

Aug. 13, 1946.

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2,405,913

FASTENING DEVICE

Filed March 13, 1944

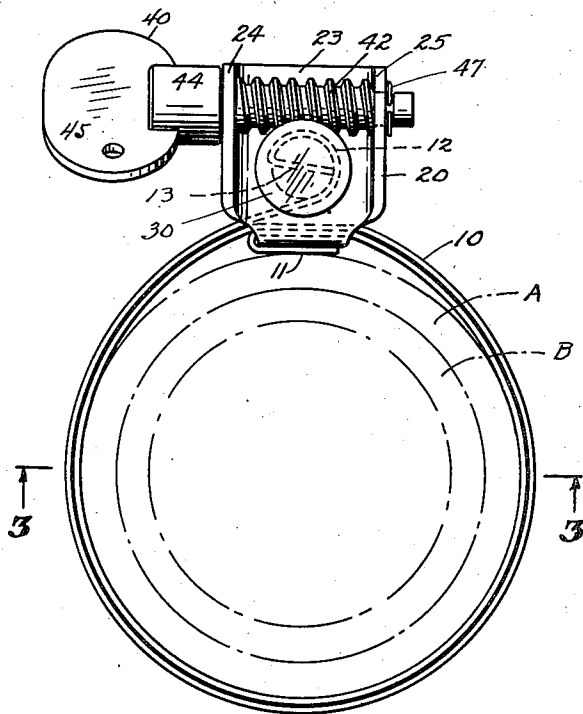


FIG. 1

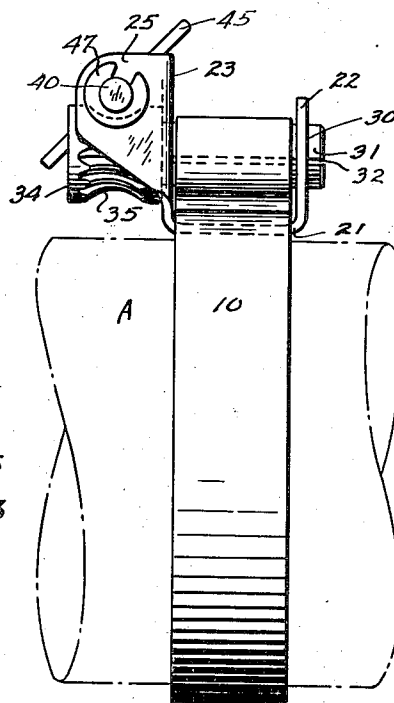


FIG. 2

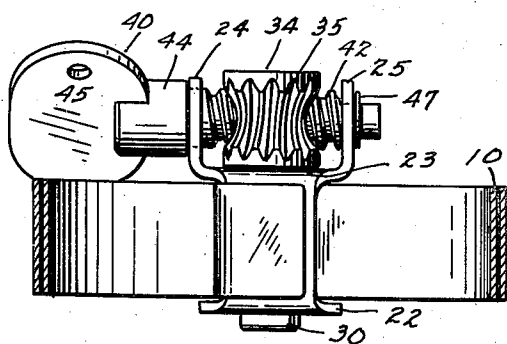


FIG. 3

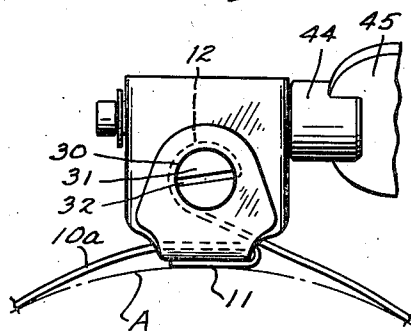


FIG. 4

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UNITED STATES PATENT OFFICE

2,405,913

FASTENING DEVICE

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Application March 13, 1944, Serial No. 526,172

4 Claims. (Cl. 24—19)

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This invention relates to a fastening device comprising a flexible strap adapted to embrace an article to be clamped and combined with means for effectively pulling the ends of the strap toward each other in circumferential direction and holding them in such position. The invention, therefore, is in the nature of a hose clamp and provides very ready means by which a yielding tubular member may be clamped very tightly upon a rigid tubular member which it embraces, maintaining the two in gas-tight or liquid-tight connection. The invention is well adapted, for instance, for clamping a comparatively large size hose which carries a high internal pressure.

One of the objects of my invention is to provide a clamp of the character described which may be readily tightened from time to time should occasion require, and also may be immediately loosened whenever desired to free the conduit from the member to which it is attached.

To effect the result desired, I combine the flexible strap with an anchorage bracket to which one end of the strap is secured and which carries a revoluble spindle to which the other end of the strap is attached, and one of the objects of the invention is to combine with such a device means by which the spindle may be manually rotated with great leverage and locked in its clamping position.

The invention, comprising the means by which I accomplish the tight and powerful clamping, which at the same time is readily releasable, is illustrated in the drawing hereof and is hereinafter more fully described.

In the drawing, Fig. 1 is an elevation of one form of my clamping device in position on a suitably supported conduit indicated with broken lines; Fig. 2 is a side elevation of the clamping device; Fig. 3 is a cross section, as indicated by the line 3—3 on Fig. 1; Fig. 4 is a fragmentary elevation of a modified embodiment of the invention.

As shown in Figs. 1 and 2, the broken lines A indicate a suitable flexible hose conduit adapted to be clamped on an embraced rigid tubular member B. In these figures, and in Fig. 3, 10 indicates a flexible strap of comparatively great strength, preferably made of sheet metal. This strap is shown as making two circuits about the hose to be clamped. In Fig. 4, a simpler embodiment is shown wherein the strap 10a makes only one circuit about the hose.

In either embodiment, I provide a winding and holding device secured to the two ends of the

strap. This device comprises a bracket 20 anchored to one end of the strap, a rotatable spindle 30 mounted in the bracket and anchored to the other end of the strap, and a manual device 40 for rotating the spindle.

In detail, the bracket shown is a channel shaped member having a base or intermediate portion 21, two upright parallel webs or sides 22 and 23, and a pair of parallel lateral flanges 24 and 25 extending outwardly from the edges of the web 23. The winding spindle 30 is journaled in two webs 22 and 23. It has a cylindrical body portion 31 bifurcated by a diametric slot 32, and it has a head portion 34, the exterior of which is grooved at 35 to make it a worm wheel. The cylindrical body 31 is journaled in the bracket webs 22 and 23 with the worm wheel head lying between the flanges 24 and 25.

The member 40 has a body journaled in the two flanges 24 and 25 and carries between them the helical rib 42 constituting a worm meshing with the worm wheel 35. On the outer side of the bracket web 24, the member 40 is formed with an enlargement 44 on which is rigidly formed a flat wing 45 providing means for manually turning the worm. The worm is held in its mounted position by a split washer 47 occupying a groove in the worm body, on the outer side of the flange 25.

One end of the strap 10, or 10a, is bent back by a return bend to produce a hooked end indicated at 11. This end portion is hooked over the base 21 of the bracket, the strap body preferably extending through the bracket, with the hook on the underside thereof, as shown in Figs. 1 and 4. The other end of the strap is bent around the spindle 30, as indicated at 12, and has a flat end portion 13 occupying the diametric slot 32 in the spindle.

It will be seen that when such a device as described is about a member to be clamped, the rotation of the worm, by simply manual turning of the wing 45, gives a relatively slow and hence powerful rotation to the spindle 30, which winds in that end of the band and pulls it tightly about the conduit being clamped. Whenever such tightness is secured the worm and worm wheel engagement automatically locks the band in its tightened position, the angle of the worm and that of the worm wheel being such that the worm wheel cannot rotate the worm. Accordingly, the device provides a powerful clamping device which is self-locking.

As there may be a considerable winding of the strap about the spindle in my clamp, the same

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clamp is available for hose of considerably different wall thicknesses. It provides for the ready tightening from time to time, as the material of the hose may flow or deteriorate in use, and it is readily released whenever change of the hose is required.

The parts of the complete clamp are readily assembled. Thus, assuming that the parts are all separated, one end of the band is hooked across the base portion 21 of the bracket and the other end is brought into position between the webs 22 and 23. Then the spindle is shoved axially into place, its bifurcated shank straddling the flat end 13 of the band. Then the worm is inserted through the flange 24 and screwed along the worm wheel until the free end of the worm has passed through the flange 25. Then the washer 47 is put in place locking the worm in position, allowing to gradually rotate the worm wheel.

I claim:

1. In a clamp having a flexible band, tightening means comprising a bracket adapted to anchor one end of the band and defining spaced side portions and spaced flanges projecting outwardly from one side of said bracket, a spindle journaled in said side portions adapted for anchoring the other end of said band, and a driving device mounted in said spaced flanges in connected relation with the spindle for rotating the spindle.

2. In a clamp having a flexible band, tightening means comprising a channel shaped bracket

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adapted to anchor one end of the band and defining spaced side portions, spaced flanges on one of said side portions projecting outwardly thereof, a spindle journaled in said side portions adapted for anchoring the other end of said band, and a driving device mounted in said spaced flanges in connected relation with said spindle for rotating the spindle.

3. In a clamp having a flexible band, tightening means comprising a channel shaped bracket defining spaced side portions, an intermediate portion adapted to anchor one end of the band, and a pair of spaced outwardly projecting flanges on one of said side portions, a spindle journaled in said side portions adapted for anchoring the other end of the band, a gear on said spindle, and a driving gear mounted in said spaced flanges in mesh with said gear on the spindle for rotating the spindle.

4. In a clamp having a flexible band, tightening means comprising a channel shaped bracket defining spaced side portions, an intermediate portion adapted to anchor one end of the band, and outwardly projecting flanges on one of said side portions, a spindle journaled in said side portions adapted for anchoring the other end of the band, a worm wheel on said spindle disposed between said outwardly projecting flanges, and a worm mounted in said flanges in mesh with said worm wheel on the spindle for rotating the spindle.

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