

RESCUE SLEEVE FOR BUILDINGS

FIELD OF THE INVENTION

5 The present invention relates to rescue systems for evacuating individuals trapped in high rise buildings in case of emergency situations such as fire or earthquake of the type disclosed in my PCT/IL00/00477 Patent Application published as WO 01/62138 on August 30, 2001 (hereinafter called "the WO Patent"), the contents of which being hereby incorporated by reference.

10 BACKGROUND OF THE INVENTION

 The systems disclosed in the WO Patent and further developments thereof (cf. my Israel Patent Application Nos. 139549, 139550, 145935, 147975) are stationary, namely designed to be permanently installed in buildings from which survivors are to be evacuated.

15 Therefore, salvation from "ordinary" high-rise buildings solely depends on the conventional firemen vehicular ladders. These ladders are of limited capacity in terms of height and evacuation rate.

 Hence, it is the general object of the present invention to provide a mobile rescue sleeve system.

20 It is a further object of the invention to provide the mobile rescue sleeve system with self-contained, remote-controlled, jaw-type system, serving to anchor the sleeve to window frames at high level building stories.

SUMMARY OF THE INVENTION

Provided according to the invention is a rescue system for evacuating individuals through a window frame of a high-rise building comprising a rescue sleeve foldable between a compact, standby position and an extended, sloping
5 down to ground level position, means for activating the ejection of the sleeve from the standby position to the extended position, and a compartment for accommodating the sleeve and a system operable to anchor the compartment to the window frame in a self-supporting fashion.

BRIEF DESCRIPTION OF THE DRAWINGS

10 These and additional constructional features and advantages of the invention will be more clearly understood in the light of the ensuing description of two preferred embodiments thereof, given by way of example only with reference to the accompanying drawings, wherein -

Fig. 1 is a general, schematic view of the mobile rescue sleeve system;

15 Fig. 2 is a sectional view of the sleeve ram-and-jaws system compartment, in the position about to break-through and reach for a window frame;

Fig. 3 shows the sleeve compartment in its anchored position;

Fig. 4 is a view taken along line IV-IV of Fig. 3;

Fig. 5 is an enlarged view of the ram-and-jaws system;

20 Fig. 6 is a sectional view taken along line VI-VI of Fig. 5;

Fig. 7 is a sectional view taken along line VII-VII of Fig. 3;

Fig. 8 is a sectional view taken along line VIII-VIII of Fig. 7;

Fig. 9 shows the system in the unfolded position of the sleeve; and

Fig. 10 illustrates a modified embodiment, using a spiral sleeve.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in Fig. 1, lifesaving crew truck 10 is equipped with a hydraulic boom 10a, carrying and lifting, by beam 10b, a rescue sleeve compartment 12.

5 The beam is freely insertable into and retractable from channel 16 as will be explained below.

The compartment 12 accommodates at the exit side thereof a rescue sleeve 18 (Fig. 2), e.g. of the type disclosed in the WO Patent, in the folded, standby state.

10 The other, entrance side of the compartment 12 stores a window-breaking ram-and-jaws system generally denoted 20.

The system 20 comprises two identical, symmetrically located ram-head displacing sub-systems 22a and 22b, operating in parallel as will now be described with reference to Figs. 5-8. The description will refer in detail to the
15 sub-system 22a, since the other, 22b is identical.

Referring to Fig. 5 there are provided a pair of L-shaped rails 24 and 26. The rail 24 is affixed to rail 28 and rail 26 to rail 30. The rail 28 is carried by rollers 32 and 34 on rails 36 and 38, respectively. Similarly, the rail 30 is carried by rollers 40 and 42 on the same rails 36 and 38. Consequently the
20 rails 24 and 26 can move in parallel towards and away from each other.

The mechanism for achieving that movement of the rails 24 and 26 includes a pneumatic cylinder 44 and piston 46. The cylinder 44 is supported by stands 48 and 50 (Fig. 6) rigidly affixed to the rails 36 and 38, respectively.

The piston 46 is coupled to the rails 24 and 26 by two pairs of scissors arms 54, 56 and 58, 60. The arms 54 and 58 are pivotally connected to the piston 46 by suitable mounting plates 62 and 64 and to the rail 24 by brackets 66 and 68, respectively; the arms 56 and 60 are pivoted to the plates 62 and 64 at one end, and, by brackets 70 and 72 to the rail 26 at their other ends, respectively. Hence, extraction of the piston 46 will displace rails 24 and 26 away from each other, and withdrawal of the piston will bring the rails closer down to the engaged position shown in Fig. 2.

The rail 24 of the sub-system 22a, together with its counterpart rail 80 of the sub-system 22b (see Figs. 4 and 6) carry one of two ram-and-jaw heads 82, whereas the rails 26 and 81 carry ram-and-jaw head 84.

The ram and jaw head 82 is preferably of a triangular cross-section, having a knife-edge leading end 82a, and an upright surface 82b (see Figs. 5 and 6); the same applies to the ram-and-jaw head 84.

Finally, there is provided a "floor" plate 86 at the lower level, between the sub-systems 22a and 22b, supported by rails 26 and 82 (see Fig. 7), on which rescued people will walk from the room window to the entrance of the rescue sleeve 18; for extra safety reasons, a bellows envelope 88 may be used to conceal the view and avoid the survivors panic when realizing the height from which they are about to glide down.

Referring now back to Fig. 2 there is shown a compressed gas container 90 conveniently serving an independent power source. The pressurized gas will

operate the piston 46, as well as activate the release/winding of the rescue sleeve 18 - all at the appropriate timing as will be described below.

The gas container 90 is thus connected by suitable valve remotely controlled device (not shown) to the cylinder 44, and also to upper and lower
5 cable winch units 92, 94 as schematically shown (see for details the WO Patent).

The operation of the rescue system is as follows:

The compartment 12 is attached by the beam 10b at the end of the boom
10a, to the socket 16, which is then raised and brought adjacent to and in
10 alignment with the window from which evacuation is intended to take place
(see Fig. 2). It should be emphasized that vehicular hydraulic booms can be
designed to reach levels higher than that of ordinary firemen ladders.

The boom 10a is maneuvered so that the ram 82, 84 breaks the outer
cover of the window, be it glass wall curtain and/or the windowpane.

15 Once penetration is achieved, following a command given by the
life-saving crew from the vehicle 10, the pneumatic cylinder 44 is charged with
compressed gas supplied by the container 90 and the ram-jaws opening
operation is started.

Of course, any equivalent prim-mover can be used such as battery
20 operated electrical motor.

The ram-jaws 82, 84 will thus become firmly anchored against the upper
and the lower concrete frame sides of the window, respectively (Figs. 3 and 4),

and the compartment 12 becomes self-supported against the outer wall of the building.

The truck 10 can now leave the scene, after withdrawal of the beam 10b from the socket 16 and folding down the hydraulic boom 10a.

5 Another remote control command is now given, effective to eject the sleeve 18, e.g. in the fashion described in the WO patent.

The survivors are able to step into the entrance side of the compartment 12 walking on the floor plate 86 towards the opening of the sleeve 12 and glide down.

10 In the embodiment illustrated in Fig. 10, the inclined sleeve is replaced by spiral sleeve 118 as disclosed in detail in my Israel Patent Applications No. 145935 or No. 147975. The remaining constructional details and the mode of operation are self-evident in view of the above and need not be described in greater detail.

15 Those skilled in the art to which this invention pertains will readily appreciate that numerous changes, variations and modifications can be effectuated without departing from the true spirit and scope of the invention as defined in and by the appended claims.

WHAT IS CLAIMED IS:

1. A rescue system for evacuating individuals through a window frame of a high-rise building comprising a rescue sleeve (18) foldable between a compact, standby position and an extended, sloping down to ground level position, means (92, 94) for activating the ejection of the sleeve (18) from the standby position to the extended position, and a compartment (12) for accommodating the sleeve (18) c h a r a c t e r i z e d by a system (20) operable to anchor the compartment (12) to the window frame in a self-supporting fashion.
2. The rescue system as claimed in Claim 1 further c h a r a c t e r i z e d in that the system (20) comprises upper and lower jaw members (82, 84) configured to embrace respectively the upper and lower window frame sides from the inside of the outer wall.
3. The rescue system as claimed in Claim 2 further c h a r a c t e r i z e d in that the jaw members (82, 84) are carried each by a pair of rails (24, 80; 26, 81), means (22a; 22b) being provided for displacing one pair of rails (24, 80) away from the other pair of rails (26, 81) in parallel to each other.
4. The rescue system as claimed in Claim 3 further c h a r a c t e r i z e d in that the rails (24, 26) are supported by rollers (32, 40) running along rails (36, 38) extending perpendicular to the rails (24, 26).
5. The rescue system as claimed in Claim 3 further c h a r a c t e r i z e d in that the displacing means (22a) comprise a pneumatic cylinder (44) and piston (46) coupled to the rails (24, 26) by pivotal scissors arm assemblies

(54, 58; 56, 60), a compressed air container (90) being provided for selectively driving the piston (46).

6. The rescue system as claimed in Claim 1 further characterized in that the sleeve ejecting means (92, 94) are selectively operable by pressurized air charged from the container (90).
7. The rescue system as claimed in Claim 6 further characterized by a bellows envelop (88) surrounding the system (20).
8. The rescue system as claimed in Claim 1 further characterized in that the compartment (12) is adapted to be carried and lifted by mobilized boom (10a).
9. The rescue system as claimed in Claim 8 wherein the boom (10a) comprises a beam (10b) freely insertable into and out of a channel (16) integrally formed with the compartment (12).
10. The rescue system as claimed in Claim 1 wherein the sleeve (18) is adapted to slope down in an inclined fashion.
11. The rescue system as claimed in Claim 1 wherein the sleeve (118) is adapted to slope down in a spiral fashion.