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DOOR COUNTERBALANCE STRUCTURE

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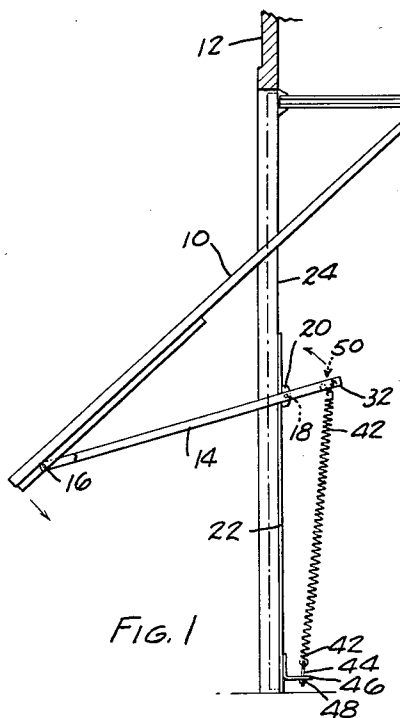


FIG. 1

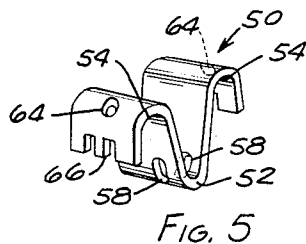


FIG. 5

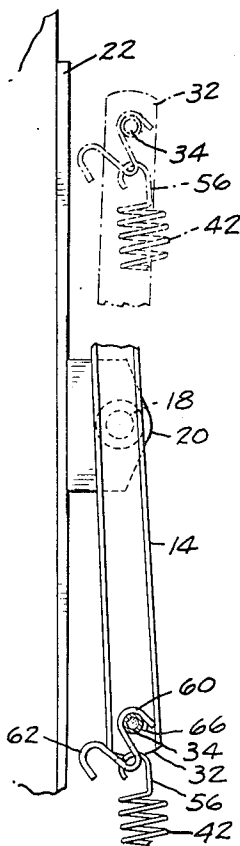


FIG. 2

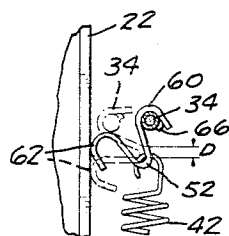


FIG. 4

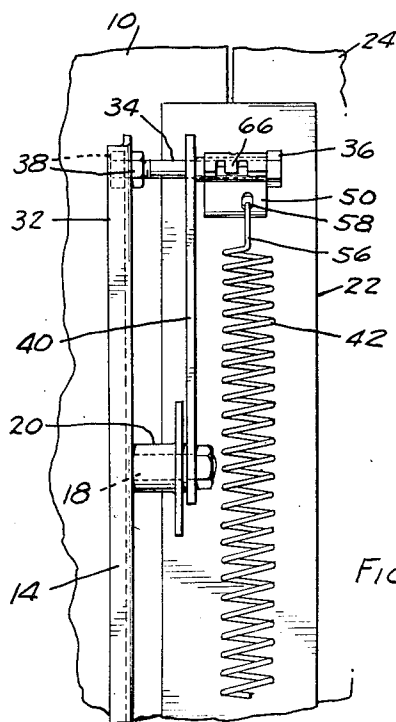


FIG. 3

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1

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DOOR COUNTERBALANCE STRUCTURE

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4 Claims. (Cl. 16—1)

This invention relates to a counterbalance structure for overhead doors of the type adapted for use on garages and the like.

Such a door is supported at each side by a lever arm which swings vertically on the door jamb to raise and lower the door for opening and closing. Each lever arm is pivoted on the door and on the jamb and has one end swinging free and connected to a counterbalance spring anchored on the door jamb. The upper edge of the door recedes from the doorway in opening and is supported by rollers engaged in a track supported within the building. Opening movement of the door is limited by the free ends of the support arms striking the door frame and in prior structures this impact caused unsightly marring of the frame and objectionable noise and shaking of the door support structure.

An object of this invention is to provide an inexpensive counterbalance structure improved to eliminate impact engagement of the support arms on the door frame. One form of the invention is shown in the accompanying drawings.

Fig. 1 is a diagrammatic illustration of an overhead door using the device of this invention.

Fig. 2 is a partly diagrammatic view illustrating the position of the device when the door is open and in dotted lines illustrating the device when the door is closed.

Fig. 3 is a partly diagrammatic fragmentary view of the device in closed position of the door.

Fig. 4 is a partly diagrammatic detailed view illustrating operation of the bumper clip and associated elements.

Fig. 5 is a perspective of the bumper clip separate from the door structure.

Shown in the drawings is a door 10 mounted in a doorway of a building 12 by a support arm 14 at each side of the door, each arm having one end pivoted on the door as at 16 and swinging on a pivot 18 journaled in a bracket 20 on a frame member 22 secured to a door jamb 24 of the building. Each upper corner of door 10 has a roller 26 engaged in a track 28 extending away from the doorway and suspended by a suitable support 30 in building 12.

Pivot 18 lies between the ends of arm 14 and the free end 32 of each arm has a pintle 34 lying generally parallel to pivots 16 and 18. The pintle comprises a bolt having a head 36 and secured on arm 14 by nuts 38. A member 40 is fixed between pivot 18 and pintle 34 to connect the pintle, pivot and end portion 32 of arm 14 in a mutually supporting frame.

A counterbalance spring 42 at each side of the door has one end anchored on door jamb 24 through a bolt 44 secured to a bracket 46 by a nut 48, the bracket being fixed on frame 22 mounted on the door jamb. The other end of each spring 42 is secured to pintle 34 on a support arm through a bumper clip 50. Tension in springs 42 is regulated by turning nuts 48 on bolts 44.

Clip 50 comprises a single piece of metal having a V-shaped central portion with an apex 52, each leg of the V having an outward return-bent portion 54 dimensioned to hook over pintle 34. Upper end 56 of counterbalance spring 42 hooks through aligned apertures 58 near the apex 52 and these apertures are offset from the center of the clip to provide clearance between the spring and the lever arm structure (Fig. 3). The clip is symmetrical relative to a plane bisecting the angle of the V so that the clip can be used interchangeably on the right side of the door as shown in Fig. 3 or the left side of the door, each return-bent portion 54 serving interchangeably

2

as a bearing 60 on pintle 34 or as a bumper 62. Each return-bent portion 54 preferably has an oil hole 64 and has struck out portions forming a finger 66 for permanently securing the clip to pintle 34 (Fig. 4).

In use, assuming that the door is initially closed, the parts are positioned as shown in Fig. 3 and in dotted lines in Fig. 2. When the door is opened, support arms 14 swing vertically on pivots 18 with their ends rotating away from door jamb 24 and then back to a position adjacent the door jamb. The bottom edge of door 10 is carried upwardly by the support arms and the top edge recedes from the doorway on rollers 26 carried by tracks 28. The weight of the door is counterbalanced by springs 42.

When door 10 reaches fully opened position it frequently has residual motion which carries bumper portion 62 of each clip 50 against frame member 22 on door jamb 24 as shown in solid lines in Fig. 4 and the door's momentum may cause arm 14 to swing further, forcing bearing portion 60 of clip 50 further toward the jamb. The latter action levers apex 52 of the clip upwardly, stretching spring 42 by an amount generally indicated by D, Fig. 4, and gradually diminishes the door's movement. After the door has stopped the parts return to an equilibrium position such as shown in solid lines, Fig. 4, under action of springs 42.

The structure thus utilizes counterbalance springs 42 for gradually stopping opening movement of the door and preventing undesirable impact of free ends 32 of the support arms against the door frame.

In closing, the bottom of door 10 rides downwardly on arms 14 and the top moves forwardly on rollers 26. While frame 22 usually stops the door before free ends 32 of support arms 14 strike the frame, the shock absorbing structure may operate to retard movement of the door as described above.

I claim:

1. In an overhead door structure for a frame defining a door opening, a door member, a lever for each side of the door member, means pivotally mounting each lever at an intermediate portion thereof to the frame, means pivotally mounting one arm of each lever to the lower portion of the door member, whereby the lower portion of the door member swings upwardly and downwardly to open and closed positions respectively, means supporting the upper portion of the door member for lateral movement, the other arm of each lever being free, a pintle on the free arms, a counter-balancing coil spring for each lever, means anchoring one end of each spring to the frame; reversible clip members for connecting the opposite end of each spring to the respective pintles, each clip member having a substantially V-shaped body portion with the ends of the arms of the V extending outwardly curvilinearly forming bearing portions, means substantially at the apex of the V for attachment to one end of a counter-balancing spring, whereby when one bearing portion is mounted on a pintle the exterior surface of the other curvilinear portion is adapted to engage the frame as the door approaches full open position to rock the clip on the pintle and stress the spring to yieldably check door opening movement.

2. The overhead door structure as recited in claim 1 characterized in that the means at the apex of the body portion for attachment to the spring is positioned laterally off center to space the spring from the arm to which it is connected.

3. The overhead door structure as recited in claim 1 characterized in that the extreme end of each curvilinear portion has a projecting tang adapted to be fashioned about a pintle to permanently unite the clip thereto.

4. In an overhead door of the type supported by a lever arm at each side of the door having one end pivoted on the door and having an intermediate portion pivoted on the door supporting structure to swing vertically in opening and closing the door, each lever arm having a free end swinging to upward and downward vertical positions adjacent the supporting structure in opening and closing the door; counterbalance structure for the door wherein each lever arm has a pintle extending laterally of said free end, a counterbalance spring connected to said pintle on each lever arm through a clip and adapted to be

3

secured to the door supporting structure, said clip having a V-shaped central region, each leg of the V having an aperture therein, said apertures being aligned, and an end portion of said spring being engaged therein, said apertures being offset from the center of said clip whereby to space said spring from said lever arm, one leg of the V having an outward return-bent portion forming a bearing engaging said pintle, the other leg of the V having an outward return-bent portion forming a bumper to con-

4

tact the door supporting structure when said free end is adjacent thereto, whereby to stress said spring and diminish motion of the door, said clip being substantially symmetrical relatively to a plane bisecting the angle of said V, whereby said return-bent portions are interchangeable as said bearing and said bumper on right and left sides of the door.

No references cited.