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(54) Damper blade mounting.

(57) A damper blade (12) is rotatably mounted in an air duct (10) by means of spindles (14) secured to the blade. Fastening means comprising spring clip devices (16) are attached to the blade (12) edges before insertion of the blade into the duct (10), and the spindles (14) become secure to the blade upon insertion through the duct walls and into operative engagement with the clips. The clips (16) each comprise convergent base (28) and retaining (36) portions between which the blade (12) and inserted spindle (14) are gripped. A non-circular opening (38) in a web (30) connecting the base and retaining portions co-operates with a non-circular portion of the spindle (14) to prevent rotation of the clip (16) and the blade (12) relative to the spindle.

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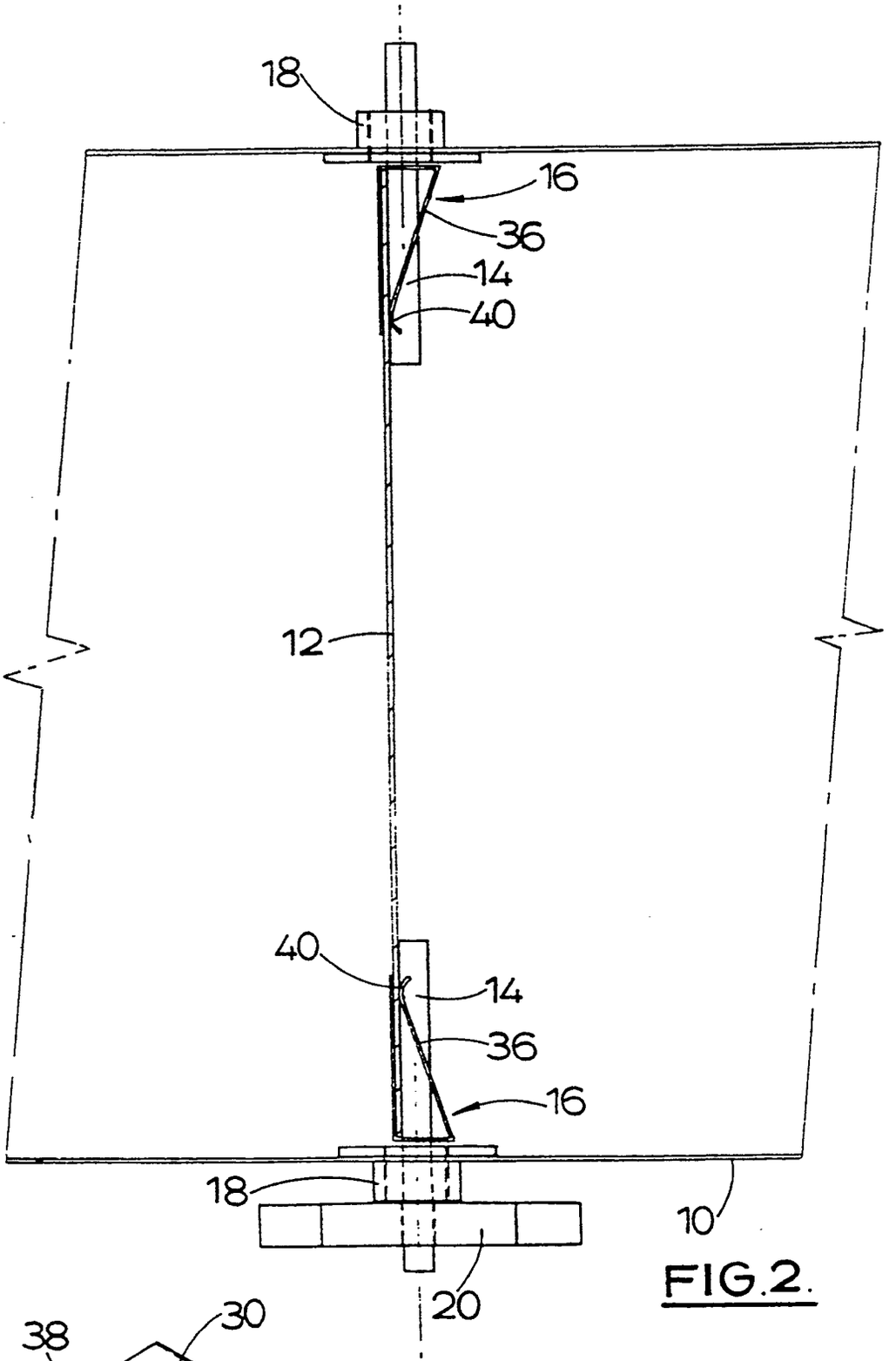

FIG.2.

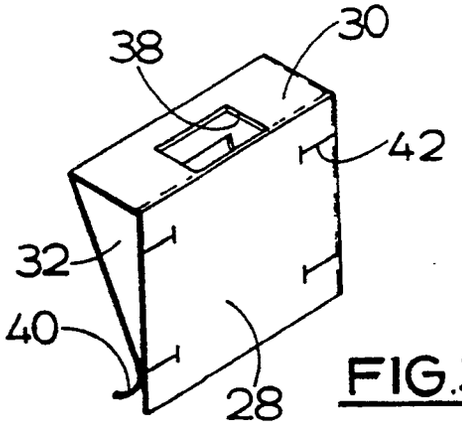

FIG.3.

DAMPER BLADE MOUNTING

In an air duct, for example in a heating and ventilating system, a rotatable damper blade may be used within the duct to control the air flow along the duct ; the blade may be turned, commonly by means of a quadrant handle, through 90° between a first position in which the blade stands across the duct (for maximum restriction of the air flow) and a second position in which the blade extends along the duct axis, the quadrant handle commonly being lockable at any required intermediate position.

Such a damper blade may be rotatably mounted in the duct walls by means of trunnion pieces secured to the blade. Most commonly the trunnions are secured to the blade by means of screw fastenings which have to be inserted through the trunnions and the blade, in situ within the duct, after insertion of the trunnions through the duct walls. Such an assembly operation can be very awkward, particularly in the case of small ducts.

It is an object of the present invention to provide an improved damper blade mounting arrangement.

The invention provides, in one of its aspects, a method of mounting a damper blade rotatably within an air duct by means of a spindle which is secured to the blade and extends through the duct wall, characterised in that the spindle is secured to the blade utilising fastening means which enables the spindle to be inserted through the duct wall and into operative engagement with the fastening means, the fastening means being secured to the blade prior to insertion of the spindle.

In a preferred arrangement, the fastening means comprises a spring clip device which can be pressed over an edge of the blade to grip a marginal portion of the blade, and which accommodates an inner end portion of the inserted spindle to secure the spindle to the blade for rotation of the blade. The spring clip may comprise base and retaining portions between which the blade and spindle are gripped, the base and retaining portions being spaced apart at an outer end of the clip where they are connected by an upstanding web from the base, and being mutually inclined in an inwards direction away from the web to converge and grip the blade and spindle. An opening in the web receives the spindle upon insertion ; preferably, the opening is of a non-circular cross-section and co-operates with a non-circular portion of the spindle to prevent rotation of the clip (and the blade) relative to the spindle.

There now follows a description, to be read with reference to the accompanying drawings, of a volume control damper mounted in an air duct.

In the accompanying drawings :

Figure 1 is a view of the damper seen in the direction along the duct ;

Figure 2 is a view of the damper seen in a longitudinal section through the duct ; and

Figure 3 is a perspective view of one of two spring clips used in mounting a blade of the damper shown in Figures 1 and 2.

In an air duct 10 of rectangular cross-section, a volume control damper comprises a single flat rotatable blade 12.

The rectangular blade is rotatably mounted by means of two spindles 14 projecting from opposite edges of the blade. Inner end portions of the spindles are secured to the blade by means of spring clips 16, and outer end portions of the spindles project from the blade through bushes 18 which act as bearings mounted in apertures in the duct walls. In a generally conventional arrangement, a quadrant handle 20 is mounted on one of the spindles 14, outside the duct, to enable rotation of the spindle (and so the damper blade). The blade can be locked in adjusted position by means of a wing nut 22 on a handle locking pin 24 which is mounted to project externally from the duct.

The two blade-mounting arrangements are identical. Each of the spindles 14 is in the form of a flat bar, to prevent rotation of the blade 12 and the quadrant handle 20 relative to the spindles. Each of the bushes 18 has a circular aperture permitting rotation of the associated spindle extending through it ; the bush is inserted through the duct wall from the inside of the duct, a head flange 26 of the bush lying against the inner surface of the duct wall.

The form of the spring clips 16 is shown also in Figure 3. The one-piece clip comprises a rectangular base 28. A web forming an outer wall 30 stands up perpendicularly from an outer edge of the base, and a retaining plate 32 extends inwards as a cantilever from the top edge of the wall 30 down towards the base 28 at an acute angle. The retaining plate 32 (see also Figure 1) is generally rectangular but is cut away centrally from its free inner edge (i.e. adjacent to the base 28) back towards the wall 30 to form a rectangular slot 34 between two remaining portions of the plate 32 forming clamping fingers 36. The slot 34 is of a suitable width to accommodate the spindle 14.

A rectangular opening 38, aligned with the slot 34 and of a shape corresponding to the spindle cross-section, is formed in the outer wall 30 of the clip to enable the spindle to be fed through the clip. Each of the clamping fingers 36 terminates at its free end in a rounded and upturned portion 40 which serves to grip a marginal portion of the damper blade against the base 28 of the clip (see Figure 2), at least prior to insertion of the spindle 14. Four teeth 42 (the backs of which are shown schematically in Figure 3) assist with secure gripping of the blade.

In assembly of the damper, the bearing bushes 18

and the handle locking pin 24 are initially inserted, from inside the duct, through pre-drilled holes in the duct walls. The spring clips 16 are then pressed over the edges of the damper blade 12, each to grip the blade between its base 28 and its clamping fingers 36. The damper blade 12 is then introduced into the duct and positioned so that the openings 38 in the clips become aligned with the bushes 18. The two spindles 14 are then inserted, from outside the duct, through the bushes 18 and through the openings 38 into the spring clips 16 to lie flat against the blade 12 ; an edge 42 of each clip, extending between the clamping fingers 36 at a closed end of the slot 34, frictionally engages the spindle 14 to resist longitudinal movement of the spindle. Finally, the quadrant handle 20, which is formed with a suitable rectangular opening to match the spindle cross-section, is mounted on its associated spindle and secured by means of the wing nut 22 on the locking pin 24.

Claims

1. A method of mounting a damper blade (12) rotatably within an air duct (10) by means of a spindle (14) which is secured to the blade and extends through the duct wall, characterised in that the spindle is secured to the blade utilising fastening means (16) which enables the spindle to be inserted through the duct wall and into operative engagement with the fastening means, the fastening means being secured to the blade prior to insertion of the spindle.

2. A method according to Claim 1 characterised in that the fastening means comprises a spring clip device (16) which is initially pressed over an edge of the blade (12) to grip a marginal portion of the blade, and which grips the inserted spindle (14) to secure the spindle to the blade (12) for rotation of the blade.

3. A method according to claim 2 characterised in that the spring clip device (16) comprises base (28) and retaining (36) portions between which the blade (12) and spindle (14) are gripped, the base and retaining portions being spaced apart at an outer end of the clip (16) where they are connected by an upstanding web (30) from the base (28), and being mutually inclined in an inwards direction away from the web to converge and grip the blade (12) and spindle (14), the spindle extending through an opening (38) in the web (30).

4. A method according to claim 3 characterised in that the opening (38) is of non-circular cross-section and co-operates with a non-circular portion of the spindle (14) to prevent rotation of the clip (16) and the blade (12) relative to the spindle.

5. Apparatus for use in a method according to claim 1 comprising a blade (12), a blade-mounting spindle (14) and fastening means (16) whereby the spindle can be secured to the blade, characterised in that the fastening means comprises a spring clip device (16) which can be pressed over the edge of the blade (12) initially to grip a marginal portion of the blade, and into operative engagement with which the spindle can be inserted through the duct wall for securement of the spindle (14) to the blade (12).

6. Apparatus according to claim 5, characterised in that the spring clip device (16) comprises base (28) and retaining (36) portions between which the blade (12) and spindle (14) are to be gripped, the base and retaining portions being spaced apart at an outer end of the clip (16) where they are connected by an upstanding web (30) from the base (28), and being mutually inclined in an inwards direction away from the web to converge and grip the blade (12) and spindle (14), there being an opening (38) in the web (30) through which the spindle (14) can be inserted.

7. Apparatus according to claim 6 characterised in that the opening (38) is of non-circular cross-section and is adapted to co-operate with a non-circular portion of the spindle (14) to prevent rotation of the clip (16), and the blade (12), relative to the spindle.

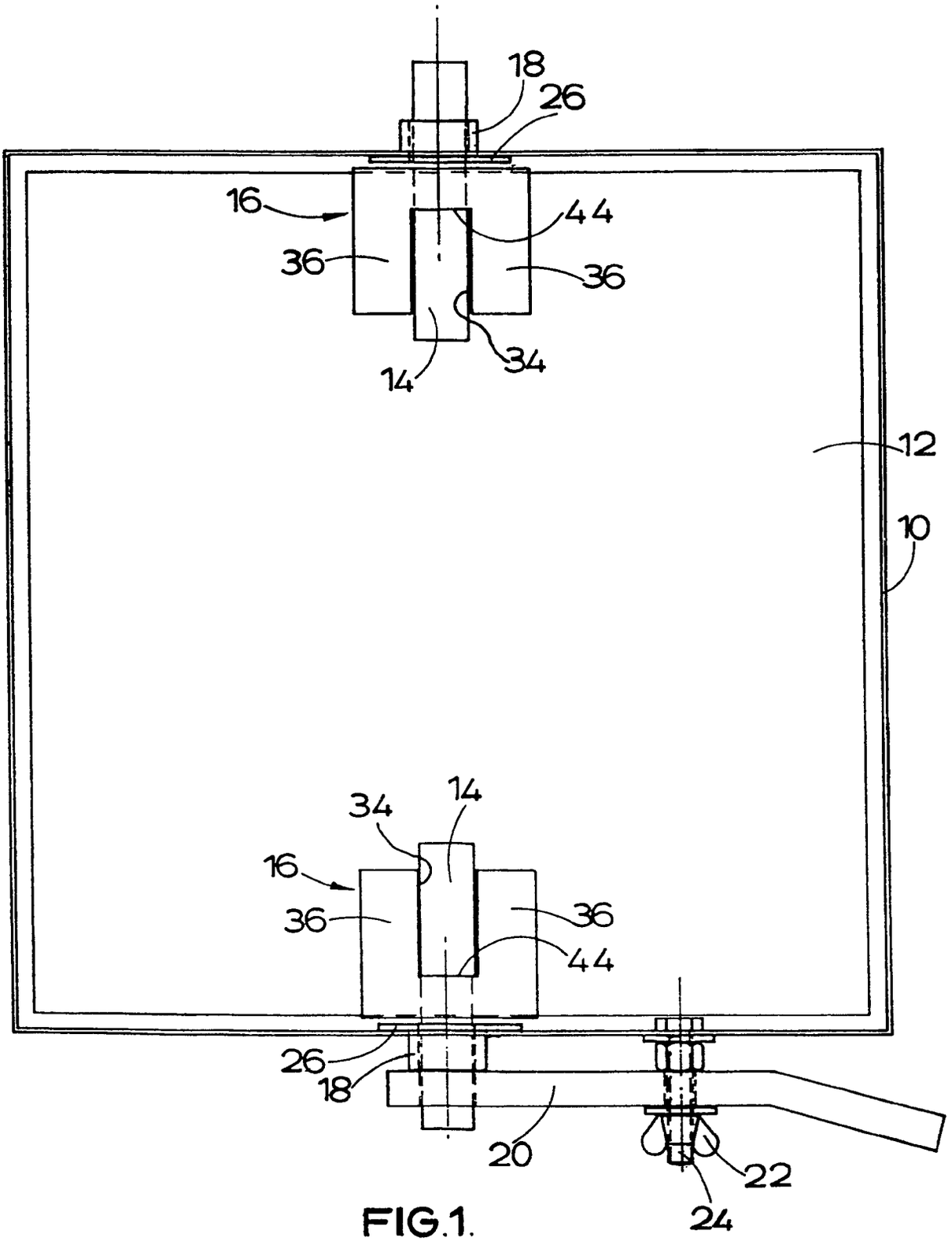

FIG.1.

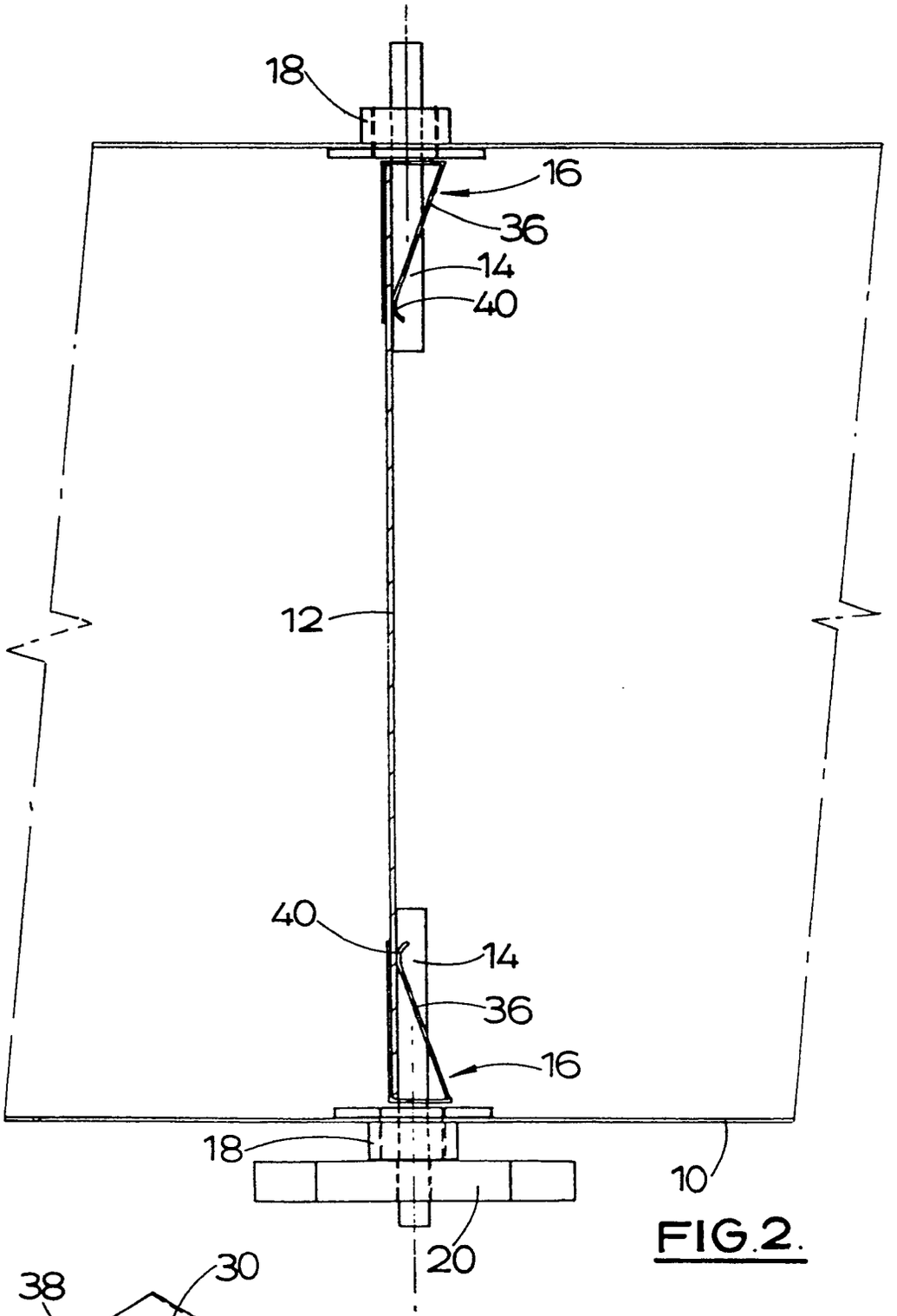

FIG.2.

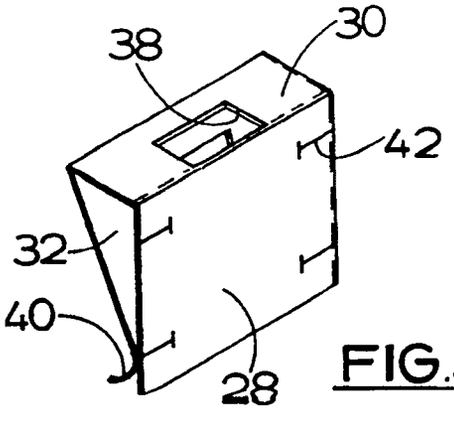

FIG.3.