

ROAD-SYSTEM FIRE STOP

The present invention relates to road-system fire stop equipment comprising at least one cover or plug, which can be arranged detachably in a frame intended to be fixed to the soil, to close off a gallery or an underground technical room which has to be protected from fires.

5 It applies to the type of road-system equipment which is installed, for example, in road-system or railroad tunnels, and subject to drastic safety standards, requiring that the technical equipment housed in the underground rooms that are closed off by road-system equipment must be effectively protected by this equipment for a predetermined period in case of a fire in the tunnel.

10 Road-system equipment is known that protects the technical equipment housed in the underground room, which is closed off by the covers or plugs of the equipment, and consists in providing one or more covers comprising a heat-insulating material arranged on top of each cover, or a plug, arranged in the support frame that is secured in the ground.

15 This known arrangement has the drawbacks of having a very complex and consequently expensive structure, and of being difficult to install, since subcovers must be available in the technical room before closing the latter with external covers or plugs. In addition, access to the technical equipment housed in the room is not easy, because the external covers or plugs have to be removed first so that then one
20 can reach the subcovers and remove them from the room.

The purpose of the present invention is to eliminate the above drawbacks of known fire-resistant road-system equipment.

For this purpose, the invention proposes road-system fire stop equipment comprising at least one cover or plug, which can be arranged detachably in a frame
25 intended to be secured to the ground to close off a gallery or an underground technical room which is to be protected from fires, and characterized in that it comprises a casing that is filled with a heat-insulating refractory material and is fixed detachably under the cover.

The equipment comprises at least a second cover, which can be arranged so it
30 rests on the frame in alignment and in the same plane as the first cover, and a second casing, which is filled with a heat-insulating refractory material and fixed detachably under the second cover.

Each cover is in the form of an inverted basin which is filled with a heat-insulating refractory material, and whose external upper wall is provided with
35 continuous passages which are also filled with the refractory material and just come in contact with the external face of the wall of the cover.

The external upper wall of each basin of the cover is surrounded by a gutter, which is delimited by the external walls of the cover and raised parallel to perforated lateral walls of the basin opposite the walls where the refractory material fills the peripheral gutter through the holes of the lateral walls of the basin.

5 The external walls of each cover and the bottom wall of the peripheral gutter constitute the seat of the cover and they can come to rest with their external faces respectively on the internal faces of the lateral walls of the frame, delimiting its opening and an internal peripheral ledge integrally connected to the lateral walls of this frame.

10 Each cover comprises lower peripheral walls that extend under the bottom wall of the peripheral gutter to delimit the inverted basin of the cover, where these lower peripheral walls are at a separation from the lateral walls of the frame when the cover is arranged so that it rests in the frame.

15 It is preferred for each casing or bottom, in the form of a box containing the heat-insulating refractory material, to be fixed detachably under the corresponding cover so that the end borders of the lower walls of the basin rest on the refractory material of the casing, and the free upper parts of the walls of the casing surround, with some separation, the lower walls of the basin when the cover is arranged in its frame.

20 Several threaded rods are anchored by their respective heads to the wall of the corresponding cover, perpendicularly under the latter wall, opposite, respectively, continuous passages in the wall of the cover so that the heads of these threaded rods are embedded in the refractory material filling these passages, and so that the threaded rods are partially embedded in the refractory material filling the basin of the cover,
25 protruding outside this material opposite the wall of the cover where the casing is fixed under the cover by threaded rods that traverse the refractory material of the casing, and where the lower wall forms the bottom of the casing, and is screwed by nuts to the threaded rods on the bottom wall of the casing.

30 The head of each threaded rod is anchored in a contact plate that is integrally connected to the internal face of the wall of the cover opposite the corresponding continuous passage of this wall.

35 The second cover presents a structure with an inverted basin which is filled with a heat-insulating refractory material that is substantially identical to that of the first cover, where the external upper wall of the second cover has one of its edges, which is not bordered by a gutter, such that it can be rest directly on the corresponding raised external wall of the first cover when the two covers are arranged in the frame, and the second cover comprises, under the border of its upper wall that

rests on the external wall of the first cover, a bar arranged with clearance below the corresponding bottom wall of the gutter of the first cover, by being opposite, with some separation, the corresponding lower wall of the basin of the first cover.

According to another embodiment, each cover is in the form of a basin filled
5 with a heat-insulating refractory material and comprises a peripheral ledge constituting the seat of the cover and delimiting the basin of the cover into two parts, an upper and a lower part, having a larger and smaller cross section, respectively, and the cover rests with its peripheral ledge on an integrally connected internal peripheral ledge of the lateral walls of the frame, so that the lateral walls of the upper part of the
10 basin rest on the internal faces of the lateral walls of the frame, and the lateral walls of the lower part of the basin are separated from the lateral walls of the frame.

Each casing containing the heat-insulating refractory material is fixed detachably under the corresponding cover of this other embodiment, so that the bottom wall of the basin rests on the refractory material of the casing, and the free
15 upper parts of the walls of the casing surround, with some separation, the lower part of the basin when the cover is arranged in its frame.

Several threaded rods with heads traverse the bottom wall of the basin, protruding perpendicularly under this wall, where the heads of these rods rest on the internal face of the bottom wall of the basin and are embedded in the refractory
20 material that fills the basin, and the casing is fixed under the cover by the threaded rods that traverse the refractory material of the casing and the bottom wall of the casing, and by nuts that are screwed to the threaded rods under the bottom wall of the casing.

The second cover of this other embodiment has one of its lateral walls, which
25 does not comprise a peripheral ledge part, present an upper part that can be placed directly on the upper part of the corresponding wall of the first cover when the two covers are arranged in the frame, and the second cover, which is integrally connected to its lateral wall, comprises a bar arranged with clearance below the corresponding ledge of the support wall of the first cover, by being opposite, with some separation,
30 the lower part of this support wall.

Advantageously, a heat-expandable joint is interposed between the bar of the second cover and the bottom wall of the gutter of the first cover or the ledge of the first cover.

The casing with refractory material, which is fixed under the second cover
35 identically to the casing of the first cover, extends in the same plane as the casing of the first cover, and one of its lateral walls faces, with some separation, the

corresponding lateral wall of the casing of the first cover when these covers are arranged in the frame.

A part forming a joint with the heat-insulating refractory material is fixed to at least one of the bottom walls of the casings of the two covers, so that it covers the
5 space between the two lateral walls opposite the two casings perpendicularly to this space.

Advantageously, the part forming the joint consists of a flat parallelepiped box covering the two bottom walls of the casings of the two covers, perpendicularly to the plane of the above-mentioned space, and containing the refractory material that can
10 consist of refractory concrete, or of one or more noncombustible heat-insulating superposed plates based on calcium silicate and alumina.

The lateral walls of each cover casing are separated from the lateral walls opposite the frame, and the bottom wall of each cover casing hangs over a lower peripheral ledge of the lateral walls of the frame, where a heat-expandable peripheral
15 joint is interposed between this ledge and the bottom wall of the casing.

Advantageously, the frame presents a modular structure with main beams and crosspieces which can be assembled detachably to each other to receive several juxtaposed covers.

The lateral walls of the frame are perforated and a heat-insulating refractory
20 material fills the openings of these walls before embedding the frame in the ground.

The refractory material that fills the basin of each cover is, for example, concrete cast into the basin in at least two layers that can present heat and mechanical resistance properties that differ from one layer to the other, and the material filling the openings of the main beam and crosspieces of the frame is also concrete cast into
25 these openings.

The material that fills each cover casing consists of concrete or one or more heat-insulating noncombustible superposed plates based on calcium silicate and alumina.

The continuous passages are in the form of oblong holes distributed over the
30 main portion of the surface of the upper wall of each cover.

Each cover is rectangular in shape.

Each casing can be replaced by another casing having a different height from that of the preceding one, and can be fixed detachably under the corresponding cover being filled with a heat-insulating refractory material.

35 The invention will be understood better, and other purposes, characteristics, details and advantages of the invention will become clearer in the following explanatory description, which is made in reference to the drawings in the appendix

that are given only as an example illustrating two embodiments of the invention, in which drawings:

- 5 - Figure 1 is a lower half-view with transverse cross section of a railroad tunnel comprising several road-system equipment items in accordance with the invention;
- Figure 2 is a perspective view from above of the road-system equipment of the invention with two covers arranged in a frame and filled with concrete;
- Figure 3 is a perspective view similar to that of Figure 2 with one of the covers removed from the frame, and the other cover empty;
- 10 - Figure 4 is a perspective view of a modular assembly with main beams and crosspieces of the frame of the road-system equipment of the invention;
- Figure 5 is a perspective view from below of one of the covers of the equipment of Figures 2 and 3;
- Figure 6 is an enlarged view of the circled part at VI of Figure 5;
- 15 - Figure 7 is a view of the cover of Figure 5 filled with a refractory material;
- Figure 8 is a perspective view of one of the covers of Figure 2;
- Figure 9 is a partial perspective view from below of the junction between the two adjacent covers of Figure 2;
- Figure 10 is an enlarged cross-sectional view along line X-X of Figure 2;
- 20 - Figure 11 is a perspective view of a casing fixed under one of the covers of the road-system equipment of Figure 2;
- Figure 12 is a cross-sectional view along line XII-XII of Figure 2; and
- Figure 13 is a cross-sectional view along line XIII-XIII of Figure 2;
- Figure 14 is a perspective view from above of road-system equipment
- 25 according to a second embodiment, and comprising two covers arranged in a frame;
- Figure 15 is a perspective view similar to that of Figure 14 with one of the covers removed from the frame, and the other cover empty;
- Figure 16 is a view from below of a cover filled with concrete according to this second embodiment;
- 30 - Figure 17 is a view from above of a cover of the second embodiment, which is not filled with concrete;
- Figure 18 is a cross-sectional view along line XVIII-XVIII of Figure 14;
- Figure 19 is an enlarged view of the circled part at XIX of Figure 18;
- Figure 20 is an enlarged cross-sectional view along line XX-XX of Figure
- 35 14; and
- Figure 21 is a an enlarged cross-sectional view along line XXI-XXI of Figure 14.

Figure 1 represents two road-system equipment items 1 of the invention, which can be installed in a railway tunnel T to close a technical room or gallery 2 in which technical installations are housed, such as, for example, electrical cables C.

Each road-system equipment item 1 is capable of protecting, for a
5 predetermined duration, the electrical installations in the technical gallery or room 2 from a considerable increase in the external temperature due to a fire propagating in the tunnel T.

The road-system equipment of the invention which is resistant to fire or acts as a fire stop will now be described in reference to Figures 2-13, for the case where this
10 equipment comprises two rectangular covers or plugs 3, 4, which are arranged detachably in a frame 5, in alignment and in the same plane, although it must be clearly understood that this equipment can be of the type comprising a single circular, triangular or rectangular cover or a plug, which can be housed in a frame, or several rectangular, or triangular plugs housed in the corresponding frame.

15 The cover plug 3 has the general shape of an inverted basin whose external upper flat wall 6 is provided with a large number of continuous passages 7, preferably in the form of oblong holes, occupying the majority of the surface of the rectangular wall 6 of the cover 3.

20 The upper wall 6 of the cover 3 is surrounded completely by a gutter 8, which is delimited by raised external walls 9 of the cover 3 which are parallel to the perforated walls 10 of the basin of this cover.

The frame 5 consists of a modular assembly of main beams 11 and crosspieces 12, which can be assembled to each other to define the four peripheral lateral walls 13 of the rectangular frame 5. As is more apparent from Figure 4, two main beams 11 on
25 the same side are assembled end to end by two external flat lugs 14, which extend perpendicularly to the corresponding main beams and are held together, in juxtaposition, by at least one bolt, not shown, traversing its lugs. This figure also shows that each crosspiece 12 is fixed at each end of a main beam by means of two flat lugs 14, which are integrally connected perpendicular to the corresponding main
30 beam 11, and to the end of the crosspiece 12, respectively, in its extension, so that the two lugs 14 can be fixed to each other by being held together, in juxtaposition, by at least one traversing bolt, not shown. Thus, this modular structure makes it possible to extend, in alignment with each other, other main beams 11 with the help of external lugs 14, depending on the number of covers one wishes to arrange in the frame 5.

35 The external walls 9 of the cover 3 and the bottom wall 15 of the peripheral gutter 8 constituting the seat of this cover have external faces resting, respectively, on

the internal faces of the lateral walls 13 of the frame 5 and an internal peripheral ledge 16 made of the same material as the walls 13 of the frame 5.

The cover 3 comprises four lower peripheral walls 17, which extend under the bottom wall 15 of the peripheral gutter 8 to delimit the inverted basin of the cover 3.

- 5 As is apparent notably from Figure 13, the lower peripheral walls 17 are at some distance from the lateral wall parts 13 of the frame 5, which are located below the bottom wall 15 of the gutter 8.

- The basin of the cover 3 is completely filled with a heat-insulating refractory material, consisting preferably of Concrete BF cast into the basin of the cover 3,
10 which is represented in its inverted position in Figure 5, so that the concrete not only fills this basin, but also the continuous passages 7 of the upper wall 6 of the cover 3, coming just in contact with the external face of this wall as well as the peripheral gutter 8 by passing through holes 10a of the lateral walls 10 of the basin of the cover 3. This filling with refractory material considerably decreases the thermal bridges
15 between the cover 3 and the technical room 2. Only the four passages 7 located at the four corners of the cover 3 are not filled with concrete and are used only for introducing a tool for lifting the cover 3 during an intervention in the technical room.

- Figure 7 shows the refractory concrete BF completely filling the basin of the cover 3 of Figure 5, so that the concrete is just in contact with the peripheral margins
20 of the lower walls 17 of this cover.

- It is preferred for two layers of refractory concrete to be cast successively into the cover 3, where these two layers can have different fire and mechanical resistance properties. Thus, the first layer of refractory concrete cast on the lower face of the plate 6 of the cover 3 can have a higher mechanical resistance than the second
25 underlying layer, and a lower fire resistance and/or lower heat insulation than the second layer.

- Before casting the refractory concrete into the inverted cover 3, a certain number of threaded rods 18, in the present case four, are anchored by their respective heads 19 in plates 20, so that the heads 19 are, respectively, opposite certain
30 continuous passages 7 with the rods protruding from the lower face of the wall 10 of the cover 3 perpendicularly to this face. By casting the concrete into the inverted cover 3, the concrete introduces itself particularly into the continuous passages 7 opposite the screw heads 19 to embed them in concrete and thus cut off any thermal bridge that may be created by the threaded rods 18. Once the inverted basin 3 has
35 been completely filled with the refractory Concrete BF, the end parts of the threaded rods 18 project from the concrete layer opposite the wall 6 of the cover 3.

A casing 21 in the form of a box with rectangular cross section, more clearly visible in Figure 11, which contains a heat-insulating refractory material, is fixed under the cover 3, so that the end edges of the lower walls 17 of the basin of this cover rest on the refractory material of the casing 21. The refractory material does not completely fill the casing 21, so that it leaves free the upper parts of the walls 22 of the casing, which surround, in a spaced manner, and along a space e1, the lower walls 17 of the basin of the cover 3, when the casing 21 is fixed under this cover, as can be seen notably in Figure 12. The casing 21, which contains the refractory material, is fixed under the cover 3 by the threaded rods 18 that traverse the refractory material BF of the casing and the corresponding perforations 23 provided in the bottom wall 24 of the casing 21, and by nuts 25 screwed to the free ends of the threaded rods 18 resting on the external face of the bottom wall 24.

The refractory material contained in the casing 21 can consist of refractory Concrete BF, or one or more layers of heat-insulating noncombustible plates based on calcium silicate and alumina, which in themselves are known.

The lateral walls 22 of the casing 21 are arranged opposite the lower parts of the lateral walls 13 of the frame 5, defining between themselves a space e2, and the bottom wall 24 of the casing 21 protrudes over a lower peripheral ledge 13a of the walls 13 of the frame 5 extending perpendicularly to these walls leaving a space e3 between this ledge and the wall 24, in which a joint J1 made of a heat-expandable material can be housed.

The walls 13 of the main beams 11 and crosspieces 12 of the frame 5 comprise openings in the form of windows 26, which are filled with a refractory material, preferably refractory concrete, before the frame is embedded in the ground.

The second cover 4 of the road-system equipment 1 presents the general structure of an inverted basin filled with a refractory material, which is substantially identical to the structure of the first cover, so that the elements of the cover 4 that are identical to those of the cover 3 bear the same reference numerals and are not described again.

The difference between the cover 4 and the cover 3 concerns the fact that the upper wall 6 of the cover 4 is only bordered by the gutter 8 on three of its sides, and the free edge of the fourth side of the wall 6 rests directly on the adjacent raised external wall 9 of the cover 3, and the cover 4 comprises, on this edge resting on the adjacent wall 9 of the cover 3, a bar 27 extending transversely between the main beams 11 of the frame 5, engaging under the bottom wall 15 of the gutter 8 located below the adjacent wall 9 of the cover 3, and forming a clearance e4 between the upper face of the bar 27 and the lower face of the wall 15 of the gutter. A heat-

expandable joint J2 can be housed in the space e4. In addition, the bar 27 is arranged opposite, with some separation, the adjacent lower wall 17 of the basin of the cover 3. This assembly makes it possible to produce a fire stop baffle.

5 A casing 21, identical to the casing 21 of the cover 3, is fixed under the cover 4 in the same manner as the casing 21 of the cover 3 with the help of sets of threaded rods 18 that traverse the refractory material contained in the casing 21 of the cover 4 and with nuts 25 that are screwed to the free ends of these threaded rods.

The two casings 21 extend adjacently in the same plane with two of their lateral walls 22 adjacent to each other, and separated by a space e5.

10 A relatively flat parallelepiped box 28, filled with a heat-insulating refractory material, such as, for example, concrete or one or more heat-insulating noncombustible superposed layers based on calcium silicate and alumina, is arranged in part on the external faces of the two bottom walls 24 of the adjacent casings 21, by covering, perpendicularly to the walls, the space e5 of the adjacent walls 22 of the
15 casings 21, so as to increase the properties of fire resistance and/or heat insulation of the road-system equipment.

It is preferred for the casing 28 to be fixed, for example, by welding, in part to the wall 24 of one of the casings 21, for example, the one that is fixed under the cover 4, where said wall extends perpendicularly to the wall 22 of the casing 21 and
20 protrudes below this wall to rest directly under the bottom wall 24 of the other casing 21 when the cover 4 is arranged in the frame 5 engaging under the cover 3. Thus the casing 28 extends perpendicularly to the plane of the space e5.

Figures 14-21 represent another embodiment of the fire stop road-system equipment of the invention.

25 According to this embodiment, the elements of the road-system equipment that present the same structure and fulfill the same functions as those of the first embodiment described above bear the same reference numerals and are not described in detail again; only the elements of the second embodiment that are different from those of the first embodiment will be described below.

30 Thus, each of the covers 3, 4 of the road-system equipment consists of a basin that is right side up and comprises a peripheral ledge 15 constituting the seat of the cover and delimiting the basin of this cover into two peripheral parts, an upper 9a and lower 9b peripheral part, which have larger and smaller transverse cross sections, respectively, where the lower part 9b of the peripheral walls 9 of the basin of the
35 cover 3, 4 is connected to the bottom wall 9c of the basin. The cover 3, 4 rests with its peripheral ledge 15 on the internal peripheral ledge 16 of the lateral walls 13 of the frame 5, so that the lateral walls 9 of the upper part 9a of the basin rest on the internal

faces of the lateral walls 13 of this frame, and the lower part 9b of the lateral walls 9 of the basin are at some distance from the lateral walls 13 of the frame 5, as one can see more clearly in Figure 21.

Each basin of the covers 3, 4 is completely filled with a heat-insulating refractory material, such as concrete B, in such a manner that they embed the plates 29, for example, four such plates, as represented in Figure 5, which protrude from the internal face of the bottom wall 9c of the basin and whose upper ends comprise oblong holes 29c for introducing a tool or key for lifting the cover 3, 4 from its frame 5, where the refractory material BF is cast into the basin to come just in contact with the ends of the plates 29.

The bottom wall 9c of the basin of each cover 3, 4 comprises perforations, for example, four perforations, for the passage of the threaded rods 18, whose heads 19 rest on the internal face of the bottom wall 9c in such a manner that the threaded rods project from the bottom wall 9c, perpendicularly to the latter. The threaded rods 18 are held so that they are integrally connected to the cover 3, 4 by the refractory material embedding the heads 19 of these rods in the basin.

As can be seen more clearly in Figure 19, all the threaded rods 18, heads 19 and nuts 25 make it possible to detachably fix the casing 21 under the corresponding cover 3, 4, so that the bottom wall 9c of the basin of this cover rests on the heat-insulating refractory material, such as concrete, which fills the casing 21. In addition, the lateral walls 22 of this casing are separated by their upper parts from the lower part 9b of the peripheral walls 9 of the cover 3, 4, along a peripheral space e1, thus cutting off any thermal bridge. As represented in Figure 20, the cover 4 has one of its lateral walls 9 not comprising a ledge 15, but a bar 27 integrally connected exterior to this lateral wall 9 and engaging below the ledge 15 of the other cover 3, along an area e4 when these two covers 3, 4 are arranged in the frame 5 in side-by-side opposition closing the latter. In this position, the upper part 9a of the wall 9 of the cover 4 rests on the upper part 9a of the lateral wall 9 of the cover.

The road-system equipment of the invention constitutes an adaptable modular set that effectively resists fire while being also mechanically resistant, and it is easy to handle in practice like a conventional cover to gain access to the technical installations housed in the underlying gallery or technical room.

The road-system equipment is arranged in such a manner that it eliminates almost all the thermal bridges that can conduct heat into the underground room. As a nonlimiting example, the road-system equipment is capable of maintaining the internal temperature of the room 2 at a value below 100°C for two hours while the external temperature is approximately 1100°C.

The road-system equipment of the invention is adaptable, that is, its fire stop performances can be improved by replacing the lower casing of the cover with another casing having a greater height, so that it can be filled with a greater thickness of heat-insulating refractory material without changing the cover.

Claims

1. Fire stop road-system equipment, comprising at least one cover or plug (3; 4), which can be arranged detachably in a frame (5) intended to be fixed to the ground, to close a gallery or an underground technical room to protect it from fires, characterized in that the cover (3) is completely filled with a heat-insulating material, and in that the casing (21) completely filled with a heat-insulating refractory material is fixed detachably under the cover (3).

2. Road-system equipment according to Claim 1, characterized in that it comprises at least a second cover (4), which is completely filled with a heat-insulating refractory material, and which can be arranged so it rests in the frame (5), with alignment and in the same plane with respect to the first cover (3), and in that a second casing (21), which is completely filled with a heat-insulating refractory material, is fixed detachably under the second cover (4).

3. Road-system equipment according to Claim 1 or 2, characterized in that each casing (21) is fixed detachably under the corresponding cover (3, 4) through the intermediary of several threaded rods (18) traversing the refractory material of the casing (21) and its bottom wall (24), and of nuts (25) screwed to the threaded rods (18) on the bottom wall (24) of the casing (21), where the threaded walls (18) have heads that are embedded in the refractory material of the cover (3).

4. Road-system equipment according to any one of the preceding claims, characterized in that each cover (3; 4) is in the shape of an inverted basin, which is filled with a heat-insulating refractory material and whose external upper wall (6) is provided with continuous passages (7), which are also filled with the refractory material in contact with the external face of the wall (6) of the cover (3; 4).

5. Road-system equipment according to Claim 4, characterized in that the external upper wall (6) of the cover of the basin of each cover (3; 4) is surrounded by a gutter (8), which is delimited by raised external walls (9) of the cover parallel to the perforated lateral walls (10) of the basin opposite the walls, and in that the

refractory material fills the peripheral gutter (8) through the holes (10a) of the lateral walls (10) of the basin.

6. Road-system equipment according to Claim 5, characterized in that the external walls (9) of each cover (3; 4) and the bottom wall (15) of the peripheral gutter (8) constitute the seat of the cover (3; 4), able to rest with their external faces, respectively, on the internal faces of the lateral walls (13) of the frame (5), delimiting its opening and an internal peripheral ledge (16) integrally connected to the lateral walls (13) of this frame (5).

7. Road-system equipment according to Claim 6, characterized in that each cover (3; 4) comprises lower peripheral walls (17) that extend under the bottom wall (15) of the peripheral gutter (8) to delimit the inverted basin of the cover, where these lower peripheral walls (17) are at some distance from the lateral walls (13) of the frame (5) when the cover (3; 4) is arranged so that it rests in the frame (5).

8. Road-system equipment according to Claim 7, characterized in that each casing (21) containing the heat-insulating refractory material is fixed detachably under the corresponding cover (3; 4), so that the end edges of the lower walls (17) of the basin rest on the refractory material of the casing (21), and the free upper parts of the walls (22) of the casing (21) surround, with some separation, the lower walls (17) of the basin when the cover (3; 4) is arranged in its frame.

9. Road-system equipment according to any one of the preceding claims, characterized in that the threaded rods (18) are anchored with their heads (19) to the wall (6) of the corresponding cover (3; 4), perpendicularly under the wall, opposite, respectively, continuous passages (7) of the walls (6) of the cover (3; 4), so that the heads (19) of these threaded rods (18) are embedded in the refractory material filling these passages, and the threaded rods (18) are partially embedded in the refractory material filling the basin of the cover (3; 4), protruding to the exterior from this material opposite the wall (6) of the cover (3; 4).

10. Equipment according to Claim 9, characterized in that the head (19) of each threaded rod (18) is anchored in a plate (20), which is integrally connected to the internal face of the wall (6) of the cover (3), opposite the corresponding continuous passage (7) of this wall.

11. Road-system equipment according to one of Claims 2-10, characterized in that the second cover (4) presents a structure with an inverted basin filled with a heat-insulating refractory material, which is substantially identical to that of the first cover (3), in that the external upper wall (6) of the second cover (4), at one of its edges which is not bordered with a gutter, can be positioned resting directly on the corresponding raised external wall (9) of the first cover (3) when the two covers (3, 4) are arranged in the frame (5), and in that the second cover (4) comprises, under the edge of its upper wall (6) that rests on the external wall (9) of the first cover (3), a bar (27) arranged with clearance (e4) below the wall of the corresponding bottom wall (15) of the gutter (8) of the first cover (3) by being opposite, with some separation, the corresponding lower wall (17) of the basin of the first cover (3).

12. Road-system equipment according to Claim 1 or 2, characterized in that each cover (3; 4) is in the form of a basin, which is filled with a heat-insulating refractory material and comprises a peripheral ledge (15) constituting the seat of the cover and delimiting the basin of the cover into two parts, an upper part (9a) and a lower part (9b), having larger and smaller sections, respectively, and in that the cover (3, 4) comes to rest with its peripheral ledge (15) on the internal peripheral ledge (16), which is integrally connected to the lateral walls (13) of the frame (5), so that the lateral walls (9) of the upper part (9a) of the basin rest on the internal faces of the lateral walls (13) of the frame (5), and the lateral walls (9) of the lower part of the basin are at some distance from the lateral walls of the frame (5).

13. Equipment according to Claim 12, characterized in that each casing (21) containing the heat-insulating refractory material is fixed detachably under the corresponding cover (3; 4) in such a manner that the bottom wall (9c) of the basin rests on the refractory material of the casing (21), and the free upper parts of the walls (22) of the casing (21) surround, with some separation, the lower part of the basin when the cover (3; 4) is arranged in its frame (5).

14. Road-system equipment according to Claim 12 or 13, characterized in that the threaded rods (18) with heads (19) traverse the bottom wall of the basin, protruding perpendicularly under this wall, where the heads (19) of these rods rest on the internal face of the bottom wall of the basin and are embedded in the refractory material that fills the basin.

15. Equipment according to one of Claims 12-14, characterized in that the second cover (4), at one of its lateral walls (9) which does not comprise peripheral ledge part (15), has an upper part (9a) that can be placed so it rests directly on the upper part (9a) of the corresponding wall (9) of the first cover (3) when the two covers (3, 4) are arranged in the frame (5), and in that the second cover (4) comprises, as an integral part of its lateral wall, a bar (27), which is arranged with clearance (e4) below the corresponding ledge of the support wall of the first cover (3) by being opposite, with some separation, the lower part of this support wall.

16. Road-system equipment according to Claim 11 or 15, characterized in that a heat-expandable joint (J2) is interposed between the bar (27) of the second cover (4) and the bottom wall (15) of the gutter (8) of the first cover (3), or the ledge of the first cover (3).

17. Road-system equipment according to one of Claims 2-16, characterized in that the casing (21) with refractory material, which is fixed under the second cover (4) identically to the casing (21) of the first cover (3), extends in the same plane as the casing (21) of the first cover (3), and it has one of its lateral walls (22)

opposite, with some separation, the corresponding lateral wall (22) of the casing (21) of the first cover (3) when these covers (3, 4) are arranged in the frame (5).

18. Road-system equipment according to Claim 17, characterized in that a part, which forms a joint with heat-insulating refractory material (28), is fixed to at least one of the bottom walls (24) of the casings (21) of the two covers (3, 4) in such a manner that it covers the space (e5) between the two opposite lateral walls (22) of the two casings (21) perpendicularly to this space.

19. Road-system equipment according to Claim 18, characterized in that the part that forms a joint consists of a flat parallelepiped box (28) covering the two bottom walls (24) of the casings (21) of the two covers (3, 4), perpendicularly to the plane of the space (e5) and containing the refractory material consisting of refractory concrete or one or more heat-insulating noncombustible superposed plates based on calcium silicate and alumina.

20. Road-system equipment according to one of Claims 2-19, characterized in that the lateral walls (22) of each casing (21) of the cover (3, 4) are at some distance from the opposite lateral walls (13) of the frame (5), and the bottom wall (24) of each cover casing (21) protrudes over a lower peripheral ledge (13a) of the lateral walls (13) of the frame (5), and a heat-expandable peripheral joint (J1) is interposed between this ledge (13a) and the bottom wall (24) of the casing (21).

21. Road-system equipment according to any one of the preceding claims, characterized in that the frame (5) presents a modular structure of main beams (11) and crosspieces (12) that can be assembled detachably to each other to receive several juxtaposed fire stop covers (3, 4).

22. Road-system equipment according to any one of the preceding claims, characterized in that the lateral walls (13) of the frame (5) are perforated, and a heat-insulating refractory material fills the holes (26) of these walls before embedding the frame (5) in the ground.

23. Road-system equipment according to any one of the preceding claims, characterized in that the refractory material that fills the basin of each cover (3, 4) is concrete that has been cast into the basin in at least two layers, which can present different heat and mechanical resistance properties from one layer to the other, and the material that fills the holes (26) of the main beams (11) and crosspieces (12) of the frame (5) is also concrete cast into these holes (26).

24. Road-system equipment according to any one of the preceding claims, characterized in that the material that fills each cover casing (21) consists of concrete or one or more heat-insulating, noncombustible superposed plates based on calcium silicate and alumina.

25. Road-system equipment according to any one of the preceding claims, characterized in that the continuous passages (7) are in the shape of oblong holes distributed over the main portion of the surface of the upper walls (6) of each cover (3, 4).

26. Road-system equipment according to any one of the preceding claims, characterized in that each cover (3) has a rectangular shape.

27. Road-system equipment according to any one of the preceding claims, characterized in that each casing (21) can be replaced by another casing having a different height from that of the preceding one and fixed detachably under the corresponding cover while being filled with a heat-insulating refractory material.