

United States Patent

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[54] **SELF-CAPTIVATING HANDLE**
9 Claims, 8 Drawing Figs.

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16/125, 190/57, 220/94 R

[51] Int. Cl..... **B25g 1/04**

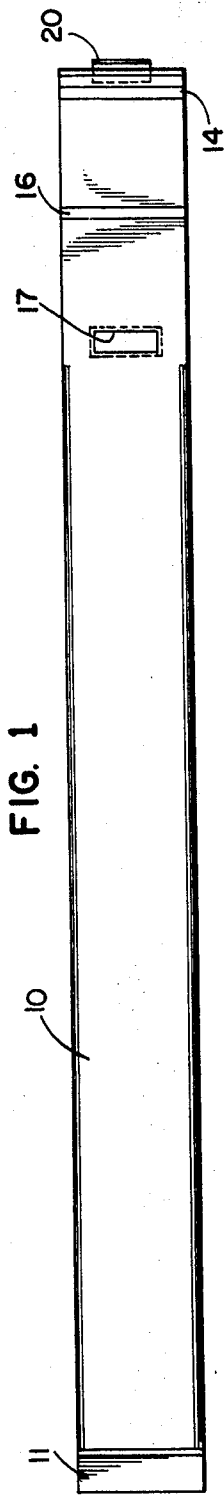
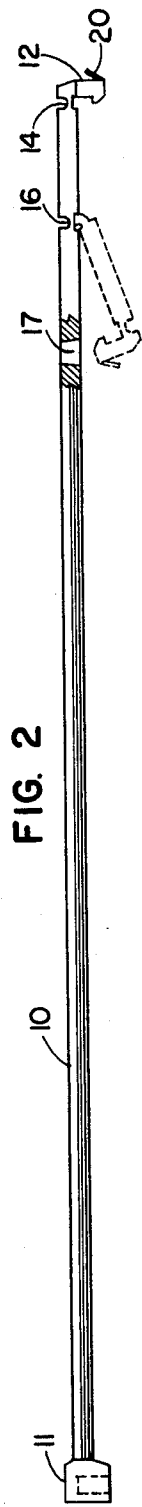
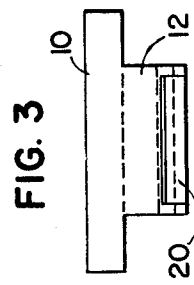
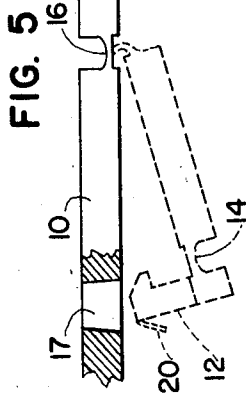
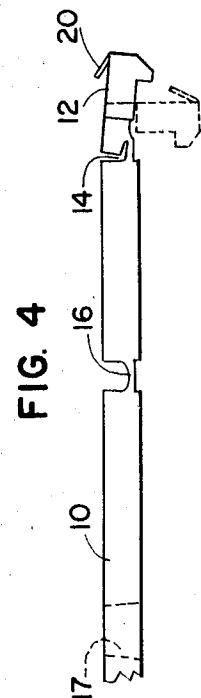
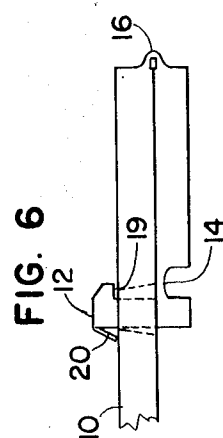
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150/12; 229/52; 190/55, 57; 220/94

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ABSTRACT: A self-captivating retractable handle for a portable television receiver cabinet is molded from an integral piece of polypropylene homopolymer plastic having an enlarged portion at one end. The other end of the handle has a downwardly extending projection hinged at the end with a second hinge located a short distance from the end of the handle. The first hinge permits bending the projection upwardly to enable the passage of the projection and the end of the handle through a pair of spaced slots in the receiver cabinet, and the second hinge is used to bend the projection back to pass it through a corresponding slot in the handle where it is locked to captivate the handle in the receiver cabinet. The resiliency of the material out of which the handle is made causes the handle to lie flat when not in use.





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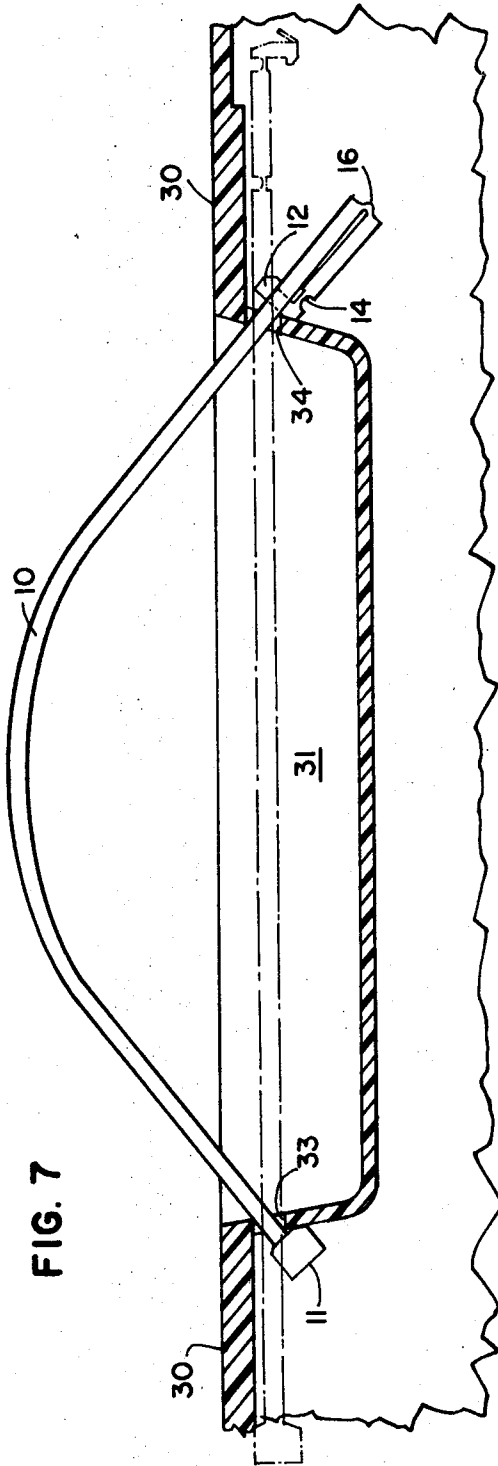


FIG. 7

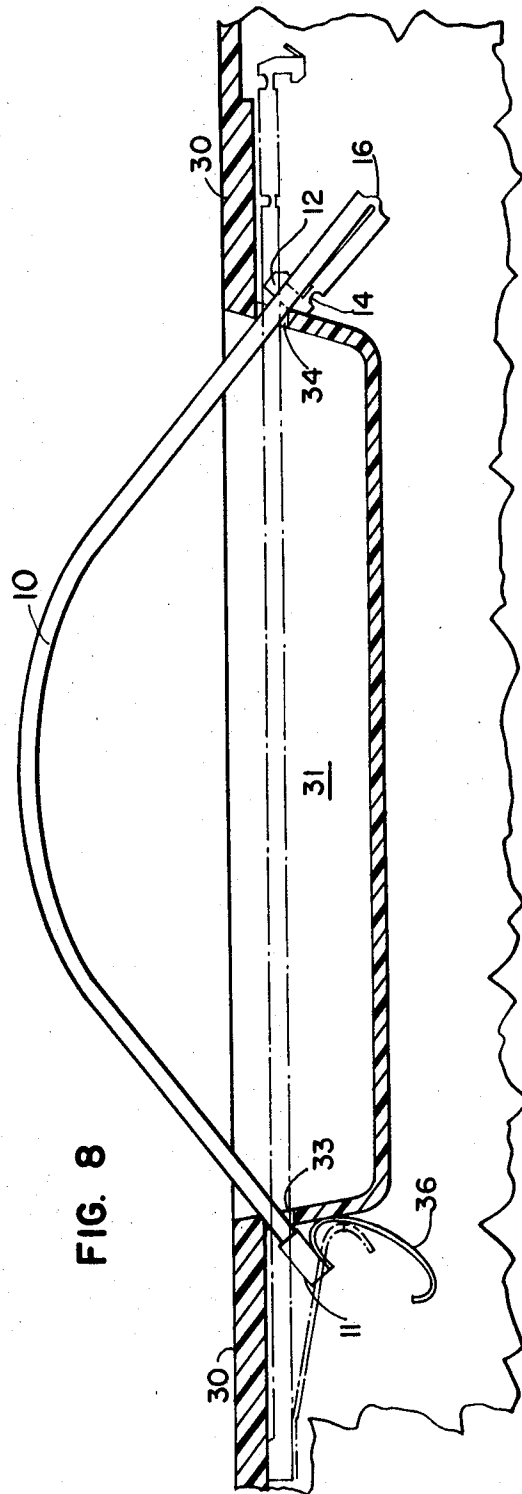


FIG. 8

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SELF-CAPTIVATING HANDLE

BACKGROUND OF THE INVENTION

For use with portable television receivers, portable radios, luggage and the like, it often is desirable to provide a handle which retracts into a recess or lies substantially flat against the receiver cabinet or luggage when the handle is not in use. Generally, such retractable handles involve a multiple-piece assembly, including separate springs in order to achieve the desired result. Such multiple-piece assemblies are relatively expensive to manufacture and install because of the number of parts involved.

As a consequence, it is desirable to provide a retractable handle which is simple and inexpensive to manufacture and which is relatively easy to install in the cabinet with which the handle is to be used.

SUMMARY OF THE INVENTION

Accordingly, it is an object of this invention to provide an improved retractable handle.

It is an additional object of this invention to form a self-captivating retractable handle strap.

It is another object of this invention to provide a resilient one-piece handle assembly which is self-captivating in a cabinet with which it is to be used.

In accordance with a preferred embodiment of this invention, a handle strap to be retained in an opening in a cabinet or housing has a width and thickness to permit its passage through the opening. On one end of the strap, a projection extends substantially at right angles to the strap; and the width of the projection is narrower than the width of the strap. The projection is hinged on the strap and a slot conforming to the width and thickness of the projection is located so that when the projection is bent back at the hinge, the projection passes through the slot to form an enlarged portion which captivates the strap in the slot. Additional means may be provided for locking the projection in the slot to impede its removal from the slot.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of a handle strap made in accordance with a preferred embodiment of the invention;

FIG. 2 is a partially cutaway side view of the handle strap shown in FIG. 1;

FIG. 3 is an end view of the handle strap shown in FIGS. 1 and 2;

FIG. 4 is a detailed view of a portion of the handle strap illustrating a feature of the preferred embodiment;

FIGS. 5 and 6 show details of another feature of the handle strap;

FIG. 7 illustrates the use of the handle strap in a cabinet; and

FIG. 8 illustrates another embodiment of the handle strap shown in FIG. 7.

DETAILED DESCRIPTION

Referring now to FIGS. 1, 2 and 3, there is shown a self-captivating retractable handle strap formed in one piece of molded polypropylene homopolymer plastic (such as Moplen 0F040), which exhibits the characteristic of sufficient spring action or resiliency to provide retraction of a handle made therefrom without the addition of any further springs. This material exhibits a high yield strength and rigidity and has stiffness in flexure with a tolerance range of 160,000 to 225,000 p.s.i. In addition, the material has a high resistance to fatigue in thin-wall sections.

The main body portion 10 of the molded strap shown in FIGS. 1, 2 and 3 is of uniform thickness and width and at one end includes an enlarged portion 11 forming a handle stop for that end of the body portion 10. At the other end of the body portion 10, there is formed an integrally molded, downward-

extending projection 12, which is attached to the end of the main body portion 10 through a thin web of material 14 forming a first hinge between the body portion 10 and the projection 12. The web 14 is thin enough to provide relatively easy flexure of the projection 12 with respect to the main body portion 10, and the exceptional flex life of the material out of which the handle strap is made permits such flexure without the danger of fracture. Another thin web hinge 16 extends across the body portion 10 midway between the projection 12 and a tapered slot 17 formed in the body portion 10 of the handle strap.

In order to insert the handle strap through slots in a cabinet in which the strap is to be captivated, the projection 12 is hinged on the web 14 counterclockwise as viewed in FIG. 4 from the dotted line position to the solid-line position to cause the projection 12 to lie substantially in the plane of the main body portion 10. In this configuration, the projection 12 may be passed through an opening or slot which is slightly wider than the thickness of the main body portion 10 and yet considerably narrower than the height of the projection 12 in the dotted line position shown in FIG. 4.

After the projection 12 and a portion of the body portion 10, sufficient to cause the slot 17 to clear the opening in the housing, is passed through the opening, the end of the body portion 10 carrying the projection 12 is hinged backwardly on the web 16, as most clearly seen in FIG. 5, to cause the projection 12 to enter the slot 17. The slot 17 is slightly wider at the bottom than it is at the top, and is of sufficient width to accommodate the width of the end of the projection 12 in a snug fit. The projection 12 is passed through the slot 17 and has a shoulder 19, most clearly seen in FIGS. 5 and 6, which then rests on the upper edge of the main body portion 10 as seen in FIG. 6.

To inhibit removal of the projection 12 from the slot 17 after the assembly has been locked into position as seen in FIG. 6, a resilient tab 20 is integrally molded on the projection 12, as shown in FIGS. 1 to 6. As viewed in FIG. 5, the tab 20 extends upwardly from the bottom of the projection 12 at an acute angle of approximately 45° with the side of the projection opposite the shoulder 19. The natural resiliency of the material from which the handle strap is made, provided a hinging action for the tab 20; and when the tab 20 enters the slot 17 with the projection 12, it is folded against the projection 12.

After the end of the projection 12 and the shoulder 19 clear the top of the body portion 10, the hinged tab 20 springs outwardly to the position shown in FIG. 6 to provide a locking of the projection 12 in the slot 17. Attempted removal of the projection 12 then causes the tab 20 to be bent or folded upwardly as viewed in FIG. 6. The combined thicknesses of the folded tab 20 and the remainder of the projection 12 above the shoulder 19 extending above the opening of the slot 17, however, exceed the width of the slot 17 on the upper surface of the body portion 10 of the handle strap, so that removal of the projection 12 from the slot 17 is prevented.

Referring now to FIG. 7, there is shown a typical assembly of the handle strap of FIGS. 1 to 6 in the upper portion of a portable television receiver cabinet 30. The television receiver cabinet 30 includes a recessed portion or well 31 formed by a depression in the top of the cabinet 30. This well is of sufficient size to permit the body portion 10 of the handle strap to lie within the well when the handle strap is in its relaxed or straight configuration, and the well 31 also is large enough to accommodate the hand of a person desiring to carry the television receiver by grasping the main body portion 10 of the handle strap.

A pair of slots 33 and 34 are formed in the cabinet 30 on opposite sides of the well 31, with the dimensions of the slots being such that the height of the slots is slightly greater than the thickness of the main body portion 10 of the handle strap but is less than the thickness of the projection 11. The width of the slots 33 and 34 is slightly greater than the width of the body portion 10 of the handle strap, so that the handle strap

may be inserted through the slots 33 and 34 from the left as viewed in FIG. 7 with the projection 12 extended as shown in FIG. 4. The dotted line showing of the handle strap in FIG. 7 indicates configuration of the handle strap after it has been inserted through the slots 33 and 34 and before the projection 12 has been locked into the slot 17 on the body portion 10 of the handle strap.

The solid-line showing of the handle strap in FIG. 7 shows the completed assembly after the projection 12 has been locked into the slot 17 and further shows the handle strap extended to its carrying position. It can be seen that the projection 12 abuts against the inside surfaces of the cabinet 30 at the slot 34 to prevent removal of the handle strap from the slot 34, while at the other end, the projection 11 performs the same function with respect to the slot 33. When the handle strap is released, it springs back into the dotted line configuration of FIG. 7, due to the natural resiliency of the material out of which the strap is made.

In FIG. 8 there is shown a similar handle strap assembly in a portable television receiver, with the handle strap being modified by the addition of a pigtail spring 36 integrally formed as part of the projection 11 on the left end of the main body portion 10 of the handle strap. As shown in the dotted lines in FIG. 8, the pigtail spring 36 in its relaxed position extends at an acute angle downwardly from the body portion 10 and is in close proximity with the left-hand side of the well 31. When the handle strap is pulled upwardly into the carrying position, the pigtail spring 36 is placed under tension and assumes the configuration shown in solid lines in FIG. 8. Upon release of the handle strap, the spring 36 assumes the dotted line position as shown in FIG. 8, and aids in returning the handle strap to the dotted line position when the handle strap is not being used.

A pigtail spring such as the spring 36 may be incorporated into the assembly if the natural resiliency of the material out of which the handle strap is made is insufficient to fully return the handle strap into the well after the cabinet or television receiver has been carried by the strap. It has been found, however, that by using a polypropylene homopolymer plastic with a thickness of 0.12 inch and a width of 0.88 inch for the main body portion 10, the natural resiliency of the material is sufficient and the pigtail spring 36 is not required. In addition, it should be noted that the locking tab 20 formed in the handle strap also provided sufficient locking capabilities when it has a thickness of approximately 0.010 to 0.015 inch. This same thickness also is used for the webs 14 and 16 forming the hinges, resulting in an easily assembled handle which is positively locked into the television cabinet after assembly.

I claim:

1. A stop for locking one end of the strap into an opening in a housing, said opening having a predetermined width and a predetermined height, the stop including in combination:

a strap made of resilient polypropylene homopolymer plastic and having a width and thickness of such dimensions as to permit passage of the strap through said opening in the housing;

a projection integrally formed with and carried on one end of the strap substantially at right angles thereto and having a length greater than the thickness of the strap, and having a width narrower than the width of the strap, the projection being undercut near its end to form a shoulder and having an integrally formed resilient locking tab opposite the shoulder;

a hinge portion in the form of a thin web extending substantially across the strap at a predetermined distance from the projection; and

the strap having a slot said same predetermined distance on the other side of the hinge portion for accommodating the projection so that the projection may be bent back at the hinge portion and inserted into the slot to form an enlarged portion, the total thickness of at least a part of the enlarged portion being greater than a corresponding dimension of said opening, the shoulder extending over

the surface of the strap after the end of the projection is passed through the slot, with the locking tab being compressed against the projection and readily passing through the slot with the projection and thereafter extending from the projection to impede removal of the projection from the slot.

2. The combination according to claim 1 further including a second hinge portion in the form of a thin web extending substantially across the strap and located adjacent the projection and between the projection and the first hinge portion, the second hinge portion permitting rotation of the projection from a plane substantially at right angles to the strap to a position substantially as an extension of the strap to facilitate passage of the end of the strap with the projection through said opening.

3. A handle to be retained between a pair of spaced openings in a housing, said openings having a predetermined width and a predetermined height, the handle including in combination:

a body portion made of resilient material and having a length exceeding the distance between the openings and having a width and thickness permitting passage of the body portion through the openings in the housing;

a first enlarged portion attached to one end of the body portion, at least one dimension of the first enlarged portion being greater than the corresponding dimension of the openings;

a projection on the other end of the body portion at substantially right angles to the body portion and having a width narrower than the body portion and having a predetermined length which is greater than the thickness of the body portion, the projection carrying at least one surface-engaging locking extension on one side thereof and having a resilient locking tab on the other side thereof;

first hinge means across the body portion at a predetermined distance from the projections; and

the body portion having a slot located said predetermined distance from the hinge means and twice said predetermined distance from the projection, the dimensions of the slot substantially conforming to the external dimensions of the projection so that when said other end of the body portion is bent back at the first hinge means the projection enters the slot with the locking tab readily passing through the slot in the body portion in a first direction when the projection is passed through the slot with the projection extending through the slot so that the locking extension thereon engages the surface of the body portion and the locking tab extends from the projection to impede removal of the projection in a second direction from the slot.

4. The combination according to claim 3 wherein the tab is integrally formed on the projection, has a thickness substantially less than the thickness of the projection, and extends at an acute angle from the projection toward the surface of the body portion after the projection is passed through the slot.

5. A stop for locking one end of a strap into an opening in a housing, said opening having a predetermined width and a predetermined height, the stop including in combination:

a strap made of resilient material and having a width and thickness of such dimensions as to permit passage of the strap through said opening in the housing;

a projection carried on one end of the strap substantially at right angles thereto and having a length at least equal to the thickness of the strap and having a width narrower than the width of the strap;

first hinge means across the strap at a predetermined distance from the projection;

second hinge means across the strap and located adjacent the projection and between the projection and the first hinge means, the second hinge means permitting rotation of the projection from a plane substantially at right angles to the strap to a position extending generally along the strap to facilitate passage of said one end of the strap and the projection through said opening in the housing; and

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the strap having a slot said predetermined distance on the other side of the first hinge means for accommodating the projection so that the projection may be bent back at the first hinge means and inserted into the slot to form an enlarged portion, the total thickness of at least a part of the enlarged portion being greater than the corresponding dimension of said opening.

6. The combination according to claim 5 wherein the strap comprises a handle to be retained between a pair of spaced openings in a housing and wherein the strap further has an enlarged portion attached to the other end thereof.

7. The combination according to claim 5 wherein the strap, the first and second hinge means, and the projection are formed of a single piece of molded polypropylene homopolymer plastic, with the hinge means being in the form

of thin webs extending across the strap the thickness of the webs being substantially less than the thickness of the strap.

8. The combination according to claim 7 wherein the projection includes a locking tab thereon, the locking tab extending at an acute angle from the projection and readily passing through the slot when the projection is passed therethrough and thereafter impeding removal of the projection from the slot.

9. The combination according to claim 6 further including an additional integral spring means located at said opposite end of said strap and engaging a portion of the housing when the handle is in a carrying position to facilitate return of the handle to a substantially straight noncarrying position when the handle is released.

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