ABSTRACT

A swingable door for garages or the like in which the door panel is held by two-armed levers which are spring biased and having one short and one long lever arm, the two-armed lever having a first bearing point at the edge frame for the door and a second bearing point at the door panel, and a supporting lever for each two-armed lever having one end articulated to the associated two-armed lever at a point proximate the first bearing point and having the other end thereof provided with a runner positioned for guided movement with respect to the door panel, a holding device for the supporting lever in the form of a flexible strip connected between the upper end of the edge frame or the inner wall surface and the supporting lever and having the broad surface portion thereof extending in planes transverse to the planes of movement of the associated support lever.

3 Claims, 3 Drawing Figures
SWINGABLE GARAGE DOOR

The present invention relates to a swingable overhead door for a garage, the door panel of which is held by two-armed levers supported at the edge frame, each of the levers being spring-loaded and including a short lever arm and a long lever arm. One supporting lever is articulated, between the bearing point of each two-armed lever at the edge frame and the associated bearing point at the door panel, to the edge frame in the proximity of the bearing point of each two-armed lever, the other end of the supporting lever carries a roller which is guided for movement with respect to the door panel, wherein a holding device for the supporting lever is arranged between the upper end of the edge frame or the interior of the garage and each supporting lever.

In the conventional swinging garage doors of this type, the holding device consists either of chains (German Patent 342,966) or of rigid arms (German Patent 1,188,472), formed from flat irons, which are pivoted in parallel vertical planes when the door panel is opened or closed. In garage swing doors wherein the two holding devices consist of chains, the runner rollers wobble in the running tracks when the door panel is almost closed, because the runner rollers are then no longer against the surfaces of the guide tracks via the supporting levers. The holding devices, consisting of flat irons, must not only be exactly fitted with respect to their lengths, but furthermore require two complicated bearing points for each holding device.

It is therefore an object of the present invention to provide a swinging garage door which overcomes the disadvantages of prior art swinging garage doors.

It is another object of the present invention to provide a swinging garage door of the type mentioned above in which the runners contact the surfaces of the guide rail tracks when the door panel is almost closed and when it is completely closed, i.e. constantly.

It is another object of the present invention to provide a swinging garage door in which an exact adaptation of the length of the holding means is unnecessary.

A further object of the present invention is to provide a swinging garage door in which the holding device is mounted in a maximally simple way.

In accordance with the present invention, a swinging garage door is provided with holding devices in the form of a spring steel band, the broadsides of which extend in planes at right angles to the planes of movement of the supporting levers, i.e. the planes in which the broadsides of the supporting levers extend. Since each spring steel band is elastic in only one direction, but is essentially rigid in a direction transverse to this one direction, the band constantly exerts a compressive force on the associated supporting lever, so that any wobbling of the runners is prevented. An adaptation to an exact length is no longer required, because each spring steel band compensates for inaccuracies in the length by bending, and it is now no longer necessary to provide two bearing points for each holding device, since one of the two therefore required bearing points, namely the one to be provided at the edge frame, or the one to be provided on the inner wall of the garage, can be replaced by a rigid mounting.

Spring steel bands, the broadsides of which extend in planes extending transversely to the planes wherein the broadsides of the door panel supporting levers extend, are known in swinging garage doors of a different type (French Patent 1,482,757). The ends of these conventional spring steel bands are mounted, on the one hand, at the edge frame and, on the other hand, at the door panel, and serve the purpose of compensating for the weight of the door. Thus, they correspond to the springs which, in the garage swing doors mentioned above, the shorter lever arms of the two two-armed levers, the longer lever arms of the levers engaging the door panel in the lower zone thereof. The door panel provided with these conventional spring steel bands can no longer be satisfactorily guided after a certain opening distance, since a spring, which is to compensate for the weight of the door, cannot exert a guiding function on the door panel.

According to a feature of the present invention, it is advantageous to firmly fix the upper end of each spring steel band into position at two points disposed one above the other or side-by-side. This can be accomplished by riveting or, more advantageously, by screws, in order to make it readily possible to exchange the spring bands, which exchange may become necessary after a certain period of time. It is also advantageous to fashion the lower end of the band as a bearing point for a pivot pin attached to the corresponding supporting lever. A particularly advantageous solution results if the upper end of each spring steel band is clamped between the edge frame and a spacer element. In this case, it is merely necessary to somewhat extend or lengthen the cover plate which presses the upper end of the spring steel band against the edge frame, and these cover plates can then be utilized for keeping several edge frames, with hingedly attached door panels, at a spacing while they are stacked on one another, which considerably facilitates packaging and shipping.

These and further objects, features and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a single embodiment in accordance with the present invention, and wherein:

FIG. 1 shows a partial sectional view of a garage with an open swinging garage door constructed in accordance with the invention, which is hingedly attached to an edge frame;

FIG. 2 shows a somewhat enlarged partial lateral view of the edge frame with the door panel mounted at the levers and with one of the two holding devices, the door panel being in the closed condition, and

FIG. 3 shows an enlarged illustration of the edge frame in the zone III of FIG. 1 of the rigid mounting of the holding device constructed in accordance with the present invention.

Referring now to the drawings wherein like reference numerals are utilized to designate like parts throughout the several views, there is shown in FIG. 1 a door panel 1 mounted by way of two-armed levers 5, having respectively one short lever arm 5' and a long lever arm 5", which levers are attached to the edge frame 2 to be pivotable about a horizontal axle 4 and are each moved by a spring 4. One supporting lever 8 is articulated respectively to each of the levers 5 with each of the supporting levers being held by a rigidly affixed flexible strip member in the form of a spring steel band 7 mounted to the upper end of the edge frame 2 or the inner wall 6 of the garage. The spring steel band is provided with a flattened or broad surface portion 7' which
broad surface extends in a plane at a right angle to the plane of movement of the associated supporting lever 8 or in other words the plane in which the broad surface portion of the supporting lever extends. Each of the supporting levers is connected, between the bearing point 3 of each two-armed lever 5 at the edge frame and the associated bearing point 9 at the door panel 1, in the proximity of the bearing point of each two-armed lever, to the edge frame at 10. The spring steel band 7 replaces the heretofore known holding devices. The other end of each supporting lever 8 carries a runner 11 such as a roller guided with respect to the door panel 1. Each of the runners can be moved back and forth in a track rail 12 affixed to the door panel. If the door panel 1 closes off a garage or the like, the two runners are in the proximity of the end 13 of the door panel which is then disposed at the top.

As can be seen from FIGS. 2 and 3, the upper end of the spring steel band 7 is fixedly mounted with one of its broad surface portions 7' to the edge frame 2 at two superimposed or adjacent points 14 and 15. Although this mounting could also be accomplished on the inner wall 6 of the garage, such a mounting is impractical, because in this case the two spring steel bands can be mounted only at the assembly site, rather than already in the factory. In order to prevent a tearing out of the spring steel band in the zone of the mounting points, the upper end of such spring steel band is covered by a plate which, in this case, corresponds to the one leg 16 of a sheet-metal strip 17 having approximately a U-shape, the other leg 18 of which serves for supporting a second edge frame which is provided with a door panel, is stacked on top of the flatly disposed edge frame 2. The mutual spacing of the two legs 16 and 18 is chosen so that the edge frames, with closed door panels, can be stacked on top of one another in parallel. The lower end 19 of each spring steel band 7 is fashioned as a bearing element and is associated with a pivot pin 20 fixedly attached to the corresponding supporting lever 8, as illustrated in FIG. 2. Therefore, each spring steel band is provided with only a single bearing point, so that two complicated bearings required in prior art arrangements are eliminated, for the upper ends of the two spring steel bands need only be screwed flatly onto the frame and yet can be deformed readily by the required angle of about 50°, and yet guide the door panel flawlessly during its opening and closing operations, since they are stable in the direction of the double arrow 21.

As for the fixed mounting of the spring steel bands, or the spring steel bands proper, the bands can also be attached on two points lying side-by-side, or by means of clamps, and that, in place of each spring band, a flexible strip member in the form of a multiple-part hinge can also be provided, since such a multiple-part hinge band can function in the same manner as the steel band with respect to stability in the transverse plane, adaptation of the length, and a simple manner of mounting to the edge frame. However, a hinge band is somewhat more complicated than a steel band and does not pre-vent a rattling of the runners in the tracks, either, when the door panel is closed.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It should therefore be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

1. claim:

In a swingable door for garages in which the door panel is held for swinging movement by two-armed levers with respectively one short and one long lever arm and the levers being spring biased, a supporting lever for each two-armed lever and having one end articulated to the associated two-armed lever between a first bearing point of the two-armed lever at the edge frame for the door and an associated second bearing point at the door panel at a point proximate to the first bearing point at the edge frame, the supporting lever having the other end thereof provided with runner means for guided movement with respect to the door panel, and a holding means for each supporting lever connected between an upper end of the edge frame or an inner wall surface and the supporting lever, the improvement comprising the holding means including flexible spring band means having the broad surface portions thereof extending in planes transverse to the planes of movement of the supporting levers, means rigidly mounting one end of said flexible spring band means on said upper end of the edge frame or inner wall surface, and means pivotally mounting the other end of said flexible spring band means on the supporting levers, said flexible spring band means being angularly disposed with respect to the edge frame or inner wall surface so that it is tensioned when the door is closed and untensioned when the door is open, whereby said flexible spring band means constantly exerts a force on said supporting levers during said swinging movement to prevent wobbling of said running means.

2. A swingable door according to claim 1, wherein the flexible spring band means has its broad surface portions extending in planes at right angles to the planes in which the broad surface portions of the supporting lever are disposed.

3. A swingable door according to claim 2, wherein said flexible spring band means comprises a spring steel band, each spring steel band has its upper end rigidly affixed at two points to the upper end of the edge frame or the inner wall surface by said means rigidly mounting and has its lower end forming a bearing member portion of said means pivotally mounting, said means pivotally mounting having a pivot portion fixedly mounted on the associated supporting lever, and said means rigidly mounting includes spacer means for clamping the upper end of the spring steel band to the edge frame or the inner wall surface at said two points, said spacer means including a U-shaped member with one leg of the U secured against the upper end of the spring steel band.