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COLLAPSIBLE RAIN GUTTER BRACKET

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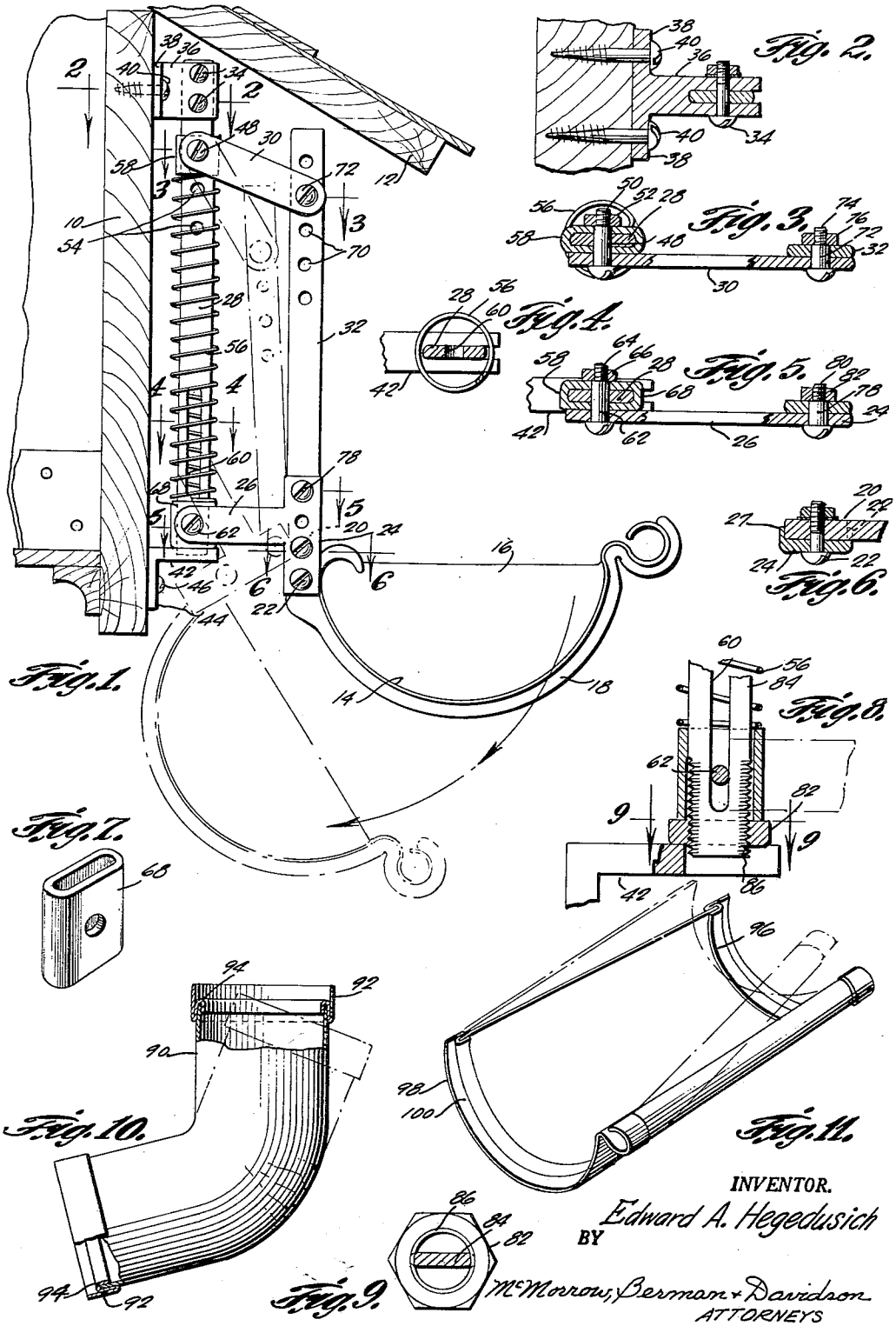


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 10.

Fig. 11.

Fig. 9.

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COLLAPSIBLE RAIN GUTTER BRACKET

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This invention relates to rain gutters, particularly hanger brackets therefor. Rain gutters are a necessity in most regions, but are attended with certain inconveniences and annoyances. For instance, they tend to accumulate leaves in the fall season, and these must be removed periodically if the gutter is to continue to perform its intended function. Another difficulty is experienced when freezing weather tends to pile up ice in the gutters, to the extent that water run-off is impeded rather than assisted, resulting in leakage through the roof, to the interior, and gradual rotting of the roof material and inner structure. The undue weight of the ice is also likely to damage the trough itself, and seriously weaken its attachment to the building.

It is therefore an object of the present invention to provide a gutter having features which compensate for accumulation of debris in the gutter, and minimize the harmful effects thereof, and in particular to achieve this result automatically. In still greater particular, it is an object to provide a gutter which is hinge-mounted so as to dip downwardly for corrective action when overloaded.

These and other ends, which will be apparent, are attained by the present invention which, in a preferred form, may be briefly described as comprising a gutter hinged along an axis located inwardly of its inner edge, or lip, the swing action being controlled by a quadrilateral linkage, and the gutter being biased to normal position of operation by a compression spring, associated with the linkage, and providing a constant minimum thrust which serves to hold the gutter in normal position except when overcome by an overload, of predetermined value, on the gutter.

For a more detailed description of the invention, reference is made to the following specification, as illustrated in the drawing, in which:

FIGURE 1 is an end elevation of the eaves portion of a building, showing a gutter suspended from the novel bracket, with an adjusted position of the gutter indicated in broken lines.

FIGURE 2 is an enlarged, detail sectional view taken on the line 2—2 of FIGURE 1.

FIGURE 3 is an enlarged sectional view taken on the staggered line 3—3 of FIGURE 1.

FIGURE 4 is an enlarged sectional view taken on the line 4—4 of FIGURE 1.

FIGURE 5 is an enlarged sectional view taken on the staggered line 5—5 of FIGURE 1.

FIGURE 6 is an enlarged sectional view taken on the line 6—6 of FIGURE 1.

FIGURE 7 is a view in perspective of the pivoted rider which pushes the movable end of the compression spring.

FIGURE 8 is a fragmentary view of the lower end of the guide rod for the spring, showing a modification for varying pre-stress on the spring.

FIGURE 9 is a sectional view taken on the line 9—9 of FIGURE 8.

FIGURE 10 is an elevational view of a modified elbow, partly broken, and

FIGURE 11 is a perspective view of a modified gutter section.

Referring to the drawings by characters of reference, FIGURE 1 shows a bracket, according to the invention,

mounted in an eaves corner formed by siding or trim board 10 and roof overhang 12. A section 14 of conventional gutter, with end face 16, is shown supported on an arcuate saddle 18, which terminates in a rear end 20, and is not essentially different from the lower end of a conventional hanger bracket. In the present instance, this rear end of the saddle is secured to one corner of the linkage which enables swinging movement of the gutter, and in particular, is secured by a pair of screws 22, to the lower half of the cross member 24 of a T-form link 26. As seen in FIGURE 6 the lower half of cross member 24 is of channel section, with side walls 27 engaging the sides of end 20 of the saddle, to render the latter more rigid with the T link. The latter forms the bottom member of the quadrilateral linkage, and is normally disposed in a horizontal attitude, but arranged for movement to an inclined position upon overload of the gutter. Of the remaining three links of the linkage, the rearward vertical link 28 is fixed in position, and anchored to the building element or trim board 10, and the other two links, 30 and 32 are movable, the former being swing mounted, and the latter arranged both for swinging movement, and movement of translation.

Particularizing the linkage construction, the fixed link 28, of flat stock is secured by two screws 34, at its top, to a forked bracket 36, which in turn is secured through its flanges 38 to the trim board 10 by means of screws 40. The lower end of link 28 is held against lateral and rearward movement by engagement in the forked flange 42 of an angle bracket, the other flange 44 of which is secured to board 10 by one or more screws 46.

The inner end of link 30 is pivoted to link 28 by means of a pin 48, having a reduced, threaded end 50, receiving a securing nut 52. The pin 48 is receivable, selectively, in any one of a series of spaced bores 54, located in the upper end of link 28, for the purpose of varying the pre-stress on a compression spring 56, which is mounted in surrounding relation to link 28. A flat tube washer 58 mounted on link 28 and on pin 48, serves as an abutment for the spring 56.

In its lower portion, the link 28 has an elongate, longitudinal slot 60, in which a pin 62, carried at the inner end of T link 26, is mounted for sliding movement. As in the case of upper pin 48, the pin 62 has a threaded end 64, secured by a nut 66, and also carries a flat tube washer 68, which engages the lower end of spring 56.

Link 32, which connects the outer ends of links 26 and 30, has a series of spaced bores 70 in its upper part, for selective engagement with the pin 72 carried by link 30, which increases the range of adjustment of pre-stress on the spring, and also permits of adjustment of the tilt of the gutter in working position. Pin 72 has a threaded end 74, receiving a nut 76. At its lower end, the outer link 32 is pivoted by a pin 78 to the upper end of the cross, T arm 24, the pin having a threaded end 80, secured by a nut 82.

Assuming a given adjustment of the pre-load on spring 56, as by adjustment of one or both of pins 48 and 72, if this load is exceeded by the movement due to the weight of material in the gutter, the latter swings downwardly about the axis of pin 62, forcing the pin 62 upwardly along slot 60 of the fixed link, and the system assuming the final position shown in broken lines in FIGURE 1. As shown, the quadrilateral linkage is very nearly a parallelogram, so that during the movement, the link 32 does not vary much from the vertical. If the gutter has had an accumulation of ice, this downward swing will remove the ice mass a sufficient distance away from the roof to avoid further pile-up. The gutter will remain in this downward position until the ice has been reduced in mass, by thawing or dropping out, to the point where the spring pressure will return the gutter to working position.

In pre-stressing the spring, in some cases it may be preferable to set it at a low value so that the gutter will drop only a small amount, under a relatively light load, and thus prevent ice build-up in the roof area, yet still permit normal carry-off of water released in a mild thaw.

In the case of leaf jams, even if the weight is not sufficient to drop the gutters automatically, it is nevertheless possible to grasp the gutter with a tool and pull it downwardly. Depending upon the inclination of the gutter, the leaves might fall out of their own weight, or under the influence of a mild shaking, or they may be pulled out with a tool.

In FIGURE 8 is shown a modification which provides a means of adjusting the spring pressure in lieu of, or in addition to, the means discussed above. In this form the flat link 84, which is the equivalent of link 28, carries threads 86 on its opposite edges at its lower end, which receive a nut 88 which is adapted to push the flat tube washer 68 and thus compress spring 56.

In order to accommodate the downward swing of the gutter, the elbows leading to the vertical downspouts will need to be flexible, and one manner of accomplishing this is to provide elbows of plastic or other readily, and highly flexible material. Thus, in FIGURE 10, is shown an elbow 90 of plastic material, with metal rings 92 secured to the ends of the elbow by crimps 94. With this construction, the elbow, although flexible, as shown by the dotted line position, may be secured to the metal parts of a drain system, as by soldering or screws.

Gutter sections located at critical areas, such as those around valleys, chimneys, dormers, and the like, may also be made of plastic or other highly flexible material, such as the section 96 (FIGURE 11), having an end, metallic connector 98, secured by a crimp 100.

Generally speaking, while a preferred embodiment has been shown and described, various modifications will become apparent, in the light of this disclosure, and the invention should not, therefore, be deemed as limited, except insofar as shall appear from the spirit and scope of the appended claims.

I claim:

1. A hanger bracket for rain gutters for use in a system of such brackets, comprising:

(*a*) a quadrilateral linkage, with a first link having a first pivot at one end;

(*b*) a second link having an elongate slot near one end, received on said first pivot, and said second link being adapted for attachment to a building at its ends;

(*c*) a third link pivoted at its one end to the other end of said second link;

(*d*) a spring surrounding said second link, between said first and third links;

(*e*) a fourth link pivotally connecting said third link and the other end of said first link; and

(*f*) said other end of said first link being adapted for attachment to one end of a gutter-supporting saddle.

2. In combination with a system of brackets, each bracket being the type defined in claim 1:

(*a*) saddles secured to said brackets; and

(*b*) a gutter carried by said saddles, and a downspout elbow of highly flexible material, with metallic rings at its ends, secured to said gutter.

3. In combination with a system of brackets of the type defined in claim 1:

(*a*) saddles secured to said brackets; and

(*b*) a gutter carried by said saddles, and said gutter having a section of highly flexible material, with metallic end connectors.

4. In a device as defined in claim 1:

(*a*) means associated with said second link for varying the tension on said spring.

5. A device as defined in claim 2, wherein:

(*a*) said gutter has a portion of highly flexible material, with metallic connectors carried at its end edges.

6. A hanger bracket for rain gutters comprising:

(*a*) a system of four links, pivotally connected in a quadrilateral linkage;

(*b*) one of said links having a slot for sliding movement of one of the pivotal connections, and also mounting a spring between its pivot connections;

(*c*) said one of said links being adapted for attachment to a building; and

(*d*) one of the other of said links being adapted for attachment to a gutter-supporting saddle.

7. A hanger bracket for rain gutters comprising:

(*a*) a first, fixed link having an elongate slot therein;

(*b*) a second link pivoted to said first link;

(*c*) a third link having a sliding, pivotal connection with said first link;

(*d*) spring means associated with said first link and biasing said second and third links apart; and

(*e*) a fourth link pivoted to said second and third links on separate axes.

8. In a device as defined in claim 7:

(*a*) means associated with said first link for varying the tension in said spring means.

9. In a device as defined in claim 8:

(*a*) said third link having a transverse arm, one end of which includes the pivotal connection with said fourth link; and

(*b*) the other end being adapted for attachment to a gutter-supporting saddle.

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