ARRANGEMENT FOR CONTROLLING THE FLOW OF PEOPLE IN THE ENTRANCE OF AN AIR-RAID OR OTHER SHELTER

INVENTORS

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BY

Michael J. Striker
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Fig. 2

Fig. 3

INVENTORS
Joachim Neeff
Rudolf Schiötz
Michael Funk

BY
Michael J. Storke

J. NEEFF ET AL
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It is the object of the present invention to overcome the aforementioned disadvantages by providing an arrangement for controlling the flow of people in the entrance of an air-raid or other shelter, especially a shelter closable by sluice gates, which comprises two fixed walls laterally bounding the entrance of the shelter and defining a free passage cross section narrowing in wedge fashion towards the shelter, and a swingable door for blocking the free passage cross section and defining an opening gap adjustable in width.

In connection with the narrowing of the passage cross section the arrangement proposed by the invention provides the advantage of narrowing the flow of people already at a relatively large distance before the opening gap of the swingable door and of largely eliminating a danger of injuries and of permitting a controlled number of persons to pass by varying the width of the opening gap, and this number can be adjusted to the respective requirements, especially those of sluice operation. A further essential advantage of the invention consists in that at the beginning of admission it is possible, by opening the swingable door to an appropriate extent, to let in relatively large numbers of people in a short time, but to restrict the passage towards the end of admission so that overfilling of the shelter is avoided and the operation of the sluice is not impaired. In addition, the arrangement proposed by the invention provides the possibility of opening the swingable door only so far that each time only one person can pass as may, for example, be desired when simultaneously with the admission a counting operation of radiation control is to be carried out.

The swingable door which in any case is so arranged that it opens inwardly may be of single-leaf construction and may be so arranged that it forms one of the two boundary walls narrowing the entrance from the side in wedge fashion. Preferably, however, the swingable door is of two-leaf construction and the leaves which are arranged at an angle relative to each other and define the opening gap therebetween form the two boundary walls narrowing the entrance in wedge fashion.

The leaves of the swingable door which may be controlled from the inner space of the shelter and supervised, e.g. by a television system, are expediently operated by means of double-acting hydraulic rams in such a manner that they can be adjusted as desired with respect to the width of their opening gap and can be fixed in the open and closed positions. Expediently the control arrangement is such that two sluice gates are provided for blocking access to the shelter and the swingable door is adapted to be controlled in dependence on said sluice gates in such a manner that it can be opened only in the open position of the sluice gate which is the first in the direction of entry into the shelter but is closed in the closed position of said first sluice gate.

In a particularly expedient embodiment of the arrangement proposed by the invention at least one guide rail is arranged parallel to the direction of entry of the people and the leaf of the swingable door is longitudinally shiftably and simultaneously swingably mounted on its lateral edge remote from the opening gap by means of the guide rail, and at least one supporting lever is provided on which the leaf is pivotally mounted on its lateral edge adjacent the opening gap and a fixed pivot is provided in the region of the boundary wall for supporting the rear end of the supporting lever on the side of the leaf facing the entrance face of the shelter. Compared with a simple pivotal mounting of the leaves of the swingable door on the fixed lateral boundary walls this embodiment of the invention affords the advantage that the closing movement of the leaf or leaves, in spite of the fact that the leaves narrow in wedge fashion towards the opening gap, takes place in the direc-
tion of the flow of people thronging towards the entrance of the shelter while the opening movement of the leaf or leaves is not impaired by the flow of people. A further substantial advantage consists in that in this construction the swingable door, due to the fact that its leaves are supported on the rear side in the region of the lateral edges adjacent the opening gap, is in all positions of operation with a larger or smaller opening gap and especially in the closing position considerably safer against yielding under the pressure of large crowds of people thronging towards the entrance of the shelter.

Especially for this purpose it is of advantage to mount and arrange the pivotable supporting levers so that they extend in the closed position of the door substantially perpendicularly to the associated leaves of the door.

According to an expedient further development of this embodiment the pressure medium operated rams serving for actuating the leaves of the door may be pivotally mounted on the fixed boundary wall and may have a movable operating member (cylinder or piston rod) pivotally mounted with its free end on the supporting lever at a relatively large distance from the fixed pivot thereof, the rams being so arranged that they engage the supporting lever with a substantially perpendicular working line in the closed position of the door. However, it is also easily possible and generally to be preferred that the pivotally mounted rams firmly on the boundary walls adjacent the guide rail parallel thereto and to pivotally mount the movable operating member with its free end on the lateral edge of the leaf of the door facing the fixed boundary wall. The disadvantage of having to use rams of greater length is counterbalanced in this case by the advantage that the rams may be firmly mounted and a pivotal mounting may be avoided and, due to the absence of a lever transmission, the rams work with greater efficiency and reliability of operation.

The guide rail may, for example, be a circular guide, expediently of hollow construction, and the leaf of the swingable door may be provided with a guide roller or similarly acting guide member engaging in the hollow rail to form a positive guiding arrangement for the leaf of the door. Expediently a guide rail is arranged above and below the leaf of the swingable door and at least one supporting ram as well as the rams or operating the leaf is arranged in the central vertical region of the leaf.

It is, however, also possible and in some cases advantageous to associate with each leaf of the swingable door only one guide rail anchored in the central vertical region on the lateral boundary wall, as well as two or even three supporting rams which either engage only at the upper and lower ends or, if necessary, also in the central vertical region of the leaf of the swingable door. Further, it is evidently also possible to associate two operating rams, instead of only one, with each leaf of the swingable door.

The lateral edges of the leaves of the swingable door adjacent the opening gap are expediently provided with closing pads to avoid injuries and these closing pads may be constructed so as to yield against spring action.

Two embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIG. 2 is a ground plan view, on a larger scale, of a swingable or folding door;

FIG. 3 is an elevation view of the folding door of FIG. 2;

FIG. 4 is a ground plan view, likewise on a larger scale, of another embodiment of the folding door, and

FIG. 5 is an elevation view of the folding door of FIG. 4.

FIG. 1 shows a shelter with an inner space 1, a sluice chamber 2 and an entrance 3. The lateral boundaries of the entrance 3 are formed by two parallel walls 5 and 5a and in the region of a compression-proof and gas-tight sluice gate 4, which is the first in the direction of entry of the people, the direction of entry of the entrance 3 is restricted by two projecting portions of the walls 5 and 5a. Another gateway, the second in the direction of entry of the people, after the one closable by the sluice gate 4, can also be closed by a compression-proof and gas-tight sluice gate 7 and is located between the sluice chamber 2 and the inner space 1 of the shelter and laterally displaced relative to the first gateway by an amount substantially corresponding to the width of the latter the displacement being due to a projecting wall 6.

A folding door with two swingable leaves 9 and 9a serves to control the flow of people in the entrance 3 and can be actuated by two conventional hydraulic rams 10 and 10a associated with the swingable leaves. The sluice gates 4 and 7 as well as the swingable leaves 9 and 9a of the folding door can be actuated or controlled from conventional type hydraulic control means, e.g. a control console 8. The direction of the flow of people leading in the shelter in the event of a catastrophe is indicated by the arrow x.

As shown especially in FIGS. 2 and 3, the two leaves 9 and 9a of the folding door are swingably mounted by means of hinge bearings 11 and 11a sunk and anchored in the walls 5 and 5a and a conventional type of rams firmly mounted on the boundary walls adjacent the guide rail parallel thereto and pivotally mounted the movable operating member with its free end on the lateral edge of the leaf of the door facing the fixed boundary wall, the advantage of having to use rams of greater length is counterbalanced in this case by the advantage that the rams may be firmly mounted and a pivotal mounting may be avoided and, due to the absence of a lever transmission, the rams work with greater efficiency and reliability of operation.

In the embodiment shown in FIGS. 4 and 5 the opening gap 12 is bounded by two swingable leaves 16 and 16a of a folding door which are arranged substantially at right angles relative to each other in the closed position so that they narrow the entrance 3 of the shelter in wedge fashion in the direction towards the shelter. Two parallel guide rails 17 and 17a are arranged on each side of the entrance 3 of the shelter and firmly anchored in the walls 5 and 5a above and below the swingable leaves 16 and 16a which are mounted in the guide rails 17 and 17a so that they can be shifted longitudinally therein and simultaneously swung across the entrance 3. Guide rollers 18 and 18a are arranged on the swingable leaves 16 and 16a and engage in the guide rails 17 and 17a which are of hollow construction and together with the guide rollers 18 and 18a form a positive guiding arrangement for the swingable leaves 16 and 16a.

On the lateral edge adjacent the opening gap 12 each of the swingable leaves 16 and 16a is pivotally mounted on a supporting lever 19 or 19a, respectively, which engages the swingable leaf in the central vertical region thereof and extends substantially perpendicularly to the swingable leaf in the closed position thereof and is supported at its rear end by means of a pivot 20 or 20a, respectively, anchored in the lateral wall 5 or 5a respectively.

The swingable leaves 16 and 16a are actuated by double-acting hydraulic rams which are connected through the inner space of the shelter in the same manner as described with reference to the embodiment of FIGS. 1, 2 and 3.

In the embodiment according to the representation in the left-hand half of FIG. 4 a hydraulic ram 21 is swingably mounted on the wall 5a and pivotally mounted with its free end on the supporting lever 19 at a relatively large distance from the fixed pivot.
An arrangement as claimed in claim 1, wherein the double-acting pressure medium operated ram is a hydraulic ram.

An arrangement as claimed in claim 6, wherein the pressure medium operated ram serving for actuating the leaf of the door is firmly anchored on said one boundary wall adjacent the guide rail parallel thereto and has a movable operating member pivotally mounted with its free end on the lateral edge of the leaf of the door facing the fixed boundary wall.

An arrangement as claimed in claim 6, wherein said guide means is in the form of a hollow guide rail and a guide roller is arranged on the leaf of the swingable door and engages in the hollow rail to form a positive guiding arrangement for the leaf of the door.

An arrangement as claimed in claim 6, wherein a guide means is arranged above and below the leaf of the swingable door and at least one supporting lever as well as the ram for operating the leaf is arranged in the central vertical region of the leaf.

An arrangement for controlling the flow of people to the entrance of a shelter, especially an air raid shelter, comprising, in combination, two fixed boundary walls defining a passage to said entrance; a swingable door including at least one leaf mounted on one of said boundary walls and movable between a closed position blocking the passage and including a given angle with one of said walls and a plurality of positions in each of which said one leaf includes with said one wall an angle smaller than that given angle and defines an opening gap increasing as said angle decreases; moving means cooperating with said leaf for moving the same between said positions thereof; at least one sluice gate arranged in direction of movement of the people to said shelter rearwardly of said swingable door and movable between a closed position blocking access to said shelter and an open position; and control means in said shelter and controlling said moving means for opening of said swingable door only when said sluice gate is open and closing said swingable door when said sluice gate is closed.

An arrangement as claimed in claim 11, wherein said moving means includes a double-acting pressure medium operated ram controlled by said control means in said shelter.

An arrangement as claimed in claim 11, wherein said swingable door is of two-leaf construction the leaves of which are arranged at an angle relative to each other and define the opening gap therebetween narrowing from the two boundary walls toward the entrance in wedge fashion.

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DAVID J. WILLIAMOWSKY, Primary Examiner.
D. L. TAYLOR, Examiner.