J. B. ROSS.

LOCK WASHER.

APPLICATION FILED JAN. 21, 1908.

903,109. Patented Nov. 3, 1908.

2 SHEETS—SHEET 1.

Fig. 1

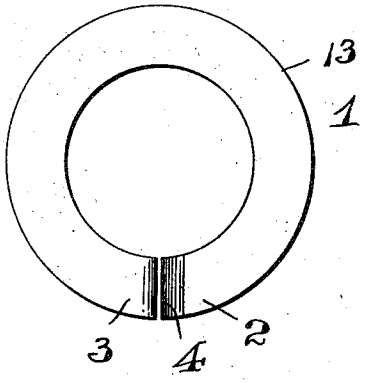


Fig. 2

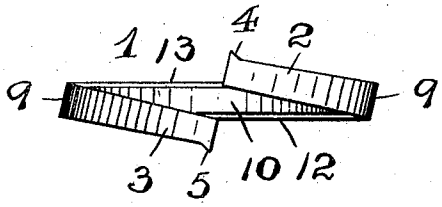
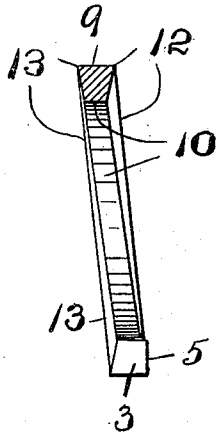


Fig. 3



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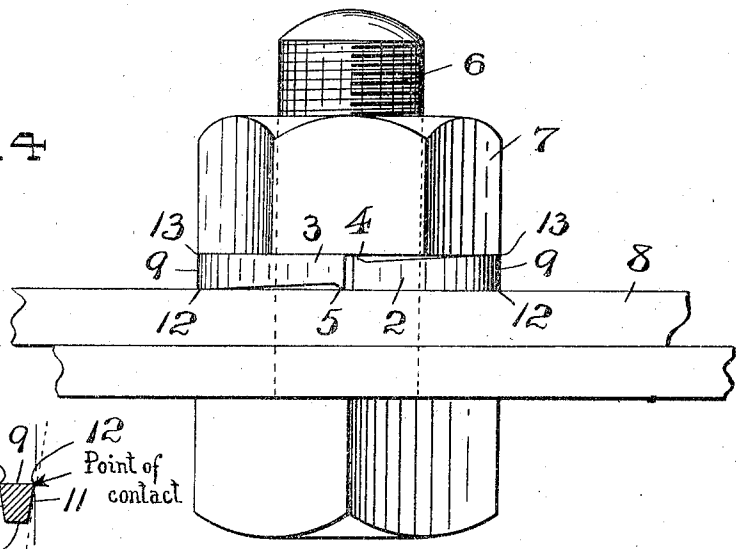
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2 SHEETS—SHEET 2.

Fig. 4



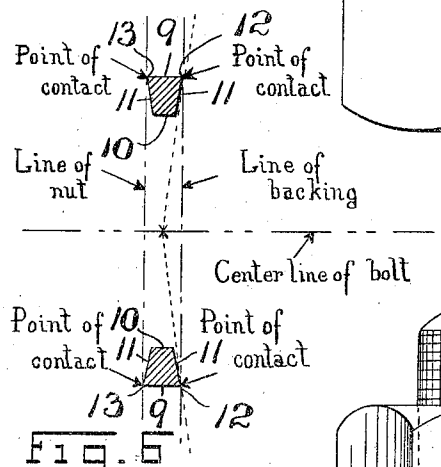
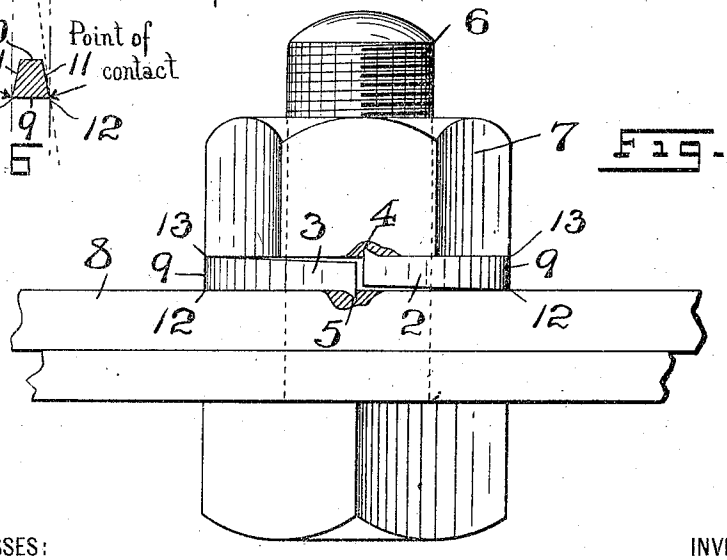


Fig. 6

Fig. 5



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UNITED STATES PATENT OFFICE.

JOHN B. ROSS, OF RAHWAY, NEW JERSEY, ASSIGNOR TO THE POSITIVE LOCK WASHER COMPANY, A CORPORATION OF NEW JERSEY.

LOCK-WASHER.

No. 903,109. Specification of Letters Patent. Patented Nov. 3, 1908.

Application filed January 21, 1908. Serial No. 411,970.

To all whom it may concern:

Be it known that I, JOHN B. ROSS, a citizen of the United States, residing at Rahway, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Lock-Washers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention has reference, generally, to improvements in nut-locks; and the present invention relates, more particularly, to a novel lock-washer for bolts and nuts of the various kinds, the lock-washer being split and formed with tapering ends terminating each with a spur or holding element.

My present invention has for its principal object to provide a simply constructed and effectively operating lock-washer of the general character hereinafter set forth, in which the stock or main body of the washer is made wedge-shaped or key-stone shaped in cross-section, with the greatest width of the wedge or key-stone located directly across the outer peripheral surface of the washer, and its narrowest width being at the inner peripheral surface of the washer, so as to cause a perfect and more positive holding or biting relation of the washer itself, aside from that of the spurs at the ends, with the surfaces of the nuts or other parts against which the lock-washers are arranged.

A further object of this invention is to provide a novel form of lock-washer in which the greatest holding or binding portion of the washer is located at its marginal edges which bound the outer peripheral surface of the washer, so as to be located at the points farthest away from the center point of the washer, so as to provide a greater resistance to the turning of the washer upon the shank of the bolt and to the unscrewing of the nut from said bolt, whereby the loosening and final loss of the nut is obviated.

Other objects of this invention not at this time more particularly enumerated will be clearly understood from the following detailed description of my present invention.

The invention consists, therefore, in the novel lock-washer hereinafter more particularly set forth, and then finally embodied in the clauses of the claims which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a plan view of my novel form of lock-washer; Fig. 2 is a side view of the same; and Fig. 3 is a transverse section of the washer, said section being taken centrally across the washer, through the body at one side and through the split portion directly opposite. Fig. 4 is an elevation of a bolt and nut, and portions of two pieces of metal which are to be secured upon each other by means of the bolt and nut, said view showing also in side elevation the normal arrangement of the lock-washer placed upon the bolt between one of the pieces of metal and the nut, that the barbs or spurs upon the tapering ends of the washer are free to vibrate so as to force themselves deeply into the nut and the metal backing. Fig. 5 is a similar view of the various parts represented in said Fig. 4, the nut and metal backing being partly shown in section, and illustrating the respective barbs or spurs deeply embedded in the nut and in said metal backing. Fig. 6 is a diagrammatical sectional representation of the said lock-washer to illustrate more clearly the points of contact between the sides of the washer with the nut and metal-backing, so as to produce the greatest holding or biting relation, during "vibration," between the washer, and the nut and metal backing.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to the drawings, the reference-character 1 indicates the lock-washer proper, the same being preferably made of spring-steel properly tempered, but being split across one of its portions so as to provide a helically formed ring-like body, having the two free ends 2 and 3, substantially as illustrated.

The free ends 2 and 3 are respectively provided with integral barbs or spurs 4 and 5, which are of such angular configuration that the nut can be rotated with comparative ease and freedom over the barb or spur while being screwed upon the bolt.

The reference-character 6 indicates a bolt, 7 the nut screwed thereon, and 8 a metal or

other suitable backing, the lock-washer being usually arranged upon the bolt 6, in the manner illustrated in said Figs. 4 and 5 of the drawings.

As will be seen, more particularly from an inspection of said Fig. 3 of the drawings, the cross-section of the stock or body from which the lock-washer is made is that of a wedge or key-stone having its widest part, at 9, upon the outer peripheral surface of the washer, and its narrowest part, at 10, upon the inner peripheral surface of the washer, so that the opposite faces 11 of the washer will taper inwardly, substantially as indicated in said Fig. 3 and in Fig. 6 of the drawings. The result and purpose of this wedge-shaped or key-stone shaped arrangement will be clearly understood from an inspection of Fig. 6, the extreme outer marginal edges 12 and 13 of the lock-washer thereby being made to respectively rest against and bind upon the faces of the nut 7 and the backing 8. At the same time the engagement between the various parts taking place at points farthest away from the center of the washer, or from the central axis of the bolt, the resisting power of the washer and nut turning loose is greatest at these points, so that a more perfect and more positively holding lock-washer is the result, all of which will be clearly evident from an inspection of the drawings.

The free ends of the washer are slightly tapered so as to give them sufficient elasticity when compressed in the manner illustrated in Fig. 4 of the drawings. The construction of the lock-washer is such that the body of the washer carries the load of compression, while the tapered ends are relieved and the spring is constant in opposite directions. The vibrations of the nut and backing will force the barbs or spurs, which project in opposite directions so that a direct-acting engagement with the adjoining surfaces is secured, deeply into the nut and the backing, thereby insuring a positive action and locking of the parts in contact.

The tapered opposite faces 11, and the tapering ends of the washer adapt it for use in all places where close work is required, that is, in all places where the parts to be secured are confined to a limited space. These features with the sharp barbs or spurs which extend approximately at right angles from the tapered ends of the body of the washer, are used jointly to secure the best results desired; and, the barbs or spurs being tempered and sharp they will readily embed themselves in the softer metal of the nut and the adjoining surface or backing, and thereby form a perfect and positive lock which will prevent the accidental loosening of the nut.

The lock-washer is also reversible, as will be clearly evident, and can be used over and over many times. The invention is admirably adapted for use on railway rails, drop-presses, automobiles, and machinery and vehicles of the various kinds which are subject to vibration, and the lock-washer can be made in various sizes so as to be adapted for use with bolts and nuts of the various kinds and sizes.

I claim:

1. As a new article of manufacture, a split washer having a tapering end, said washer having a body whose cross-section is that of a key-stone, having its widest portion upon the outer peripheral surface of the washer, and its narrowest portion upon the inner peripheral surface of the washer, substantially as and for the purposes set forth.

2. As a new article of manufacture, a split washer having a tapering end provided with a spur, said washer having a body whose cross-section is that of a key-stone, having its widest portion upon the outer peripheral surface of the washer, and its narrowest portion upon the inner peripheral surface of the washer, substantially as and for the purposes set forth.

3. As a new article of manufacture, a split washer having tapering ends, and a spur upon each end, said washer having a body whose cross-section is that of a key-stone, having its widest portion upon the outer peripheral surface of the washer, and its narrowest portion upon the inner peripheral surface of the washer, substantially as and for the purposes set forth.

4. As a new article of manufacture, a split washer comprising a helically bent body having a tapering end provided with a spur, said washer having a body whose cross-section is that of a key-stone, having its widest portion upon the outer peripheral surface of the washer, and its narrowest portion upon the inner peripheral surface of the washer, substantially as and for the purposes set forth.

5. As a new article of manufacture, a split washer comprising a helically bent body having tapering ends, and a spur upon each end, said washer having a body whose cross-section is that of a key-stone, having its widest portion upon the outer peripheral surface of the washer, and its narrowest portion upon the inner peripheral surface of the washer, substantially as and for the purposes set forth.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 17th day of January, 1908.

JOHN B. ROSS.

Witnesses:
FREDK. C. FRAENTZEL,
ANNA H. ALTER.