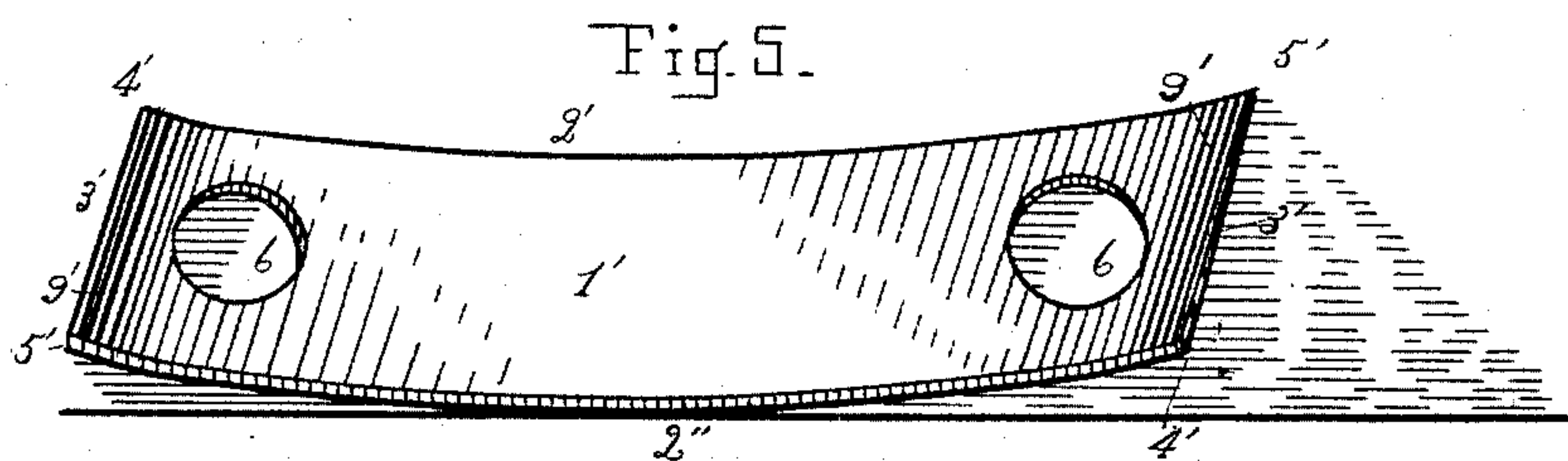
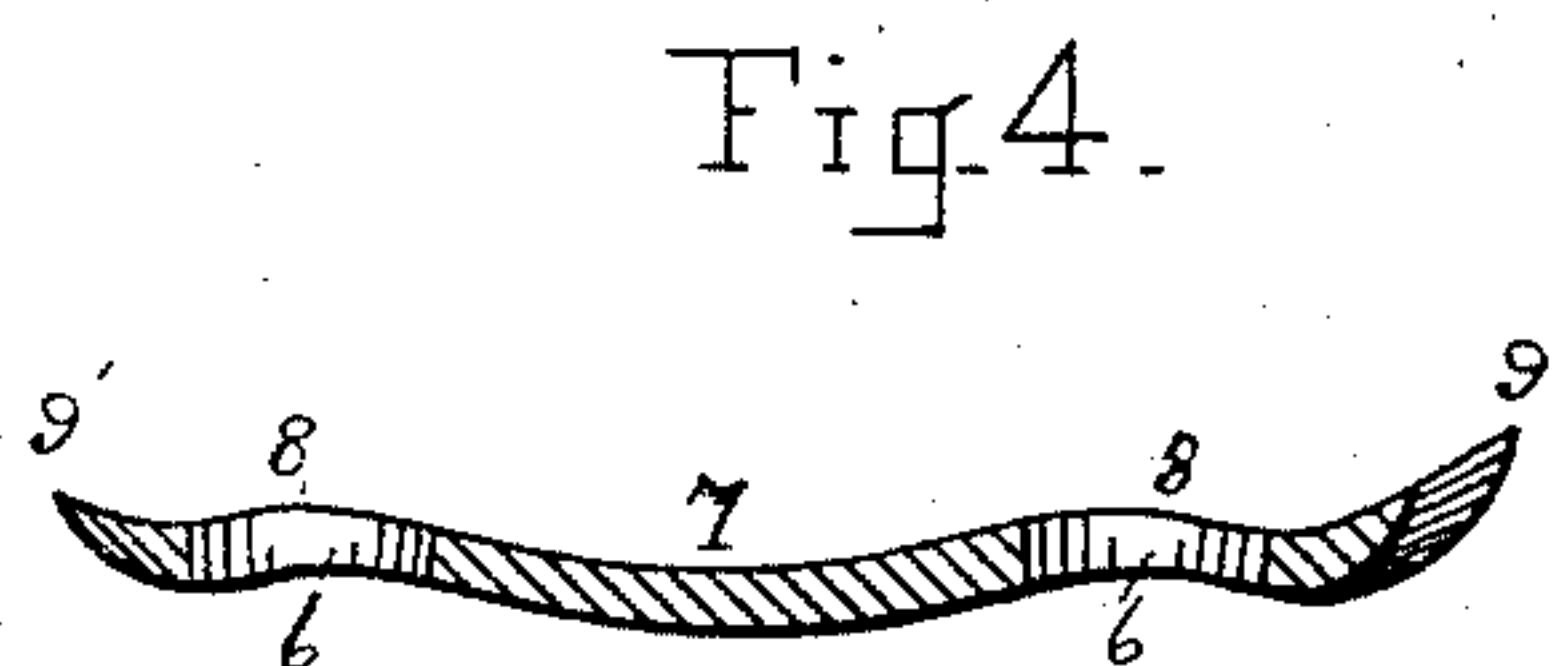
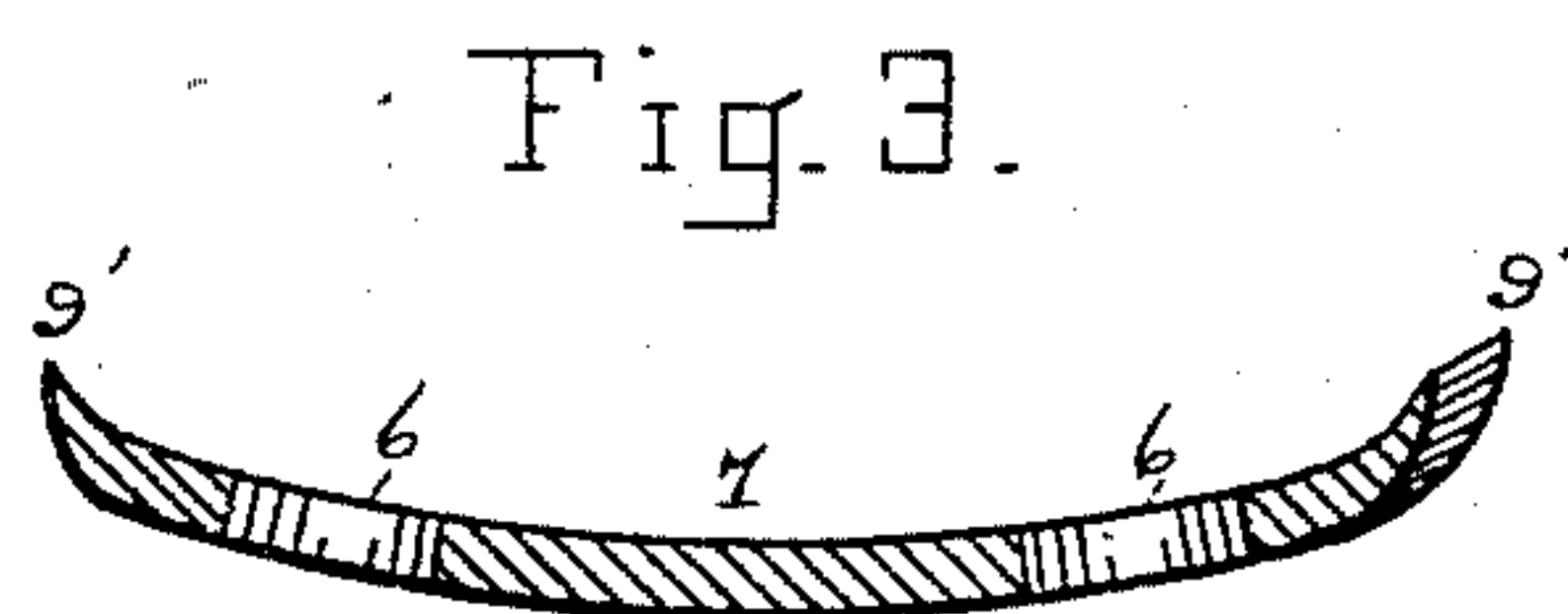
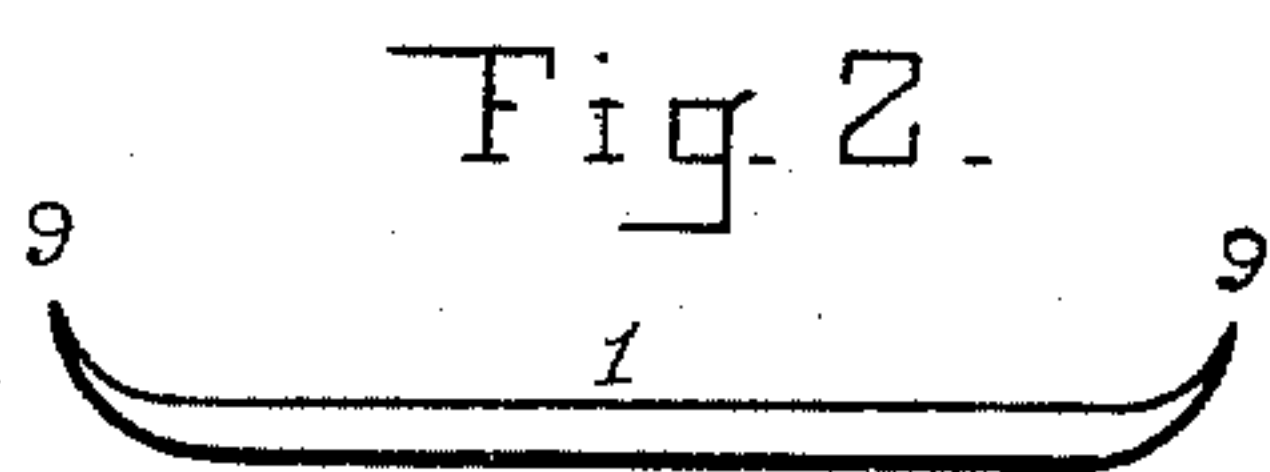
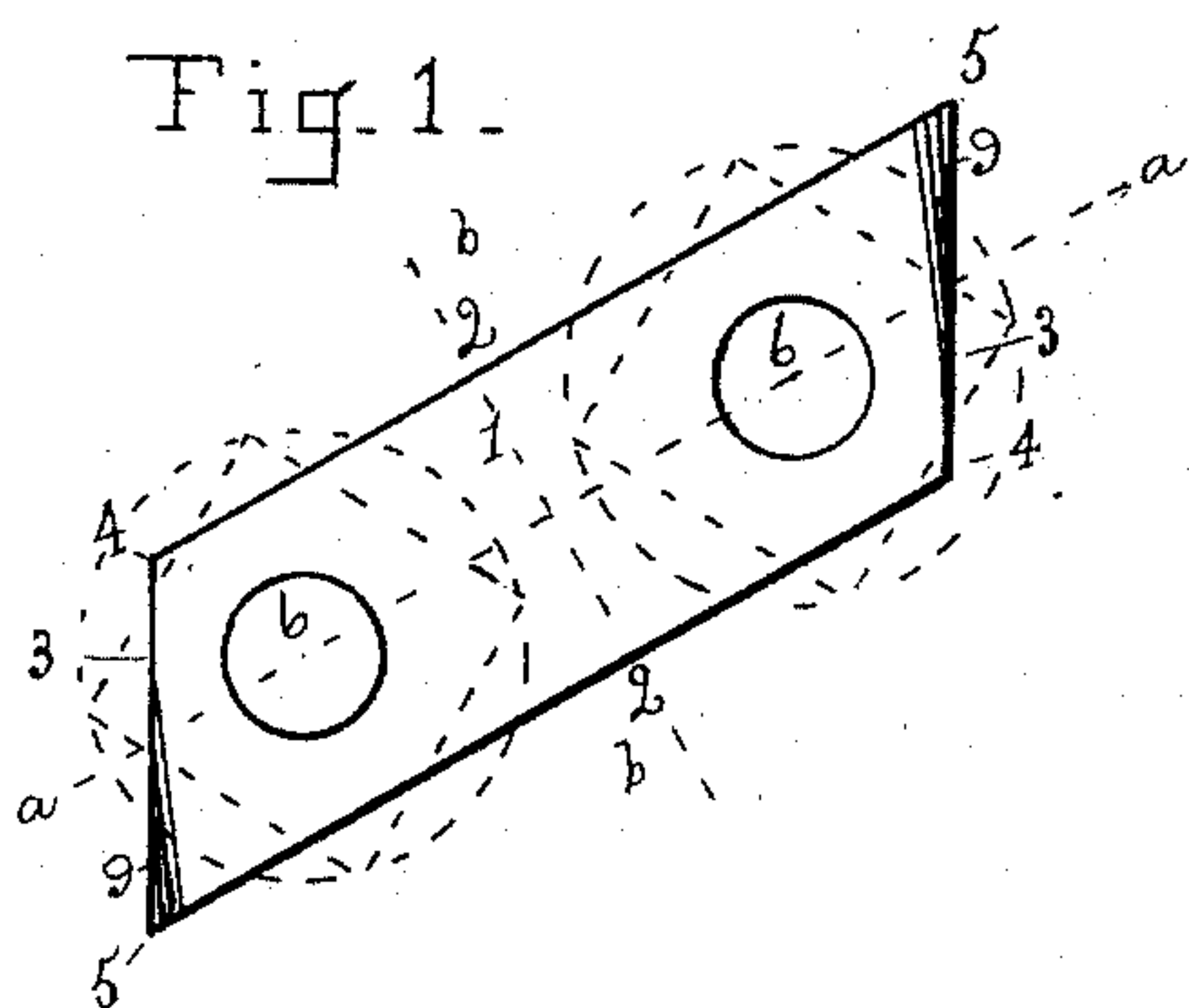


(No Model.)

B. F. SWEET.
NUT LOCK.

No. 524,493.

Patented Aug. 14, 1894.



Witnesses.

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UNITED STATES PATENT OFFICE.

BENJAMIN F. SWEET, OF FOND DU LAC, WISCONSIN.

NUT-LOCK.

SPECIFICATION forming part of Letters Patent No. 524,493, dated August 14, 1894.

Application filed May 18, 1894. Serial No. 511,702. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. SWEET, a citizen of the United States, residing at Fond du Lac, in the county of Fond du Lac and State of Wisconsin, have invented a new and useful Improvement in Nut-Locking Bolt-Ties, of which the following is a specification.

My invention relates to a washer plate, or bolt tie, formed from a plate of metal having some degree of resiliency, and which is cut into a four sided, and for most purposes, into a rhomboidal form, is perforated near each of its ends with holes, each one for receiving a bolt, and each end of the plate being provided with a sharp edged lip which extends upward from its face and is adapted to engage with and prevent a nut, or bolt head, which may be screwed down upon said plate, or bolt tie, from turning backward, the device being an improvement upon a nut lock patented by me March 6, 1894, No. 515,848, in the nut locking feature thereof in its application to a bolt tie.

The device is illustrated in the accompanying drawings, in which—

Figure 1 is a plan of said device, a square nut being indicated by dotted lines in the position it should occupy over its bolt holes, and dotted lines in a circle showing the circle upon the plate within which the nut will revolve. Fig. 2 is an edge view of the same as it appears when looking at the front edge of Fig. 1, in a direction parallel with its end edges. Fig. 3 is a vertical section upon the line *a, a*, of Fig. 1, and showing a modification in its form across the plate at that line. Fig. 4 is a similar view of another modification in the form of said plate, and Fig. 5 is a perspective view of the bolt tie, upon an enlarged scale, showing a modification similar to Fig. 3.

Similar figures of reference indicate like parts in the several views.

1, indicates the upper face, or the working side of the washer plate, or bolt tie, upon which the nuts are to be placed; 2, 2', 2'' its side edges; 3, 3', its end edges; 4, 4', its obtuse angles; 5, 5', its acute angles; 6, perforations in the plate for receiving a bolt; 7, the central concavity across the upper face of the plate; 8, convex points upon the face of the modified form shown in Fig. 4; 9, 9', lips

which extend upward from the face of the plate along a part of the edges of its ends.

In the manufacture of the bolt tie, or washer plate, a strip of metal of the desired width and thickness is taken and cut into lengths such as its particular use demands, its form being preferably rhomboidal, although should it be a rectangle in form, or nearly so, very fair results may be obtained.

For convenience in forming the bolt tie its edges, 2, may be made parallel with each other, as may also its end edges, 3, but this is not an essential feature of their construction, as for some purposes a different form may be required, one side, or one end of the plate being at an angle with its opposite side, or end. The holes 6 are formed for receiving bolts and the lips 9, 9', turned up as shown in Fig. 2. The projection of these lips from the face of the plate, as they are shown in Figs. 2, 3 and 4, is made more pronounced than they are required to be in practice for engaging the nuts, and upon those plates having a concave upper surface, as in Figs. 3 and 5 but a slight projection of the lip is required. These operations may be executed in the order named, or in any other which experience in manufacturing the bolt ties proves to be the best.

The lips 9, 9' upon the ends of the plate should commence at about one third of the distance from an obtuse to an acute angle and increase their projection gradually from their commencing point to, or toward the latter angle. It will be observed that the circle formed by the dotted line which incloses the nut in Fig. 1, comes within the extreme point of the angle 5 and that it is not therefore essential that the lip extends to said point.

As the bolts which pass through the plate will prevent it from turning around upon its bolts the lip which projects downward for that purpose upon the nut lock of the before mentioned patent is unnecessary. Nuts being screwed down upon bolts which pass through the holes in the plate they will be engaged by the sharp edge of the lips, cut into, and thereby prevented from turning backward.

It will be evident that the device is equally well adapted for retaining a bolt from turning when placed under its head while screw-

ing down its nut, as it is for holding said nut from turning backward.

The drawings represent the device as being adapted for use with bolts having a right hand thread, but it will be evident that if a bolt having a left hand thread were to be used the only change required would be reversing the position of the obtuse and acute angles.

The curve which produces the concavity that is shown in Figs. 3 and 5 is made for the purpose of providing for a slight shrinkage in the material upon which the device may be used, and the two upwardly projecting convexities at the line of the bolt holes which are shown upon the upper side of the bolt tie, in Fig. 4, are for the providing for said shrinkage, and also, for permitting the nut upon one of the bolts to loosen, or one of the bolts to break, without in any way impairing the nut locking feature of the device relative to the remaining bolt.

The material of which the bolt ties are made being somewhat resilient the screwing down of a nut upon it will compress the plate between the nut, (or bolt head, as the case may be,) and the material to be bolted, bending the plate where it is curved, the springing of which at said curves will take up any slight shrinkage of the material bolted. In the modification shown in Fig. 4, the nuts of each bolt will rest upon their individual curve, whereby a shrinkage around, or a breakage of one bolt, will in no way affect the nut locking feature of the bolt tie relative to the companion bolt.

Fig. 5 shows the plate cut at its ends at a different angle from the ends of the plate in Fig. 1, and it shows the form of its side edges produced by segments of circles which are eccentric to each other, and forming thereby a winding surface to the plate, whereby said plate upon being placed in position upon two bolts which pass through a body having an even surface, the corners of the plate at the angle 5', will be farther from said body than the angle 4', even were the ends of the plate at right angles with its sides, and when the ends are of the form here shown will be still farther from said body and adapted by reason of the resiliency of the plate to engage a nut which is being screwed down upon the bolts, although the elevation of the lip above the general surface of the plate is barely perceptible.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A nut locking bolt tie, consisting of a four sided plate of metal having two of its opposite edges longer than the others, said plate being perforated near each end for receiving a bolt and having a lip extending along each end and projecting from one side of said plate, from its commencing point at approximately one third of the distance from one to the other angle of said ends, said projection having a gradual increase from its

commencing point toward the latter angle, and said lips being adapted when in contact with a bolt head, or nut, to penetrate said parts, and to thereby hold the bolt from turning while screwing down the nut, or to hold the nut from loosening on said bolt, substantially as described.

2. A nut locking bolt tie, consisting of a plate of resilient metal of a rhomboidal form, perforated near each end for receiving a bolt, a lip extending along each end and projecting from one side of said plate from its commencing point, at approximately one third of the distance from an obtuse to an acute angle of said ends, said projection having a gradual increase from its commencing point toward the latter angle, and said lips being adapted when in contact with a bolt head or nut to penetrate said parts and to thereby hold the bolt from turning while screwing down the nut, or to hold the nut from loosening on the bolt, substantially as set forth.

3. A nut locking bolt tie, consisting of a plate of resilient metal of a rhomboidal form, perforated near each end thereof for receiving a bolt, and being concave in the direction of its length intermediate its ends; a lip extending along each end and projecting from the concave face of said plate, from its commencing point at approximately one third of the distance from an obtuse to an acute angle of said ends, said projection having a gradual increase from its commencing point toward the latter angle, and said lips being adapted when in contact with a bolt head or nut, to penetrate said parts and to thereby hold the bolt from turning while screwing down the nut, or to hold the nut from loosening on said bolt, substantially as described.

4. A nut locking bolt tie, consisting of a plate of resilient metal of a rhomboidal form, perforated near each end for receiving a bolt and being concave in the direction of its length intermediate its ends, the arcs of such concavity at the opposite side edges of said plate being eccentric, one to the other, and producing thereby a winding surface to said plate, a lip extending along each end and projecting from the concave face of said plate, from its commencing point at approximately one third of the distance from an obtuse toward an acute angle of said ends, said projection having a gradual increase from its commencing point toward the latter angle, and said lips being adapted, when in contact with a bolt head or nut to penetrate said parts, and to thereby hold the bolt from turning while screwing down the nut, or to hold the nut from loosening on said bolt, substantially as set forth.

5. A nut locking bolt tie, consisting of a plate of resilient metal of a rhomboidal form, perforated near each end for receiving a bolt and being concave in the direction of its length intermediate its ends, and convex in said direction at the point of a line passing

transversely of said plate through said bolt
holes, a lip extending along each end and pro-
jecting from the aforesaid concave face of
said plate, from its commencing point, at ap-
5 proximately one third of the distance from an
obtuse to an acute angle of said ends, said pro-
jection having a gradual increase from its
commencing point toward the latter angle,
and said lips being adapted, when in contact

with a bolt head, or nut, to penetrate said ro
parts, and to thereby hold the bolt from turn-
ing while screwing down the nut, or to hold
the nut from loosening on said bolt, substan-
tially as described.

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Witnesses:

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