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54 Door assemblies.

57 A door assembly comprises a frame (6), a door (16) pivotally mounted on the frame (6), and door closing mechanism comprising a coil spring (20) an end portion (22) of which extends through an opening (24) in a frame member (8) and is attached (26) to the door (16) whereby, when the door (16) is opened, a length of the coil spring (20) is pulled through the opening (24) unwinding the spring (20) and the spring (20) tends to rewind to pull the door (16) closed. The spring (20) may be of the kind having a zero helix angle, a decreasing radius of curvature in the radially inward direction, and a significant axial depth, and preferably exerts a generally constant rewinding force.

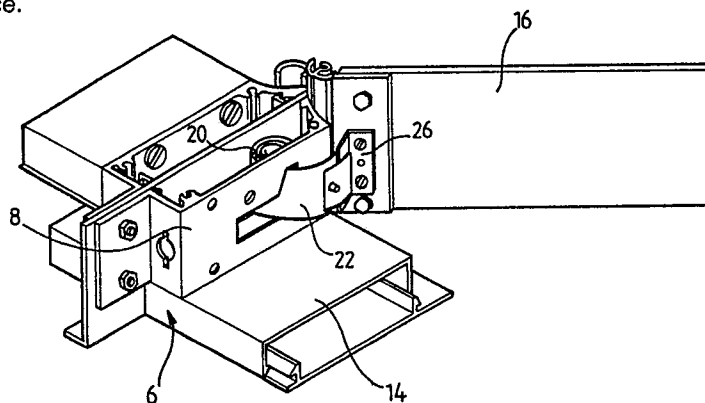


FIG 1

Door assemblies

This invention is concerned with improvements relating to door assemblies. The invention has been devised particularly in relation to the provision of a simple but reliable door closing mechanism for a door assembly of the kind commonly found in locker rooms. It is however to be appreciated that the door closing mechanism the subject of this invention may be utilised for doors in general terms.

According to this invention there is provided a door assembly comprising a frame, a door pivotally mounted on the frame, and door closing mechanism comprising a coil spring an end portion of which extends through an opening in a frame member and is attached to the door whereby, when the door is opened, a length of the coil spring is pulled through the opening unwinding the spring and the spring tends to rewind to pull the door closed.

Preferably the coil spring is of the kind having a zero helix angle and a decreasing radius of curvature in the radially inward direction, such springs desirably having a significant axial depth. Preferably the spring is of "constant force" type. Preferably the spring is releasably secured to the door, advantageously to an inside face of the door adjacent to the axis of its pivotal mounting.

Preferably the coil spring is so located as to engage an inner face of the frame member, the reaction to the force exerted by the spring to close the door being taken on the frame member.

Conveniently the spring is otherwise unsupported: in this manner when it is necessary to change the spring it is necessary simply to release said end portion of the spring from the door and to draw the spring through the opening, allowing an alternative such spring to be inserted through the opening, central part first, the end portion of the alternative spring then being attached to the door.

Advantageously the frame comprises an elongate extruded channel member providing a curved bearing surface and the door comprises an elongate extruded hinge member having a curved bearing surface, whereby mounting of the door on the frame involves linear movement of the hinge member into the channel member along the axis of pivotal movement of the door.

Advantageously the door closing mechanism comprises a bracket secured to said end portion of the spring, the bracket being adapted for securement to the door, for example adjacent to the pivotal axis.

There will now be given a detailed description, to be read with reference to the accompanying drawings, of a door assembly which is a preferred

embodiment of this invention, having been selected for the purposes of illustrating the invention by way of example.

In the accompanying drawings:

FIGURE 1 is a schematic perspective view of part of the door assembly, illustrating particularly the door closing mechanism thereof, the door of the assembly being shown in a part-open position; and

FIGURE 2 is a horizontal sectional view of part of the door assembly, the door being shown (in full lines) in its closed position, and (in dotted lines) in its open position.

The door assembly which is the preferred embodiment of this invention comprises a frame assembly 6 comprising a vertically-extending channel-shaped frame member 8 comprising an elongate extruded channel member 10 providing a curved bearing surface 22. Extending from the frame member 8 is a horizontal base member 14, the frame member 8, base member 14 and other frame members of the assembly 6 defining an opening to a locker of the kind commonly found in locker rooms.

The door assembly also comprises a door member 16, provided along one vertical edge thereof with an elongate extruded hinge member 18, which may be inserted vertically into the channel member 10 in a manner such that the bearing surfaces of the channel member 10 and the hinge member 18 cooperate to provide for smooth pivotal movement of the door 16 about a vertical axis.

The door assembly comprises door closing mechanism comprising a "constant force" spring 20, of generally scroll-like form, the major part of the spring 20 being located within the channel member 8. The spring 20 has a free inner-end portion 2, and an outer end portion 22 of the spring 20 extends through an opening 24 in the channel member, and is attached by a bracket 26 to the lower edge of the door 16 adjacent to the axis of pivotal movement thereof.

On opening of the door 16, a length of the spring 20, including the portion 22 thereof, is drawn through the opening 24, involving an unwinding of the spring 20 as the spring 20 is pulled against the interior of the channel member 10. The extent of the spring 20, in evolute, is such that, with the door in its fully open position (shown in dotted lines in Figure 2) sufficient of the spring 20 remains within the channel member 10 to exert a return force, by way of the bracket 26, onto the door 16. Thus on release of the door 16, the spring 20 rewinds itself, pulling the end portion 22 back towards the aperture 24, to pull the door against the base mem-

ber 14.

Should the spring 20 be in need of replacement, the bracket 26 may readily be unscrewed from the door 16, allowing the spring in total to be pulled through the slot 24, removed from the bracket, and replaced by a new such spring, which may then be reinserted, through the aperture 24 for operation as hereinbefore described.

If desired the door assembly may comprise two such door closing mechanisms, one adjacent to the base of the door, the second adjacent to the top edge of the door.

The "constant force" spring 20 used herein is basically a coiled spring of strip steel having depth in the axial dimension, which may typically be in the order of 5 mm to 50 mm, and a zero helix angle, such springs exerting a generally constant rewinding force. By the use of a coiled spring having axial depth not only is the force exerted by the spring in the tendency thereof to rewind increased, but the face-to-face contact between the spring and the channel member 10 is increased, providing a long lasting and smooth operation of door opening and closing.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, or a class or group of substances or compositions, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A door assembly comprising a frame (6), a door (16) pivotally mounted on the frame, and door closing mechanism comprising a coil spring (20) an end portion (22) of which extends through an opening (24) in a frame member and is attached to the door whereby, when the door (16) is opened, a length of the coil spring (20) is pulled through the opening unwinding the spring and the spring tends to rewind to pull the door closed.

2. A door assembly according to Claim 1 wherein the coil spring (20) is of the kind having a zero helix angle and a decreasing radius of curvature in the radially inward direction.

3. A door assembly according to Claim 2 wherein the spring (20) has a significant axial depth.

4. A door assembly according to any one of the preceding claims wherein the spring is releasably secured to an inside face of the door adjacent to the axis of its pivotal mounting.

5. A door assembly according to any one of

the preceding claims wherein the coil spring is so located as to engage an inner face of the frame member, the reaction to the force exerted by the spring to close the door being taken on the frame member, and the spring being otherwise unsupported.

6. A door assembly according to Claim 5 such that when it is necessary to change the spring it is necessary simply to release said end portion (22) of the spring from the door (16) and to draw the spring (20) through the opening, allowing an alternative such spring to be inserted through the opening, central part first, the end portion of the alternative spring then being attached to the door.

7. A door assembly according to any one of the preceding claims wherein the frame (6) comprises an elongate extruded channel member (10) providing a curved bearing surface (12) and the door comprises an elongate extruded hinge member (18) having a curved bearing surface.

8. A door assembly according to Claim 7 such that mounting of the door on the frame involves linear movement of the hinge member into the channel member along the axis of pivotal movement of the door.

9. A door assembly according to any one of the preceding claims comprising a bracket (26) secured to said end portion of the spring, the bracket being adapted for securement to the door.

10. A door assembly according to Claim 9 wherein such securement is adjacent to the pivotal axis of the door.

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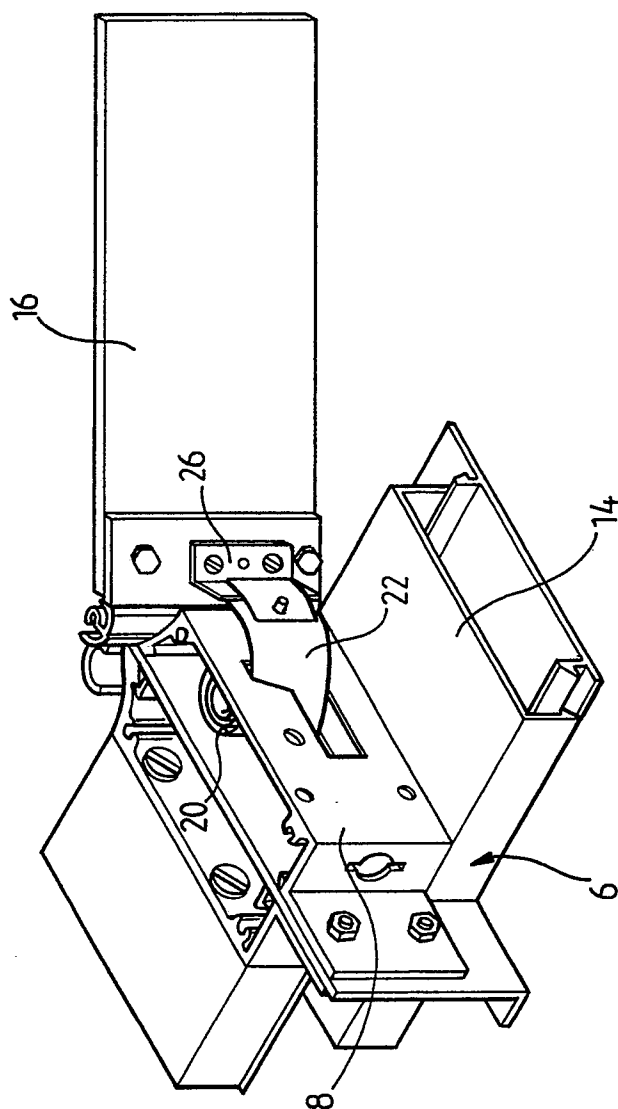


FIG 1

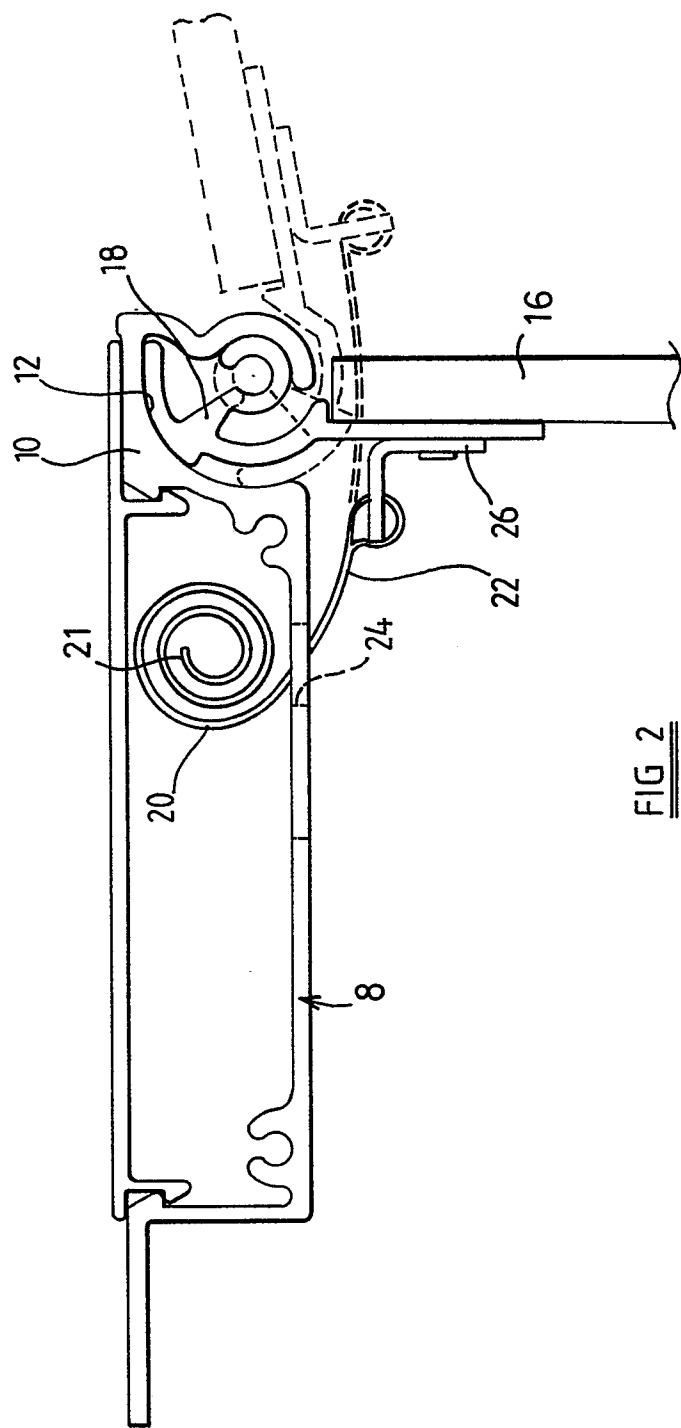


FIG 2



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.5)
X	GB-A-2 173 546 (CHING HO SHI) * Whole document *	1,9,10	E 05 F 1/10
Y	----	2-6	
Y	DE-A-2 436 237 (NIX) * Figures 1,2; page 13, line 9 - page 16, line 26 *	2,3,4	
Y	---- US-A-2 895 779 (BENDER) * Figures 3,5,6; column 3, line 12 - column 4, line 54 *	5,6	
A	---- DE-C- 813 107 (GENERAL MOTORS CORP.) * Figures 1,6; column 2, lines 16-35 *	7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 05 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10-07-1989	Examiner KISING A.J.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			