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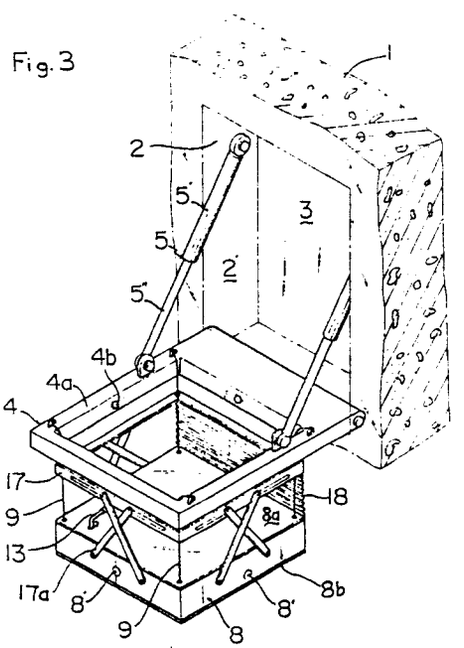
(54) **Apparatus for assisting escape from a high building.**

(57) The apparatus comprises an escape exit (2) with a fire-resistant inner door (3) and an outer pivotable platform (4) which can be lowered under the control of arms (5) to a horizontal position. A person may descend from the platform by means of e.g. a rope ladder or by means of a carrier (8) which can be lowered mechanically.

Fig. 3



EP 0 218 764 A1

APPARATUS FOR ASSISTING ESCAPE FROM A HIGH BUILDING

This specification relates to apparatus for asisting escape from a high building, particularly when on fire, by means of an escape aperture provided in an outside wall of the building.

In case of a big fire in a high building, escape may be effected by using such means as a rope ladder or a wire rope hung from a window of the building. An alternative is for a rescue to be carried out by a helicopter or by a high ladder equipped on a fire truck moved to outside of the building. However, these alternatives may not be effective if the rescue attempt is not carried out quickly. Also, there are many cases where such attempts become futile because of the weather or neighborhood conditions restricting access. Thus, it is not possible to depend on these means only and it is desirable to provide fixed means of escape such as the rope ladder or wire rope, which can be kept in position or stored inside the building and used in case of emergency.

However, there are problems with the use of a rope ladder, wire rope or the like. Firstly, only one or a limited number of persons can escape at a time. Thus, there may be chaos and panic when persons have to wait for their turn. Secondly, when a fire is ablaze, escaping persons may be exposed to flames, smoke etc. through the window of the building. Thirdly, there is a danger that weak persons, e.g. children, the aged or infirm will not be rescued safely.

It is therefore an object of the apparatus disclosed herein to at least partially solve or alleviate the aforementioned problems.

Viewed from one broad aspect, apparatus disclosed herein is characterised by a fire resistant door mounted to permit access through the aperture and an emergency platform on the outer side of the aperture, the platform being pivotable between an inoperative position and a position in which it is substantially horizontal and can support one or more persons.

Thus, in the event of a fire, persons can pass through the escape aperture onto the platform which projects from the outside wall of the building. Here they will be protected by the fire resistant door, which will shield them from flames, smoke, fumes etc. The persons could then wait until rescue by a fireman's ladder for example, but preferably means are provided for enabling their descent to safety. Such means could comprise known apparatus such as a rope, rope ladder or the like which could be stored in a suitable place so as to be readily accessible. In one preferred arrangement an alternative means of enabling a low speed descent comprises a carrier which can be lowered from the platform. A braking system is provided to ensure a sufficiently low speed of descent for safety, and means may be provided for raising the carrier again. A fire resistant curtain or the like is preferably provided to protect persons whilst the carrier is being lowered.

The platform is preferably provided with a safety handrail and where a carrier is used, the handrail can be mounted on this and be collapsible. By this means, the carrier handrail will be erected when the platform is lowered to its operative position, ready for persons to be loaded into, and then lowered by, the carrier.

The platform, and where used the carrier, should preferably be sufficiently large to accommodate a number of persons.

In general, the platform will be pivoted downwardly into its operative position. This movement may be controlled by one or more telescopic arms or the like and these arms, or alternatively separate members, will act as struts to support the platform in the horizontal position. When in the inoperative condition, the platform and other components are preferably contained within the escape aperture in the wall. Thus, the base of the platform will be up against the wall whilst other parts will be within the wall occupying the space up to the fire resistant door.

Two embodiments of apparatus in accordance with the above and other broad ccncepts will now be described by way of example and with reference to the accompanying drawings, in which:-

Fig. I is a perspective view of a first embodiment of the apparatus;

Fig. 2 is a side sectional view showing the opened and closed conditions of the apparatus of Fig. I;

Fig. 3 is a perspective view of a second embodiment of the apparatus;

Fig. 4 is a side sectional view of the apparatus of Fig. 3; and

Fig. 5 is a side sectional view showing the apparatus of Fig. 3 in the closed condition.

With reference to Figs. I and 2, an outside wall I of a building is provided with an escape exit 2. A flame insulating door 3 made of heat resisting material is mounted on the inner side of the exit 2 with its upper end pivoted at 3'. An emergency Platform 4 is mounted on the outer side of the exit 2 with its lower end pivoted at 4'. Between the side walls 2' of the exit 2 and the inner sides of the emergency platform 4, a pair of expanding and contracting arms 5 are connected oppositely so as to enable the emergency platform to be located in a horizontal position when opened. Each arm com-

prises a cylinder 5' and a piston 5" engaged with each other expansively so that the emergency platform will be opened resiliently when a locking device (not shown) is released.

When the emergency platform 4 is positioned at such a low storey that a rope ladder 7 or a wire rope can be used safely, an equipment box 4" may be provided containing descending devices such as the wire ropes or rope ladders and may be positioned inside the emergency platform 4 as shown in Fig. 2. A handrail 6 is attached around the periphery of the emergency platform 4 and its height is moderate in view of the thickness of the wall of building. Persons can descend safely using wire rope or e.g. the rope ladder 7.

If the emergency platform 4 is positioned at a higher storey where it is dangerous to use rope ladders, wire ropes or the like, the emergency platform 4 is provided with a specially designed low speed descending carrier 8 as shown in Figs. 3, 4 and 5. In this arrangement, a rectangular aperture is provided in the emergency platform 4 leaving a peripheral part in the form of a frame 4a. The carrier 8 is mounted in the frame 4a when the emergency platform is closed as shown in Fig. 5. If the locking device (not shown) is released in case of emergency, the platform is opened by the resilient force of the expanding and contracting arms 5 to be supported in the substantially horizontal position as shown in Figs. 3 and 4. In this position the carier 8 projects downwardly below the frame 4a by a certain distance due to its weight and due to the reaction forces when the platform is stopped at its horizontal position by the arms reaching the limit of extension. Thus, the carrier 8 is suspended under the emergency platform and provides a space for the escaping persons.

The carrier 8 is attached to the frame 4a by four wire ropes. One end of each wire rope is attached to the frame 4a and the other end is wound on a reel I0 mounted in a space between the floor 8a and the bottom 8b of the carrier 8. The reel is mounted rotatably and is equipped with a brake wheel II and an associated brake lining I2 to control descent of the carrier. The brake wheel II is controlled by a handle I3 protruding from the floor 8a of the carrier 8. A gear wheel I4 is mounted coaxially with the reel I0 and is engaged with a gear I5, which can be rotated by turning a handle I6, so as to raise the carrier after it has been lowered by rewinding the cables 9 onto reel I0.

A handrail I7 is provided above the periphery of the carrier 8 and is connected to the carrier by four sets of crossed bars I7a. The wire ropes 9 pass through holes bored at each corner of the handrail I7. As shown in Fig. 4, since the horizontal distance from the perpendicular centre line of the carrier 8 to the hole of the handrail through which the wire rope passes is longer than the horizontal distance from the centre line to the first point on the carrier at which the wire rope is supported, the tension of the wire ropes 9 which slide frictionally through the bores keeps the handrail I7 from sliding downardly to the floor of the descending carrier thereby providing a safer enclosure for escaping persons on the carrier.

A flame insulating curtain I8 is attached between the handrail I7 and the floor of the carrier 8 facing the building in order to provide protection against flames possibly extending through windows, and/or the heat of the wall.

Recesses 8' are provided at the outer peripheral faces of the carrier 8 and these are adapted to engage locking balls 4b mounted resiliently on the inner side of the frame 4a of the platform when the carrier is inserted in the frame 4a, as shown in Fig. 5.

Incidentally, if the pattern and/or colour of the bottom 8b of the carrier are identical to those of the outer portion of the wall, the apparatus does not affect badly the outer appearance of the building when it is in the inperative condition. The same is true for the frame 4a or for the entire platform 4 as in the first embodiment.

When a fire breaks out in the building, persons in the building open the flame insulating door 3 by pivoting it upwardly and release the locking device (not shown) of the emergency platform 4. Thereafter, the platform 4 is automatically opened outwardly by the force of the expanding and contracting arms 5, pivoting downwardly until it is supported in a substantially horizontal plane as shown in Figs. I. 3, and 4 so that a "shunting" zone is provided outside the building. This zone provided by the emergency platform 4 is insulated from flames, smoke, fumes etc. ejected from the inside of the building, provided that the fire-insulating door 3 is closed. Thereafter, persons can descend to the ground safely using e.g. the rope ladders as shown in Fig. I or the low speed descending carrier as shown in Figs. 3, 4 and 5.

It will be appreciated that the apparatus disclosed permits a large number of people to be located in a safe area in the event of a fire, and that the use of the descending carrier permits safe and rapid rescue of these people. Even if using rope ladders or the like, a number can be attached around the platform to increase the number of persons who can descend at a time.

It will be appreciated that modifications may be possible both to the broad concepts and to the specific apparatus described whilst retaining at least some of the advantages obtained. Furthermore some features -such as the design of the carrier -may be of use in other contexts.

Claims

I. Apparatus for assisting escape of persons from a high building, comprising an escape aperture (2) provided in an outside wall (I) of the building, characterised by a fire resistant door (3) mounted to permit access through the aperture (2), and an emergency platform (4) on the outer side of the aperture (2), the platform being pivotable between an inoperative position and a position in which it is substantially horizontal and can support one or more persons.

2. Apparatus as claimed in claim I, characterised in that the platform (4) is provided with means (7;8) for enabling a person to descend from the platform.

3. Apparatus as claimed in claim 2 characterised in that the means enabling a person to descend comprises a carrier (8) mounted in the platform (4) and means (9,II) for lowering the carrier.

4. Apparatus as claimed in claim 3 characterised in that the means for lowering the carrier - (8) comprises a plurality of cable (9) connected to a peripheral portion (4a) of the platform (4) and wound on one or more reels (I0) mounted on the carrier (8), means being provided for controlling unwinding of the cables (9).

5. Apparatus as claimed in claim 4 characterised in that the means for controlling unwinding of the cables (9) comprises a friction brake arrangement (II,I2) provided with a manual control - (I3).

6. Apparatus as claimed in claim 4 or 5 characterised in that the carrier (8) is provided with a collapsible hand rail (I7), the cables (9) passing through portions of the hand rail (I7) so as to bias it to the extended, operative condition during lowering of the carrier (8).

7. Apparatus as claimed in any of claims 3 to 6, characterised in that means (I4,I5,I6) are provided for raising the carrier (8) once it has been lowered.

8. Apparatus as claimed in any of claims 3 to 7 characterised in that the carrier (8) is provided with a fire-resistant curtain (I8) on the side facing the building.

9. Apparatus as claimed in any any preceding claim, characterised in that at least one telescopic arm (5) is provided to control downward pivotal movement of the platform (4) into its substantially horizontal position.

I0. Apparatus as claimed in any preceding claim, characterised in that the fire resistant door - (3) is arranged for upward pivotal movement to be opened.

Fig. 1

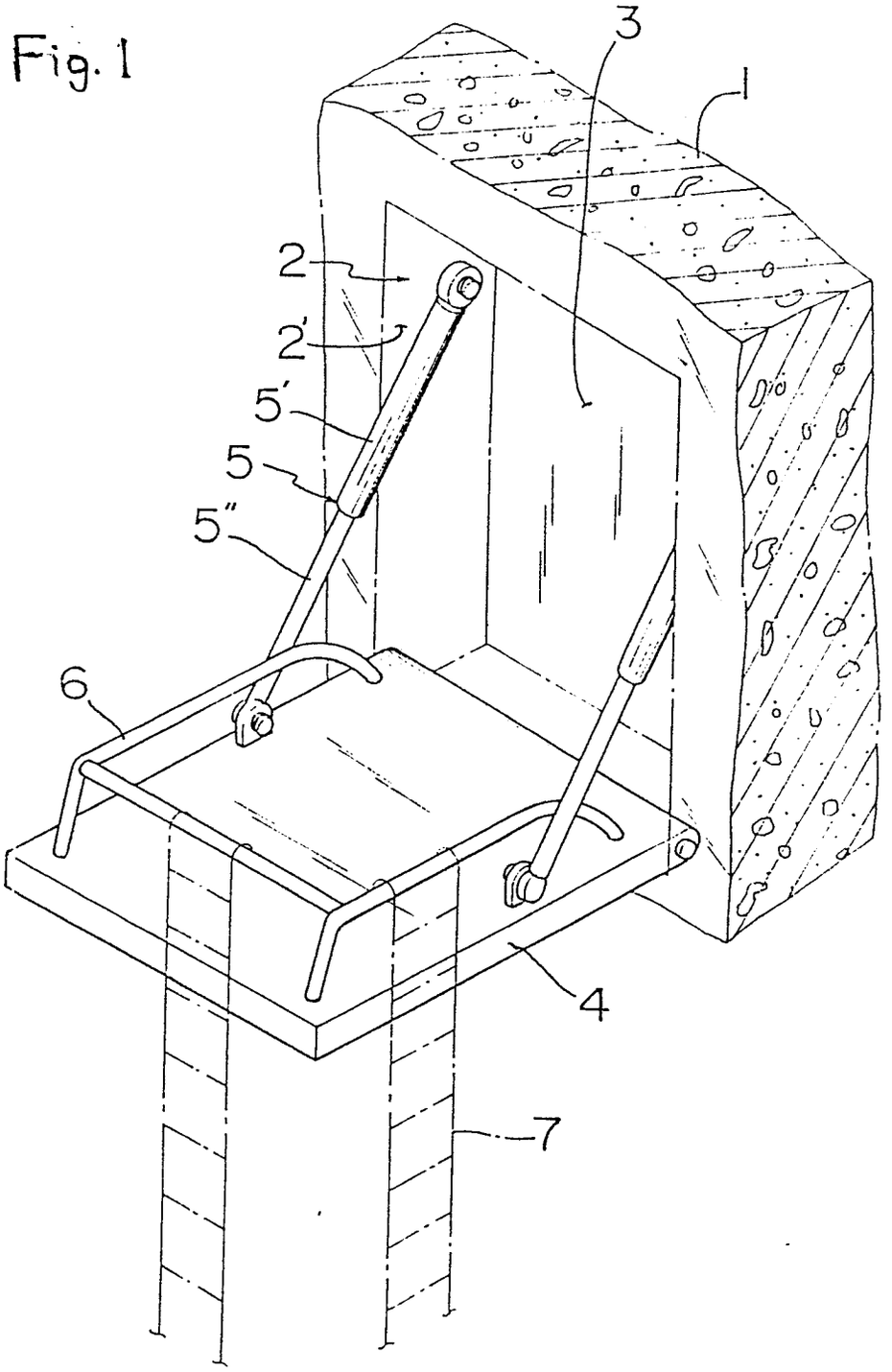


Fig. 2

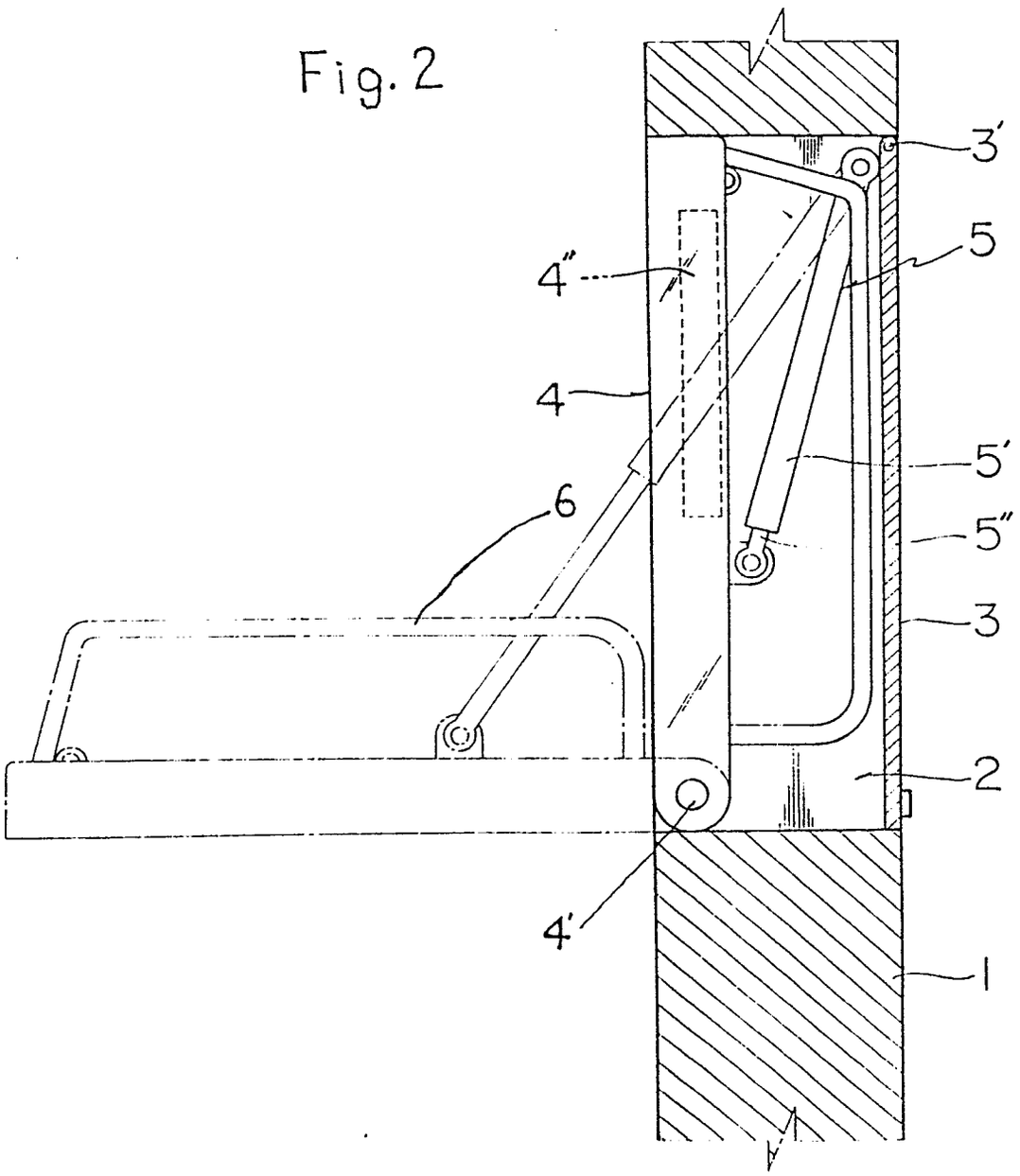


Fig. 3

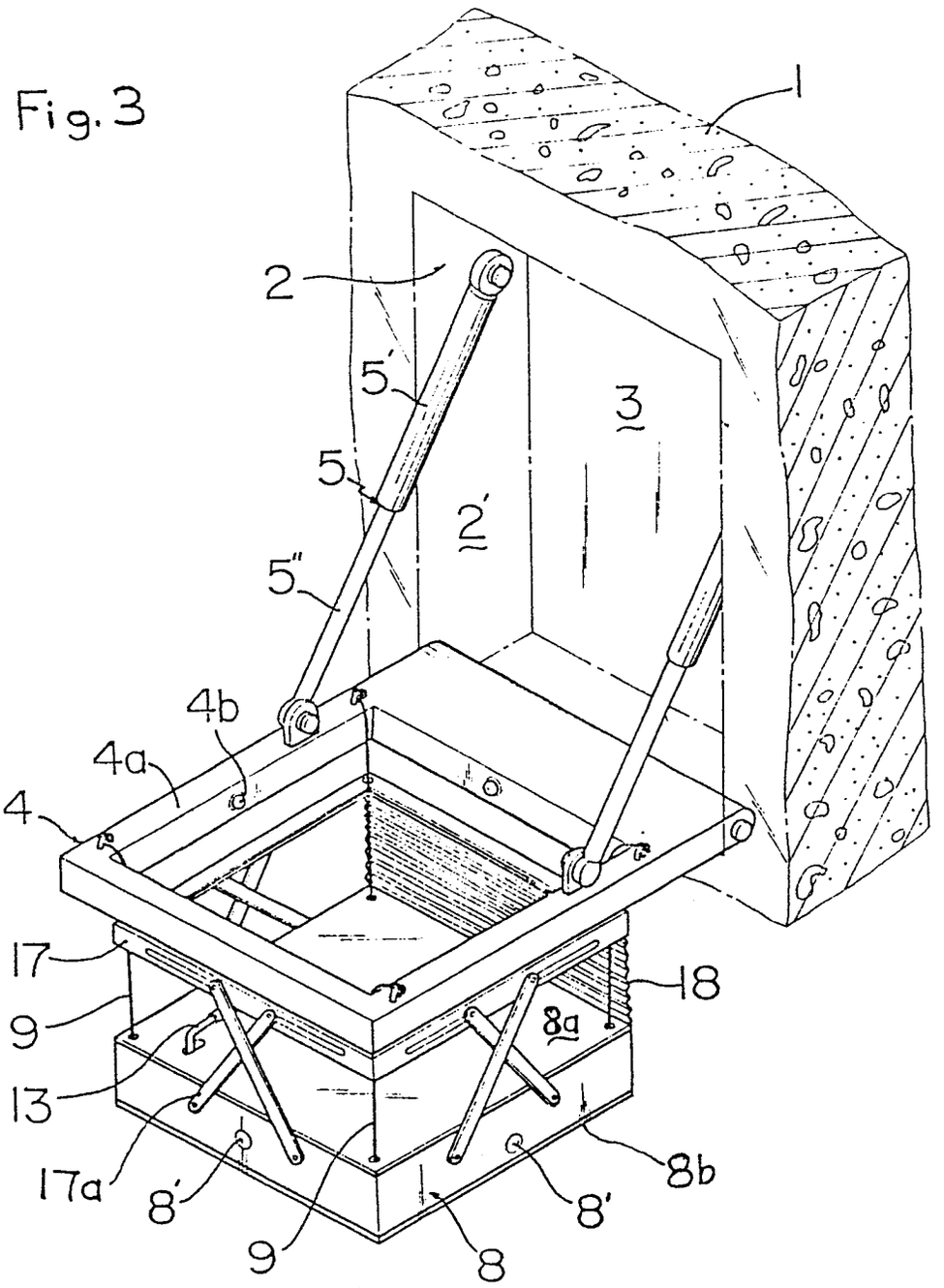


Fig. 4

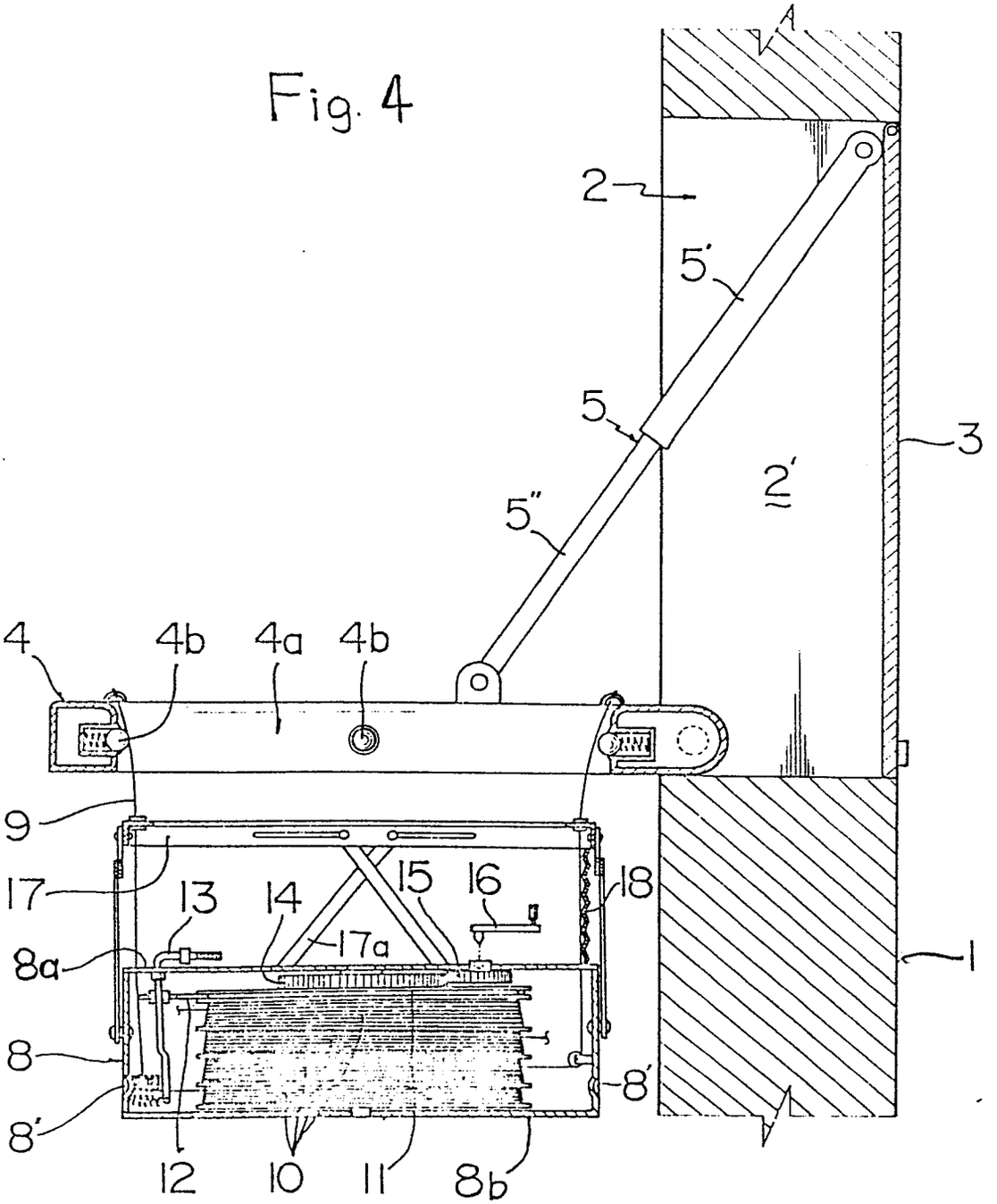
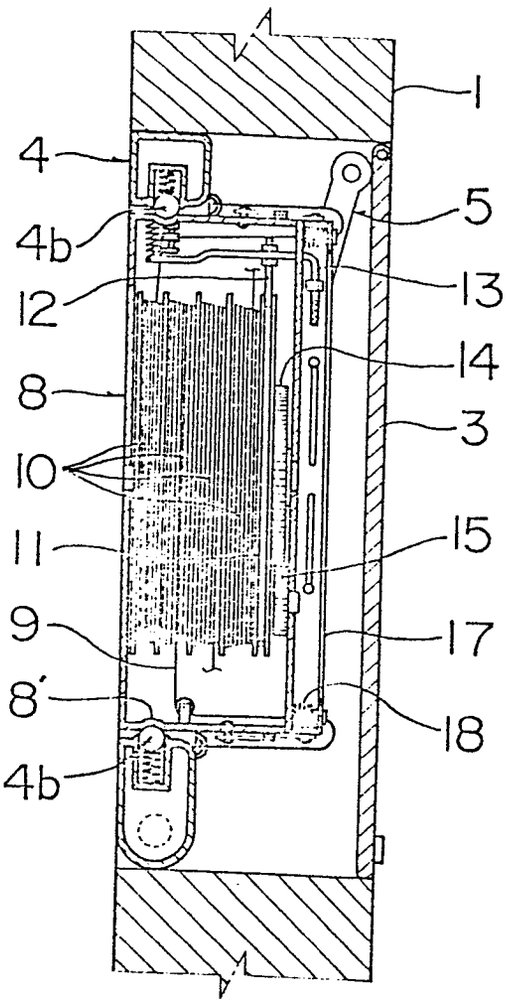


Fig. 5



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EUROPEAN SEARCH REPORT

Application number

EP 85 30 7317

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-A-2 023 103 (SAVER ZAPFE) * claims 1, 2; page 4, lines 6-21; figures 1, 2 *	1	A 62 B 1/00 A 62 B 1/06 E 06 C 9/14
A		2	
X	PATENT ABSTRACTS OF JAPAN, vol. 1, no. 74, 16th July 1977, page 1473 M 77; & JP - A - 52 2700 (NAKA GIJUTSU) 16-02-1977	1	
A	idem	2-4	
A	AT-B- 50 190 (WISTOF) * claim; figures 1-4 *	1-4	
A	US-A-3 847 246 (BANNER) * claims 1, 7, 11 *	1,2	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	DE-B-2 610 429 (K.K. NAKA GIJUTSU KENKYUSHO) * claim 1; figures 3, 4, 10, 20, 28, 32, 33 *	1,2	A 62 B 1/00 A 62 B 3/00 A 62 B 5/00 E 06 C 9/00
A	DE-C- 11 035 (CLERCK-AMAND) * claim; page 1, right-hand column, lines 16-18 *	1,2	

-/-

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	28-05-1986	KANAL P K

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-2 709 030 (VROMAN et al.) * figures *	1,2	
A	DE-C-2 227 125 (JACOBS) * claims 1, 5; figures 8, 9, 10 *	4,5,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)

The present search report has been drawn up for all claims

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BERLIN	28-05-1986	KANAL P K

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