F. CLAY.

NUT LOCK.

APPLICATION FILED MAY 2, 1908.

978,698. Patented Dec. 13, 1910.

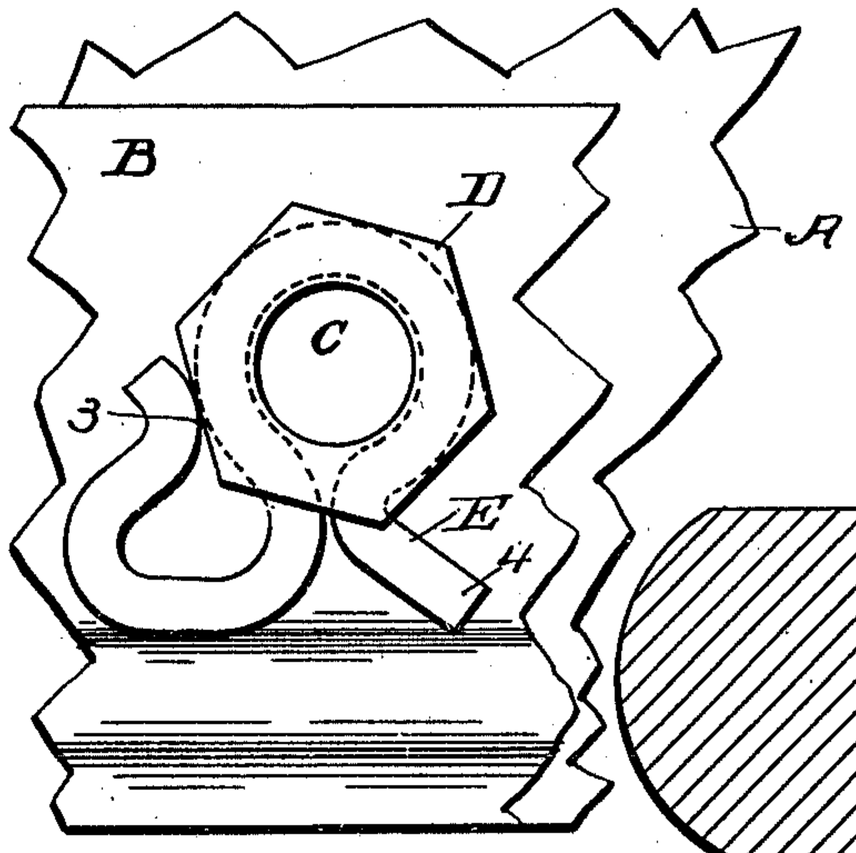

Fig. 2.

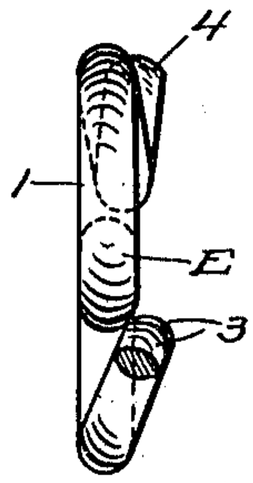

Fig. 3.

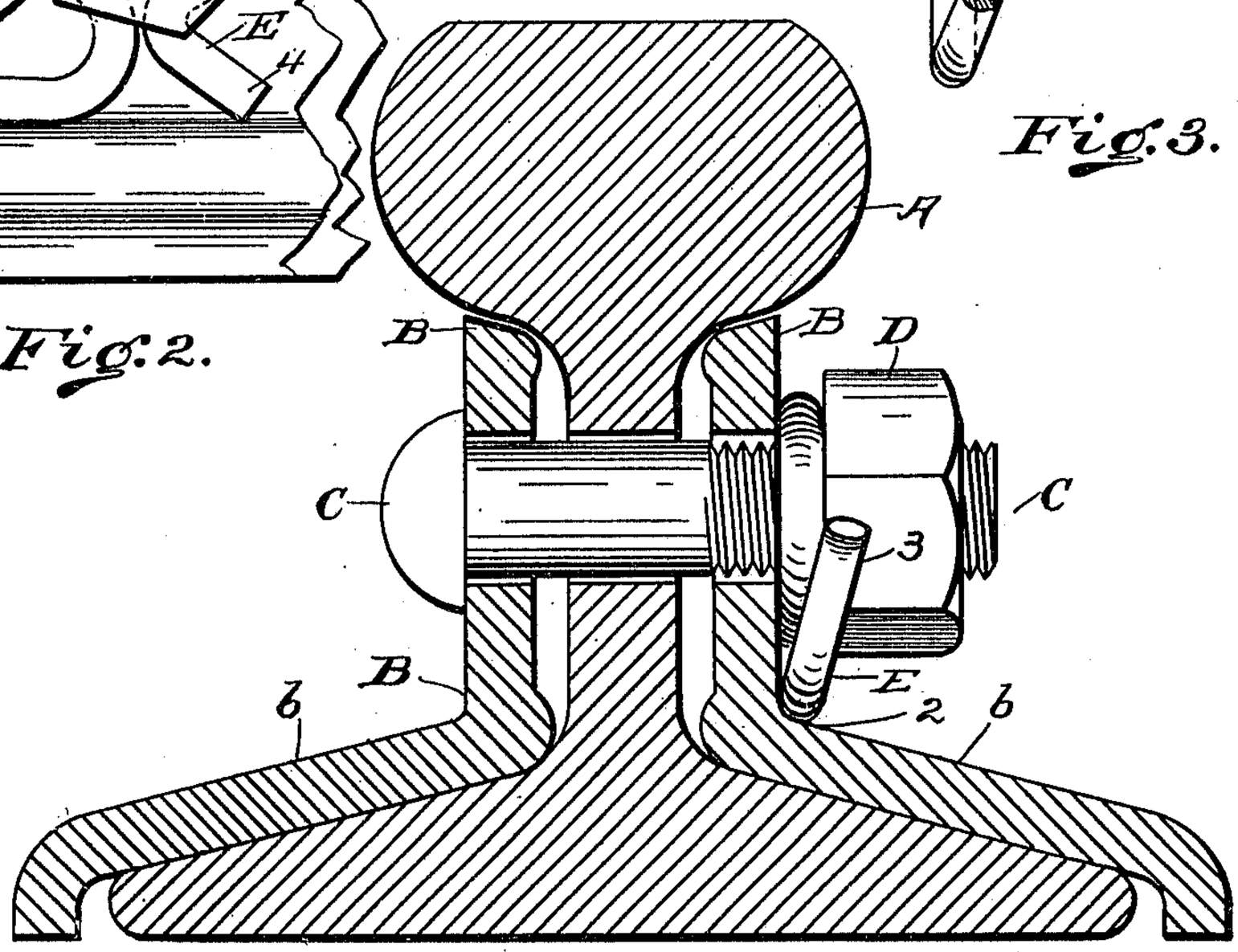

Fig. 1.

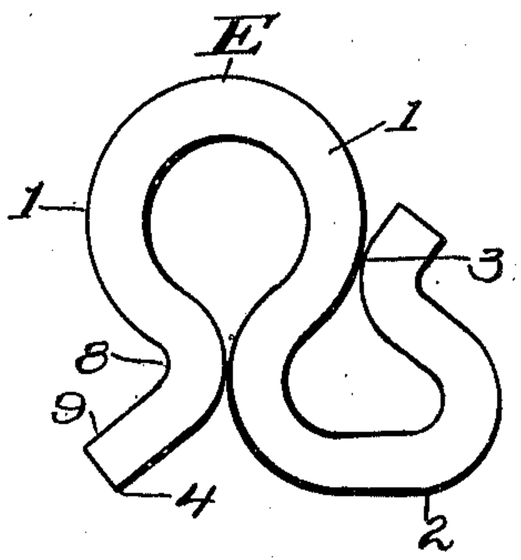

Fig. 4.

Witnesses
Agnes B. Grant.
Ethel LaCour

Inventor
Fred Clay,
By George B. Carthusen,
Attorney

UNITED STATES PATENT OFFICE.

FRED CLAY, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO GEORGE HAEHNLE, OF CINCINNATI, OHIO.

NUT-LOCK.

978,698. Specification of Letters Patent. Patented Dec. 13, 1910.

Application filed May 2, 1908. Serial No. 430,606.

To all whom it may concern:

Be it known that I, FRED CLAY, a citizen of the United States, and resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Nut-Locks, of which the following is a specification.

My invention is more especially designed for use upon the bolts used in railway fish joints, but it will be found useful in any positions which afford a fixed or relatively fixed abutment for the base.

The nut-locking device in most common use, in connection with railway fish joints, is of the Verona type. In one form it is merely a spring washer coil cut obliquely so that it has one cutting edge adapted to bite into the nut, and another cutting edge designed to bite into the fish-plate. In another form this washer has one cutting edge adapted to bite into the nut, the other end being extended to constitute an arm adapted to engage a flange of the fish-plate or rail. The recognized defects in these devices are imperfect locking; injurious effect upon the nut; impossibility of removal without practically destroying the nut; and the frequent forming of rust joints so rigid that the bolts can only be removed by cutting them. The first form turns with the nut as the nut works off. The second form turns with the nut a larger part of a revolution before the arm comes into locking engagement. Numerous attempts have been made to provide a more acceptable nut-lock of the base-washer type, but they have been subject to serious objections from the manufacturing stand point, and, so far as I am aware, none of them have found a foot hold in railway use or elsewhere.

The object of my invention is to provide a simple and efficient nut-locking base-washer which will automatically take up any slack due to wear or expansion; which will, when the nut is driven home, immediately and effectively lock it against the backward rotation incident to its use, and still permit easy removal without injury to bolt or nut; which will present a minimum of rusting surface without impairing the efficiency of the spring-washer; and which may be manufactured by machinery in one operation.

My invention consists in the nut-lock hereinafter described and claimed.

I have illustrated my invention as applied to one of the bolts of a standard railway fish-joint.

In the drawings, Figure 1 is a vertical cross section of a railway rail and fish-plates showing a bolt and nut with my nut-lock in its position of use; Fig. 2 a side view of a portion of a railway rail and fish-plate showing the nut end of the bolt with my nut-lock in its position of use; and Figs. 3 and 4 top and rear views of the nut-lock.

A represents a railway rail, B, B flanged fish plates, C a bolt, and D a nut, all of the standard type.

E represents the nut-lock which is formed of a piece of round bar steel preferably cut at right angles to its length. The bar is cut in lengths and bent to form a loop adapted to take loosely over the bolt. One end extends from the loop downward and forward in an oval curve to engage at 2 with the flange *b* of the fish-plate, then upward and inward to contact at 3 with one face of the nut, then outward so that the point of contact with the nut shall be on a curve. The other end extends from the loop downward and rearward to engage, at 4, with the flange *b* of the fish-plate. The bar is also bent spirally or in helical form, as clearly shown in Figs. 1 and 3, to provide tension in the washer portion, and to bring the locking point 3 into position to engage with the side faces of the nut. The other end is bent downward at 8 and outward at 9. The parts 2 and 9 engage with the flange *b* of the fish-plate and hold the lock against rotation with the nut.

As will be noted upon an examination of the drawings, and more particularly Fig. 3, both loops are bent or extend outwardly on the same side of the plane in which the connecting portion lies.

The bar of which the nut-lock is made being round it has no angles to engage with the threads on the bolts and it may be placed in position with less trouble than the locks now in use.

In turning the nut on, when its inner edge engages with the locking arm it contacts with a surface curved in two directions—longitudinally and peripherally—and the resultant is a tendency to force the locking arm inwardly toward the fish-plate and forwardly away from the nut. The line of contact, as an angle of the nut travels along

the reversed curve of the locking arm is, therefore, a slightly inclined plane. Consequently, the angles of the nut ride easily over the locking point, which immediately engages a flat face and normally holds the nut against rearward rotation. When the nut is in its home position, the force tending to rearward rotation, acts centrally upon the bar and is effective against the longitudinal curve only; and the locking arm must be forced forwardly in order to allow an angle of the nut to pass. There is no tendency to force it toward the rail. Consequently the locking arm offers a materially greater resistance to rearward rotation than to forward rotation of the nut.

The bar of which the nut-lock is formed being round, it presents but a narrow line of contact with nut and fish-plate, and any joint formed by rust may be broken with comparative ease.

Being formed of a single piece of steel without bevels, notches or parts which require machine or hand work, the nut-lock may be cut from the bar and formed by machinery at one operation.

I claim as my invention:

1. A nut-lock formed of a resilient metallic bar, substantially circular in cross-section, said bar being formed or bent to produce two connected, open, spiral loops, with an arm or finger extending from each loop, the loops being inclined to each other.

2. A nut-lock formed of a resilient metallic bar and comprising two connected, open loops, each terminating in a free end or finger, said loops being of spiral form and both bent outwardly on the same side of the plane in which the connecting portion lies.

3. A nut-lock comprising a substantially cylindrical, resilient metallic bar bent to form two reversely-curved helical loops, each terminating in a holding finger, the helical curves of the two loops lying on the same side of the plane of the connecting portion.

4. A nut-lock formed of a resilient metallic bar substantially circular in cross-section, said bar being formed or bent to produce connected open spiral loops inclined to each other, with an arm or finger extending from each loop, one of said arms being adapted to engage a flange or other fixed abutment and the other arm bent inwardly to engage a side face of the nut.

5. A nut-lock formed of a resilient metallic bar substantially circular in cross-section, said bar being formed or bent to produce two connected open spiral loops with an arm or finger extending from each loop, one loop being adapted to encircle the bolt and to thereby form a spring washer, the arm extending from said loop bearing upon a flange or other fixed abutment and out of contact with the nut as the same is screwed to place, whereby said arm will be carried or forced inwardly along with the nut and the loop to which the arm is attached, the arm of the other loop adapted to contact with a side face of the nut and to prevent accidental rotation of the nut upon the bolt.

6. A nut-lock formed of a resilient metallic bar, said bar being formed or bent to produce two connected open spiral loops inclined to each other with an arm or finger extending from each loop, one loop being adapted to embrace the bolt and in effect to form a spring washer and the arm which extends from said loop being adapted to contact with a fixed portion of the structure to which the bolt and nut may be secured, and to prevent rotation of the nut-lock in one direction, the second loop having the lower portion thereof adapted to contact with the fixed abutment aforesaid and having its arm arranged to contact with a side face of the nut and adapted to hold the same against accidental rotation.

7. A nut-lock formed of a resilient metallic bar, said bar being formed or bent to produce two connected open spiral loops inclined to each other with an arm or finger extending outwardly from each loop, one of said loops being adapted to embrace the bolt and having its arm in substantial alinement with the curved head of the second loop, said arm and head adapted to contact with a flange or other fixed abutment and to prevent rotation of the nut-lock in either direction, and the arm of the second loop adapted to contact with a side face of the nut and to be held in spring contact therewith, whereby the movement of the lock with reference to the bolt is prevented and accidental movement of the nut in either direction is likewise prevented.

FRED CLAY.

Witnesses:
AGNES B. GRANT,
GEO. B. PARKINSON.