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LOCKING CLIP

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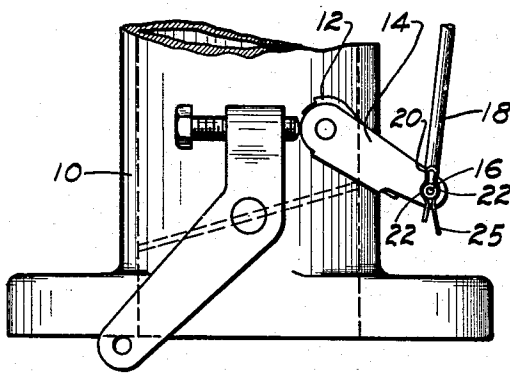


Fig. 1

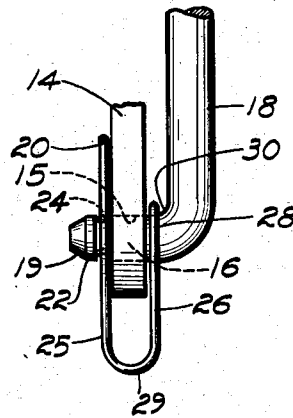


Fig. 2

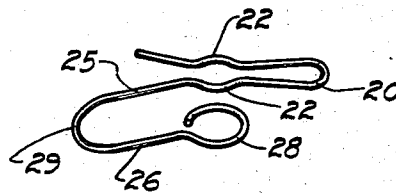


Fig. 3

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LOCKING CLIP

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9 Claims. (Cl. 287—93)

This invention relates generally to locking clips and particularly to devices or clips for securing rods and levers together.

The levers of many mechanical devices are operably connected with other parts by rod-like links. A link of this character commonly has a laterally turned end portion pivotally received in an opening provided therefor in the lever to which it is connected and the parts are held from accidentally becoming disconnected by a cotter pin or hairpin clip received in an annular groove adjacent the free end of said laterally turned portion of the rod. However, this type of connection is not satisfactory due to the tendency of the lever to become wedged against the inner curved portion or bend of the link thus restricting free operative movements of the associated parts. To eliminate this wedging tendency it has been necessary in the past to either grind or otherwise machine the inner curved portion, producing a sharp or square corner against which the link would not become wedged. The grinding or machining operation is moderately expensive and it is therefore highly desirable to eliminate it if possible.

With the foregoing in view it is an important object of the present invention to provide a clip for securing together levers and rods of this character that will eliminate such wedging and sticking of the parts and permit free operative movements thereof.

Another object of the invention is to provide a device of this character which holds the lever away from the bend in the rod.

Still other objects of the invention are to provide a device of this character that is simple in construction, that lends itself to inexpensive manufacture in large volume by automatic machinery and that is easy to attach.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawing, in which:

Figure 1 is a partial elevation of a carburetor having a lever with an actuating rod connected therewith, said lever and rod being secured together with the present invention;

Figure 2 is an enlarged side view of the rod and lever assembly operably secured together with the present invention; and

Figure 3 is an enlarged perspective view of the clip per se.

While the preferred embodiment of the invention is shown and described herein it is to be understood that this disclosure is given merely

for the purpose of illustrating the invention and is not intended as a limitation thereof to the construction disclosed, the appended claims being intended to cover all the modifications and alternative constructions falling within the scope of the invention.

The invention may be used to secure together various types of levers and rods although it is herein shown in connection with a lever and rod of a carburetor, said carburetor being indicated generally by reference numeral 10 in the drawing. Idling cam 12 is part of a lever 14 having an opening 15 adjacent the free end thereof in which is pivotally received an end portion 16 of rod or link 18, said end portion 16 being turned laterally at substantially right angles to the body of the rod 18.

The present invention preferably comprises a length of wire having a resilient U-shaped or hairpin-like clip 20 including opposed arcuate sections 22 adapted to be received in an annular groove 24 adjacent the free end of the laterally bent rod portion 16, and a U-shaped lever-retaining member. The retaining member includes one arm of the clip which is extended at 25, an arm 26 in spaced parallel relation therewith and a loop or ring 28 adjacent the end of arm 26 and having a substantially common axis with the sections 22. However, the loop may be of some other shape than circular, the clip may be formed in any other suitable manner and the arcuate sections may be otherwise shaped to engage the groove.

In connecting the lever and rod, the locking device is placed on the lever with the arcuate sections 22 and ring 28 in substantial register with the opening 15 in the lever, the clip 20 being on the outer side of the lever and the ring 28 on the inner side thereof as shown in Figures 1 and 2. The lever and locking device are then slipped onto the laterally turned portion 16, the end of which is tapered at 19 to facilitate the assembling operation by spreading the arms of the clip 20 as the device is pressed onto the rod. As the lever and locking device are pressed further onto portion 16, the arcuate sections 22 enter the groove 24.

When the assembly is thus completed the lever retaining-member straddles the end of the lever 14 and the ring or loop 28 floats on the end 16 of rod 18 adjacent the inner side of lever 14 and spaces the lever from the inner curved portion 30 of the bend in the rod. The lever is loosely received between the arms of the retaining member with the arms substantially parallel

with the respective outer and inner sides of the lever, and the closed end 29 of said member is normally spaced a sufficient distance from the adjacent end of the lever to prevent contact therewith throughout normal operative movements thereof.

The sides of the groove 24 are substantially parallel with each other and are at substantially right angles to the axis of the portion 16 thereby forming shoulders which resist escape of the arcuate sections 22 from the groove. However, one or both sides of the groove may be curved or otherwise sloped. The resiliency or elasticity of the clip 20 permits the spreading of the arms when the device is being attached, but said arms are normally spaced sufficiently close together so that when attached the arcuate sections lie sufficiently within the groove to prevent their accidental dislocation therefrom. It is also preferable that the arcuate sections at least lightly grip the bottom or sides of the groove to prevent undue rotation of the device on the rod. However, the device does not engage the groove with sufficient pressure to interfere with manual operative movements of the lever and rod should the closed end 29 of the retaining member come into contact with the lever.

Wedging of the lever and curved portion 30 of the rod is prevented by the arms of the retaining member which limit relative longitudinal movements thereof and by the ring 28 which positively spaces the lever from the curved portion 30.

While but one embodiment of the invention has been illustrated in connection with a rod and lever, it will be apparent to those skilled in the art that the invention may be applied to other types of rods and levers. Other changes, modifications, substitutions, additions and omissions may be made in the structure described without departing from the spirit and scope of the appended claims.

I claim:

1. In a device of the class described the combination of a rod having a laterally turned end portion, said portion having an annular groove adjacent the free end thereof, a lever pivotally received on the end portion, a wire locking device including a resilient U-shaped clip having opposed arcuate sections received in the groove, said clip having an arm extended and turned back in spaced parallel relation therewith to form a U-shaped retaining member which straddles the lever, and a loop formed at the free end of the back turned arm of the retaining member, the loop being rotatably received on the laterally turned end portion of the rod adjacent the inner side of the lever, said retaining member limiting longitudinal movement of the lever on the rod and retaining said lever in spaced relation with the turn in the rod.

2. In a device of the class described, the combination of a rod bent to provide a laterally extending end portion having an annular groove therein, a lever pivoted on said laterally extending portion, and a locking device comprising a resilient clip received in the groove, a U-shaped

portion straddling the lever, and a ring on one arm of the U-shaped portion, said ring being received on the laterally extending portion between the lever and the bend in the rod.

3. The combination of a lever pivoted on a rod having a circumferential groove therein, with a fastening device including a hairpin-shaped part engaging the groove and disposed adjacent one side of the lever, and a lever retaining part disposed adjacent the other side of the lever, means connecting said parts and extending about the lever, said means being so disposed that substantial rotative movement of the lever may occur on the rod without engagement with the connecting means.

4. A device of the class described comprising a length of wire bent to form a U-shaped clip at one end having arcuate sections resiliently separable relative to each other and adapted to engage a groove, a loop at the other end in substantially axial alignment with the arcuate sections, and an intermediate U-shaped portion connecting the clip and loop in spaced parallel relation.

5. The combination of a fastening device having a loop portion and a resilient clip member with sections adapted to be received in an annular groove, and a rod having a tapering end and an annular groove for the clip sections, the loop portion of the fastening device being adapted to float on the rod and the tapered end of the rod being adapted to enter between the clip sections and separate same during attachment of the clip onto the rod.

6. In a fastening device formed of wire, a U-shaped portion, and a resilient hairpin-like clip formed adjacent the end of one of the arms of the U-shaped portion, said clip including opposed arcuate sections, and the other arm of the U-shaped portion being spaced from said one arm longitudinally relative to the axis of the arcuate sections.

7. In combination, an annularly grooved rod, a lever pivoted on the annularly grooved rod, and a U-shaped fastening device formed of a length of wire of relatively small cross-section and straddling the lever, at least a portion of one arm of the U-shaped device being formed into a hairpin-like clip adapted to engage the groove and secure the fastener on the rod.

8. The combination of a rod having an annular groove, a lever pivoted on the rod with one side adjacent said groove, and a fastening device formed to include a U-shaped clip adapted to engage the groove, an eye disposed on the rod adjacent the other side of the lever, and a U-shaped portion extending from the eye to one end of the clip.

9. A fastening device comprising a length of wire bent to form a U-shaped member, and a clip adjacent the end of one arm of the U-shaped member, said clip including sections resiliently separable relative to each other, the other arm of the U-shaped member having a bent portion spaced from the clip.

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