Jan. 15, 1929. 1,698,813

R. GOUIRAND

CLAMP

Filed Dec. 2, 1926

Fig. 3

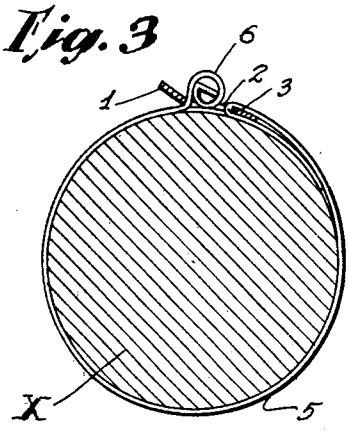
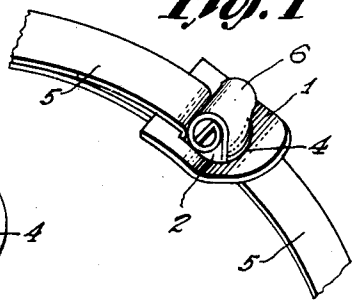


Fig. 1



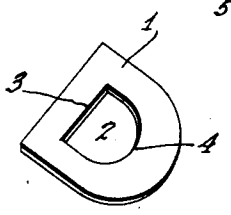


Fig. 2

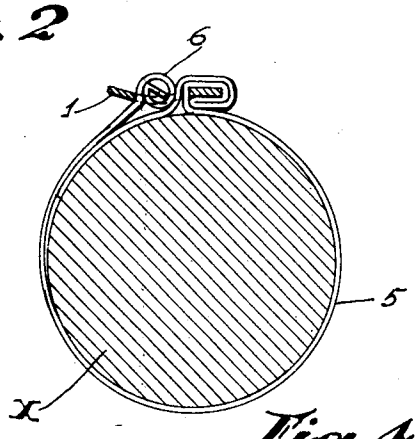


Fig. 4

Fig. 5

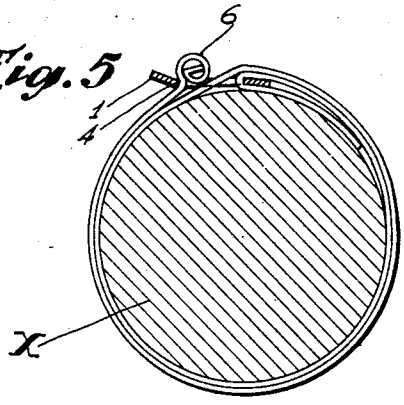


Fig. 6

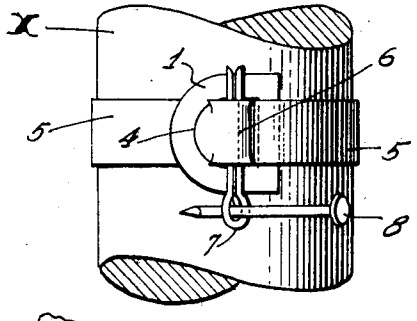
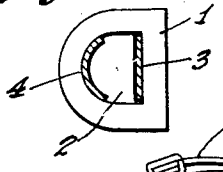


Fig. 7



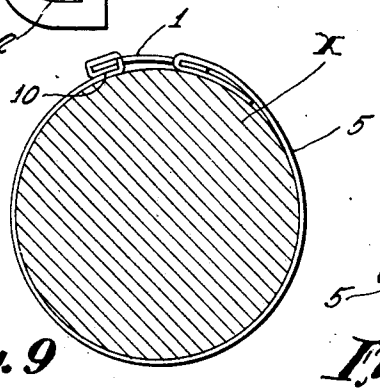


Fig. 9

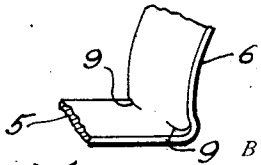


Fig. 8

INVENTOR.
Rene Gouirand
BY Cornelius Fabricius
ATTORNEYS.

Patented Jan. 15, 1929. 1,698,813

UNITED STATES PATENT OFFICE.

RENÉ GOUIRAND, OF NEW YORK, N. Y.

CLAMP.

Application filed December 2, 1926. Serial No. 152,082.

This invention relates to clamps and embodies, more particularly, an improvement upon the clamp described and claimed in Patent No. 1,579,523, issued on April 6, 1926, to René Gouirand and Auguste Pache.

The object of this invention is to provide a clamp wherein the locking operation of the buckle upon a band of material is accomplished by drawing the band over an edge or surface which will transversely distort the band and automatically form a lock against inadvertent release of the band from the buckle and to accomplish this result by a buckle of much simpler construction than described in the prior patent and which can be more easily and economically manufactured.

The clamp of the present invention embodies a buckle which, in the preferred form of the invention, is preferably in the form of a flat sheet metal stamping in contradistinction to the substantially triangular cross section of the clamp of the patent. To manufacture the clamp of the patent, relatively expensive forming dies are required, and a plurality of forming operations necessary.

The clamp of this invention, in contradistinction, may be made by a simple stamping operation and requires for its manufacture only a fraction of the metal required in the prior clamp. As a result, the clamp buckle of this invention may be more economically and easily manufactured and can be sold at a relatively small cost as compared to the clamp of the patent.

In its preferred practical form, the present clamp buckle is substantially **D** shape. It is in the form of sheet metal stamping and is preferably provided with a single opening in its center, one end of said opening being substantially straight to permit one end of a band to be looped through the opening against said edge, while the other end of the opening is of curved or concave configuration, so that when the free end of the band is passed through the opening and placed under tension, while drawn over said curved edge, the band will be transversely distorted to produce abutments by the shoulders, whereby the clamp is locked against inadvertent release and without the employment of any extraneous locking means. If desired, the buckle may be provided with two openings, one for the looped end of the band, and the other for the opposite end of the band, but I find it more economical to stamp a single opening in the buckle.

Features of the invention, other than those specified, will be apparent from the hereinafter detailed description and claims, when read in conjunction with the accompanying drawings.

The accompanying drawings illustrate different practical embodiments of the invention, but the constructions therein shown are to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a perspective view illustrating a clamp embodying the present invention.

Figure 2 is a like view showing the buckle portion of the clamp detached.

Figures 3, 4 and 5 show different ways in which the buckle may be associated with a metal strip.

Figure 6 is a plan view of the construction shown in Figure 3.

Figure 7 is a section in the top plane of the buckle in Figure 3.

Figure 8 is a fragmental perspective view showing in a diagrammatic manner, the manner in which the locking operation is affected by transverse distortion of the band; and,

Figure 9 is a view similar to Figure 3, but illustrating a modified manner of manipulating the clamp.

In carrying out the invention in its preferred practical form, the buckle 1 is made as a sheet metal stamping, shown in Figures 1, 2 and 7 as substantially **D** shape, although it manifestly may be of other contour without departing from the spirit and scope of this invention. It is provided interiorly of its margins with one or more openings through which a sheet metal band may be passed a plurality of times.

In the preferred form of the construction shown in Figures 1 to 7, the buckle is provided with a single opening 2 having spaced from one end of the buckle a relatively straight edge 3, while adjacent the other end of the buckle the opening is formed with a curved or concave edge 4. The width of the opening 2 is substantially the same as the width of the band 5 with which the buckle is adapted to cooperate. In practice, the buckle may be made perfectly flat or may

be slightly curved longitudinally, but I preferably make it flat throughout as this economizes in manufacture.

The buckle of this invention may be associated with a metal strap in different ways, three illustrative forms of which are shown in Figures 3 to 5. In the form of Figure 3, one end of the band is looped over the straight end of the buckle so that the loop of the band engages with the edge 3 of the opening therein. Thereafter the band is passed once around the article X to be clamped and then threaded through the opening 2 after which the free end of the band is coiled or rolled as shown at 6, in Figures 1 and 3.

This coiling operation may be accomplished through the employment of a suitable key engaged with the free end of the band and then rotated to produce the roll or coil 6. In practice, a cotter pin 7 is found to operate as a key in a thoroughly efficient and satisfactory manner, particularly if some suitable implement such as a handle, screw driver or the like 8 is introduced through the head of the cotter pin to permit the application of considerable power thereto. At the beginning of the rolling operation of the band, said band rolls very easy, and this continues until a sufficiently large portion of the band has been rolled to draw the band snugly about the object to be clamped. As the rolling continues beyond this point, tension on the band increases and the roll is drawn tight against the outer face of the buckle, after which continuation of the rolling operation rapidly increases the tension on the band in order that it may be drawn tightly about such object.

As the tension of the band increases, the automatic locking means of the buckle comes into operation, and the manner in which the locking is effected, will now be described.

The band in its natural form is flat, but as it is drawn into the coil 6, it is pressed tightly against the curved edge 4 of the opening 2, as shown in Fig. 7. This operation is accomplished while the band is under considerable tension and this great tension serves to deform the band as it is drawn through the opening, so that as each part of the band passes over the edge 4, it is caused to transversely conform to the curvature of said edge. The coil or roll 6 is substantially cylindrical at the commencement of the tensioning operation and consequently there results by this deformation of the band, a slight stretching of its marginal edges.

Thus, as each marginal edge passes through the opening, it leaves the edge 4 in a slightly stretched condition to be thereafter immediately wound upon a substantially cylindrical coil or roll 6. In practice, it is found that this operation causes the inner concave formation of the band to be reversed, so that it becomes exteriorly concave beyond the edge 4. While thus shaped, it is wound upon a roll with the result that said roll becomes slightly concave longitudinally as is clearly apparent from Figure 6.

It will thus appear that the reversal of the transverse configuration of the band occurs as soon as it leaves the edge 4, and there is accordingly produced a reaction which draws the coil close to said edge and produces at either margin of the band a tendency of the edge to bite into the band, while the band is simultaneously formed adjacent its margins into pronounced abutments directly adjacent the edge 4 and adjacent the exterior face of the buckle 1.

These abutments are designated 9 in Figure 8. In practice, they engage with the edge 4 at the outer face of the buckle to form a positive lock which, in practice, will effectually preclude retrograde movement of the band over the edge 4. It is thus entirely feasible to entirely remove the cotter pin or other tensioning implement after the band has been drawn tight, the abutments which I have described serving thereafter to positively lock the band under tension. When tension is applied to the band and it is drawn into clamping relation with the object to be clamped, it is found, in practice, that that portion of the clamp which directly overlies such object will substantially conform to the shape of the object, while the forward end of the clamp has a tendency under the great pressure imposed thereon to be deflected upwardly or outwardly from the object, as shown in Figure 3. This upward deflection of the free end of the buckle causes it to even more tightly dig into the band and facilitates the formation of the abutments with the consequent positive locking function.

In Figure 4, the construction and mode of operation are substantially the same, as has been described with reference to Fig. 3, with the exception that the rear end of the band is returned upon itself prior to its passage through the opening 2 of the buckle, in order to give greater strength at the rear end of the band by doubling the amount of material engaging with the buckle at this point. The free end of the band, moreover, instead of being bent back beneath the band is carried forwardly underneath the forward portion of the buckle, so as to form a substantially continuous bridge of band beneath the buckle.

The structure of Figure 5 is substantially the same as the arrangement shown in Figure 3 and functions in the same manner except that instead of passing the band once about the object X to be clamped, the band is passed twice about said object before be-

ing formed into the roll 6. The mode of operation is the same as described in connection with Figure 3.

In the preferred manner of manipulating the band, the roll 6 is left in place after the band has been placed under tension. In some instances, however, the projection produced by the roll is objectionable and when such is the case, I may proceed as follows.

After the band is drawn tightly by rolling of its free end in the manner hereinbefore described to produce the abutments 9, which serve to positively lock the band against retrograde movement, the free end of the band is carefully unrolled and the greater portion of the material forming said roll is cut away by snips or otherwise to leave a short projecting end of the band. This short projecting end is bent over the forward end of the buckle, so that its free end underlies the buckle forwardly of the edge 4. Thereafter the forward edge of the buckle is bent downwardly as shown in Fig. 9, so as to clamp the free end of the band beneath the nose of the buckle. This produces a double lock. That is to say, the band is not only locked by the abutments at the edge 4, but its free end is also tightly gripped beneath the ends of the buckle as shown at 10.

It will be understood that this manner of eliminating the roll in the finished construction is applicable not only to the arrangement shown in Figs. 1, 3, 4, and 5, but also to numerous other band arrangements of which the invention is susceptible.

It is found in practice that great tension can be applied to the band by the construction of this invention, through the application of relatively little manual power to the implement 8, because of the relatively great leverage resulting from the application of such power.

This invention constitutes a marked advance in the art to which it pertains. It provides a construction of unusual simplicity, capable of performing a locking function without any extraneous locking means. It is simple in construction, economical to manufacture and is thoroughly reliable in its operations.

The foregoing detailed description sets forth the invention in its preferred practical form, but the invention is to be understood as fully commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. A clamp embodying a flat band or strap, a substantially flat buckle having an uninterrupted periphery and adapted to be secured to one end of the band and provided with an opening positioned inwardly of its margin and through which the other end of the band is adapted to be passed and thereafter rolled, said opening being shaped to transversely distort the band during its passage therethrough for the purpose of precluding inadvertent retrograde movement of the band without rupture of the band.

2. A clamp embodying a flat band or strap, a substantially flat buckle having an uninterrupted periphery and adapted to be secured to one end of the band and having an opening positioned inwardly of its margin and through which the free end of the band is adapted to be passed and thereafter rolled, said opening having a curvilinear contour, whereby the rolling of the band to place it under tension will draw the band over such curvilinear contour and distort it sufficiently to effectually lock the band against inadvertent loosening without rupture of the band.

3. A clamp embodying a flat band or strap, a substantially flat buckle having an uninterrupted periphery and associated with one end of the band and having an opening positioned inwardly of its margin through which the opposite end of the band is adapted to be passed, said opening being provided with a curved edge, and means operable upon the free end of the band beyond the curved edge for placing the band under tension and simultaneously drawing it against said edge for the purpose of deforming the band to lock it under tension.

4. A clamp embodying a flat band or strap, a substantially flat buckle having an uninterrupted periphery and connected to one end of the band and provided with a centrally disposed opening through which the other end of the band is adapted to be passed, means positioned beyond the opening and cooperable with the free end of the band to draw the band through the opening and place it under tension, said opening being configurated to deform the band during its passage therethrough to thereby preclude inadvertent retrograde shifting of the band without rupture of the band.

5. A clamp embodying a flat band or strap, a substantially flat sheet metal buckle apertured to permit one end of the band to be passed through the buckle to anchor said end of the band thereto and also to provide a curvilinear edge over which the other end of the band may be drawn when tightening the band about the object to be clamped.

6. A clamp embodying a flat band or strap, a substantially flat sheet metal buckle apertured to permit one end of the band to be passed through the buckle and anchoring said end of the band thereto and also to provide a curvilinear edge over which the other end of the band may be drawn when tightening the band about the object to be clamped, and means for rolling the free end of the band to place said band under tension and draw it over said curvilinear edge.

7. A clamp embodying a sustantially flat sheet metal buckle provided with an opening, one end of which is substantially straight and the other end of which is concave, a band, one end of which is passed through the opening and looped about the straight edge thereof and the free end of which band is passed through the opening and thereafter rolled to engage with the curved edge of said opening.

8. A clamp embodying a flat band or strap, a buckle having an uninterrupted periphery and adapted to be secured to one end of the band and provided with a single centrally disposed aperture through which the other end of the band is adapted to be passed and thereafter rolled, said aperture being shaped to transversely distort the band during its passage therethrough for the purpose of precluding inadvertent retrograde movement of the band without rupture of the band.

9. As a new article of manufacture, a clamp buckle having an uninterrupted periphery and provided with a single aperture, one end of which is curved to transversely distort a band drawn thereover.

10. As a new article of manufacture, a clamp buckle comprising a sheet metal stamping having an uninterrupted periphery and provided with a single aperture, one end of which is curved to transversely distort a flat band drawn thereover.

11. As a new article of manufacture, a clamp buckle comprising a sheet metal stamping having an uninterrupted periphery and provided with an aperture, one end of which aperture is substantially straight and the other end of which is curvilinear and is adapted to transversely distort a band drawn thereover under tension.

12. As a new article of manufacture, a clamp buckle comprising a substantially flat sheet metal stamping provided with an uninterrupted and unbroken periphery and having a substantially D shaped aperture in its body whereby one end of said aperture is substantially straight and the other end thereof is curvilinear and is adapted to transversely distort a normally flat band drawn thereover under tension.

13. As a new article of manufacture, a clamp buckle comprising a substantially flat sheet metal stamping having a continuous, unbroken periphery and also having a substantially D shaped aperture therein, the peripheral edge of which is continuous and unbroken, one end of said opening being substantially straight and the other end of the opening being curvilinear in a direction longitudinally of its periphery and substantially flat in a direction perpendicular to the faces of the body of the buckle, whereby said curvilinear end of the aperture is adapted to form shoulders on a band passed through the opening and rolled to place the band under tension.

In testimony whereof I have signed the foregoing specification.

RENÉ GOUIRAND.