

[54] TIE-DOWN DEVICE

[76] Inventor: **George W. Sherwood**, 3288 Elgin Dr., Salt Lake City, Utah 84109

[22] Filed: **Oct. 15, 1974**

[21] Appl. No.: **514,388**

[52] U.S. Cl. .... **24/131 R; 24/115 J; 24/230.5 W; 248/303**

[51] Int. Cl.<sup>2</sup> ..... **F16G 11/14; A44B 13/00**

[58] Field of Search ..... **24/131 R, 129 C, 115 J, 24/230.5 TD, 230.5 PH, 230.5 W, 230.5 AD, 230.5 T; 248/303**

[56] **References Cited**

**UNITED STATES PATENTS**

3,332,119 7/1967 Sherwood ..... 24/131 R

**FOREIGN PATENTS OR APPLICATIONS**

31,858 6/1885 Germany ..... 24/131  
241,260 6/1946 Switzerland ..... 24/131

Primary Examiner—Bernard A. Gelak  
Attorney, Agent, or Firm—Mallinckrodt & Mallinckrodt

[57] **ABSTRACT**

A tie-down device comprising a piece of heavy wire or round stock bent back upon itself intermediate its length to form an elongate loop having two arms of the wire or round stock extending from the loop in side-by-side, parallel relationship with each other. The side-by-side, parallel arms are bent back in a direction away from the plane of the loop and upon themselves to form a generally U-shaped section with the free ends of the wire or round stock extending from the U-shaped section being bent to diverge from each other thereby forming a resilient, split-hook member. The loop member is held securely to support plate by attachment means which permits uninhibited elastic movement between the wire portions forming the loop and arms extending from the loop in a direction away from each other and in the plane of the loop.

**10 Claims, 7 Drawing Figures**

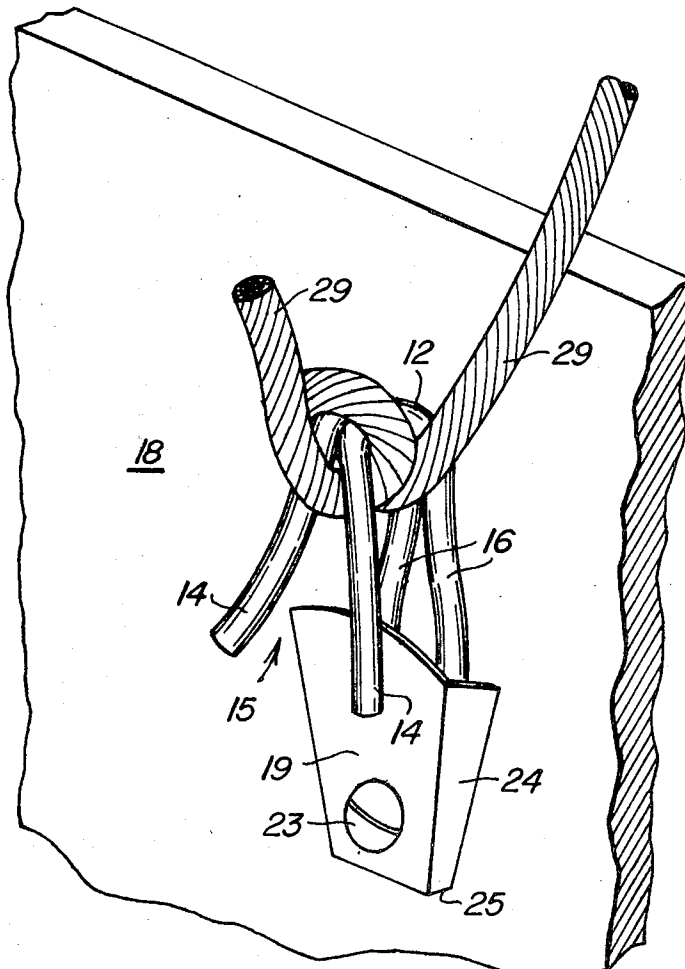


FIG. 1.

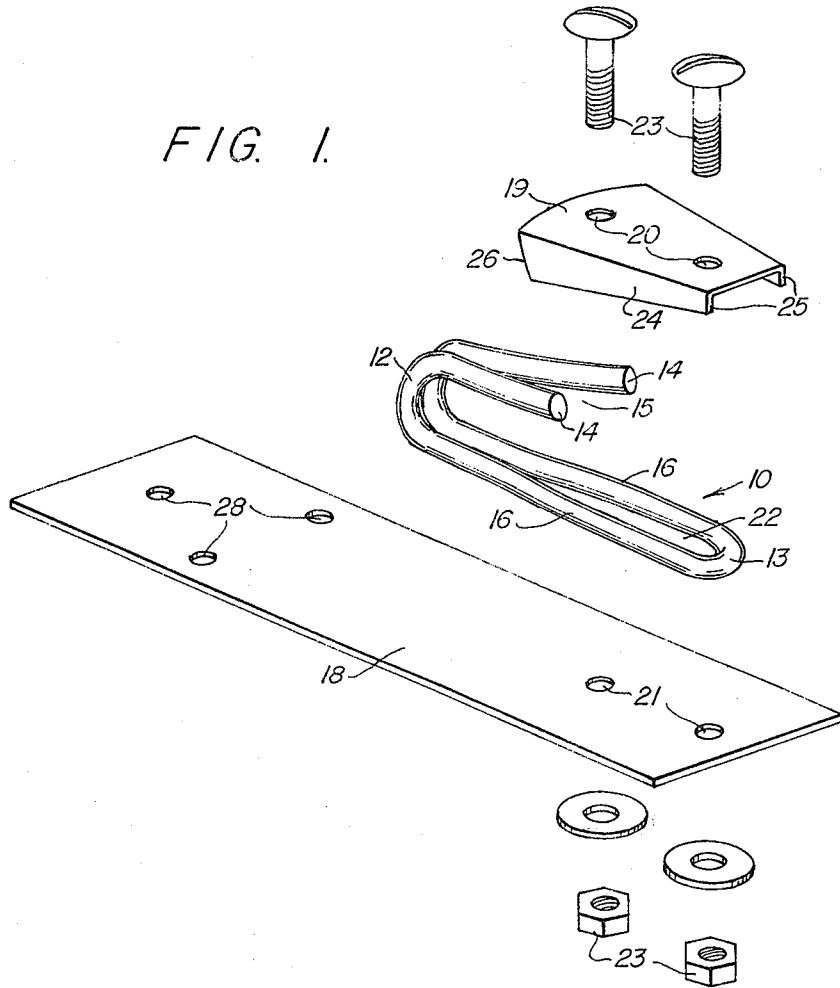


FIG. 3.

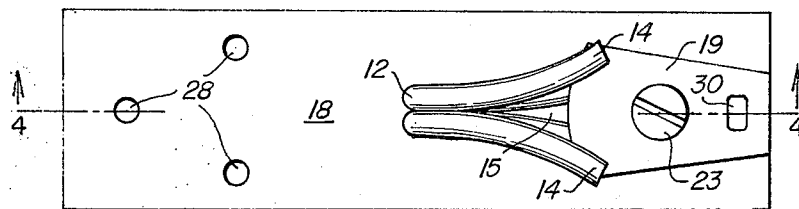


FIG. 2.

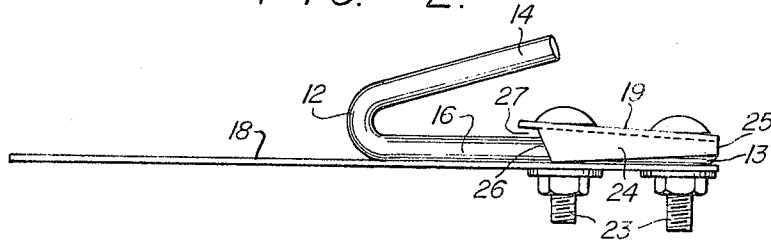


FIG. 4.

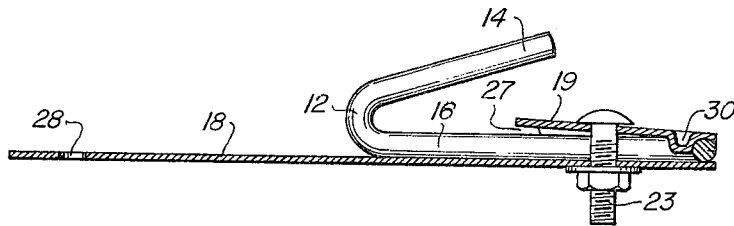


FIG. 5.

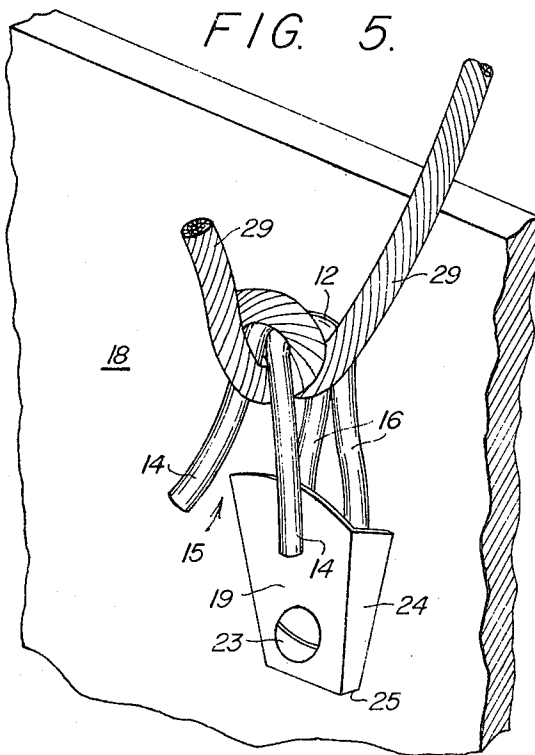


FIG. 6.

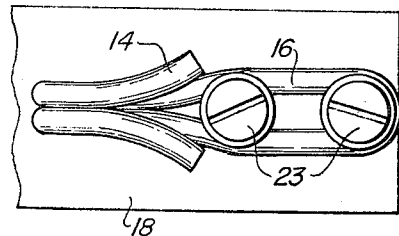
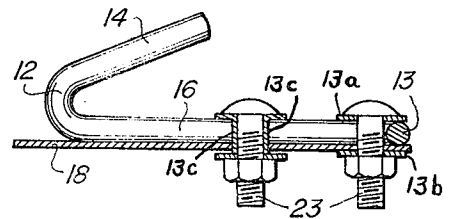


FIG. 7.



## TIE-DOWN DEVICE

## BACKGROUND OF THE INVENTION

## 1. Field

This invention is concerned with an improvement in a tie-down device of a split-hook type as disclosed in U.S. Pat. No. 3,332,119 issued July 25, 1967. The tie-down device is used to attach a rope thereto under tension without forming a knot in the rope.

## 2. State of the Art

A tie-down device for securing small boats to the top of automobiles is disclosed in U.S. Pat. No. 3,332,119. The tie-down device of U.S. Pat. No. 3,332,119 is formed from a single stiff, yet resilient wire bent to final formation wherein the two end portions of the wire form a split-hook portion and an open throat for the split hook. The intermediate portion of the wire forms an elongate loop that is bent over upon itself to provide a resilient clip member which is back-to-back and has one side in common with the split-hook member. The clip member is used to attach the tie-down device to the bumper of an automobile, and the split-hook member is then used to receive a tie rope which is in turn secured to the boat.

In U.S. Pat. No. 1,964,849, a device for supporting electrical conductors is described. The device comprises a single piece of round stock or wire which is bent to form a small, round loop portion. The free ends of the wire are then bent back upon themselves in parallel relation and formed into an outwardly extending hook. The device is attached to a wall by a nail extending through the loop portion thereof.

## SUMMARY OF THE INVENTION

This invention provides an easy-to-use, safe and permanently or semi-permanently affixed device to which a rope or other similar article can be secured without the use of a knot. The device comprises a single length of stiff, yet resilient wire or round stock which is bent to form a split-hook member. The split-hook member is formed by bending the wire or round stock back against itself intermediate its length to form an elongate, planar loop having two arms extending therefrom in parallel, side-by-side relation to each other. At some distance from the loop, the arms are bent in parallel in a direction away from the plane of the loop and back upon themselves to form a U-shaped member. The free ends are then bent to form outwardly extending, mutually spaced ends of the split-hook member. Means are provided for securely fastening the split-hook member to a support member wherein the backside of the loop, i.e., the side opposite the split-hook member is held firmly against the support member. The support member can be an integral part of the apparatus to which the split-hook device is to be affixed or a separate member which is an integral part of the split-hook device and which in turn is attached to the apparatus to which the split-hook member is to be affixed. In one particular embodiment, the support member is an integral part of the side of a truck or trailer bed or any apparatus to which it is desired to secure a rope thereto.

The means for securing the split-hook member to the support member preferably comprises an elongated attachment clip member having a general channel shape. The channel-shaped clip member is positioned parallel to the plane of the loop and between the loop and the mutually spaced ends of the split-hook member. One

end of the clip member is situated over the loop of the split-hook member, and the other end thereof over the arms extending from the enclosed loop to the U-shaped section. The sides of the channel-shaped clip member extend over the loop and the arms of the split-hook member. The sides have either a uniform width equal to the diameter of the wire or round stock of the split-hook member, or, preferably, the sides of the channel-shaped attachment clip are tapered. In the preferred mode, the sides of the channel-shaped clip, at the end of the clip which is positioned over the loop of the split-hook member, have a width less than the diameter of the wire or round stock. The width of the sides of the channel-shaped clip then gradually increase along the length of the clip until, at the opposite ends thereof, the sides have a width greater than the diameter of the wire or round stock of the split-hook member.

The split-hook member and attachment clip are positioned so that the support member is adjacent the loop and on the opposite side of the loop from the attachment clip and the mutually spaced ends of the split-hook member. Holding means are provided which securely holds the attachment clip and the support member together with the wire or round stock forming the loop held securely therebetween. In the tie-down device of this invention, the arms extending from the loop to the split-hook, including that portion beneath the attachment clip, are free for limited elastic movement transversely away from each other. Thus, when a rope is forced into the split-hook of the device, the arms extending from the loop are forced apart with an equivalent force being exerted on the rope by the parallel members forming the U-shaped hook member. When the rope is removed, the arms and the parallel members forming the U-shaped hook member return to their normal, close-press position. Then, even if a rope of smaller size than the previous rope is forced into the split-hook, the hook will expand elastically and hold the smaller rope just as it did the larger rope. If the arms extending from the loop, including the portion beneath the attachment clip, were not free for limited elastic movement, the portions of the wire or round stock forming the U-shaped section would permanently deform and the ability of the device to satisfactorily hold a small rope after having been used with a larger rope would be severely hampered.

In addition, in the alternate embodiment of the invention, wherein the legs of the attachment clip member are tapered as discussed above, both arms extending from the loop, the U-shaped section and the split-hook portion are free for limited separate rotational movement in two planes about the loop portion of the wire or round stock member. The arms and U-shaped member can rotate to a limited extent both in the plane of the loop itself and in a plane traverse of the plane of the loop.

## THE DRAWINGS

The tie-down devices illustrated in the accompanying drawings represent the best modes presently contemplated of carrying out the invention, although it is recognized that the inventive concepts here taught can be utilized in a variety of specific forms within the scope of the claims.

FIG. 1 is an exploded perspective of one embodiment of the tiedown device of this invention.

FIG. 2 is a side elevation of the device shown in FIG. 1.

FIG. 3 is a top plan view of another embodiment of the apparatus according to this invention.

FIG. 4 is a cross-sectional view taken along section 4—4 of FIG. 3.

FIG. 5 is a perspective of another embodiment of the tie-down device of the present invention which is shown attached to the side of the equipment, such as a truck bed, to which a load is to be tied down.

FIG. 6 is a partial top plan view of another embodiment of the apparatus according to this invention.

FIG. 7 is a cross-sectional view taken along section 6—6 of FIG. 6.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in the drawings, a split-hook tie-down member 10 is formed from a length of stiff, yet resilient wire or round stock which is bent intermediate its ends into the desired configuration to form elongate, planar loop 13. The wire is bent so that the two ends converge into close press relationship at the open end of the loop with arms 16 extending therefrom in side-by-side, parallel relationship to each other. The wires of the arms 16 are then bent back upon themselves to form a U-shaped hook portion 12 with the wires being in side-by-side, parallel relationship throughout the curve portion of split hook 12. The ends of the wire extending from hook portion 12 are mutually bent away from each other thereby diverging to mutually spaced ends 14 to form a mouth and throat 15.

Although it is presently preferred to use a stiff, yet resilient wire as the material of construction of the split-hook member 10, other suitable materials such as round stock can also be used providing, the configuration of loop 13, hook 12, and divergent mouth 15 are retained. Whether wire or round stock is used, it should be of sufficient rigidity and elasticity so that the two parts of hook portion 12 can be sprung apart by forcing a rope or other similar article through the mouth and throat 15, and so that the two parts will then return to side-by-side relationship when the rope or other article is removed.

The wire or round stock member 10 is held securely to a support member. The support member can be an integral part of the apparatus to which the tie-down device is to be affixed, such as the side of a truck or trailer 51 as shown in FIG. 5 or, as shown in FIGS. 1—4, the support member can be an independent support plate 18 which, in turn, is adapted to be attached to the support member of the apparatus to which the device is ultimately affixed. The support plate 18 shown in FIGS. 1—4 has openings 28 through which it can be bolted or otherwise attached to the support member of the apparatus to which the tie-down device is to be ultimately affixed.

In the embodiments shown in FIGS. 1—4, wire member 10 is secured to support plate 18 by attachment clip member 19 which has the general shape of a channel. The channel-shaped clip member 19 is positioned over the loop portion 13 of wire member 10. The clip member 19 is secured tightly to support plate 18 with the loop portion 13 of the wire member 10 positioned therebetween. In FIG. 1, the clip member 19 is shown attached to support plate 18 by nut and bolt attachment means 23. The elongated bolts of attachment

means 23 are inserted through openings 20 in clip member 19 and extend through the open space 22 formed by elongated loop 13 and finally through openings 21 in support plate 18. The bolt of nut and bolt member 23 tightens upon the extending nut, thus firmly securing clip member 19 to support plate 18. The openings 20 in clip 19 as shown in FIG. 1 are located adjacent to the ends of clip 19 and along the longitudinal axis of clip member 19.

In FIGS. 3 and 4 is shown a modification of the device of FIG. 1. The clip member 19 of FIGS. 3 and 4 is attached to support 18 with a single nut and bolt 23. When a single nut and bolt attachment is used, the nut and bolt 23 can be located at or adjacent the end of clip 19 most remote from the hook member 12 of wire-member 10, i.e., the closed end of loop 13, or anywhere along the longitudinal axis of clip 19. As shown in FIGS. 3 and 4, the nut and bolt 23 is located intermediate the ends of clip member 19.

The clip member 19 has leg members 24 which extend over loop 13 towards the support member, or as shown in FIGS. 1—4 towards support plate 18. In the illustrated embodiments, the clip member 19 has leg members 24 whose depth at the end 25 which is most remote from the hook member 12, i.e., the end of clip member which is positioned over the closed end of loop 13, is smaller than the diameter of the wire or round stock of split-hook member 10. The leg member 24 gradually increases in its depth along the length of clip member 19 to where at the other end 26, the depth of the leg members 24 is greater than the diameter of the wire in split-hook member 10. The distance between the legs at the end 26 is sufficient to allow elastic movement of the lateral sides of loop 13 away from each other when a rope or similar object is inserted between the wires in hook member 12. The distance between the legs at end 25 simply need be such as to span the loop 13 of member 10, and can be the same or less than the distance between legs at end 26.

In the embodiment shown in FIG. 1, the second nut and bolt member 23 extends through the opening in the end of clip member 19 closest to hook member 12, i.e., at the end of loop 13 opposite the closed end, and also extends through the end of space 22 formed by the elongated loop 13.

Due to the differences in the width of the legs of clip member 19 from one end thereof to the other, a space 27 as shown in FIGS. 3 and 4 is formed between the split-hook member 10 and clip member 19 whereby the hook member 12 of tie-down member 10 is free for limited movement away from support plate 18.

The end 26 of the clip member 19 closest to split-hook member 12 can be securely fixed to support plate 18 by means other than the second nut and bolt 23 as shown in FIG. 1. For example, end 26 of clip 19 can be welded to support plate 18.

The device of this invention can be attached to any equipment to which a rope is to be secured and held under tension. Such applications include the securing of loads upon trucks, trailers, boats and campers. Other applications include securing ropes used for the support of awnings, tents, and ropes on flag poles or tie ropes mooring a boat to a dock, etc. The device of this invention is easily attached to the applicable equipment or apparatus. The support plate of FIGS. 1, 2, 3, and 4 can easily be secured to the desired apparatus by such attachment means as rivets, screws, nuts and bolts, etc.

Openings 28 are shown in base plate 18 for accepting such attachment means. If convenient, a structural plate of the apparatus or equipment can be used directly as the support plate 18. In such cases, the support plate 18 is an integral part of the apparatus to which the device of the present invention is to be attached.

In FIG. 5, a device of this invention is shown attached to the side of a truck bed or other similar apparatus wherein the side wall of the truck bed is used as the base plate 18 for the device. As shown, the clip member 19 is attached to the side of the truck by the nut and bolt member 23 which extends through clip member and the side wall of the truck. The other end of the clip member 19 is attached to plate 18 by welding.

The tie-down device having throat 15 and hook portion 12 can advantageously be used with a variety of tie-lines such as ropes, cables, and the like. The device is particularly useful with a tie-down rope 29 of the type shown in FIG. 5. The tie-line such as the rope of FIG. 5 is passed under the hook member 12 and pulled tightly. The rope 29 is then passed over the top of hook member 12 and around one of the ends 14 and pulled up tightly between the jaws formed between both ends 14 of the device.

Another embodiment of the device is shown in FIGS. 6 and 7, wherein a set of nut and bolts 23 is used to secure the loop 13 of the device to support member 18. The bolt 23 at the closed end of loop 13 extends in series through a washer 13a, loop 13, an opening in plate 18 and another washer 13b. The associated nut is threaded on the bolt and tightened down to hold the closed end of loop 13 in tight engagement with support member 18. The second bolt 23 passes concentrically through a spacer means 13c. The bolt and the spacer means 13b passes through the loop 13 adjacent the end opposite the closed end thereof and then through an opening in support member 18. The associated nut is threaded down until it abuts spacer means 13b. This leaves the lateral sides 16 of loop 13 and the respective arms extending to the U-shaped hook member 12 free for uninhibited elastic movement away from each other and back towards each other in the plane of loop 13.

Whereas there is here illustrated and specifically described certain preferred constructions of apparatus which are presently regarded as the best modes for carrying out the invention, it should be understood that various changes can be made and other constructions adopted without departing from the inventive subject matter particularly pointed out and claimed herebelow.

What I claim is:

1. A tie-down device comprising a single length of stiff, yet resilient, wire or round stock bent back against itself intermediate its length to form a generally elongate, planar loop which is closed at one end with the respective end portions of said wire or round stock extending as two arms from the other end thereof, said arms being in generally parallel, side-by-side relationship to each other, said arms being mutually bent away from the plane of said loop and back upon themselves to form a generally U-shaped section in which the arms remain in parallel, side-by-side relationship to each other, and with the free ends of said wire or round stock extending from the U-shaped section being bent away from each other to form a split-hook; and means for fastening said elongate loop to a support member, comprising means for attaching the closed end of said

loop to the support member and means for holding the other end of said loop adjacent the support member so that said arms extending therefrom and the respective lateral sides of said loop are free for uninhibited elastic movement in the plane of said loop.

2. A tie-down device in accordance with claim 1, wherein said means for fastening said loop to the support member comprises an elongated clip member having generally a channel shape and being positioned over said loop with the sides of said clip member extending towards the support member, and means for securing said clip member to the support member whereby said loop is firmly held between said clip member and the support member.

3. A tie-down device in accordance with claim 2, wherein the sides of said clip member at the end thereof adjacent the closed end of said loop have a depth less than the diameter of said wire or round stock and the depth of said sides gradually increases along the length of said clip member until at the opposite end thereof said sides have a depth greater than the diameter of said wire or round stock, and wherein said means for securing said clip member to the support member comprises (1) an opening in said clip member located on the longitudinal axis of said clip member so as to communicate with the area enclosed by said loop and (2) elongated attachment means extending from said support member and passing through said opening and said area enclosed by said loop for securing said clip member to the support member.

4. A tie-down device in accordance with claim 3, wherein the end of said clip member nearest said arms extending from said loop has a width greater than the width of said wire or round stock.

5. A tie-down device in accordance with claim 3, wherein the longitudinal axis of said elongated loop is parallel to the longitudinal axis of said elongated clip member, the longitudinal length of said loop is approximately the length of said clip member, said clip member has two openings therein located along the longitudinal axis of said clip member with one opening being adjacent each end of said clip member, said openings communicate with the area enclosed by said loop, and said support member has elongated attachment means extending therefrom with same passing respectively through said openings and said area enclosed by said loop for securing said clip member to the support member.

6. A tie-down device in accordance with claim 1, wherein said means for fastening said loop to the support member comprises a support plate adjacent the opposite side of said loop from the mutually spaced ends of said wire or round stock; means for securing said support plate to the support member; an elongated clip member having generally a channel shape and being positioned over said loop with the sides of said clip member extending towards said support plate; and means for securing said clip member to said support plate whereby said loop is firmly held between said clip member and said support plate.

7. A tie-down device in accordance with claim 6, wherein the sides of said clip member at the end thereof adjacent the closed end of said loop have a depth less than the diameter of said wire or round stock and the depth of said sides gradually increases along the length of said clip member until at the opposite end thereof said sides have a depth greater than the diame-

7

ter of said wire or round stock, and wherein said means for securing said clip member to the support plate comprises (1) an opening in said clip member located on the longitudinal axis of said clip member so as to communicate with the area enclosed by said loop and (2) elongated attachment means passing through said opening and said area enclosed by said loop for securing said clip member to the support plate.

8. A tie-down device in accordance with claim 6, wherein the longitudinal axis of said elongated loop is parallel to the longitudinal axis of said elongated clip member, the longitudinal length of said loop is approximately the length of said clip member, said clip member having two openings therein located along the longitudinal axis of said clip member with one opening being adjacent each end of said clip member and communicating with the area enclosed by said loop, and said openings have elongated attachment means passing therethrough for securing said clip member to the support member.

9. A tie-down device in accordance with claim 1, wherein said means for fastening said loop to the support member comprises an elongate attachment means extending from said support member and passing through said loop adjacent the closed end thereof for attaching said closed loop securely to said support

8

member, and a second elongate attachment means extending from said support member and passing through said loop at the other end thereof, said second elongate attachment means being adapted to hold said other end of said loop adjacent said support member so that said arms extending therefrom and the respective lateral sides of said loop are free for uninhibited elastic movement in the plane of said loop.

10. A tie-down device in accordance with claim 9, wherein said elongate attachment means comprises a bolt which passes through said loop adjacent the closed end thereof and through an opening in the support plate, and a nut positioned on the bolt so that the nut can be tightened to securely attach said closed end of said loop to the support plate, and said second elongate attachment means comprises a bolt which passes through the loop adjacent the other end thereof and through an opening in the support plate, a nut positioned on the bolt, and spacer means whereby said bolt and nut can be tightened against said spacer means thereby holding said other end of said loop adjacent said support member so that the arms extending from said loop and the respective lateral sides of said loop are free for uninhibited elastic movement in the plane of said loop.

\* \* \* \* \*

30

35

40

45

50

55

60

65