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(54) **Industrial door**

(57) An industrial door comprises at least two leaves (4) that are coupled to one another by at least one hinge (7) defined by at least two sleeves (11, 12) arranged co-axially with respect to a fulcrum axis (6) of the two leaves

(4), a pin (13) inserted inside the sleeves (11, 12), and at least one thrust bearing (22) comprising a widened portion (23) arranged between the sleeves (11, 12) and a narrowed portion (24) blocked inside one of said sleeves (11, 12).

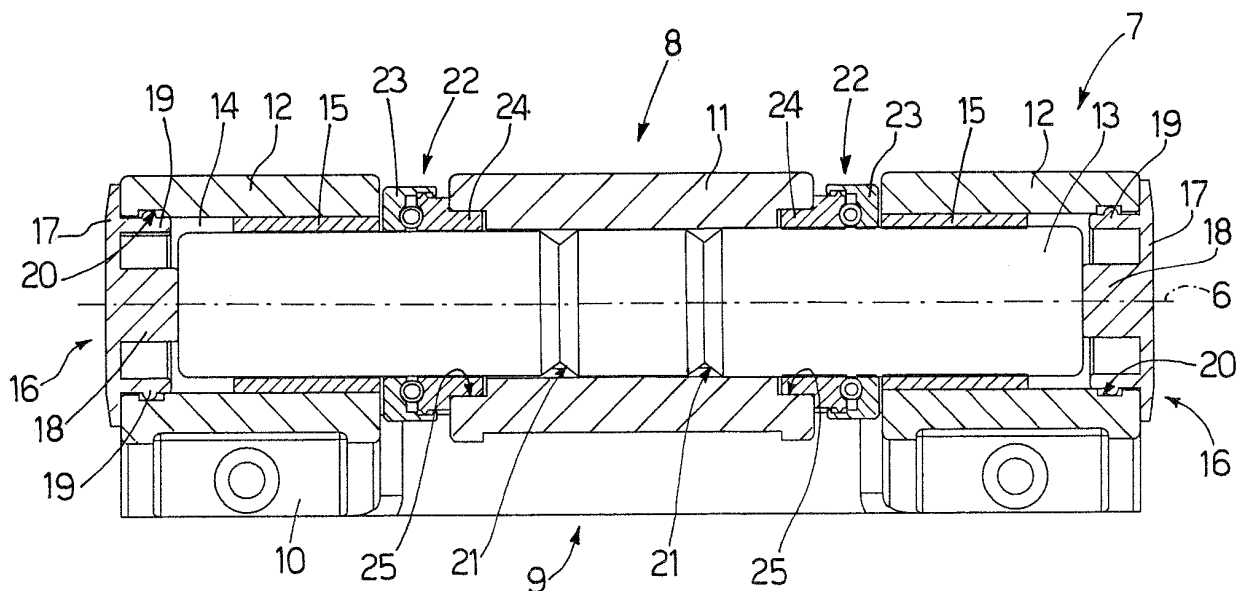


Fig.3

Description

[0001] The present invention relates to an industrial door.

[0002] To close openings made through the masonry structure of an industrial building, it is known to provide a door of the type comprising at least two leaves that are coupled to one another by means of at least one hinge so as to turn with respect to one other about a given fulcrum axis.

[0003] The hinge generally comprises two coupling members, each of which is fastened to a relative leaf, and is provided with at least one sleeve arranged coaxially with respect to said fulcrum axis, a pin inserted inside the sleeves, and at least one annular thrust bearing arranged between said sleeves.

[0004] Known industrial doors of the above type have some drawbacks principally resulting from the fact that the presence of the thrust bearing makes the job of installing the industrial door a very difficult operation on account of the fact that the installer must first arrange the thrust bearing between the sleeves and keep it in a coaxial position with respect to the fulcrum axis and then insert the pin into the sleeves and said thrust bearing.

[0005] It is an object of the present invention to provide an industrial door that overcomes the drawbacks described above and that is simple and inexpensive to produce.

[0006] According to the present invention there is provided an industrial door as set forth in the appended claims.

[0007] The present invention will now be described with reference to the accompanying drawings, which illustrate a non-limiting embodiment thereof, in which:

figure 1 is a schematic side view of a preferred embodiment of the industrial door according to the present invention;

figure 2 is a side view of a detail of the industrial door of figure 1;

figure 3 is a cross-section along the line III-III of figure 2; and

figures 4 and 5 are similar to figures 2 and 3 and illustrate an alternative embodiment of the detail illustrated in figures 2 and 3.

[0008] With reference to figure 1, designated as a whole by number 1 is a door mounted to close an opening 2 made through the masonry structure 3 of an industrial building.

[0009] The door 1 comprises a plurality of flat leaves 4 (in the case in point four vertical leaves 4), which have a substantially rectangular shape, and are hinged together in points corresponding to respective longitudinal edges parallel to a vertical direction 5 so as to turn with respect to one another about relative fulcrum axes 6 parallel to said direction 5.

[0010] According to an alternative embodiment that is

not illustrated, the leaves 4 may be arranged horizontally.

[0011] According to that illustrated in figures 2 and 3, the leaves 4 of each pair of adjacent leaves 4 are hinged together by means of at least one hinge 7 (in the case in point two hinges 7) comprising two coupling members 8, 9 provided with respective mounting plates 10 for fastening them to the relative leaves 4. The member 8 comprises a central sleeve 11 arranged coaxially with respect to the relative axis 6, while the member 9 comprises two lateral sleeves 12 arranged on opposite sides of the sleeve 11 coaxially with respect to said axis 6.

[0012] The members 8, 9 are rotatably coupled to one another by means of a substantially cylindrical pin 13, which is housed inside a tubular chamber 14 defined by the sleeves 11 and 12, has a diameter that is substantially equal to the diameter of the sleeve 11 and less than the diameter of the sleeves 12, and is coupled to each sleeve 12 via the interposition of a relative bushing 15 coaxial with the axis 6.

[0013] The chamber 14 is axially closed at the ends by two plugs 16 each comprising a respective head 17, which extends transversely with respect to the axis 6, and is arranged substantially in contact with the relative sleeve 12, a respective central shaft 18, which extends inside the chamber 14, and is arranged at a distance from the shaft 18 of the other plug 16 that is substantially equal to a length of the pin 13, and a respective plurality of elastically deformable hooks 19 (in the case in point four hooks 19), which are distributed uniformly around the relative shaft 18, and engage an annular recess 20 obtained on the inside surface of the relative sleeve 12.

[0014] Moreover, the pin 13 is blocked on the sleeve 11 by means of two threaded-shaft locking pins (not illustrated), which are distributed along the axis 6, and extend radially through the sleeve 11 to engage respective annular recesses 21 obtained on the outside surface of the pin 13.

[0015] The hinge 7 also comprises two thrust bearings 22, each of which extends round the pin 13, and comprises, in turn, a widened portion 23 arranged between the sleeve 11 and a relative sleeve 12 and a narrowed portion 24 housed, and blocked by interference, inside a cylindrical seat 25 obtained on the inside surface of the sleeve 11.

[0016] The alternative embodiment illustrated in figures 4 and 5 differs from that illustrated in figures 2 and 3 exclusively in that the seats 25 have been eliminated and replaced with similar seats 26, each of which is obtained on the inside surface of a relative sleeve 12.

[0017] The door 1 thus presents a number of advantages principally resulting from the fact that:

the hinges 7 are supplied to the installers of the door 1 already partially mounted, i.e. with the thrust bearings 22 blocked by interference on the sleeves 11 or 12; and

the shape of the plugs 16, i.e. the presence of the hooks 19 and of the shafts 18, makes final assembly

of each hinge 7 considerably easier, since this merely involves the simple operations of hooking the lower plug 16, inserting the pin 13 into the chamber 14 and arranging it so as to be in contact with the lower plug 16, blocking the pin 13 using said threaded-shaft locking pins (not illustrated) and hooking the upper plug 16.

Claims

1. Industrial door comprising at least two leaves (4) hinged to one another so as to turn with respect to one another about a given fulcrum axis (6); and at least one hinge (7) to couple the two leaves (4) together, the hinge (7) comprising two coupling members (8, 9), each of which is fastened to a relative leaf (4), and is provided with at least one sleeve (11, 12) coaxial with said fulcrum axis (6), a pin (13) inserted inside the sleeves (11, 12), and at least one thrust bearing (22) mounted between said sleeves (11, 12); and **characterized in that** the thrust bearing (22) comprises a widened portion (23) arranged between the sleeves (11, 12) and a narrowed portion (24) housed inside one of said sleeves (11, 12).
2. Industrial door according to claim 1, wherein the narrowed portion (24) is blocked by interference inside the relative sleeve (11, 12).
3. Industrial door according to claim 1 or 2, wherein the coupling members (8, 9) are provided one with a single said first sleeve (11) and the other with two second said sleeves (12) arranged on opposite sides of the first sleeve (11); a thrust bearing (22) being mounted between the first sleeve (11) and each said second sleeve (12).
4. Industrial door according to claim 3, wherein each second sleeve (12) comprises a seat (26) to house the narrowed portion (24) of a relative said thrust bearing (22).
5. Industrial door according to claim 3, wherein the first sleeve (11) comprises two further seats (25) opposite one another, each of which is suitable to house the narrowed portion (24) of a relative said thrust bearing (22).
6. Industrial door according to any one of the previous claims, wherein the hinge (7) also comprises at least one bushing (15) mounted between the pin (13) and a relative said sleeve (11, 12) coaxial with said fulcrum axis (6).
7. Industrial door according to any one of the previous claims, wherein the sleeves (11, 12) define a chamber (14) to house the pin (13) axially closed by means

of two plugs (16).

8. Industrial door according to claim 7, wherein each plug (16) comprises a plurality of elastically deformable hooks (19), which are distributed about said fulcrum axis (6), and are engaged in a recess (20) obtained inside the relative sleeve (11, 12), and a central shaft (18) to block the pin (13) in a given position along said fulcrum axis (6).
9. Industrial door according to any one of the previous claims, wherein the hinge (7) also comprises at least one coupling member to couple the pin (13) to one of said sleeves (11, 12).
10. Industrial door according to claim 9, wherein the pin (13) comprises at least one additional annular recess (21) coaxial with said fulcrum axis (6); the coupling member extending through a relative said sleeve (11) to engage said further recess (21).
11. Industrial door comprising at least two leaves (4) hinged together so as to turn with respect to one another about a given fulcrum axis (6); and at least one hinge (7) to couple the two wings (4) to one another, the hinge (7) comprising two coupling members (8, 9), each of which is fastened to a relative leaf (4), and is provided with at least one sleeve (11, 12) defining, with the sleeve (11, 12) of the other coupling member (8, 9), a housing chamber (14) arranged coaxially with respect to said fulcrum axis (6), a pin (13) inserted inside the chamber (14), and two plugs (16) to axially close said chamber (14); and **characterized in that** each plug (16) comprises a central shaft (18) to block the pin (13) in a given position along said fulcrum axis (6).

