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(54) Terminal unit for a balanced flue

(57) Discharge structure (4) for closed gas appliances, comprising two pipes extending concentrically into each other, in which the outer pipe (8) and the inner pipe (5) each comprise an inner end at the boiler side (3) and an outer end at the side of the outside air, in which the inner pipe is a flue gas discharge pipe and both pipes define an annular line with each other for air supply to the boiler, in which the outer pipe at the inner end is provided with a pipe bend (19) which consists of at least two members, that are provided with connection surfaces which extend at least with a directional component in flow direction, in which the pipe bend is held in its place in the discharge structure by having its ends attached to or on the parts of the air supply line connecting to the pipe bend.

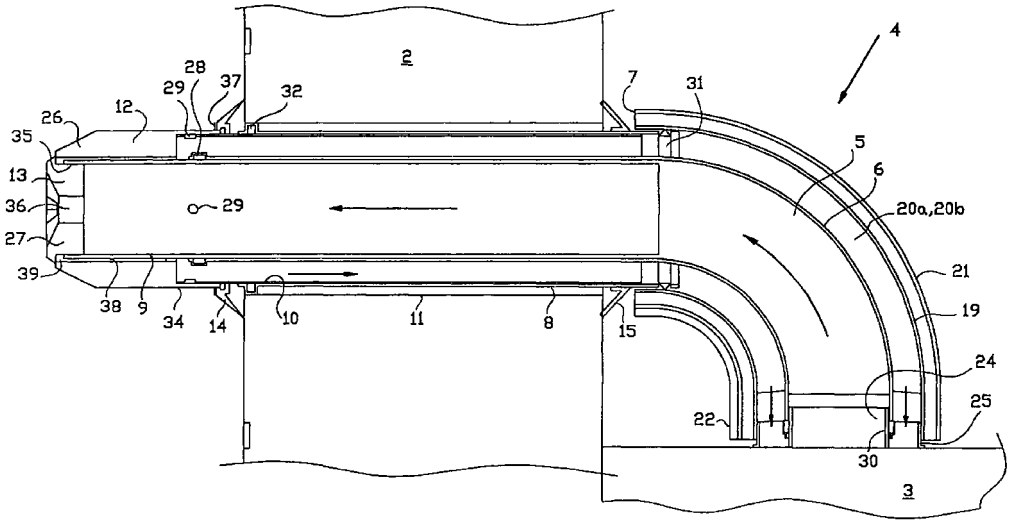

FIG. 3

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Description

[0001] The invention relates to discharge structures for discharge structures for closed gas appliances that extend through a wall of a building, particularly discharge structures extending through facades

[0002] The invention further relates to parts for such a discharge structure.

[0003] Such discharge structures are widely known. The are usually provided with a double line, namely a supply line for supply of combustion air to the boiler and a discharge line concentrically situated within it for discharge of flue gasses from the boiler to the outside.

[0004] The discharge structure should particularly in exterior wall ducts provide a transition of the vertical line portion coming out of (or going to) the boiler -usually pipe stubs on the exit/entrance of the boiler- to the horizontal line portion extending through the facade. To that end a arch piece can be used which comprises two concentric pipe members, that can be connected to both concentric lines

[0005] It is an object of the invention to provide a discharge structure which can be mounted easily with as few tools as possible.

[0006] It is furthermore an object of the invention to provide a discharge structure having favourable flow properties.

[0007] From one aspect the invention to that end provides a discharge structure for closed gas appliances, comprising two pipes extending concentrically into each other, in which the outer pipe and the inner pipe each comprise an inner end at the boiler side and an outer end at the side of the outside air, in which the inner pipe is a flue gas discharge pipe and both pipes define an annular line with each other for air supply to the boiler, in which the outer pipe at the inner end is provided with a pipe bend or bend piece which consists of at least two members, that are provided with connection surfaces which extend at least with a directional component in flow direction, in which the pipe bend is held in its place in the discharge structure by having its ends attached to or on the parts of the air supply line connecting to the pipe bend.

[0008] In this way the mounting ease for the fitter is strongly increased, because the pipe bend can be brought in its place in radial/tangential direction around the bent inner pipe. This can particularly even take place when the inner pipe has already been mounted. Because the pipe bend can be placed after the inner pipe has been placed, the fitter can check the connection of the inner pipe to the boiler. Furthermore as a result of the manner of dividing, forming this portion of the outer pipe is made easier and there is a larger degree of freedom in design details. Because of the connecting portions of the air supply line, in particular the connection to the boiler and the portion of the outer pipe situated upstream, the pipe bend can be kept in its place independent of the inner pipe, so that size tolerances are less troubling when mounting. In the bend the outer pipe and the inner pipe need not necessarily run concentrically.

[0009] Preferably the connection surfaces extend in flow direction, so that a dividing area is obtained which is as short as possible. Preferably the pipe bend is built up from two shell members.

[0010] In other words the invention provides a discharge structure, in which the outer pipe is provided with a pipe bend at the inner end, which is longitudinally divided into two halves placed against each other, that preferably are symmetrical.

[0011] The pipe bend members may be connected to each other by means of screws, an elastic circumferential band, a snap connection or the like, preferably in a non-permanent manner.

[0012] Preferably profiles are provided for sealingly clamping the members of the pipe bend to each other. The fitter then arranges the pipe bends around the inner pipe and subsequently attaches them onto each other by means of clamping profiles, which also ensure sealing.

[0013] It is also possible to provide that the outer pipe is formed for radially engaging the outer ends of the pipe bend in a clamping manner, which makes the placement very easy. For that purpose said ends preferably are situated radially offset to the inside, in order to thus define a portion which is narrowed over a wall thickness.

[0014] For further ease of placement it is preferred that the inner pipe and/or the outer pipe is/are built up from pipe parts that are telescopically slidable with respect to each other.

[0015] The invention also provides a pipe bend for discharge structures, consisting of at least two parts, which are provided with connection surfaces which extend at least with a directional component in flow direction.

[0016] Preferably the inner edge is bent, preferably with a same curvature centre point as the outer edge of the pipe bend.

[0017] The invention further provides a method for fitting a discharge structure to gas appliances, provided with a gas discharge line and an air supply line situated concentrically around it, in which first of all an inner pipe part for gas discharge is connected to the gas appliance and after that an outer pipe part that consists of two or more longitudinal members is arranged from aside around the inner pipe part, the longitudinal members are placed against each other, in particular connected to each other and the outer pipe part is connected to the gas appliance.

[0018] For further ease of mounting, in the discharge structure according to the invention a supply end piece is placed at the outer end of the inner pipe, which supply end piece is provided with air flow guiding means that are situated in flow line with the annular line and with means for restraining the inner pipe in outward

direction.

[0019] Preferably the restraining means comprise stop surfaces cooperating with the end edge of the inner pipe.

[0020] Preferably the supply end piece comprises means for attachment to the outer end of the outer pipe, preferably for a snap attachment. The supply end piece thus forms a means with which the outer pipe and the inner pipe are secured in outward direction with respect to each other.

[0021] For even further ease of mounting in the discharge structure according to the invention a discharge end piece can be placed in the outer end of the inner pipe, which discharge end piece is provided with discharge gas flow guiding means that are situated in flow line with the gas discharge line and in which the discharge end piece is provided with means for restraining the supply mouthpiece in outward direction, preferably in the form of stop surfaces.

[0022] Preferably said restraining means comprise stop surfaces cooperating with the end edge of the supply mouthpiece.

[0023] Preferably the end mouthpiece is attached here to the inner pipe, preferably by means of clamping it thereon.

[0024] It will be understood that the supply mouthpiece and/or discharge end piece can also be used in other discharge structures, for instance the one having a straight course from the boiler.

[0025] The invention further provides a pipe suitable for use as an inner pipe for the discharge structure according to the invention.

[0026] Preferably a pipe, formed as a unity having substantially an L-shape in side view and having a relatively long stretched portion and a relatively short portion perpendicular to it, is used as inner pipe member.

[0027] From a further aspect the invention provides a discharge structure for closed gas appliances, comprising two pipes extending concentrically into each other, in which the outer pipe and the inner pipe each have an inner end at the side of the boiler and an outer end at the side of the outside air, in which the inner pipe is a flue gas discharge pipe and both pipes define a annular line with each other for air supply to the boiler, the inner pipe comprising two portions, which in flow direction are in line which each other, forming a unity with each other and are situated at an angle to each other.

[0028] By using an inner pipe that is already provided with a bend, parts and their mounting are economized on. As a result furthermore fewer transitions, and thus fewer sealing provision are necessary and less potential condensation locations (corners) are present. Furthermore the freedom in making the bent portion of the outer pipe is increased as a result.

[0029] Preferably said angle is approximately 90 degrees, so that for the turning from horizontal to vertical for the inner pipe no further pipe parts are necessary in principle. In other words the inner pipe preferably comprises an elbow portion formed with it as a unity.

[0030] From another aspect the invention to that end provides a discharge structure for closed gas appliances, comprising two pipes extending concentrically into each other, in which the outer pipe and the inner pipe each comprise an inner end at the side of the boiler and an outer end at the side of the outside air, in which the inner pipe is a flue gas discharge pipe and both pipes define and annular line with each other for air supply to the boiler, in which at the inner end the inner pipe is provided with arched portion formed with it as a unity.

[0031] The invention will below be elucidated on the basis of the exemplary embodiments shown in the attached drawings, in which:

Figure 1 shows a disassembled side view on the discharge structure according to the invention, at the location of an exterior wall duct near a boiler;

Figure 2 shows a disassembled top view on the discharge structure of figure 1;

Figure 3 shows the discharge structure according to figures 1 and 2, in cross-section and in mounted situation;

Figure 4 shows a detail of the connection of the parts of the pipe bend according to the invention; and

Figure 5 shows a cross-section of an alternative arrangement of a pipe bend according to the invention.

[0032] In figure 1 the boiler arrangement 1 is shown, comprising a boiler 3 and a discharge structure 4 for it. The boiler 3 has a pipe stub 24 in the top side for connection of a gas discharge pipe and a pipe stub 25 situated concentrically around it for connection of an air supply pipe.

[0033] The boiler arrangement 1 is near an exterior wall or facade 2, in which a duct 11 has been made through which the discharge structure 4 can extend to form a connection between the outside air and the boiler 3, in particular the aforementioned pipe stubs 24, 25.

[0034] The discharge structure 4 comprises a first inner pipe 5 and a second inner pipe 9 telescopically and snugly accommodated therein, both pipes for instance made of aluminium. The first inner pipe 5 consists of a pipe portion 6 which is bend over 90 degrees and a straight pipe portion 7 formed with it as a unity. At the inner end the first inner pipe 5 is provided with an annular chamber 30 opening to the inside, in which a rubber sealing ring 18 can be accommodated for sealing against the pipe stub 24. At the outer end the first inner pipe 5 is provided with an annular chamber 28 opening to the inside, in which a rubber sealing ring 16

can be accommodated for sealing the straight pipe portion 7 against the second inner pipe 9.

[0035] The discharge structure 4 further comprises a straight outer pipe 8 and a second outer pipe 10 telescopically and snugly accommodated therein, both pipes for instance made of zenzidmir galvanized steal or synthetic material. Preferably the first outer pipe 8 is painted white for the sight inside the house. For the connection of the outer pipes 8, 10 to the pipe stub 25 a pipe bend 19 is provided, which is bent around the centre point M, over 90 degrees with both the inner edge and the outer edge, as shown in figure 1. The pipe bend 19 can be made by means of injection moulding with synthetic material or an aluminium or aluminium alloy, and then be painted white for aesthetic reasons.

[0036] At the inner end the first outer pipe 8 is provided with an annular chamber 31 opening to the outside, in which chamber a rubber sealing ring 33 can be accommodated for sealing against the inner wall of the pipe bend 19. At the outer end the first outer pipe 8 is provided with an annular chamber 32 opening to the inside, in which chamber a rubber sealing ring 17 can be accommodated for sealing against the outer surface of the second outer pipe 10. The second outer pipe is furthermore provided with snap holes 29 at its outer end, of which snap holes the function will be explained below.

[0037] The pipe bend 19 is divided into two identical longitudinal halves 20a, 20b. Said longitudinal halves are designed such that they can easily be released from a mould. They are both provided with outer edges 40, 41 (see figure 41) with which they can be placed flat against to each other. The inner edges of said longitudinal halves are formed correspondingly. The outer edges 40, 41 -and therefore the inner edges as well- are formed with a tangential turn, to define a hook shape. By snapping a rubber profile 21 which is fittingly formed with it like a kind of zipper gasket over the joined edges 40, 41 the longitudinal halves 20a, 20b can thus be secured to each other along said edge and also ensure sealing of said edge. The longitudinal halves of the pipe bend may possibly be secured to each other by means of rivets or screws.

[0038] In figure 5 an alternative is shown, in which the inner end of the pipe bend 119 (which just like the pipe bend 19 is longitudinally divided) is slid into an annular groove 125 on the boiler an at the outer end is provided with a narrowed portion 123. Both longitudinal halves 122a, 122b are placed one after the other into the groove 125, then placed (plain joined) with their longitudinal edges against each other, and subsequently the pipe 110 is clampingly slid over the portion 123 with the inner end, after which the pipe bend 119 is retained at both ends. An additional fastener for the longitudinal edges can be dispensed with here, as a result of the clamping at the ends. A sealing along said longitudinal edges could also possibly be dispensed with.

[0039] In both cases the pipe bend 19, 119 can be retained independently from the inner pipe/inner pipe bend.

[0040] At the outer end the discharge structure 4 further comprises an air flow guide 12, for instance made of synthetic material or cast aluminium, comprising an outer ring 34, an inner ring 38 situated radially within it and axially outside of it and a number of radial fins 26 formed as a unity with said inner ring. At its inner surface the outer ring 34 is provided with snap protrusions (not shown), which can snap into the holes 29 in the second outer pipe 10, in order to fix the guide 12 on the pipe 10. The fins 26 abut the outer surface of the second inner pipe 9. The guide 12 thus provides a means for concentrically retaining the second inner pipe 9 with respect to the second outer pipe 10. At the outer end the inner ring 38 is provided with a shoulder flange 35 extending to the inside, against which the end edge of the second inner pipe 9 abuts. In this way the guide 12 provides a means for securing the second inner pipe 9 axially to the outside with respect to the second outer pipe 10.

[0041] At the inner end the air flow guide 12 is provided with a little flange 37, on which a rubber sealing sleeve 14 can be attached. At the outer end the air flow guide 12 is provided with an opening bounded by the flange 35, in which opening a gas flow guide or gas flow grid 13, for instance made by casting aluminium or an alloy of aluminium, can be clamp fittingly accommodated. Said grid 13 is provided with an middle bush 36 from which radial fins 27 extend. The fins 27 and the bush 36 are wing-shaped in cross-section for lowered flow resistance. The fins 27 at the outer end form an annular stop 39 extending to the inside, with which stop the end edge of the inner pipe 9 is retained. Thus the axial and radial securing of outer pipe 10 and inner pipe 9 is achieved.

[0042] The mounting takes place in the following manner. The parts 9, 10, 12 and 13 and sleeve 14 are pre-assembled in the factory. A snap connection is realised in the holes 29 and the gas flow guide 13 is clampingly fixed.

[0043] Said assembly is inserted into the hole 11 from the outside. Subsequently the first outer pipe 8, which has been provided with rubber rings 17 and 33 beforehand, is slid from the inside around the second outer pipe 10. Subsequently a sealing sleeve 15 is placed on the inner end of the first outer pipe 8, is that said sleeve, just like sleeve 14, is pressed against the surface of the wall 2 and the passage 11 outside the outer pipe 8/10 is closed off. After that the inner pipe 5, which has been provided with rings 16 and 18 beforehand, is slid into the second inner pipe, and the inner end is fitted onto the pipe stub 24 -possibly after rotation about the centre line of the straight pipe portion-.

[0044] The outer pipes 8, 10 and the inner pipes 5 and 9 are brought at the correct length by extending or retracting. The rubber ring 23 is placed on the pipe stub 25. Finally the two shells or longitudinal halves 20a, 20b

with profiles 21, 22 are taken and placed on either side around the pipe bend 6, the ends abutting the rubber rings 33 and 23, and the longitudinal edges against each other. By attaching the rubber profiles 21 and 22 on the joined longitudinal edges after that, the pipe bend 19 is also secured. The pipe bend is then held concentrically with respect to the inner pipe by the pipe stub 25 and the outer pipe 8. The inner pipe 5 is retained concentrically with respect to the outer pipe by the pipe stub 24 and the air flow guide 12. No additional means are needed for concentrically retaining the parts of the discharge structure.

[0045] Thus the discharge structure 4 is simple to build up and can easily and quickly be placed without tools. The flow resistance is low because there are no transitions and the presence of broad pipe bends, both in the gas discharge and in the air supply.

[0046] When the inner pipe 5 is formed by bending this entails the advantage that the wall thickness desired for bending also renders the inner pipe particularly suitable for accommodation in condensing arrangements.

Claims

1. Discharge structure for closed gas appliances, comprising two pipes extending concentrically into each other, in which the outer pipe and the inner pipe each comprise an inner end at the boiler side and an outer end at the side of the outside air, in which the inner pipe is a flue gas discharge pipe and both pipes define an annular line with each other for air supply to the boiler, in which the outer pipe at the inner end is provided with a pipe bend which consists of at least two members, that are provided with connection surfaces which extend at least with a directional component in flow direction, in which the pipe bend is held in its place in the discharge structure by having its ends attached to or on the parts of the air supply line connecting to the pipe bend.

2. Discharge structure according to claim 1, in which the connection surfaces extend in flow direction.

3. Discharge structure according to claim 1 or 2, in which the pipe bend is built up from two shell members, which are preferably longitudinally divided.

4. Discharge structure according to claim 1, 2 or 3, further provided with profiles for sealingly clamping the members of pipe bend to each other.

5. Discharge structure according to claim 1, 2 or 3, in which the outer pipe is formed for radially engaging the outer ends of the pipe bend in a clamping manner, in which preferably the longitudinal edges are situated plain joined against each other.

6. Discharge structure according to any one of the preceding claims, in which the pipe bend is attached to the rest of the supply line only at it ends, on parts of the outer pipe that connect to the pipe bend.

7. Discharge structure according to any one of the preceding claims, in which the outer pipe is built up from pipe parts that are telescopically slidable with respect to each other.

8. Discharge structure according to any one of the preceding claims, in which at the outer end of the inner pipe a supply end piece is placed, which is provided with air flow guiding means that are situated in flow line with the annular line and with means for restraining the inner pipe in outward direction.

9. Discharge structure according to claim 8, in which the restraining means comprise stop surfaces cooperating with the end edge of the inner pipe.

10. Discharge structure according to claim 8 or 9, in which the supply end piece is furthermore provided with means for connection to the outer end of the outer pipe, preferably snapping means.

11. Discharge structure according to claim 8, 9 or 10, in which a discharge end piece is placed in the outer end of the outer pipe, which end piece is provided with discharge gas flow guiding means that are situated in flow line with the gas discharge line and in which the discharge end piece is provided with means, preferably stop surfaces, for restraining the supply mouthpiece in outward direction, in which the discharge mouthpiece is attached to the inner pipe, preferably by clamping.

12. Discharge structure according to any one of the preceding claims, in which the inner pipe is built up from pipe parts that are telescopically slidable with respect to each other.

13. Discharge structure according to any one of the preceding claims, in which the inner pipe comprises two portions, which in flow direction are in line with each other, form a unity with each other and are at an angle of approximately 90 degrees with respect to each other and/or the inner pipe comprises an elbow formed with it as a unity.

14. Pipe bend suitable for use as pipe bend for the discharge structure according to any one of the preceding claims.

15. Pipe bend for the air supply line of discharge structures for closed gas appliances, which pipe bend

consists of at least two members, which are provided with connection surfaces that can be connected to each other during the placement of the discharge structure, which connection surfaces extend at least with a directional component in flow direction, in which the two members are provided with means for support on parts of the air supply line that are connected to the pipe bend.

16. Pipe bend according to claim 15, in which the connection surfaces extend in flow direction.

17. Pipe bend according to claim 15 or 16, in which the pipe bend is built up from two shell members.

18. Pipe bend according to claim 17, which is longitudinally divided.

19. Pipe bend according to any one of the claims 15-18, in which the inner edge is bent, preferably with a same curvature centre point as the outer edge of the pipe bend.

20. Pipe bend according to any one of the claims 15-19, further comprising means for holding the connection surfaces plain joined to each other.

21. Method for fitting a discharge structure to gas appliances, provided with a gas discharge line and an air supply line situated concentrically around it, in which first of all an inner pipe part for gas discharge is connected to the gas appliance and after that an outer pipe part that consists of two or more longitudinal members is arranged from aside around the inner pipe part, the longitudinal members are placed against each other, in particular connected to each other and the outer pipe part is connected to the gas appliance.

22. Method according to claim 21, in which a pipe, formed as a unity having substantially an L-shape in side view and having a relatively long stretched portion and a relatively short portion perpendicular to it, is used as an inner pipe part.

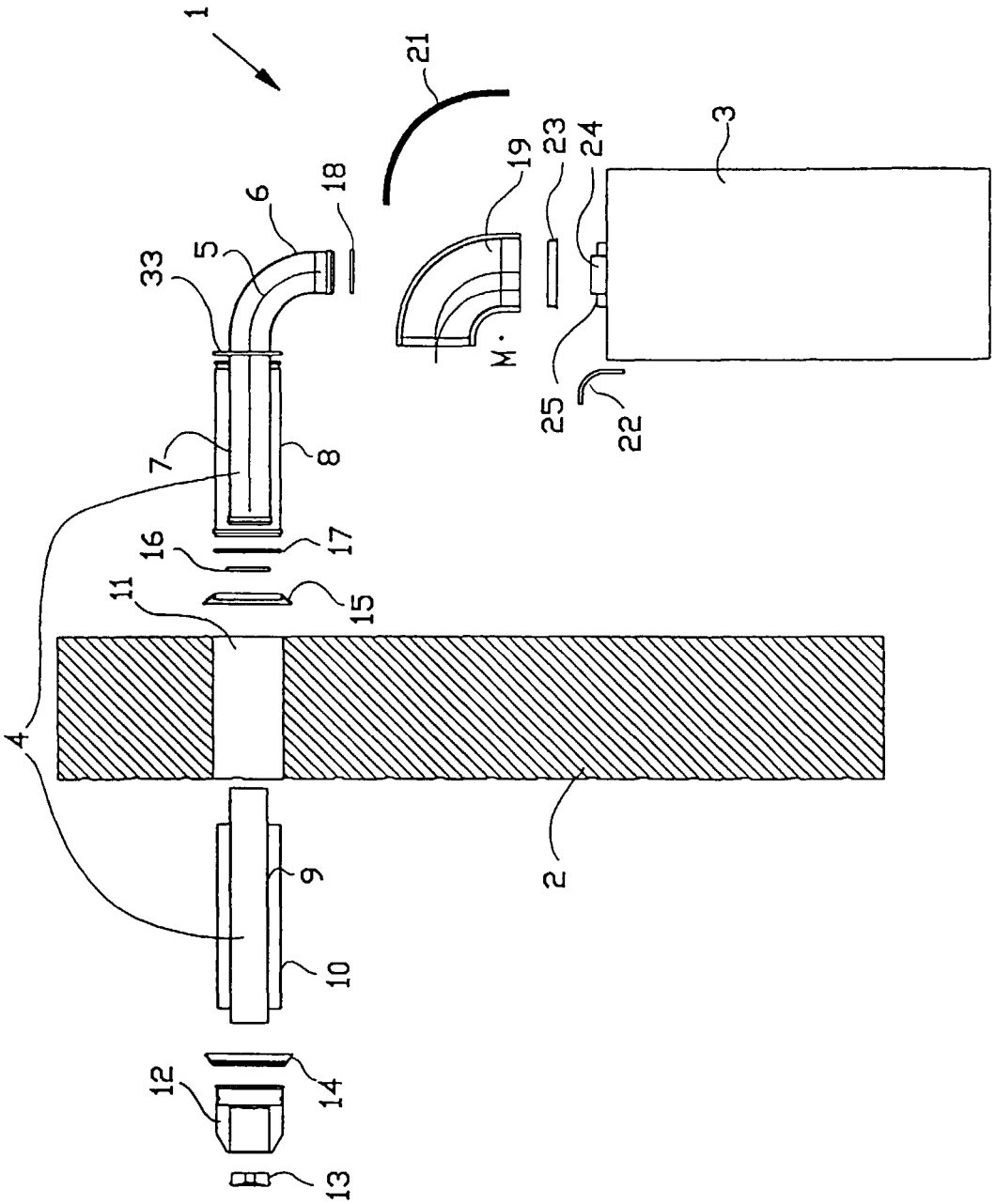

FIG. 1

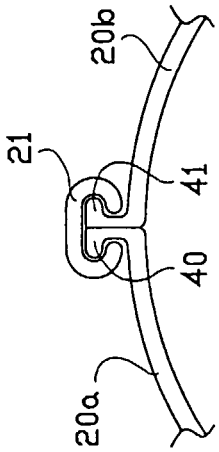

FIG. 4

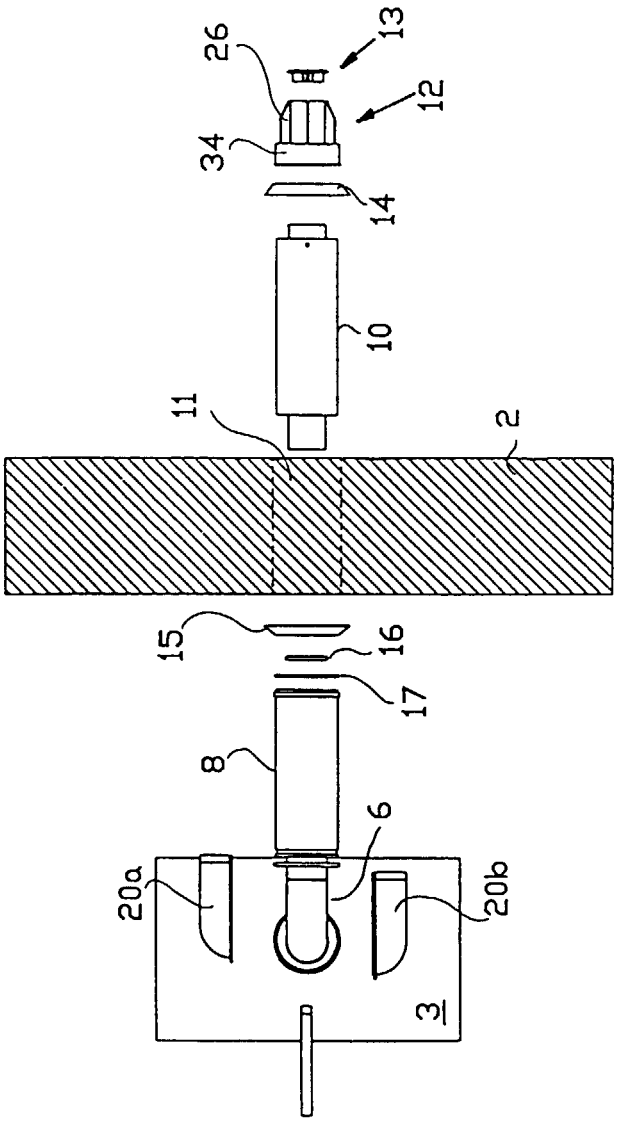

FIG. 2

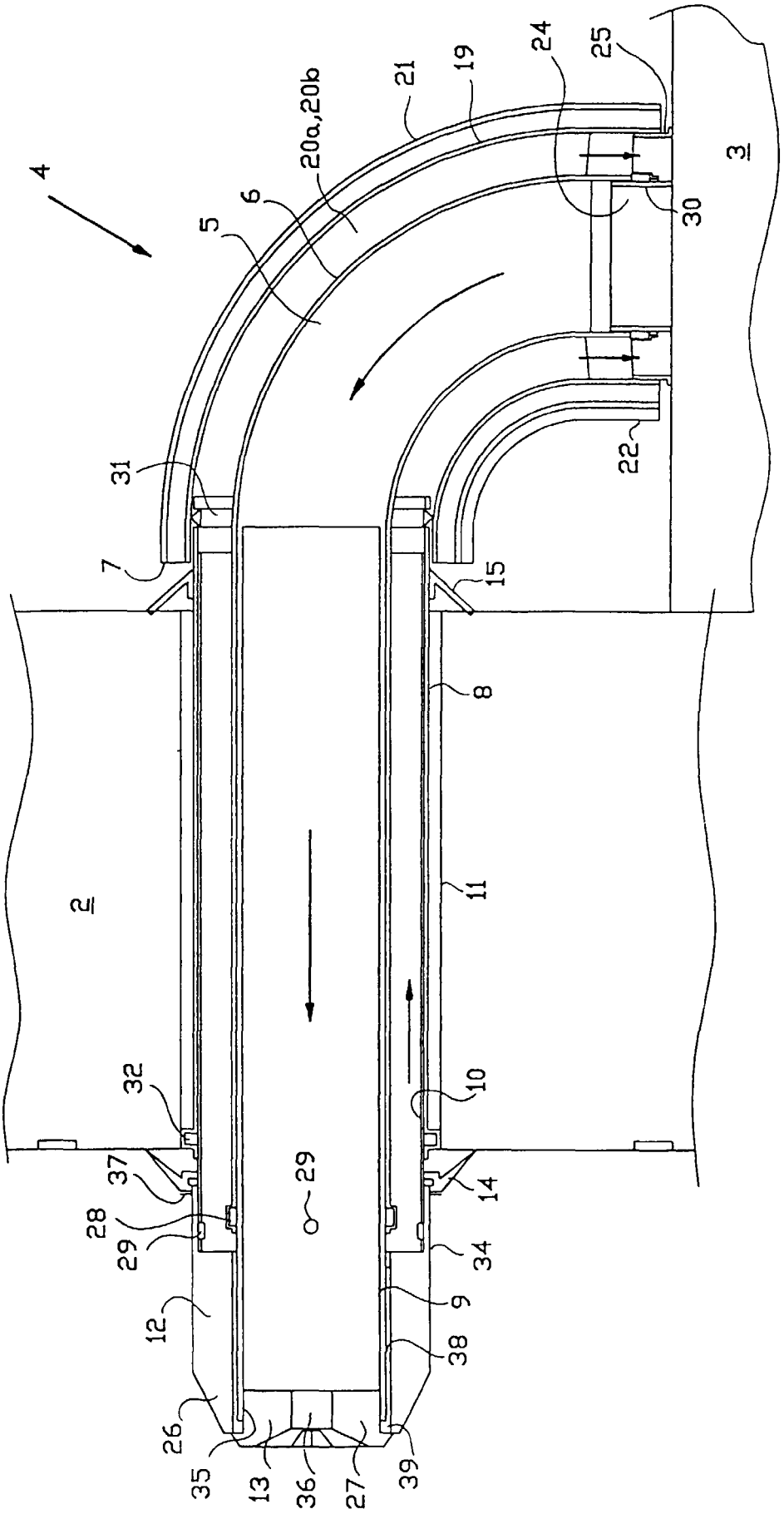
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FIG. 3

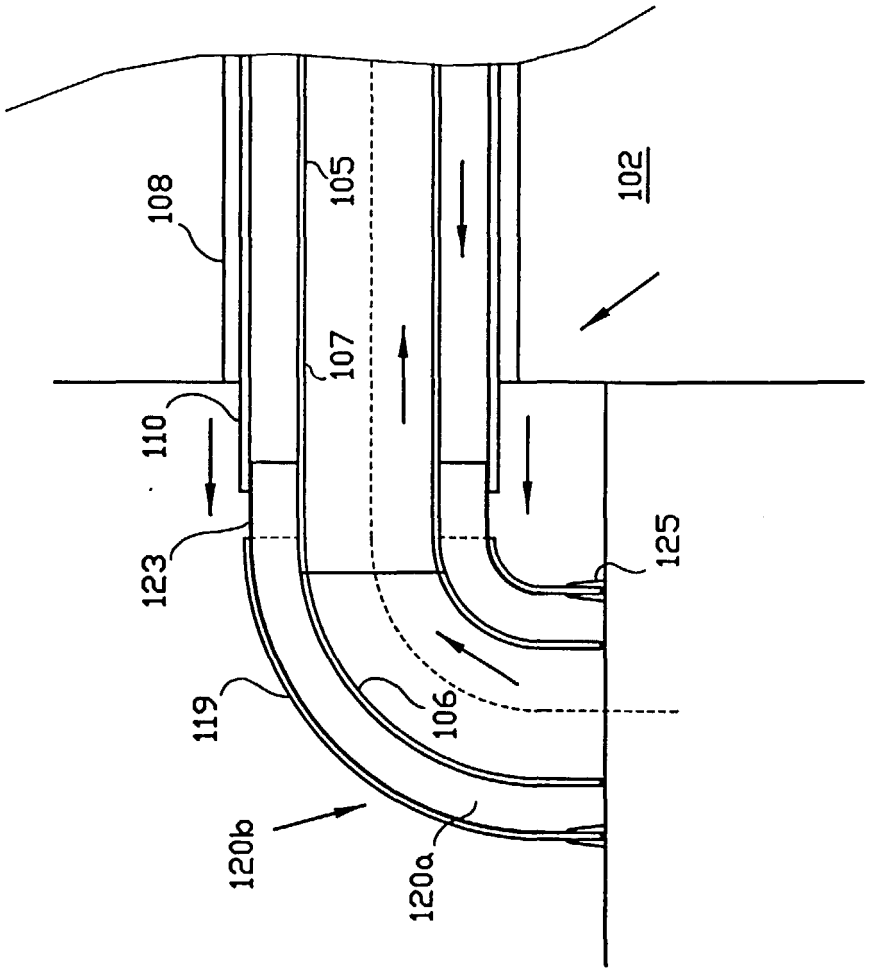

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 3410

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 December 2000	Coli, E

CATEGORY OF CITED DOCUMENTS

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