United States Patent

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[54] **FRAME CLAMPING DEVICE**
8 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **248/316,** 40/125; 248/488
[51] **Int. Cl.** **A47f 7/14**
[50] **Field of Search** 248/496, 316, 488, 494, 229, 313; 40/209, 125

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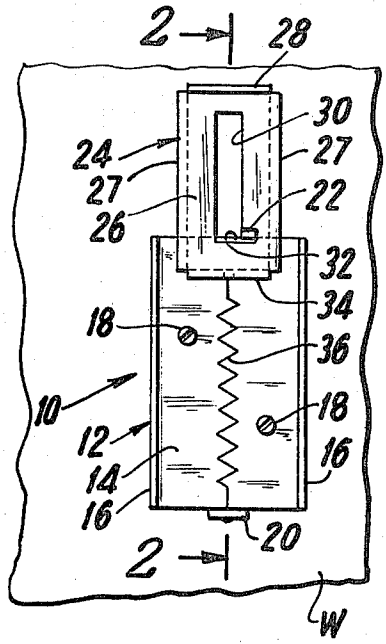
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Assistant Examiner—J. Franklin Foss
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ABSTRACT: A bracket that is secured to a wall and a clamp that is relatively movable with respect to the bracket provide the means for releasably holding an article such as a frame, picture, sign or the like. Means are provided for urging the clamp into engagement with the top of the article.



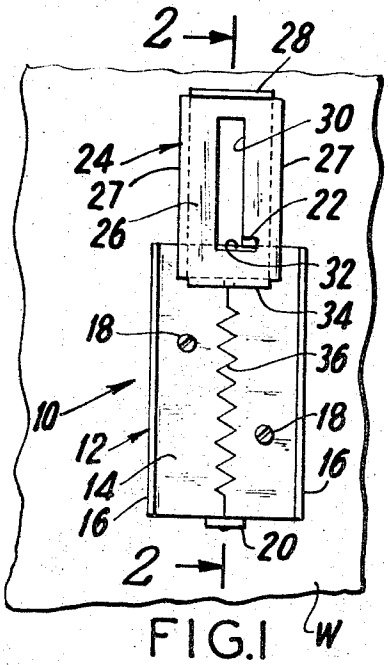


FIG.1

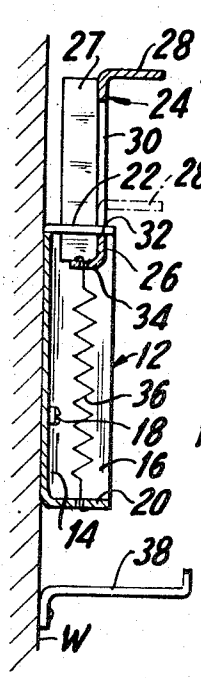


FIG.2

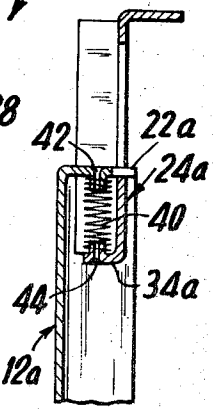


FIG.3

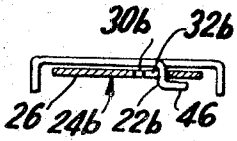


FIG.4

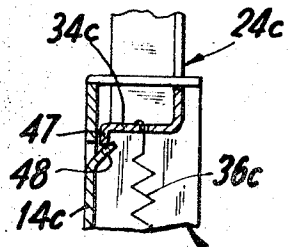


FIG.5

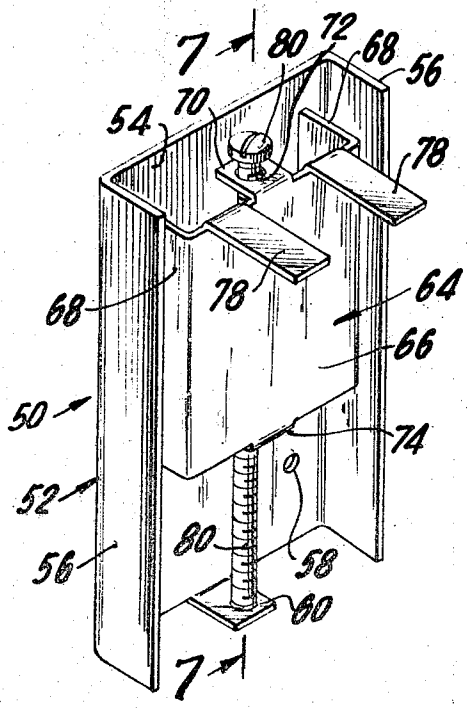


FIG.6

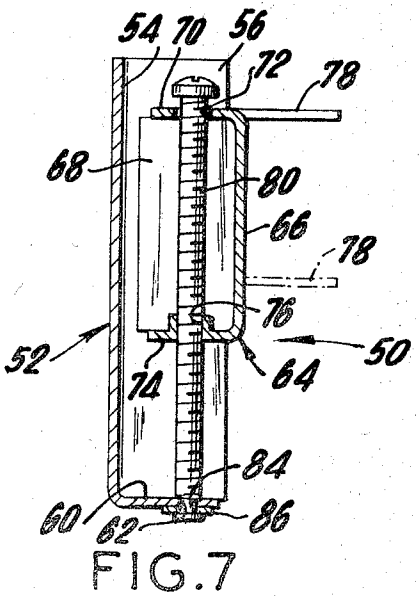


FIG.7

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FRAME CLAMPING DEVICE

This invention relates generally to clamps and more particularly to clamp means for releasably holding an article on a wall such that the article may be readily changed.

It is frequently necessary to provide means for supporting an article, for example, a sign, in such a manner that the article may be readily removed for changed as conditions require. The support means for the sign should have the characteristics of being relatively inexpensive, substantially universal for a wide range of article sizes, easily operated and reliable.

The present invention, by a very simple construction, provides improved article clamping means having the aforementioned characteristics. In its broadest aspect the present invention comprises a bracket that is fixedly secured to a first support surface such as a wall. A clamp is mounted on the bracket and is relatively movable with respect thereto so that a portion of the clamp can engage the top edge of the article. Means are also provided for urging the tripping portion of the clamp into a position such that it releasably holds the article. Several alternative embodiments of this basic concept will be described in detail hereinafter. The bottom edge of the article rests on a second support member that is secured to the wall. The second support for the bottom edge of the article may also be a table or counter top.

Accordingly, it is an object of this invention to provide improved low cost means for clamping an article on a wall or like support.

It is another object of this invention to provide a clamp as described above that is substantially universal as regards the size of the article.

Still another object of this invention is to provide a clamp as described above that may be readily installed and which is simple to operate.

These and other features, objects and advantages of the invention will, in part, be pointed out with particularity and will, in part, become obvious from the following more detailed description of the invention taken in conjunction with the accompanying drawing which forms an integral part thereof.

BRIEF DESCRIPTION OF THE DRAWING

In the various view of the drawing, like reference characters designate like parts.

FIG. 1 is a front elevational view of one embodiment of this invention;

FIG. 2 is a sectional elevational view taken along line 2–2 of FIG. 1;

FIG. 3 is a sectional elevational view similar to FIG. 2 illustrating an alternative embodiment of this invention;

FIG. 4 is a sectional plan view illustrating a modification of a portion of the present invention;

FIG. 5 is a sectional elevational view illustrating a modification of another portion of the present invention;

FIG. 6 is a perspective view illustrating another embodiment of the present invention; and

FIG. 7 is a sectional elevational view taken along line 7–7 of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, the basic concept of the present invention is shown in FIGS. 1 and 2. In one embodiment, the clamp assembly **10** that forms the present invention is comprised of a bracket **12** having a base wall **14** and a pair of spaced sidewalls **16** extending from the base wall **14**. Screws **18**, passing through the base wall **14**, secure the bracket **12** to a first support surface such as a wall W (FIG. 2). The base wall **14** is also provided with a first tab **20** extending outwardly proximate the lower edge thereof and a second tab **22** extending outwardly therefrom proximate the top edge. The bracket **12** may be made from a suitable material such as aluminum or steel by a stamping operation wherein the sidewalls **16**, the apertures for screws **18** and the tabs **20** and **22** are formed with a minimum number of operations. Alternatively, a rigid moldable plastic may be used.

Clamping means **24** is mounted on the bracket **12** and is relatively movable with respect thereto. From the drawing, it will be seen that the clamp means **24** is comprised of a substantially flat base wall **26**, a pair of spaced sidewalls **27** and a lip **28** extending outwardly from the base wall **26** proximate the top thereof. Further, an L-shaped slot comprising a vertical section **30** and a horizontal section **32** at the bottom of the vertical section **30** is formed in the base wall **26**. Finally, a tab **34** is formed proximate the bottom edge of the clamping means **24** and extends in a direction opposite to that of the lip **28**.

The clamp assembly **10** is completed by having the ends of a spring **36** hooked to the tab **34** formed at the bottom of the clamping means **24** and to the tab **20** formed at the bottom of the bracket **12**. In this embodiment of the invention the spring **36** is a tension spring.

It will be seen particularly in FIG. 2 that with an article such as a frame or a sign supported on any suitable second support member such as a bracket **38** that extends outwardly from the wall W, the spring **36** will normally urge the lip **28** downwardly to a second position shown in phantom outline and into engagement with the top edge of the article. Thus, it is a relatively simple matter to position and clamp the article and, when it is necessary to change the article for any reason, it is relatively simple to pull the lip **28** upwardly and thereby release the article. It should be noted that in the first or unclamped position the tab **22** of the bracket **12** is disposed in the horizontal slot portion **32** and the clamping means **24** will be held in the first or upper position. When the clamp assembly **10** is to be used, the clamping means **24** is moved laterally so that the vertical slot portion **30** is in alignment with the tab **22**. The spring **36** will then pull the clamping means **24** downwardly to the second position wherein the lip **28** of the clamping means **24** is in engagement with the top of the article. Thus, it will be appreciated that the present invention can accommodate a wide range of article sizes. Although the terms "vertical" and "horizontal" have been used to describe the orientation of the slot portions **30** and **32**, it should be understood that this is for convenience only. The device is not limited to use in the orientation illustrated but may be positioned in any manner required since the action of the means to move the clamping means is positive and does not depend on the force of gravity.

Referring now to FIG. **3**, there is shown an alternative embodiment to the present invention. The basic elements, namely, the bracket and the clamp means, slidably mounted thereon, are substantially the same as in the first embodiment shown in FIG. **1** and FIG. **2**. However, it is to be noted that the two changes made are the elimination of the lower tab **20** and the inclusion of a compression spring **40** in place of the tension spring **36**. In FIG. **3**, the outwardly extended tab **22***a* of the bracket **12***a* is provided with a projection **42** formed in any suitable manner, for example, during the stamping operation. Similarly, the rearwardly extending lower lip **34***a* of the clamping means **24***a* is also provided with a projection **44** that is spacedly opposed to and in coaxial alignment with the projection **42**. The ends of the compression spring **40** are mounted on the projections **42** and **44** such that the spring **40**, in the absence of the action of any locking means such as the slot portion **32**, tends to urge the clamping means **24***a* in a downward direction and into engagement with the top edge of the article to be held. When not in use, the clamping means is held in the position shown in FIG. **3** by the cooperation of the tab **22***a* and the horizontal slot portion **32** (not illustrated).

FIG. **4** and FIG. **5** illustrate modifications of certain portions of the embodiments shown in either FIG. **1**, FIG. **2** or FIG. **3**. Turning first to FIG. **4** it will be appreciated that unless some restraining means is provided, the clamping means **24***b* can become disengaged from the tab **22***b*. To avoid any accidental disengagement, an auxiliary tab **46** is formed after assembly. The auxiliary tab **46** is dimensioned and is positioned so as to overlay the flat base wall **26***b* of the clamping means **24***b* regardless of what portion of the slot **30***b* or **32***b* receives the tab **22***b*. It will be appreciated that the vertical slot portion **30***b* need not be substantially wider than the thickness of the

material forming the tab 22*b*. The height of the horizontal slot portion 32*b* need not be substantially greater than the width of the tab 22*b*. This, of course, is opposite to the configuration shown in FIG. 1. With the present modification the auxiliary tab 46 will always be in a position over some portion of the flat base wall 26*b*. For convenience, the clamping means 24*b* is shown in FIG. 4 without sidewalls. Stiffening ribs, which will be referred to hereinafter, may be used in place of the sidewalls to provide the required rigidity.

In FIG. 5, an alternative arrangement is shown for holding the clamping means 24*c* in its upper position. In this modification the L-shaped slot shown in FIG. 1 and also described in connection with the FIG. 4 is eliminated. Instead, tab 34*c* is provided with a downwardly extending auxiliary tab 47 and a cooperating portion 48 is bent away from the base wall 14*c* of the bracket 12*c*. When the clamping means 24*c* is in its upper position, the auxiliary tab 47 is placed in engagement with the bent portion 48 in order to resist the pull of the tension spring 36*c*. When it is desired to engage the clamping means 24*c* with the top edge of the article, the auxiliary tab 47 is raised slightly and moved in a direction away from the base wall 14 so as to be disengaged from the bent portion 48. The tension spring 36*c* then pulls the clamping 24*c* into its second, lower position in engagement with the top edge of the article. Alternatively a compression spring could be used, as shown in FIG. 3.

An alternative embodiment of this invention is illustrated in FIG. 6 and FIG. 7. The principle of operation for this last-mentioned embodiment is the same as in the previously described embodiments. That is, a clamping member is mounted on a base member for relative movement with respect thereto between a first position and a second clamping position. The clamping assembly 50 of this embodiment is comprised of a bracket 52 having a base wall 54 and two spaced-apart sidewalls 56. A plurality of holes 58 formed in the base wall 54 provide means for mounting the bracket 52 on a support surface such as the wall W shown in FIG. 2. Proximate its lower end the bracket 52 is provided with a tab 60 in which is formed a clearance hole 62 (FIG. 7). The clamping means 64 of this embodiment is a plate comprised of a base wall 66 and two spaced sidewalls 68. Proximate its top edge, the base wall 66 is provided with a central tab 70 having a clearance hole 72 formed therein (FIG. 7). Proximate its bottom end, the base wall 66 is provided with a lower tab 74 in which is formed a threaded opening 76 (FIG. 7).

It will be noted in FIG. 6 that the bracket 52 and the clamping means 64 are substantially U-shaped and are oppositely facing. It will also be noted particularly in FIG. 7 that the tabs 70 and 74 extend from the base wall 66 in a direction towards the base wall 54 of the bracket 52. When the clamping means 64 is in its second or lower position, as shown in phantom outline (FIG. 7), the tabs 78 will releasably engage and clamp the top edge of the article.

A screw 80 extends through the opening 72 formed in the tab 70 and is threadably engaged in the threaded opening 76 formed in the tab 74. The lowermost end of the screw 80 has a reduced diameter portion 84 that passes through the opening 62 formed in the tab 60 of the bracket 52. Any suitable retaining means such as a clip or retaining ring 86 can be used to loosely capture the reduced diameter end portion 84 of the screw 80 with respect to the tab 60. It will be appreciated that, since the screw 80 is freely rotatable in the openings 62 and 72 and is rotatably engaged in the threaded opening 76, rotation of the screw 80 will cause translation of the clamping means 64 from its upper position that is illustrated in solid outline in FIG. 6 and FIG. 7 to the second lower position that is fragmentarily shown in phantom outline in FIG. 7. The sidewalls 68 of the clamping means 64 are positioned close enough to the base wall 54 and the sidewalls 56 of the bracket 52 so as to prevent any substantial rotation of the clamping means 64. This arrangement, in effect, makes the clamping means 64 a traveling nut that is limited primarily to axial movement. Thus, it is necessary only to rotate the screw 80 to either clamp or unclamp the article.

In the embodiments discussed hereinabove, the brackets and clamping means have been illustrated in a U-shaped form. This construction provides for substantial rigidity but it should be understood that other arrangements may be used for the same purpose. For example, the sidewalls may be eliminated and in their place stiffening ribs may be formed in the respective base walls when the members are stamped. Further, in the embodiments of FIG. 1, FIG. 3 and FIG. 6, the U-shaped movable clamping means is shown nested within the U-shaped rigidly secured bracket. This particular arrangement is not essential and the relationship may be reversed, if desired, whereby the U-shaped rigidly secured bracket is nested within the U-shaped movable clamping means.

While two different types of elements are illustrated as the means for moving the clamping means from one of its positions to the other of its positions, it will be appreciated that still other arrangements are possible. For example, an over-center toggle arrangement could be used but this would undoubtedly add to the cost of the device. Similarly, an eccentrically rotatable member such as a cam could also be used but this would complicate both the construction and operation of the device and would again add to the manufacturing cost.

From the foregoing, it is evident that a relatively low cost device has been provided for releasably clamping an article with relation to a wall or like support. The embodiments described and illustrated provide a device that is substantially universal as regards the size of the article. In addition to being relatively inexpensive to manufacture, the device of this invention is readily installed without special skills or tools and is very simple to operate.

There has been disclosed the best embodiment of the invention presently contemplated. It is to be understood, however, that various changes and modifications may be made by those skilled in the art without departing from the spirit of the invention.

I claim:

1. A device for releasably clamping an article, such as a frame, a picture, a sign or the like with respect to first and second support surfaces, said device comprising:
   a. a bracket having a mounting portion adapted to be secured to the first support surface;
   b. clamping means mounted on said bracket for relative movement with respect thereto, said clamping means being movable from a first position to a second position;
   c. means for moving said clamping means from one of said positions to the other of said positions whereby in said second position, at least a portion of said clamping means is in engagement with a portion of the article and the article is thereby held between said clamping means and a second support surface; and
   d. holding means for releasably maintaining said clamping means in said first position, said holding means being defined by a portion cut out and bent forward from said mounting portion.

2. The device in accordance with claim 1, wherein said holding means is further comprised of a slot in said clamping means, said slot having two sections, one of which is offset from the other, the portion of said mounting surface that is cut out and bent forward being positioned in said offset slot portion when said clamping means is in said first position.

3. The device in accordance with claim 1, wherein said holding means is further comprised of a tab on said clamping means, said tab being in engagement with said portion of said bracket that is cut out and bent forward when said clamping means is in said first position.

4. The device in accordance with claim 1, wherein said bracket and said clamping means are U-shaped one of said last two mentioned elements being nested within the other.

5. The device in accordance with claim 1, wherein said portion of said clamping means in engagement with the article is a lip and said means for moving said clamping means is a spring extending between said clamping means and said bracket.

6. The device in accordance with claim 5, wherein said spring is a tension spring.

7. The device in accordance with claim 5, wherein said spring is a compression spring.

8. The device in accordance with claim 1, further including means retaining said clamping means on said bracket.