(12) UK Patent Application (19) GB (11) 2 201 983 (13) A

(43) Application published 14 Sep 1988

(21) Application No 8705179

(22) Date of filing 5 Mar 1987

(51) INT CL⁴
E06B 9/17

(52) Domestic classification (Edition J):
E1J CA

(56) Documents cited
EP A 0125217

(58) Field of search
E1J
Selected US specifications from IPC sub-class
E06B

(71) Applicant
Hymo-Lift Ltd

(Incorporated in United Kingdom)

Scaldwell Road, Brixworth, Northampton, NN6 9EN

(72) Inventors
James John Williamson
Richard Charles Hall

(74) Agent and/or Address for Service
A A Thornton & Co
Northumberland House, 303-306 High Holborn,
London, WC1V 7LE

(54) Improved door

(57) A door and frame comprise a sheet of rollable flexible material (5) drivable by motor (7) to form roll (6) to open the door. Channel means (3) hold edges of the material and are disposed along opposite sides of the frame. A wind bar assembly comprises a pair of wind bars (12), one disposed each side of the material, and end members (13) which are movable freely along at least part of the channel means (3). The assembly (12,13) may be movable upwardly from its lowermost position by abutting engagement with a rigid crossbar (9) disposed across the lower edge of the sheet material (5).

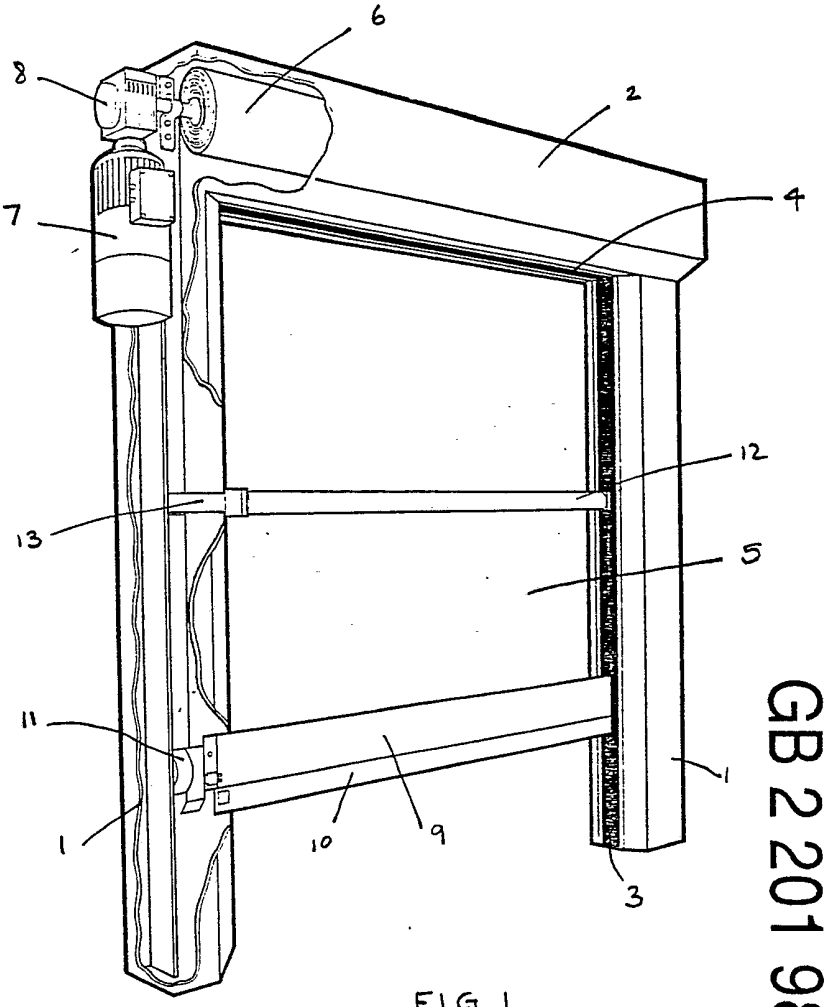

FIG 1

GB 2 201 983 A

2201983

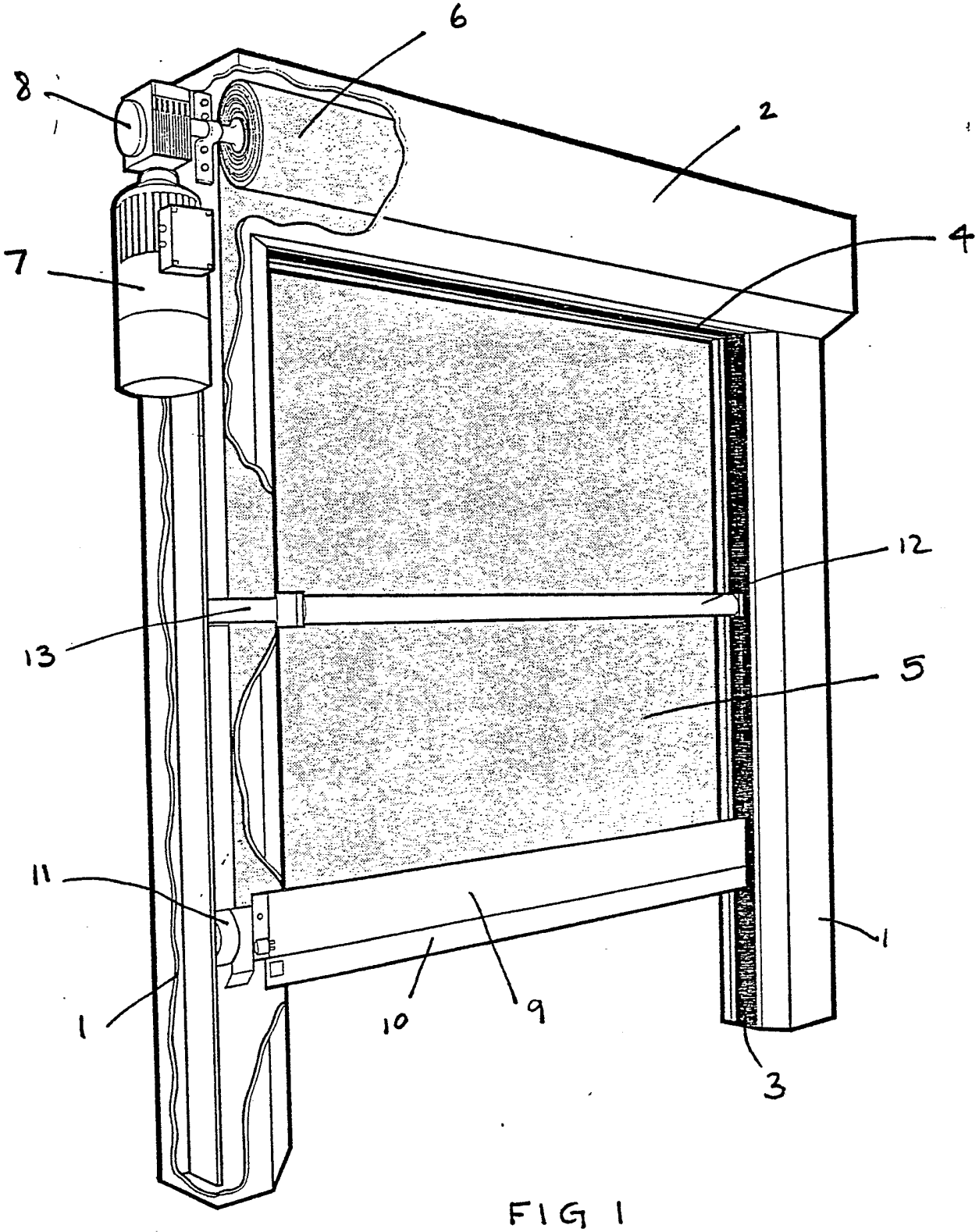

FIG 1

2201983

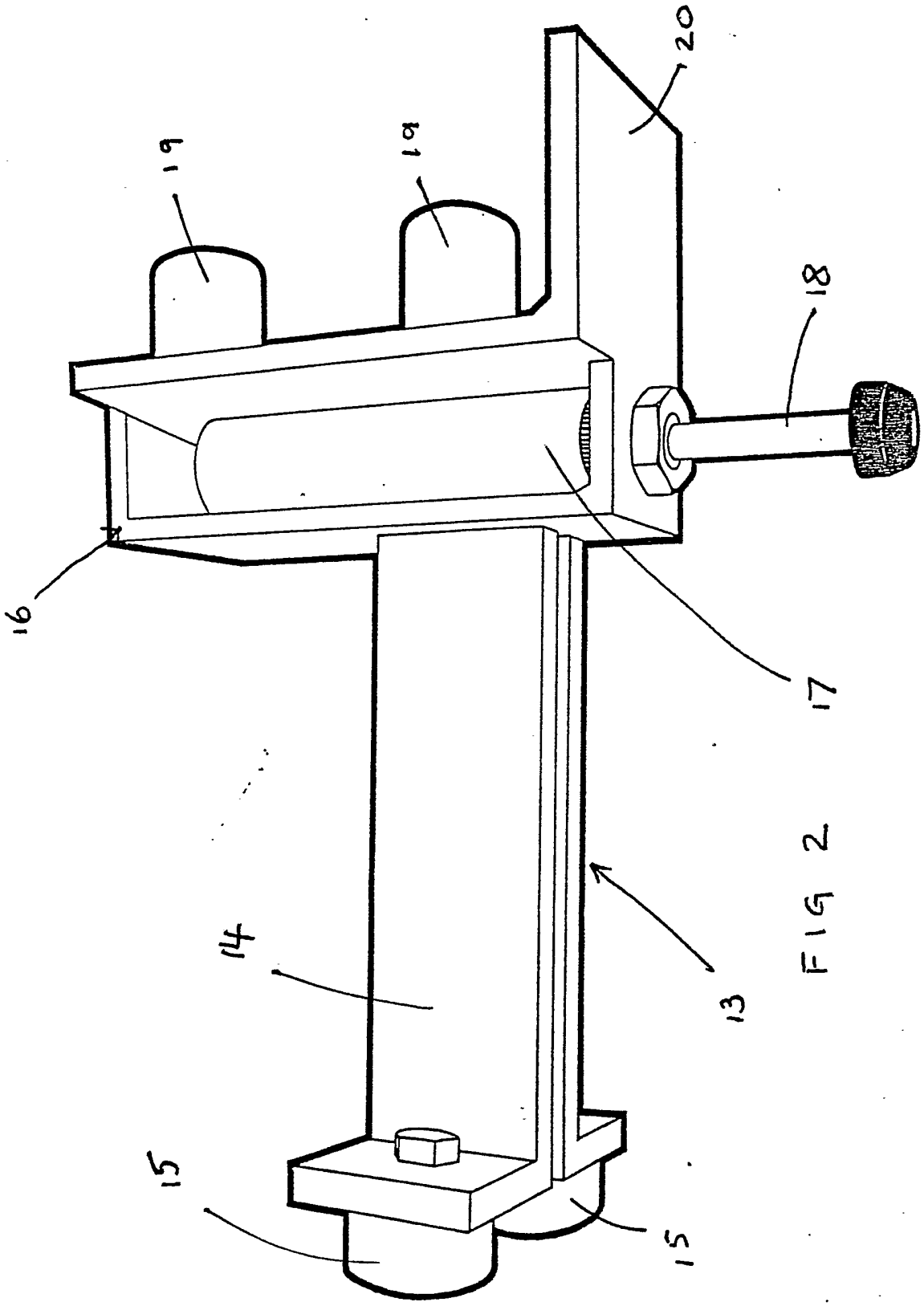

FIG 2

IMPROVED DOOR

The present invention relates to doors of the type comprising a flexible sheet of material which rolls up to open the door. More particularly, the invention relates to wind bars for use with such a door.

Roller doors of this type are well known and are often used for entrances and exits to factories and workshops. The sheet of flexible material, for example transparent PVC, is guided as it unrolls in a pair of channels extending down the jambs of the doorway. The bottom of the sheet may be stabilised by a rigid cross-bar attached to the bottom and also running in the channels.

One problem with doors of this type is that some are slow to operate, in some cases even being operated by hand. Such doors are often left open for convenience. The purpose of the door is often to maintain the interior of the building warm or cool, or possibly to reduce contamination by wind blown dust and pollutants. In such cases, it is important that the door be maintained closed for as much of the time as possible. To overcome this problem there have been developed high speed doors in which the sheet is rolled up to the top by means of an electric motor, taking

only a few seconds to do so. The door is held in its rolled up position for a predetermined period of time and then unrolls to close the doorway..

These doors are generally in an external wall of a building or factory and are often sufficiently large to allow trucks to pass through. In some cases, they may be as large as 5 meters high and 4 meters wide. Thus, then the door is closed, it presents an area of possibly 20 square meters of material sufficiently flexible to be rolled up. When a wind blows, the material flexes, possibly to such an extent that it is pulled from one or both side channels. This allows the external air to enter the building and also impedes rolling up of the sheet material.

The problem has been partially overcome by providing, at the lower edge of the sheet material a rigid crossbar. This may incorporate a pneumatic safety edge so that the door will not close on an obstruction. Such a crossbar will stabilise the lower edge of the material, but in large doors, this is not enough. It has been found that gusts of wind may still dislodge the sheet material from its channels between the crossbar and the top roller.

In one attempt to overcome this problem, there has been provided a wind bar of rigid material adhered across the sheet material at a height of approximately half the door height. This has proved successful in stabilizing the flexible sheet material but causes problems when the sheet material is rolled up. As soon as the wind bar reaches the upper roller, halfway during the rolling cycle, it forms a protuberance on the roll which affects the rolling speed and the diameter of the roll housing. It also

unbalances the roll putting unnecessary stresses on the motor.

In an attempt to overcome this problem, it has been proposed to provide a wind bar behind the door but not attached to it. Such a wind bar is raised with the door at half the speed by which the door is raised. Thus, when the bottom of the door reaches the door lintel, so does the wind bar. In this case, there are problems in that the gearing required makes the device somewhat cumbersome, and in that the wind bar must be lifted by a chain geared to the top roller.

There is one further disadvantage with this type of wind bar in that, during gusty wind conditions, often there is a "suction" force on the door as a gust ceases. Such a force can be equally as strong as the wind force against the door and can again dislodge the sheet material from the channels, although this time in an outward direction. One way to overcome this problem would be to put an additional wind bar across the exterior of the door. However, to raise both wind bars together with the door would require contra rotating sets of gears, one for each wind bar. This is not a practicable proposition.

It is an object of the present invention to provide a door having a wind bar arrangement which overcomes all the above disadvantages.

According to the present invention there is provided a door comprising a sheet of rollable flexible material, channel means for holding edges thereof and disposed along opposite sides of the door, and a wind bar assembly comprises a pair of wind bars, one disposed each side of the material, the assembly being movable along at least part of the channel means.

Preferably a stop is provided in at least one of the channel means at an approximately median

position to support the assembly in a lowermost position thereof.

The assembly may be movable upwardly from its lowermost position by abutting engagement with a rigid crossbar disposed across the lower edge of the sheet material.

The assembly may be provided with shock absorbing means for cushioning said abutting engagement.

The assembly preferably comprises end members each movable in a respective channel means and adapted to support the pair of wind bars between them.

One or both of the wind bars may be journalled for rotation between the end members or alternatively a freely rotatable sleeve may be provided.

An embodiment of the present invention will now be more particularly described by way of example and with reference to the accompanying drawings, in which:

FIGURE 1 is a perspective view, partially cut away of a door embodying the invention; and

FIGURE 2 is a view of an end member of the wind bar assembly therefor.

Referring now to Figure 1, there is shown a doorway comprising two vertical jambs 1 and a horizontal lintel 2, which also comprises a roll housing. Each jamb 1 is provided with a channel 3, closed by nylon brush seals. The lintel 2 also has a gap 4, similarly closed by nylon brush seals extending from each side of the gap.

The door itself comprises a sheet of preferably transparent flexible PVC, possibly 4 mm thick and 5.2 kg/m^2 in weight, or even up to 8 mm thick. This sheet of material 5 may close the door opening in its lowered condition or the door may be opened by rolling the material 5 onto roll

6 within the lintel 2. Rolling is accomplished by means of an electric motor 7 and gear set 8 driving an axle of the roll 6. Preferably, the motor and gears are set to roll up the sheet at a speed in the region of 1 m/sec and lower it at half that speed.

At the lower edge of the material 5 is a crossbar 9, for example an aluminium extrusion, which has on its lower surface a pneumatic safety edge 10 adapted to reverse the motor should it contact an obstruction during the door lowering phase. In normal operation, the lifting of the door is actuated by some remote means such as a push button, an induction loop, a photoelectric cell, radar means, or hand-held radio or infra red transmitters. It is intended that, as soon as a vehicle or person approaches the door, it lifts automatically and remains open for a predetermined period of time. The material is then unrolled to close the door. If any obstructions should be encountered, the door immediately opens again and remains so until it is instructed that the obstruction is cleared.

When lowered, the edges of the sheet 5 are held within the brush seals of the channels 3. Similarly, the crossbar 9 at the lower edge also passes between the brush seals and is provided with roller means 11 within each jamb 1.

The door is provided with wind bars, one of which is indicated by numeral 12 (there being a complementary one on the opposite side of the material 5). This pair of wind bars are held in end members 13, one located in each channel 3. Each wind bar may be either a simple cylindrical rod of aluminium or the like or it may be arranged to rotate with respect of the material 5. This can be accomplished either by providing a freely rotatable sleeve, e.g. of plastics material, or by journalling the rod at each end.

Referring now to Figure 2, there is shown an end member 13 of the wind bar assembly. It comprises two arms 14, spaced one from the other to allow passage of the sheet 5, and each having at its end a mounting 15 for a respective wind bar. A central portion 16 of the member is adapted to accommodate an hydraulic cylinder 17, the piston 18 of which projects downwardly. The function of this piston and cylinder arrangement will be described in more detail below. Projections 19 are adapted to support rollers for guiding the end member within a channel 3. Finally, there is an extension 20 extending from the central body 16 such a distance as to abut a ledge (not shown) within the channel 3.

When the door is closed, each end member 13 rests on the ledge at approximately half the height of the doorway. At this position, the wind bars are operative to prevent displacement of the sheet 5. When the door is opened, the sheet 5 is rolled rapidly upwardly and the crossbar 9 contacts, in due course, pistons 18 of the two piston and cylinder shock absorber arrangements. Each end member 13 is carried upwardly by the crossbar 9 until the door is fully open and the wind bars are at an uppermost position of the door opening.

When the door is closed, the wind bar assembly moves downwardly with the lower crossbar 9 until it reaches the ledge, at which point it is held.

As can be seen, the wind bar assembly protects the flexible material 5 from deformation at its most vulnerable point, namely midway between the two points where it is rigidly supported, whenever the door is closed. However, the assembly is easily moved upwardly with the door to allow free passage of vehicles. It involves no complicated gearing nor stress on the motor, being simply pulled out of the way when it is

no longer required as the door opens over its final upper half.

The invention has been described with reference to a single wind bar assembly located at a median position. It is, of course, possible to provide two or more wind bar assemblies spaced substantially equidistantly or where necessary over the height of the doorway. In such a case, each assembly would be lifted as the lower crossbar 9 reached it. The extensions 20 resting on respective ledges would need to be of different lengths such that the lowermost wind bar assembly extension 20 passed beyond the ledge adapted to hold the uppermost wind bar assembly.

CLAIMS:

1. A door and frame therefor comprising a sheet of rollable flexible material, means to move said material within the frame to open and close the door, channel means for holding opposite edges of the material and disposed along facing opposite sides of the frame, and a wind bar assembly comprising a pair of wind bars, one disposed each side of the material, the assembly being movable freely along at least part of the channel means.

2. A door as claimed in claim 1, wherein a stop is provided in at least one of the channel means at an approximately median position thereof to support the assembly in a lowermost position thereof.

3. A door as claimed in claim 2, wherein the assembly is movable upwardly from its lowermost position by abutting engagement with a rigid crossbar disposed across the lower edge of the sheet material.

4. A door as claimed in claim 3, wherein the assembly is provided with shock absorbing means for cushioning said abutting engagement.

5. A door as claimed in claim 4, wherein said shock absorbing means comprises fluid damped piston and cylinder units.

6. A door as claimed in any one of the preceding claims, wherein the assembly comprises end members each movable in a respective channel means and adapted to support the pair of wind bars between them.

7. A door as claimed in claim 6, wherein one or both of the wind bars is journalled for rotation between the end members.

8. A door as claimed in claim 6, wherein one or both of the wind bars is provided with a freely rotatable sleeve.

9. A door and frame therefor substantially as described herein with reference to the accompanying drawings.

Published 1988 at The Patent Office, State House, 66/71 High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office,