

"CONNECTING DEVICE FOR THE PIPES IN A
TEMPERATURE-CONTROLLING DEVICE FOR CURTAIN WALLS"

This invention relates to a connecting device for
5 the weld-free connection of pipes, which essentially meet
perpendicularly. It is of particular application to the
connection of pipes in the pipe-system of a temperature-
controlling device for curtain walls.

With buildings comprising curtain walls having a
10 metal skeleton made up of columns and horizontal members to
which facade elements and, if required, window surfaces are
secured problems arise in achieving an even comfortable
temperature within the rooms of the building. In general a
room is comfortable if the temperature therein and the
15 environmental temperature, when the air is substantially
stationary, are at about 20°C. The skeleton members of
curtain walls do not provide thermal insulation or resist
the transmission of heat and thus, as a rule, the room
temperature is lower than the comfort temperature.

20 If people in a room stay near a curtain wall they
lose considerable heat via the cold metal structural members
during winter. In summer, on the contrary, the uprights and
horizontal members of the metal wall skeleton are heated by
solar radiation and in turn heat the room. Thus the comfort
25 of people inside the room is reduced because of the heat

transmitted from the heated curtain wall structure, more particularly when the skeleton is anodised or painted in dark colours, as is nowadays common.

In our co-pending Application No. 79 13683 (from
5 which the present application is divided) we have disclosed a device for controlling the temperature in rooms of such a building which has particular advantage in that it need not be included in the initial building design but can easily and inexpensively be incorporated in existing buildings,
10 while also permitting rapid and simple control of the room temperature. Said device comprises a temperature control means which is substantially in the form of a pipeline system in which a heat-transmitting fluid flows, and which is disposed inside a room and adjacent the metal skeleton of
15 columns and horizontal members of the curtain wall structure. The pipework is aligned relative to the skeleton so as to produce thermal coupling between the skeleton and the temperature-control means.

The pipework of the temperature-control means is
20 advantageously made up of straight pipes which meet so as to be substantially perpendicular to one another. This enables the system to be constructed in a particularly simple manner from easily manufactured components. Such components are particularly advantageous when a temperature-control
25 device is subsequently incorporated in existing buildings, since the system is easy to handle until it is finally installed. Desirably the meeting pipes are joined by weldless connections thus avoiding the

disadvantageous effects of welding, more particularly changes in the microscopic structure of the welded parts and the risk of corrosion or changes in the shape of components resulting from the heat of welding with resultant localised stress concentrations.

An object of the present invention is to provide a connecting device which results in weldless connection of the pipes at the perpendicular junctions thereof.

To this end the invention comprises a connecting device for the weldless connection of pipes, which essentially meet perpendicularly, in the pipe-system of a temperature-controlling device for curtain walls, wherein an externally threaded bush is screwed into one end of a first pipe to be connected, which bush has an axially extending aperture for the through flow of a heat-transmitting fluid and a central threaded axial bore to receive a screw-threaded bolt which extends laterally of a second pipe which is connected with and disposed perpendicular to the first pipe so that the bolt clamps the two pipes to each other, and sealing rings are provided between the connected parts.

Preferably the bush is stepped with a threaded larger diameter portion which screws into the end of the first pipe, and a smaller diameter portion which extends into a side connecting bore in the second pipe. The bush can easily be produced by extrusion moulding, and said through flow aperture is desirably one of a plurality of

axially extending through apertures disposed around said central threaded bore. Conveniently a ring of six such apertures are provided.

5 The bush may be in the form of a sleeve with a larger length sleeve portion which projects from the end of the first pipe, into which the bush is screwed, so as to extend across the second pipe. In this case said bolt forms a closure plug which screws into the threaded bore at the outer end of the sleeve to secure the first pipe to the
10 second pipe in a fluid-tight manner, and the projecting portion has radial side apertures within the second pipe which communicate with said flow aperture in the bush.

The through flow aperture (or apertures) or the radial side apertures in the bush may be closable for
15 control purposes. The dead ends of pipes which meet perpendicularly at junctions in the pipe-system are advantageously fitted with screwed closure plugs. This renders the assembly of the individual components of the system particularly simple.

20 The invention will now be further described with reference to the accompanying drawings which illustrate, by way of example, two preferred embodiments of the invention. In the drawings:

Figure 1 is a detail view of a temperature-control
25 means with which said embodiments are advantageously used, including the attachment thereof to a curtain wall of a building shown in horizontal section;

Figure 2 is a cross-sectional view taken just above a pipe junction, illustrating use of the first preferred embodiment at the junction;

Figure 3 is a vertical cross-sectional detail view on
5 the line I - I in Figure 2;

Figure 4 is a view similar to that of Figure 3, but showing the second embodiment used at a pipe bend with two horizontal pipes and a vertical connecting pipe;

Figure 5 is a section on the line II - II in Figure 4;

10 Figure 6 is a corresponding cross-sectional detail view illustrating the second embodiment; and

Figure 7 is a cross-sectional view on the line III - III in Figure 6.

Figure 1 is a horizontal section through the wall
15 or facade 2 showing the temperature-control means 1 attached on the inner side thereof. The building facade comprises vertical columns of a metal skeleton 3 made up of columns and horizontal members and securing double-glazed glass panes 5, leaving insulation cavities 6 between the panes 5
20 and the columns. In the neighbourhood of regions 10, the columns can be integral parts of the facade 2 as shown and can secure facade elements or glass panes 5, again via insulating cavities 12.

The temperature-control means 1 comprises a
25 pipeline system of double pipes 20,21 disposed at a distance a, preferably 50 mm, from the vertical columns of the skeleton 3 which is to be temperature controlled. The

double pipes are aligned relative to the respective skeleton members, so as to provide a radiation thermal coupling between the means 1 and the members of the skeleton 3. The pipes 20,21 are formed integrally with radiation reflecting parts 23 of U-shaped cross-section. The means 1 is installed with the free ends of the section U of the parts 23 facing towards the skeleton members 3 which are to be temperature controlled.

Figure 2 illustrates the left-hand portion of the temperature-control means 1 in the neighbourhood of a pipe bend, shown in greater detail in Figure 3. At this bend straight individual pipes 25 are connected to a header pipe 26 disposed perpendicularly thereto, so that flow can occur from one pipe to the other, by means of a weldless screw connecting device. This avoids the disadvantages of a welded connection.

As shown more particularly in Figure 3 the screw connection comprises an externally-threaded bush 32 screwed into the end 31 of an individual pipe 25. As can be seen more clearly in Figure 2, the bush 32 has a ring of six axially-extending apertures 33 for the through flow of heat-transfer fluid flowing in the direction of the arrow A, and also an axially-extending central threaded bore 34. the threaded bore 34 receives a screw-threaded bolt 36 which extends through the pipe 26 and clamps it to the pipe 25, which extends perpendicularly to the pipe 26. Sealing rings 37 and 38 are provided in order to obtain a liquid-tight

joint between the connected parts.

The bush 32 is stepped with a larger diameter portion which is screw-threaded, for screwing into the pipe 25, and a shorter projecting portion which fits into a side
5 connecting bore in the pipe 26. This projecting portion is of somewhat shorter length than the wall thickness of the pipe 26.

As can be seen, a screw connection of this form is a simple way of connecting individual pipes (mainly standard
10 components) so that fluid can flow from one pipe to the other and so that the resulting temperature-control means can be installed in an existing building. Dead ends of pipes, more particularly the end 29 of the header pipe 26, can be fitted with a screwed closure plug 30, thus reliably
15 preventing leaks.

Figures 4 and 5 show a junction 28 between individual pipes at right angles to one another, using a bush 32 and a threaded bolt 36 as in Figure 3. In Figure 4, in contrast to the embodiment of Figure 3, two horizontal
20 pipes 26 are connected instead of two vertical pipes 25, and they are disposed in radiation-coupled relationship with horizontal members of the curtain wall skeleton.

The described connecting device can also be used for the inlet or the outlet of the temperature-control
25 means. The components in Figures 4 and 5 correspond to those of Figure 3, like parts being given the same references.

Figures 6 and 7 show another embodiment of a weldless connecting device at the bend between two pipes 43,44 which are to be connected so that a flow occurs from one pipe to the other, the pipes being at right angles to one another. One pipe 43 ends at 31 in an internal thread in screw-threaded engagement with a bush 40 in the form of a sleeve, with a larger diameter end portion which is externally threaded to screw into the pipe 43 and a projecting longer sleeve portion 46. Most of the bush 40 (in contrast to the bush 32 in Figures 2 to 5) thus projects from the end 31 of the pipe 43 to provide the sleeve portion 46 which extends through the second pipe 44, which is at right angles to the pipe 43, and the other end of the sleeve portion 46 has an internally-threaded bore 47 receiving a screw-threaded closure plug 48 which again acts as a clamping bolt. Sealing rings 37 and 38 connect the pipe 43 in a fluid-tight manner to the pipe 44 via the sleeve 40. Inside the pipe 44, the sleeve 40 has radial apertures 49 for the heat-conveying fluid 35, so that the fluid can flow in the direction of the arrow A during operation of the facility 1.

Depending on the required flow resistance, the radial side apertures 49 in the sleeve 40 can be closed to obtain a uniform flow resistance and thus balance the system. The axial flow apertures 33 in the bush 32 shown in Figures 2 to 5 can similarly be closed. The closure means for the individual apertures can be plugs or valves, or

washers or bushes, incorporated with the sleeve and partly covering the axial apertures 33 or the radial side apertures 49. Individual apertures can be steplessly closed if it is desired to make fine adjustments to the flow resistance of
5 an individual flow section of the system.



CLAIMS:

1. A connecting device for the weldless connection of pipes, which essentially meet perpendicularly, in the pipe-system of a temperature-controlling device for curtain walls, wherein an externally threaded bush is screwed into one end of a first pipe to be connected, which bush has an axially-extending aperture for the through flow of a heat-transmitting fluid and a central threaded axial bore to receive a screw-threaded bolt which extends laterally of a second pipe which is connected with and disposed perpendicularly to the first pipe so that the bolt clamps the two pipes to each other, and sealing rings are provided between the connected parts.

2. A connecting device according to claim 1, wherein the bush is stepped with a threaded larger diameter portion which screws into the end of the first pipe, and a smaller diameter portion which extends into a side connecting bore in the second pipe.

3. A connecting device according to either one of the preceding claims, wherein said aperture is one of a plurality of axially extending through apertures disposed around said central threaded bore.

4. A connecting device according to claim 1 or claim 2,



wherein the bush is in the form of a sleeve with a sleeve portion which projects from the end of the first pipe into which the bush is screwed so as to extend across the second pipe, said bolt is in the form of a closure plug which screws into the threaded bore at the outer end of the sleeve portion to secure the first pipe to the second pipe in a fluid-tight manner, and the sleeve portion has radial side apertures within the second pipe which communicate with said through flow aperture in the bush.

5. A connecting device according to any one of the preceding claims wherein the through flow aperture (or apertures) or the radial side apertures are closable.

6. A connecting device according to any one of the preceding claims, wherein the dead ends of pipes which meet perpendicularly at junctions in the pipe-system are fitted with screwed closure plugs.

7. A connecting device for the weldless connection of pipes, constructed and arranged substantially as herein particularly described with reference to Figures 2 to 5, or Figures 6 and 7, of the accompanying drawings.

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