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71 Applicant: **Lovegrove, Alan Martin, Rivendell 6 The Deans Quarry Burleigh Lane, Brimscombe Gloucestershire (GB)**

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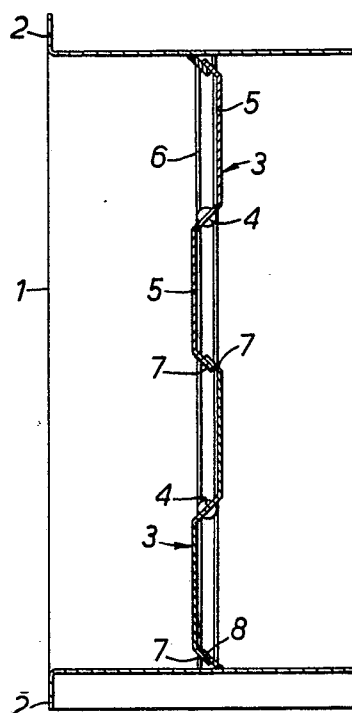
72 Inventor: **Lovegrove, Alan Martin, Rivendell 6 The Deans Quarry Burleigh Lane, Brimscombe Gloucestershire (GB)**

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74 Representative: **James, Michael John Gwynne et al, Wynne-Jones, Lainé & James 22, Rodney Road, Cheltenham Gloucestershire GL50 1JJ (GB)**

54 Improvements relating to fire dampers.

57 A fire damper for a section of a duct (1) comprises one or more cranked doors (3) pivotally mounted on shafts (4). When the doors are moved to the closed position, panel sections (5) of the door mate against channel sections (6) projecting inwardly of the walls of the duct (1) and angled flaps (7) also mate against angled flanges (8) projecting from the duct. Symmetrical pivoting of the doors allows them to be swung freely from the open to closed positions and the cranking of the doors provides better rigidity.



"Improvements relating to Fire Dampers"

This invention relates to fire dampers, particularly, though not exclusively, for marine applications such as in ocean going tankers or north sea oil rigs. It is important to be able to provide a damper door in a ventilation duct
5 to prevent the spread of fire and such damper doors could be positioned in the duct at the point where the duct passes through a bulkhead of a ship, for example.

It is an object of this invention to provide a fire damper which may be readily operated to ensure good
10 sealing of the passageway through a duct.

Accordingly, from one aspect this invention provides a fire damper comprising a section of a duct incorporating a door pivotally mounted on a shaft across the duct, the door being cranked through the pivot point
15 to provide two door panel sections which will close against opposite sides of a wall member projecting inwardly from either side of the duct section when the door is closed, and the ends of the door, remote from the pivot point providing portions which will mate with flanges projecting
20 inwardly of the duct section and lying between the wall members.

The size of the duct, or other factors, may be such that it would be more suitable to provide two or more doors pivotally mounted within the duct section so that

when all the doors are in the closed position they will overlap and together close off the duct section.

Accordingly, from another aspect, the invention provides a fire damper comprising a section of a duct
5 incorporating two or more doors pivotally mounted on respective shafts across the duct, each door being cranked through the pivot point to provide two door panel sections which will close against opposite sides of a wall member projecting inwardly from either side of the
10 duct section when the door is closed, each end of the door, remote from the pivot point providing a portion which will mate with a flange projecting inwardly of the duct section and lying between the wall members, or which will overly a similar end portion of an adjacent door
15 when the doors are closed on one another to close off the duct.

The pivoting of the or each door, if situated substantially at the mid point of the door, means that a minimum amount of effort is required to move the door from
20 an open to a closed position whilst the provision of the wall members and flanges against which the door edges and flaps will close, allows for the opening through the duct to be sealed off very effectively. If desired, edge seals could be provided between the door panels and the wall
25 members and flanges.

It may well be preferred that the two panels of the or each door are symmetrically balanced about the

pivot point so that the door can be turned easily on its pivot. However it is possible to provide that the panel of the or each door which is to lie upstream of the other panel of the door presents a larger surface area so that
5 a positive closing pressure is applied to the door.

Ideally the wall members will be formed from channel section which has the effect of making the wall members rigid and providing a housing for the pivot shaft for the door. Ideally each portion at the end of a door
10 will form an angled flap arranged to mate with a similarly angled flange on the duct or with an angled flap on an adjacent door.

In the preferred arrangement an operating mechanism will be provided for rotating the end of the or
15 each pivot shaft projecting through to the outside of the duct section. Ideally this operating mechanism will be arranged to apply a variable torque to the or each pivot shaft so as to provide the largest torque during the initial stages of opening the door or doors. Also the
20 operating mechanism will usefully incorporate a latch for holding the door or doors in the open and/or closed positions.

The duct section may be provided with end flanges enabling it to be secured to another portion of a duct.

25 The invention may be performed in various ways

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and a preferred embodiment thereof will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a vertical cross section through a fire damper constructed in accordance with the invention;

5 Figure 2 is a front view of the fire damper shown in Figure 1;

Figure 3 is a front view of one of the fire damper doors used in the apparatus; and

Figure 4 shows the operating mechanism for the
10 fire damper.

The fire damper shown in the drawings comprises a duct section 1, having flanges 2 and housing a pair of doors 3 mounted pivotally on shafts 4. Each door 3 is cranked at the position where it passes through the axis
15 of the shaft 4 to provide two panel sections 5 which will close against opposite sides of a channel section 6 welded at either side of the duct section 1. The pivot shafts 4 are housed within the channel sections 6. At their free ends each door 3 is provided with angled flaps 7. Where
20 the two doors meet, when closed, the flaps 7 will overlap but at their other ends these flaps will mate against angled flanges 8 projecting inwardly of the door section 1. From Figures 2 and 3 it will be noted that cut out portions 9 are provided in each door in which the ends of the shafts
25 4 are welded.

Figure 4 shows the operating mechanism for rotating the doors about their pivot shafts 4. It has a lever 10 which, when operated, will move a bar 11 in the direction of the arrow 12, the bar being supported by rollers 13. Arms 14 are pivotally connected to the bar 11 and at their other ends are pivotally interconnected with arms 15 carrying the ends of the shafts 4 which pass through the wall of the duct section 1. As the bar 11 moves in the direction of the arrow 12 the pivotal movement and angling of the arms 14 and 15 is such that, during the initial stages, the shafts 4 are rotated to only a small extent whilst later these shafts are rotated to a much larger extent. The mechanism shown in Figure 4 therefore acts as a variable torque mechanism providing the largest torque during the initial steps of opening the doors, where the effort required will be greatest. A latch 16 is provided on the bar 11 to enable the bar to be locked in the open and/or closed positions so as to hold the doors open and closed.

It will be appreciated that for a smaller duct a single door may be sufficient. Also it would be feasible to provide a flat wall member instead of the channel section 6 although this is less preferred. The cranking of the doors 3 could also be modified. The purpose of the cranking is to allow the portions of the door to seal against the channel sections and the flanges 8 and also to provide inherent rigidity for the door and thus enhance the sealing at the edges.

MJ/RJR

CLAIMS

1. A fire damper comprising a section of a duct incorporating a door pivotally mounted on a shaft across the duct, the door being cranked through the pivot point to provide two door panel sections which will close against 5 opposite sides of a wall member projecting inwardly from either side of the duct section when the door is closed, and the ends of the door, remote from the pivot point providing portions which will mate with flanges projecting inwardly of the duct section and lying between the wall 10 members.

2. A fire damper comprising a section of a duct incorporating two or more doors pivotally mounted on respective shafts across the duct, each door being cranked through the pivot point to provide two door panel sections 15 which will close against opposite sides of a wall member projecting inwardly from either side of the duct section when the door is closed, each end of the door, remote from the pivot point providing a portion which will mate with a flange projecting inwardly of the duct section and 20 lying between the wall members, on which will overly a similar end portion of an adjacent door when the doors are closed on one another to close off the duct.

3. A fire damper according to claim 1 or claim 2, wherein the wall members are formed from channel section.

4. A fire damper according to claim 3, wherein the pivot shaft for the or each door is housed within the channel section.

5. A fire damper according to any one of claims 1 to 4, wherein each portion at the ends of a door forms an angled flap arranged to mate with a similarly angled flange on the duct or with an angled flap on an adjacent door.

6. A fire damper according to any one of claims 1 to 5, including an operating mechanism for rotating the end of the or each pivot shaft projecting through to the outside of the duct section.

7. A fire damper according to claim 6, wherein the operating mechanism is arranged to apply a variable torque to the or each pivot shaft so as to provide the largest torque during the initial stages of opening the door or doors.

8. A fire damper according to claim 6 or claim 7, wherein the operating mechanism incorporates a latch for holding the door or doors in the open and/or closed positions.

9. A fire damper according to any one of claims 1 to 8, wherein the duct section is provided with end flanges enabling it to be secured to another portion of a duct.

10. A fire damper according to any one of claims 1 to 9, wherein edge seals are provided between the door

panels and the wall members and flanges.

11. A fire damper according to any one of claims 1 to 10, wherein the panel of the or each door which is to lie upstream of the other panel of the door presents a 5 larger surface area.

12. A fire damper according to any one of claims 1 to 10, wherein the two panels of the or each door are symmetrically balanced about the pivot point.

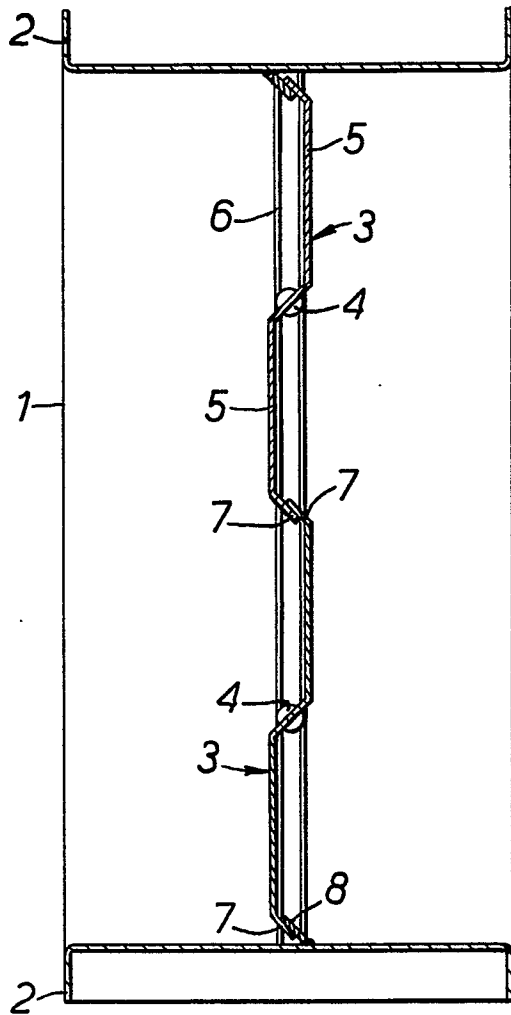


FIG. 1.

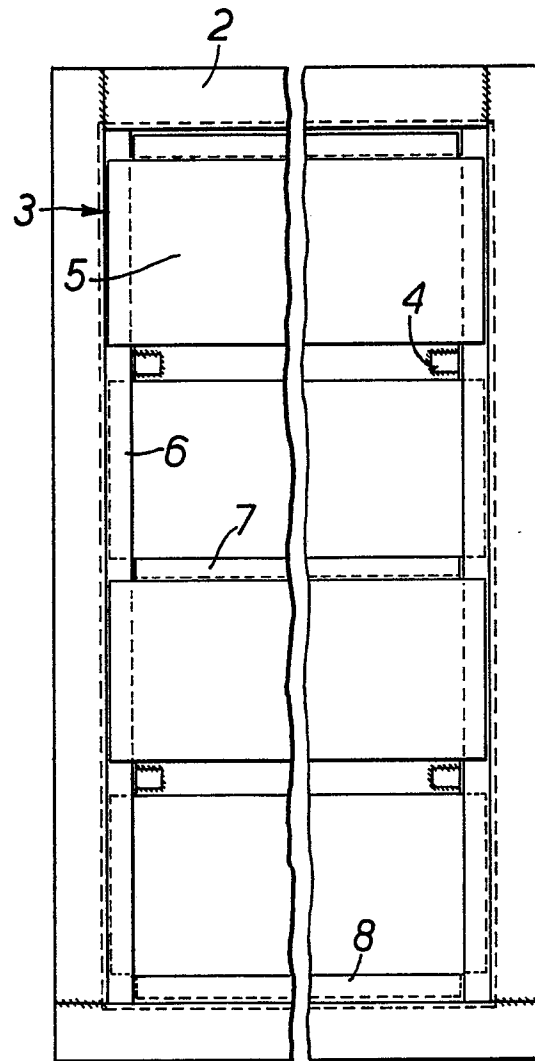


FIG. 2.

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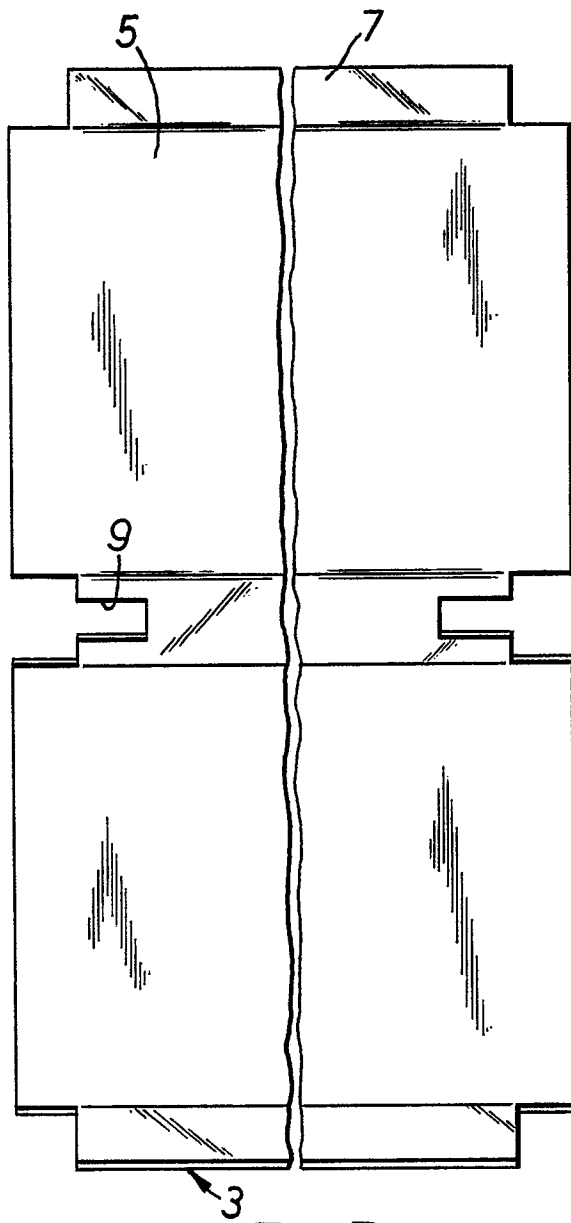


FIG. 3.

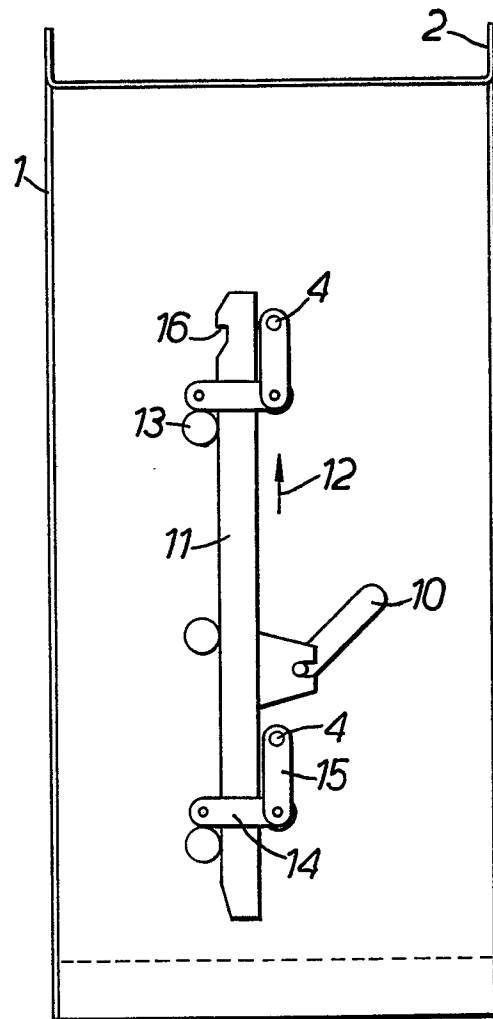


FIG. 4.



European Patent
Office

EUROPEAN SEARCH REPORT

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Application number

EP 81 30 3340

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>US - A - 3 260 018 (SCHUH)</u> * Column 2, lines 16-68; figures 1,2 * --	1-6, 8,9,12	A 62 C 3/14
X	<u>US - A - 4 080 978 (McCABE)</u> * Column 3, line 25 to column 4, line 65; figures 1,2,3, * --	1-5, 8,10, 12	
X	<u>AU - B - 436 907 (PANTLAND)</u> * Page 2, abstract; page 5, paragraph 3 to page 6, para- graph 2; figure 1 * --	1,3,5, 8,11	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) A 62 C
	<u>FR - A - 2 230 163 (S.C.D.R.V.M.)</u> * Page 2, line 25 to page 3, line 16; figures 1-3 * ----	1,4,6, 9,11	
			CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
 The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 03-11-1981	Examiner WOHLRAPP