

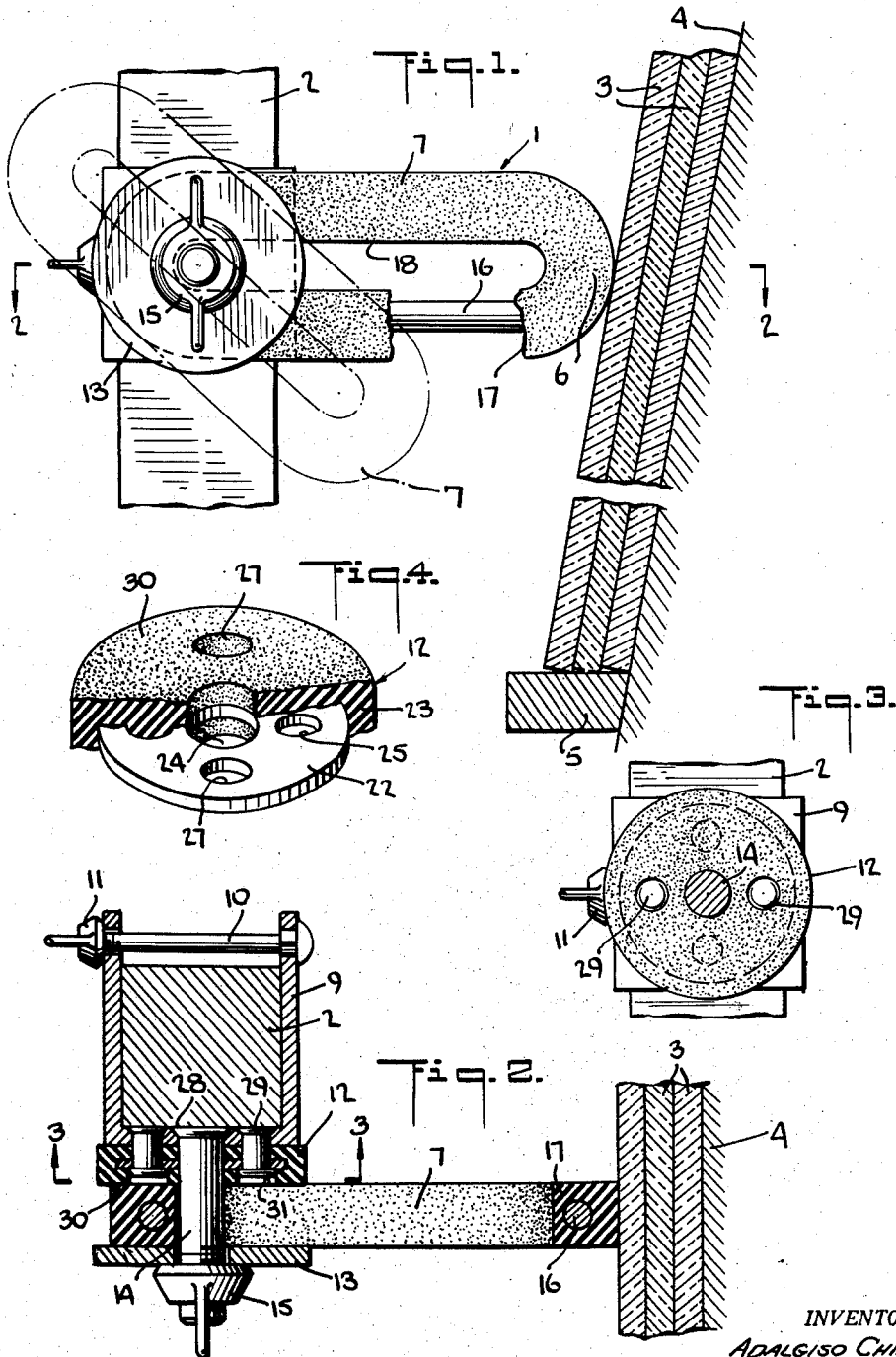
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ADJUSTABLE HOLD DOWN DEVICE

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ADJUSTABLE HOLD DOWN DEVICE

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The present invention relates to a clamping member and more particularly to an adjustable clamping member for use with fragile articles such as glass objects, glass plates, mirrors, or similar articles. Adjustable clamps are presently known which are used to mount or anchor fragile articles in position by contacting the articles at spaced positions and by holding the articles against a suitable support. Such clamps, for example, are used on delivery trucks which carry relatively large plate glass windows or mirrors. These trucks have a series of spaced vertical rods positioned adjacent to plate mounting racks. On each of the vertical rods several adjustable clamps are mounted so that they may be tightened in place against the supported glass plates to hold the glass plates in place on the truck. These known types of clamps are unsatisfactory for several reasons. Many of them are relatively weak, and, after short periods of use, they fail to securely lock the supported articles in place. Others of the known types of clamps are adjusted with great difficulty, and they are not adaptable for use in varying positions such as may be required where widely differing loads are supported or carried. Other presently known types of clamps are subject to wear so that they tend to work loose during use, thereby releasing the supported articles.

Accordingly, an object of the present invention is to provide an improved adjustable clamping member.

Another object of the present invention is to provide a relatively strong and lightweight clamping member.

Another object of the present invention is to provide a clamping member which is easily adjustable for a variety of shapes and sizes of articles and which may be positively locked after being moved into position against the articles.

Another object of the present invention is to provide a clamping member having a relatively large and firmly mounted resilient article-engaging surface, allowing the clamp to engage the supported article from a variety of angles.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

Fig. 1 is a side elevational view partially cut away of the clamping member locked into position against a plurality of supported glass plates;

Fig. 2 is a sectional view of the clamping member of Fig. 1 taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2; and

Fig. 4 is a perspective view partially cut away of the locking disc.

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Fig. 1 illustrates the clamping member 1 of the present invention locked into position on a vertical support or rod member 2 to hold a plurality of glass plates 3 in position on a support surface 4. A typical application for such a combination is found on glass-carrying trucks where the support 4 comprises the rear body portion of the truck which supports one or more glass plates 3 in a generally vertical position on a foot panel 5. Surrounding the support or truck body 4 are a series of carrier rods 2 which are rigidly mounted in fixed, spaced relationship with the support or truck body 4. Along each of these carrier rods 2 are positioned a plurality of the clamping members 1 of the present invention. These clamping members are adjusted to tightly and adjustably engage the glass plates 3, as will be more fully explained below.

The clamping member 1 comprises a sliding pressure arm 7 which is adjustably attached to a mounting means or strap 9, which in the preferred embodiment illustrated in the drawing comprises a C-clamp adjustably positioned on the rod member 2 by a fastening means comprising the bolt 10 having a wing nut 11 threadedly connected on its end. The sliding pressure arm 7 is attached to the strap 9 by a frame engaging means comprising a through-bolt 14 which is welded or otherwise fastened to the strap 9, as indicated at 28, and wing nut 15. Through-bolt 14 is adapted to pass through the central, elongated slot or aperture 18 in the sliding pressure arm 7 and adjustable wing nut 15 on the outer end of the through-bolt 14 clamps the sliding pressure arm 7 into place between washer 13 adjacent to the wing nut 15 and locking disc 12 which is attached to the strap 9.

In order to provide for a sliding pressure arm 7 having great strength, light weight, and a relatively large resilient article engaging surface, the sliding pressure arm 7 in its preferred embodiment, as illustrated in the drawing, comprises an elongated ring-like metal frame 16 completely encased in a resilient coating or covering 17 formed of rubber or a similar resilient material. The metal frame 16 is preferably formed of metal to provide for the desired combination of great strength and light weight and it may be formed from a round steel rod bent into the desired ring-like form and having its two ends welded together to form an endless ring or link construction. A suitable resilient coating is formed over the metal frame 16 by coating the frame with the resilient material. If rubber is used, the coating may be formed by wrapping the metal frame 16 with rubber strips and thereafter heating, vulcanizing, and curing the rubber to provide a homogeneous, tightly adhering resilient covering. Resilient covering 17 provides a relatively large contact area between the sliding pressure arm 7 and the clamped articles, such as the glass plates 3. Thus, the pressure arm 7 of the clamp 1 may be moved from the position indicated in solid lines in Fig. 1 to the position indicated in dash-dot lines for a different article, and a suitable resilient gripping face will always be provided to engage the clamped article.

In addition to providing the article-gripping surface, the resilient covering 17 also provides for an easily adjusted and positive locking action between the sliding pressure arm 7 and the wing nut 15 on the strap 9 in cooperation with washer 13. Washer 13 is formed of metal or another relatively stiff material, and when wing nut 15 is tightened to lock the sliding pressure arm 7 into its chosen position, the washer 13 is forced inwardly into the resilient frame covering 17 so that a tight gripping action occurs between the through-bolt 14, washer 13, and the resilient frame covering 17.

To further insure a positive locking action between the sliding pressure arm 7 and the strap 9, a locking

member or disc 12 is provided between the sliding pressure arm 7 and the strap 9. The preferred embodiment of this locking disc is shown more clearly in Figs. 2 and 4.

Locking disc 12 comprises a rigid inner frame or washer 22 which is covered with a resilient outer coating 23. The inner frame member 22 holds the locking disc 12 in shape and provides a mounting means to attach the locking disc 12 to the strap 9. A preferred means for attaching the locking disc 12 to strap 9 is illustrated in Fig. 2. Two apertures 27 are provided which pass completely through the washer 22 and the coating 23. Rivets 29 are inserted through these holes and have their opposite ends fastened to the clamp 9 and the locking disc frame 22, respectively. A central through-bolt aperture 24 is provided at the center of the locking disc 12 to permit the locking disc 12 to be slipped over the through-bolt 14 on strap 9. In the preferred form of the locking disc 12 as illustrated in the drawings, additional bonding apertures 25 are provided in the locking disc frame 22 to lock the resilient coating 23 in place on the locking disc frame 22. The resilient coating 23 is formed of rubber or another suitable resilient material which is molded on or otherwise applied to the frame 22 in a suitable manner. As seen in Fig. 2, the outer surface 30 of the locking disc 12 engages the resilient inner surface 31 of the sliding pressure arm 7 when the sliding pressure arm 7 has been moved into position and when the wing nut 15 is tightened against the washer 13 on the through-bolt 14. The abutting resilient surfaces of the locking disc 12 and the sliding pressure arm 7 provide for an extremely tight gripping action therebetween so that the sliding pressure arm 7 is tightly held in position. In addition, the tightening of the wing nut 15 also causes the locking disc and the sliding pressure arm coatings 23 and 17, respectively, to be compressed so that the resulting compressional force between the washer 13 and the strap 9 tends to lock the pressure arm 7 tightly in its clamping position. As seen in the vertical sectional view of Fig. 2, the preferred embodiment of the strap 9 has a square cross section adapted to engage a carrier rod 2 having a complementary square cross section. With this preferred construction, it is clear that the clamp 1 may be removed from the carrier rod 4 by the removal of the wing nut 11 and the bolt 10 and may be reapplied to the carrier rod 4 in any of the other three remaining positions. The clamp 1 thus, for example, may be reapplied to the carrier rod 4 with the sliding pressure arm 7 on the opposite side of carrier rod 4 and still in contact with glass plates 3.

It will be seen that the present invention provides an improved adjustable clamp which is stronger, more easily adjusted and more universally adaptable than presently known clamps of this general type. The frame-like construction of the clamp with its resilient coating provides a clamp of great strength, and at the same time the use of the resilient coating on the reinforcing frame cooperates with the clamp mounting member to provide a positive locking action after the clamp is moved into position to hold a particular article in place. Also, by having the metal frame construction, the elongated article engaging pressure arm is given a high degree of strength to resist forces directed against it in all directions. For this reason, the pressure arm of the clamp may be moved against the clamped article in various angles as desired and such as are convenient to provide the best locking action with the particular article con-

cerned. Thus, for example, when the clamp of the present invention is being used on a generally vertical support rod to hold glass plates or mirrors in position on delivery trucks, the pressure arm which engages the glass plates may be tilted upwardly or downwardly, as desired, to correctly direct the clamping force for the particular type of truck and glass product and to accommodate the particular clamp and clamping frame structure to loads of widely varying proportions. Also, the frame-type construction of the sliding pressure arm of the clamp of the present invention with its resilient coating over its entire surface allows the pressure arm to be moved to engage with the clamped article at any portion of the pressure arm surface. The resilient coating itself, by encompassing the entire frame of the clamping arm is tightly fastened onto the frame so that it remains in position on the clamp in spite of any shocks or shearing forces to which the clamp may be subjected. This type of resilient coating also provides for an easily manufactured and long lasting resilient pressure arm.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. An adjustable hold down device adapted to resiliently engage fragile articles and to hold them against a support means comprising the combination of an elongated pressure arm having a resilient covering thereon and an elongated slot therein extending along a substantial portion of its length, a clamp having opposed inner gripping portions adapted to releasably grip a rod member adjacent to the support means and having a relatively flat outer portion, a resilient coating on said flat outer portion, an adjustable connector for said elongated member on said flat portion, said connector comprising a through-bolt projecting from said flat portion passing through said slot in said elongated pressure arm and a connecting member on said through-bolt releasably urging the resiliently coated surface of said elongated pressure arm against the resilient coating on said clamp whereby said elongated pressure arm may be adjustably positioned on said clamp by being slid and rotated with respect to said through-bolt when said connecting member is released and whereby said elongated pressure arm is tightly fastened to said clamp when said connecting member is engaged whereby the resilient coating on the flat portion of said clamp engaged with a portion of the resilient coating on said elongated pressure arm provides a shock resistant locking and a positive positioning of said elongated pressure arm on said clamp.

2. The device as claimed in claim 1 in which said resilient coating on said flat outer portion of said clamp comprises a rigid frame member attached to said clamp and having a coating of resilient material.

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