LATCH MECHANISM TO PREVENT SAG IN OVERHEAD GARAGE DOORS

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This invention relates to a device for preventing sagging of overhead garage doors.

Overhead garage doors, usually built of wood and of considerable width, are ordinarily hung from hardware at each side edge, enabling the door to be shifted from a vertical closed position to an elevated open position. In the latter position part of the door is inside the garage and part is outside. The weight of such doors and the fact that they are suspended from the side edges usually results in a tendency for them to sag in the middle when in their horizontal open position. One expedient aimed at correcting the sagging is the use of strap or rod trusses mounted transversely on the door. These impose weight and expense, detract from the appearance of the door installation, and are not entirely satisfactory in operation because they tend not only to stretch but to vary under temperature changes. The use of rigid wood frames for the doors, or intermediate bracing, is employed to the extent feasible, but light weight doors are desirable and usually there is a compromise between rigidity and sagging.

One of the principal objects of the present invention is to provide a device to be attached to a garage door header to support an overhead garage door in the center when in an open position by latching to a handle on the door.

Another object of this invention is to provide a device which will compensate for the maximum amount of overhead garage door sag usually encountered and which will be automatically engaged when the door is raised notwithstanding variation in the amount of sag from time to time and will nevertheless sustain the door at the original horizontal elevation, flattening out the sag if any is present.

Another object of this invention is to provide a device cooperative with a garage door handle to retain the handle in door supporting condition when the door is open, and which will automatically be reset upon lowering the door toward closed position so that it will be conditioned to receive the door handle on the next raising of the door.

Other objects and advantages of the invention will appear during the course of the following part of this specification wherein the details of construction and mode of operation of an embodiment of the invention are described with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of the anti-sag device comprising the latch and the door handle but with the door omitted for the sake of clarity. Figure 2 is a side elevational view of a garage door and header showing the position of the mounted latch and the door handle. Figure 3 is a side elevational view showing the door in open position and the device in operation. Figure 4 is a side elevational view partly in cross-section of the latch and handle in engaged relationship. Figure 5 is a front elevational view partly in cross-section of the same assembly. Figure 6 is a view similar to Figure 4 showing the latch open. Referring to the drawing, and more specifically Figure 2, reference numeral 10 designates an overhead garage door, which is positioned between vertical side pieces of a frame 11 defining an opening. Across the top is a horizontal frame piece 13 secured to a header 12. The garage door 10 may be any of those in general use where they are pivotally mounted and swing from a closed vertical position as shown in Figure 2 to a horizontal open position, as shown in Figure 3. On the header 12 and frame piece 13 and positioned generally midway between the ends of the header is my latch type anti-sag device generally designated by reference numeral 16, and in vertical alignment therewith positioned on the front face 14 of the door 10 is a handle element, generally designated by reference numeral 17, to be received by the anti-sag device 16, when the garage door 10 is opened.

The latch 16, made of steel or other suitable material, is formed of three primary parts, a bracket 16a, rocker 16b, and pivot element 16c. The bracket comprises a substantially flat elongated back plate 20 having a front face 21, a rear face 22, and edges 23 and 24, and extending laterally and rearwardly from the lower end of the back plate 20 is a bottom plate 25. Extending forwardly from the back plate 20 adjacent the lower region thereof from edges 23 and 24 and in vertical alignment therewith are two parallel bracket ears or extensions 26 and 27 forming generally a U-shaped rocker receiver.

Pivotedly mounted between the ears 26 and 27 is a rocker 30. The rocker comprises a substantially flat rear wall 30a, and extending outwardly therefrom in parallel relationship two side walls 31 and 32, having outer plane surfaces 33 and 34. The side walls 31 and 32 are formed with upwardly tapering extensions, their lower ends are rounded as at 35 and 36. Projecting outwardly, upwardly, and forwardly from the upper region of the rear wall 30a is a finger 37, having the same general width as the rear wall 30a and being depressed in an arc at its mid-section to form a cradle 39 for receiving the handle element 17.

The rocker element is rotatably secured between the walls 26 and 27 of the bracket element by means of a main pivot pin 50 extending through holes 51 in the walls 31 and 32. Preferably, a sleeve 52 is secured in the side walls of the rocker to function as a bearing sleeve on the pivot pin 50. The rocker has free rotational movement downwardly about 90° or more, but the rearward rotation is limited due to the rear wall 30a of the rocker abutting the back plate 20 of the bracket. Locating the sleeve 52 and holes 51 to receive pin 50, the axis is placed slightly outward from the axis of the rocker cradle 39, thus causing the upper part of the rocker and the cradle 39 to be past dead center inwardly relative to the pivot pin 50. Also provided to frictionally restrain the free forward pivotal rotation of the rocker is an arresting means, which is mounted adjacent the rounded extensions 35 and 36 of walls 31 and 32. This arresting means, best shown in Figure 5, comprises a sleeve 53 confining a compression spring 55 and friction pins or shoes 56 and 57. The friction pins 56 and 57 projecting through apertures 58 and 59 in the walls of the rocker engage the inner surfaces 28 and 29 of the ear extensions 26 and 27 creating a friction brake contact, the shoes being constantly urged in outward opposite directions due to the force of the compression spring 55.

Thus, when the rocker is moved forward the arresting means described above will frictionally hold the rocker element in the position it is left in until force is again exerted to change the position of the rocker.

The third major element provided is the handle element 17, which is best illustrated by Figures 1 and 5. It
is mounted to the outer surface 14 of the garage door 10, by means of two carriage bolts 60 extending through a washer plate 61. The handle consists of a generally U-shaped bracket of uniform thickness, whose bottom side 63 rests against the door 10, the carriage bolts 60 passing through the bottom 63, securing the U-shaped bracket to the door 10. Extending outward from the bottom side 63 are parallel sides 64 and 65, and mounted between said sides is a handle bar 66, which is to be received by the cradle 39 of the anti-sag latch 16.

The latch 16 is secured to the garage door header 12 and a frame member 13 by means of screws through openings 18 and 19 in the frame 20 and 19 in bottom plate 25, respectively. The handle element 17 is positioned on the garage door 10, described above, in vertical alignment with said latch at a predetermined distance from the bottom of said door so that when the garage door 10 is opened the handle bar 66 will engage the finger 37 of the rocker and ride along the finger until seated in the cradle 39, caused by the manual operation of opening the door 10, and final closing movement of the door will pivot the rocker to a position where the handle is past dead center of the pivot pin 50.

In the usual installation, the door is hung with the pivot center of door movement several feet below the header, and its upper horizontal open position.

When the rocker comes to rest against the back plate 20, the handle bar 66 will transmit a substantial portion of the weight of the garage door 10 to the latch 16, thus relieving the stress and weight from strap trusses which are generally found in conventional overhead garage doors, and in any case will sustain the central portion of the door against sagging. With the cradle past dead center of the pivot pin 50 the garage door 10, when in open position, will rest in place so that some force is necessary to dislodge the door other than the vertical gravitational pull imposed by the weight of the door.

In closing the garage door, manual lowering will cause the handle bar 66 to ride along the surface of the finger 37 over the end of said finger and as it passes the highest point of the convex arc of the finger will trip the rocker element to an open or receiving position, best shown by Figure 6, thus leaving it at the exact location necessary to receive the handle bar when the door is again lifted. The arresting element described above retains the rocker in said position.

While the instant invention has been shown and described herein in what is conceived to be a practical embodiment, it is recognized that departures may be made therefrom within the spirit of the invention, which is, therefore, not to be limited to the details shown and described but is to be accorded the full scope of the claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A latch device of the character described comprising: a mountable bracket comprising a substantially flat vertical plate having parallel ear members extending forwardly from the flat vertical plate, said ear members and plate forming a receiving channel for a rockable arm, a rockable arm pivotally mounted in the channel between the ear members and provided with a cradle element spaced from the axis of the pivot and having a load receiving surface facing away from the axis, the substantially flat vertical plate of said mountable bracket providing stop means interposed in the path of said rockable arm above the said axis and offset from a vertical plane through and parallel to said axis whereby a load imposed upon the cradle element may be sustained with its center of gravity between the axis of the pivot and the stop means.

2. A latch device of the character described comprising: a mountable bracket comprising a substantially flat vertical plate having parallel ear members extending forwardly from the flat vertical plate, said ear members and plate forming a receiving channel for a rockable arm, a rockable arm pivotally mounted in the channel between the ear members and provided with a cradle element spaced from the axis of the pivot and having a load receiving surface facing away from the axis, the substantially flat vertical plate of said mountable bracket providing stop means interposed in the path of said rockable arm above the said axis and offset from a vertical plane through and parallel to said axis whereby a load imposed upon the cradle element may be sustained with its center of gravity between the axis of the pivot and the stop means, and a friction brake co-acting between the rockable arm and the ears of the bracket to yieldably retain the rockable arm in any arcuate position in which it may be released of load.

3. A latch device of the character described comprising: a mountable bracket comprising a substantially flat vertical plate having parallel ear members extending forwardly from the flat vertical plate, said ear members and plate forming a receiving channel for a rockable arm, a rockable arm pivotally mounted in the channel between the ear members and provided with a cradle element spaced from the axis of the pivot and having a load receiving surface facing away from the axis, the substantially flat vertical plate of said mountable bracket providing stop means interposed in the path of said rockable arm above the said axis and offset from a vertical plane through and parallel to said axis whereby a load imposed upon the cradle element may be sustained with its center of gravity between the axis of the pivot and the stop means, and a friction brake co-acting between the rockable arm and the ears of the bracket to yieldably retain the rockable arm in any arcuate position in which it may be released of load.

4. A latch mechanism comprising: a bracket comprising parallel ears, a pivot pin mounted in said ears, a rocker mounted on said pivot pin, said rocker comprising a load supporting cradle having a depressed center of a configuration to yieldly receive a cooperating bar member, the axis of the depressed center being offset inwardly from the axis of the pivot pin when the cradle is pivoted to load supporting position, stop means limiting the rotational movement of the cradle in one direction to the load supporting position, and an elongated finger extending forwardly from the cradle adapted to engage the bar member as soon as the latter is approaching or retrieving from the cradle.

5. A latch mechanism comprising: a bracket comprising parallel ears, a pivot pin mounted in said ears, a rocker mounted on said pivot pin, said rocker comprising a load supporting cradle having a depressed center of a configuration to yieldly receive a cooperating bar member, the axis of the depressed center being offset inwardly from the axis of the pivot pin when the cradle is pivoted to load supporting position, stop means limiting the rotational movement of the cradle in one direction to the load supporting position, an elongated finger extending forwardly from the cradle adapted to engage the bar member when the latter is approaching or retrieving from the cradle, and a friction brake continuously co-acting with an ear of the bracket to yieldly retain the rocker in any position which it assumes when the bar member has retreated from the cradle.

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