus of Figure 1;
Figure 3 is a partial section taken along the plane III-III of Figure 2;
Figure 4 is an enlarged and broken section taken along the plane IV-IV of Figure 2;
Figure 5 is a front view of the transferring means showing a connecting region connecting the transferring means with the containing means;
Figure 6 is a view like Figure 1 showing a variation of an apparatus according to the invention;
Figure 7 is a top view of the brazier means and the transferring means of the apparatus of Figure 6;
Figure 8 is a partial section taken along the plane VIII-VIII of Figure 7.

[0030] With reference to Figure 1, an apparatus 1 for heating rooms, insertable for example into a fireplace, is shown, comprising a supporting structure 2 upwardly provided with a connecting element 3 arranged for connecting the apparatus with a flue. Containing means 4 for containing particulate solid fuel, for example pellets of wood, and brazier means 5 in which the combustion of said pellets takes place are arranged into said supporting structure 2. A grid 6 is positioned below said brazier means 5, arranged for collecting the ash and the possible further products originated from the combustion in order to transfer said ash and possible further products into an underlying collecting drawer 7 from which said ash and possible further products can be periodically removed.

[0031] Transferring means 8 is arranged between the brazier means 5 and the containing means 4, suitable for collecting the solid fuel from the containing means 4 and introducing said solid fuel into the brazier means 5 for feeding the combustion.

[0032] With reference to Figures 2 and 3, the transferring means 8 comprises feeding duct means 10 extending between a lower portion 28 of the containing

means 4, said lower portion 28 having converging walls inclined downwardly for causing the solid fuel to outflow, and an inlet 18 of the brazier means 5. The feeding duct means 10 comprises, at one end thereof, connecting means 12 arranged for connecting the lower portion 28 with the feeding duct means 10 for allowing the solid fuel to pass through said feeding duct means 10.

[0033] Screw conveyor means 13 is arranged internally to said feeding duct means 10, said screw conveyor means being driven by respective driving means 14 firmly coupled to the transferring means 8.

[0034] The transferring means 5 may be easily separated from the brazier means 5 by simply removing the feeding duct means 10 from the brazier means 5, which allows maintaining operations, cleaning operations and/or substitutions of the screw conveyor means 13 and of the respective driving means 14 to be carried out.

[0035] The brazier means 5 comprises a tubular external body 15 downwardly open and into which a metallic liner.16 is placed, said liner 16 defining a cavity 17 arranged for containing the solid fuel introduced thereinto through the inlet 18. The solid fuel pushed by further material transported by the screw conveyor means 13 fills the cavity 17 until it emerges therefrom through a hearth 22 in which the combustion takes place.

[0036] A clearance 34 is defined between the external tubular body 15 and the metallic liner 16.

[0037] The tubular body 15 is provided with a bore 19 through which air blown by a not represented fan is introduced into the clearance 34, through a tube 20, said air being arranged for promoting the combustion. As shown in Figure 4, the liner 16, near the bore 19, is shaped so as not to prevent air from entering into the tubular body 15.

[0038] The aforesaid fan feeds, in' addition, a further tube 21 connected with the transferring means 8 for mixing air and solid fuel during transferring so obtaining a more efficient combustion in the brazier means 5. The air contained in the clearance 34 reaches the hearth 22 by outflowing through a series of bores obtained in the liner 16.

[0039] A first plurality of bores 23 is obtained in the vertical wall 16a of the liner 16, so that the air can pass into the cavity 17 being mixed with the solid fuel before the combustion, whereas a second plurality of bores 24, obtained in the horizontal wall 16b of the liner 16, allows a proper amount of air to be supplied to the hearth 22.

[0040] Rotation driving means 25 is downwardly associated with the brazier means 5; said rotation driving means 25 is arranged for rotating the brazier means 5 by moving the transferring means 8, firmly coupled thereto, from an operative position, in which said transferring means collect solid fuel from the containing means 5 to a rest position in which the transferring means 8, and possibly the containing means 5, may be subjected to maintenance. As shown in Figure 1, the brazier means 5 may rotate around a vertical axis thereof, according to the direction of the arrow R, through an angular extension of about 90°.

[0041] The rotation driving means 25 comprises sliding surface means 26 perimetrally delimited by guide means 27 of the above mentioned brazier means 5. By acting on the feeding means 8, it is therefore possible to cause the brazier means 5 to slide on the plane sliding means 26, producing such a wide rotation as to allow a user to reach any point of the apparatus requiring maintenance or cleaning.

[0042] With reference to Figure 5, the connecting means 12 is shown in the operative position of the transferring means 8. In such position, the connecting means 12 is firmly fixed to the lower portion 28 of the containing means 4.

[0043] The connecting means 12 comprises an end 12a suitable for engaging respective lip means 28a obtained in the portion 28, and a further end 12b provided with a bore 12c through which a screw 29 may pass, said screw 29 being suitable for engaging a relative threaded bore 28c of a supporting element 28b of the portion 28 for assuring, during operating, connection between the transferring means 8 and the containing means 4.

[0044] In order to pass to the rest position it is enough to release the connecting means 12, by acting on the screw 29, and to rotate the transferring means 8 through the desired angle.

[0045] In order to return to the operative position, the transferring means 8 has to be rotated in an opposite direction with respect to the previous direction until the end 12a is inserted into the lip means 28a. Subsequently, the connecting means 12 has to be fixed to the containing means 4 by tightening the screw 29 into the respective threaded bore 28c. As shown in Figures 6 to 8, a variation of the apparatus 1 according to the invention is shown in which exhaust means 30 is interposed between the feeding duct means 10 and the brazier means 5, arranged for allowing evacuation of smokes generated during the combustion and present in the cavity 17 due to possible obstructions of the hearth means 22.

[0046] The exhaust means 30 comprises duct means 31 provided with a first end 32 opening into the feeding duct means 10 and a second end 33 opening into the clearance 34. In this manner the smokes possibly present in the feeding duct means 10, instead of directing towards the containing means 4, are conveyed into the clearance 34 and exit from the clearance 34 through the bores 24.

Claims

1. Apparatus for heating rooms, comprising brazier means (5) provided with hearth means (22) in which the combustion of fuel materials takes place, containing means (4) suitable for containing said fuel materials and transferring means (8) arranged in an operative position between said containing means

(4) and said brazier means (5) for transferring said fuel materials from said containing means (4) to said hearth means (22), **characterized in that** said transferring means (8) is associated with displacement promoting means (25) arranged for allowing said transferring means (8) to be moved from said operative position to a rest position in which said transferring means (8) is not arranged between said brazier means (5) and said containing means (4), and vice versa.

2. Apparatus according to claim 1, wherein exhaust means (30) arranged for conveying smokes produced by said combustion towards said hearth means (22) is interposed between said transferring means (8) and said brazier means (5).

3. Apparatus for heating rooms, comprising brazier means (5) provided with hearth means (22) in which the combustion of fuel materials takes place, containing means (4) suitable for containing said fuel materials and transferring means (8) arranged between said containing means (4) and said brazier means (5) for transferring said fuel materials from said containing means (4) to said hearth means (22), **characterized in that** exhaust means (30) arranged for conveying smokes produced by said combustion towards said hearth means (22) is interposed between said transferring means (8) and said brazier means (5).

4. Apparatus according to claim 3, wherein said transferring means (8) is associated with displacement promoting means (25) arranged for allowing said transferring means (8) to be moved from an operative position in which said transferring means (8) is arranged between said containing means (4) and said brazier means (5) to a rest position in which said transferring means (8) is not arranged between said containing means (4) and said brazier means (5), and vice versa.

5. Apparatus according to claim 1, or 4, wherein said displacement promoting means comprises hinge means (25) for rotating said transferring means (8) from said operative position to said rest position, and vice versa.

6. Apparatus according to claim 5, wherein said hinge means (25) comprises sliding surface means (26) delimited by guide means (27) and arranged for guiding said brazier means (5) when it slides on said sliding surface means (26).

7. Apparatus according to claim 5, or 6, wherein said hinge means (25) rotates said brazier means through an angular extension of about 90°.

8. Apparatus according to claim 2, or 3, or 4, or any one of claims 5 to 7 as appended to claim 4, wherein said exhaust means (30) comprises duct means (31) provided with a first end (32) opening into said transferring means (8) and a second end (33) opening into said brazier means (5).

9. Apparatus according to any one of the preceding claims, wherein said brazier means (5) comprises tubular body means (15) inside which liner means (16) is positioned.

10. Apparatus according to claim 9, wherein said liner means (16) comprises a plurality of bores (24) arranged near said hearth means (22).

11. Apparatus according to claim 9, or 10, wherein said liner means (16) defines clearance means (34) in said tubular body means (15).

12. Apparatus according to claim 11 as appended to claim 8, wherein said second end (33) of said duct means (31) flows into said clearance means (34).

13. Apparatus according to any one of the preceding claims, and further comprising fan means arranged for obtaining pressurised air, said air being suitable for promoting said combustion.

14. Apparatus according to claim 13 as appended to claim 1, wherein said transferring means (8) comprises tube means (21) suitable for introducing said pressurised air into said transferring means (8) for mixing said air with said fuel materials.

15. Apparatus according to claim 13 as appended to claim 1, or according to claim 14, wherein said liner means (16) comprises a further plurality of bores (23) arranged for allowing said air to be inserted into said hearth means (22).

16. Apparatus according to any one of the preceding claims, wherein said transferring means (8) comprises feeding duct means (10) extending between a lower portion (28) of said containing means (4) and said hearth means (22).

17. Apparatus according to claim 16, wherein internally to said feeding duct means (10) screw conveyor means (13) is arranged actuated by respective driving means (14) firmly coupled to said transferring means (8).

18. Apparatus according to claim 16, or 17, wherein said feeding duct means (10) comprises, at one end thereof, connecting means (12) arranged for connecting said portion (28) with said feeding duct means (10).

19. Apparatus according to claim 18, wherein said connecting means (12) is releasebly connected with said containing means (4) through respective fastening means (12a, 12b, 28a, 28b, 29).

20. Apparatus according to claim 19, wherein said fastening means comprises an end (12a) of said connecting means (12) suitable for engaging respective lip means (28a) obtained in said portion (28).

21. Apparatus according to claim 19, or 20, wherein said fastening means comprises a further end (12b) of said connecting means (12) suitable for being connected through screw means (29) with a supporting element (28b) of said portion (28).

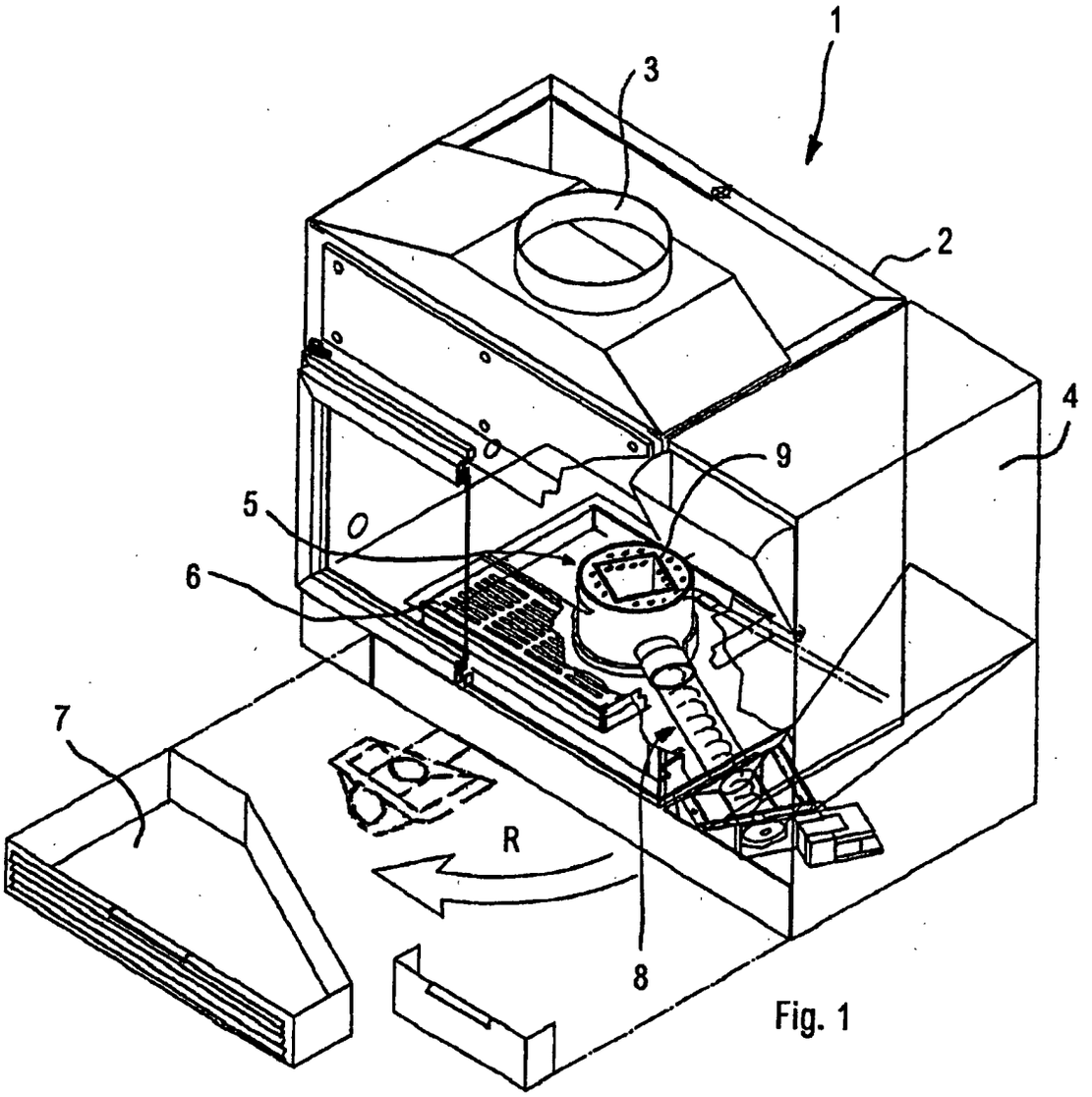

Fig. 1

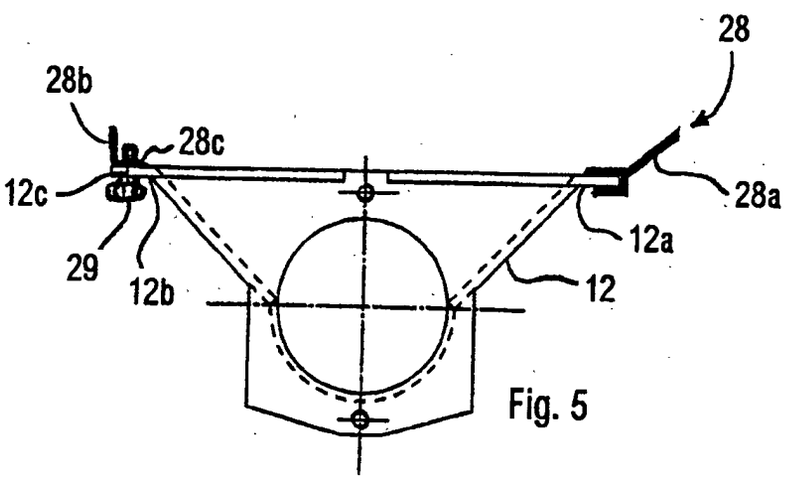

Fig. 5

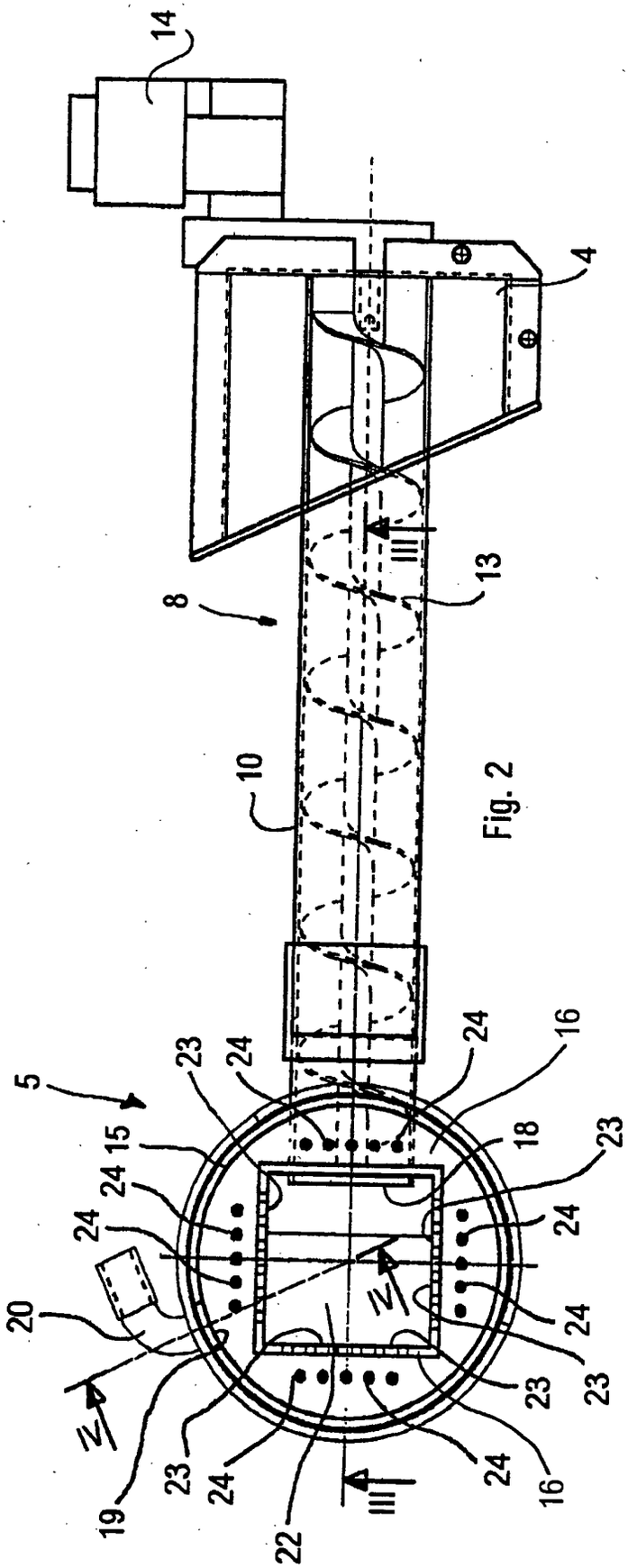

Fig. 2

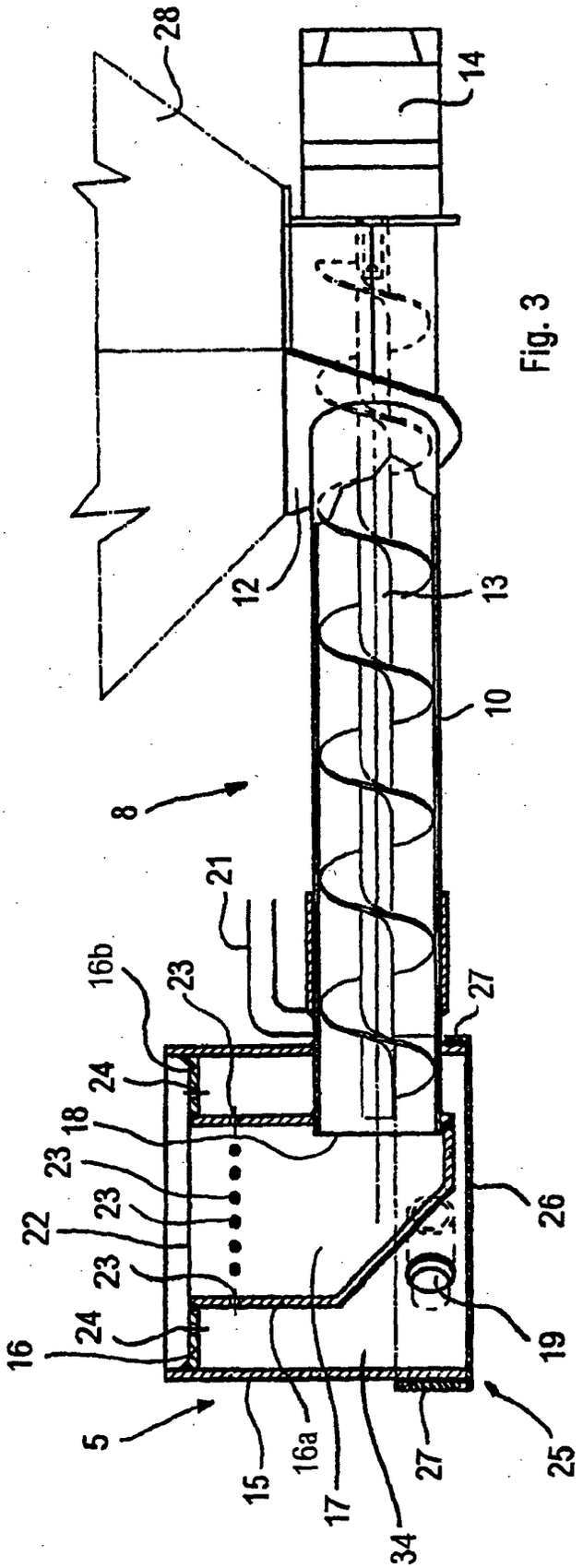
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Fig. 3

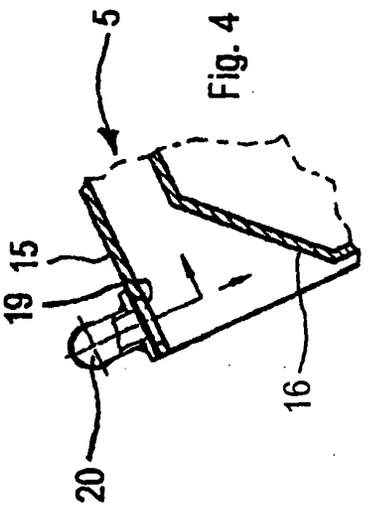
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Fig. 4

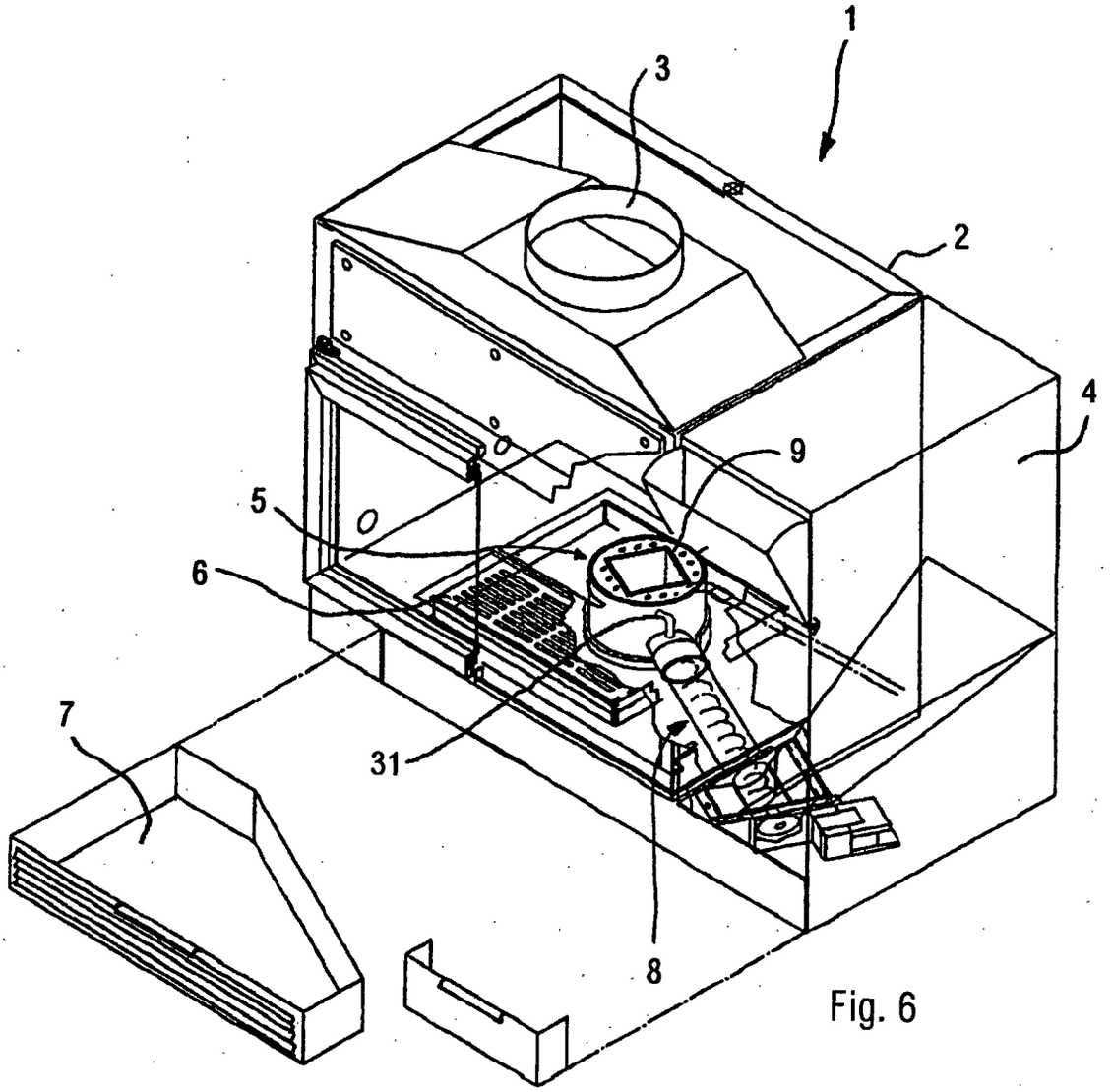

Fig. 6

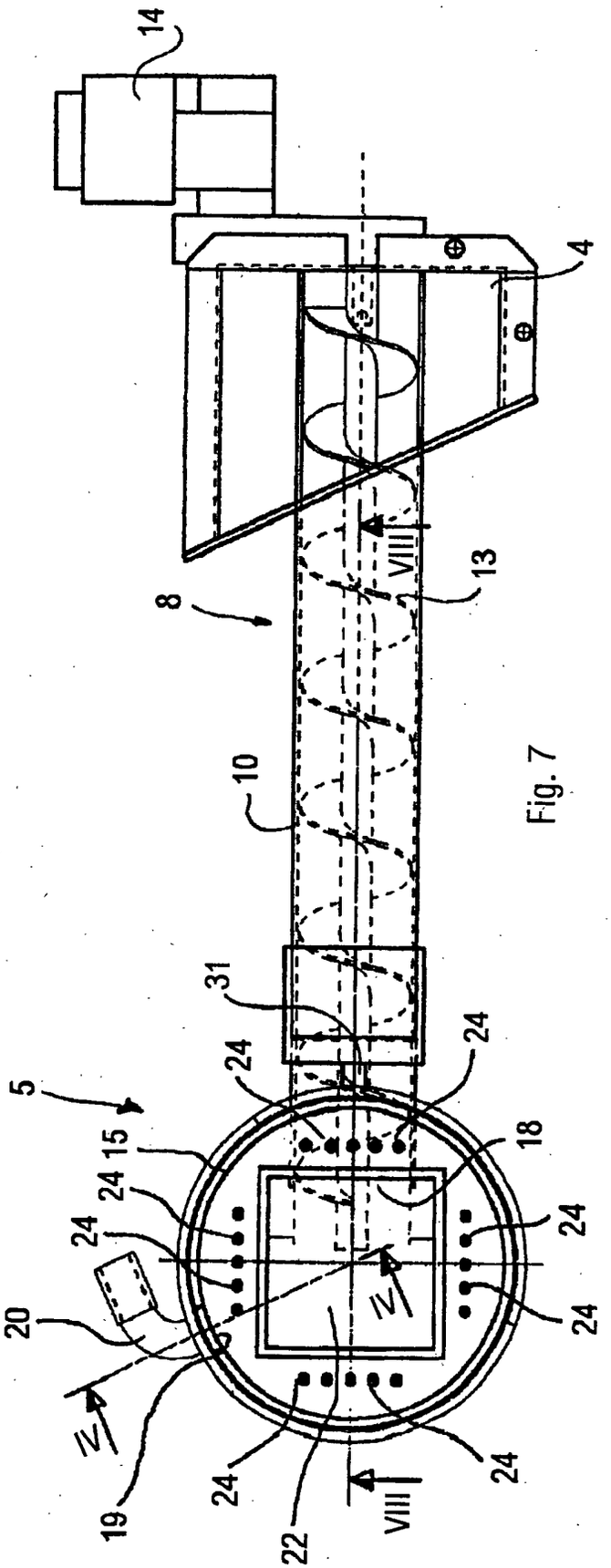

Fig. 7

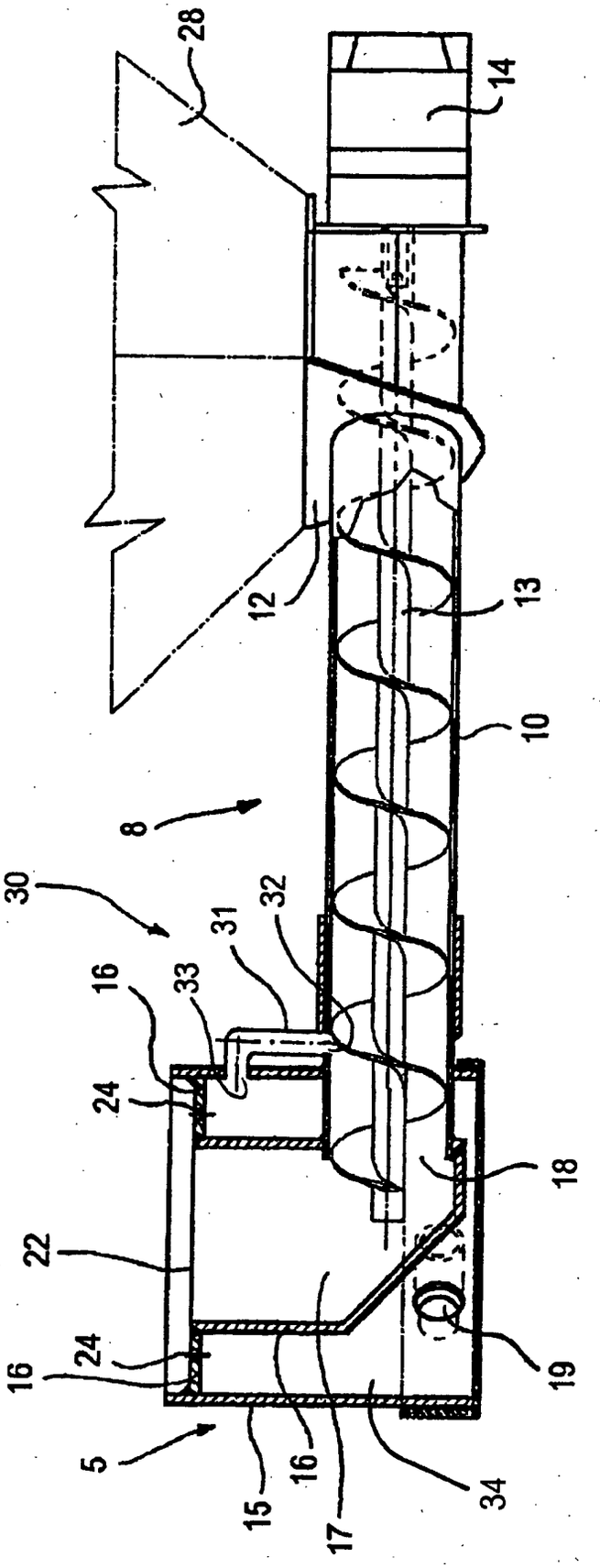

Fig. 8