RECOILING CLOSURE FOR SHELTERS AGAINST HEAVY EXPLOSIONS

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

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The present invention has for its object a new type of closure for such shelters as are designed to resist the blast attending the explosion of heavy projectiles, airplane bombs or shells.

It is characterized by the use of a massive block so movable that it can yield to the blow consequent to the pressure or blast caused by the explosion gases.

The momentum acquired by the closure in these conditions is then cushioned by a suitable brake or accumulated partly or totally in a storing device capable of holding the closure back to its original position, e.g. inclined guide surfaces, springs, or a cylinder with a piston adapted to compress a gaseous or a liquid fluid.

The recoil movement may be a rectilinear or a circular translation or a rotation about a suitable axis.

In the case of a rectilinear translation, which is the simplest one, the closure may either slide on the ground or roll along rails.

In the case of a closure designed to obturate a tunnel the closure will naturally assume the shape of a cylinder conforming the shape of the tunnel in which it will move in the fashion of a piston. It will be possible to retract it either into a branch of the tunnel or into a side chamber.

The tunnel may then constitute the brake cylinder in which the piston-like closure is movable. For that purpose it is only necessary to close the tunnel by means of bulkhead capable of resisting the air pressure generated by the recoil of the closure.

The thickness of the block providing the closure and the recoil-cushioning means will be ascertained by the usual resistance calculations in view of the shock resulting from the explosions to be expected.

An embodiment of a closure adapted to recoil in parallel motion is shown in the drawing appended hereto in which Fig. 1 is a longitudinal section, Fig. 2 a cross section, Fig. 3 a horizontal section showing how the closure can be returned by means of a windlass and Fig. 4 a vertical section showing how it is returned automatically to its original position.

The closure consists of a concrete block 1 the cross section of which is slightly less than that of the tunnel 2 which it is intended to close in a fluid-tight manner.

The weight of the said block is so calculated that the shock resulting from the explosion is converted into movement and the block itself is resiliently supported on trucks 3 the wheels or rollers 4 of which run on a track 5.

Arranged at the side of the block or in the tunnel wall are liquid-operated jacks 6 connected through a pipe system 7 with a pressure tank 8 secured to the block. The flow through the system is controlled with the aid of a valve 9 and a windlass 11; it can be pulled back to its original position with the aid of the cable 12 through the medium of a fixed return pulley 13.

With the block in position, the valve 9 is opened and the recoil of said block resulting from the shock consequent to the explosion is cushioned by the friction of the jacks and that of rest shoes 15 designed to limit the sag of the springs 16. With a 1000-ton block the recoil can be limited to 0.8 m. in the case of a very heavy explosion.

By arranging a retractable bulkhead 14 behind the door 1 the air compressed between said block 1 and said bulkhead 14 in the course of the instantaneous recoil of the block is availed of to return the block to its initial position.

Such a recovery of the momentum can also be achieved with the aid of an inclined guide surface.

The rolling movement of the block may be replaced by a sliding movement, e.g. by resting the block on a liquid.

What I claim is:

1. An installation giving an access to an underground shelter and adapted to shield the inside of said shelter from the effects of very heavy explosions occurring outside, which comprises a tunnel leading to the outside through an entrance and providing a communication between the open air through said entrance and the inside of the shelter, a siding adjacent to the tunnel, a massive block movable along the tunnel and the adjacent siding to close the tunnel, means to move the block into the siding clear of the tunnel whenever people have to be allowed in or out and to re-position the block at the entrance for the time the occupants of the shelter have to be protected against the effect of external explosions, means to decelerate the block as it recoils and to so limit the length of such a recoil that following the explosion the block will be brought to rest within the tunnel and further means adapted to make the aforementioned means operative upon the block being hauled to its shelter-shielding position and to make them inoperative when it is desired to design a move said block.

2. An installation giving an access to an un-
derground shelter and adapted to shield the inside of said shelter from the effects of very heavy explosions occurring outside, which comprises a tunnel leading from the outside into said shelter, a sideways leading from a point situated between the entrance to said tunnel and the shelter, a massive block adapted to close said tunnel arranged movable therein from the entrance to the same towards the blind end of said sideways clear of the tunnel whenever people have to be allowed in or out and to reposition the block at the entrance for the time the occupants of the shelter have to be protected against the effect of external explosions, means to decelerate the block as it recoils and to so limit the length of such a recoil that following the explosion the block will be brought to rest within the tunnel and further means adapted to make the aforementioned means operative upon the block being hauled to shelter-shielding position and to make them inoperative when it is desired to designedly move said block.

3. An installation giving an access to an underground shelter and adapted to shield the inside of said shelter against the effects of very heavy explosions occurring outside, which comprises a tunnel leading to the outside through an entrance and providing a communication between the open air through said entrance and the inside of the shelter, a siding adjacent to the tunnel, a massive block movable along the tunnel and the adjacent siding to close the tunnel, means to move the block into the siding clear of the tunnel whenever people have to be allowed in or out and to re-position the block in the entrance for the time the occupants of the shelter have to be protected against the effects of external explosions, jacks mounted in the block opposite the tunnel walls, jacks arranged in the block opposite the tunnel walls designed to be operated by means of a compressed fluid, a compressed fluid source on the block, a pipe leading from the compressed fluid source to the jacks through which same are caused at each explosion to deaden the recoil of the block and to so limit the recoil travel that after the explosion the block will be brought to rest within the tunnel and a valve in said pipe adapted to make said jacks operative once the block has been brought to shelter-shielding position in the outer end of the tunnel and to make them inoperative when it is desired to displace the block.

JACQUES MÉSNAGER.

REFERENCES CITED

The following references are of record in the files of this patent:

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<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
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<tbody>
<tr>
<td>1,243,377</td>
<td>Allison</td>
<td>Oct. 16, 1917</td>
</tr>
<tr>
<td>2,005,669</td>
<td>Potter</td>
<td>June 4, 1935</td>
</tr>
<tr>
<td>2,827,656</td>
<td>Lindsay</td>
<td>Jan. 7, 1941</td>
</tr>
</tbody>
</table>