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Plate I

PATENTED AUG 1 1871

Fig. 1

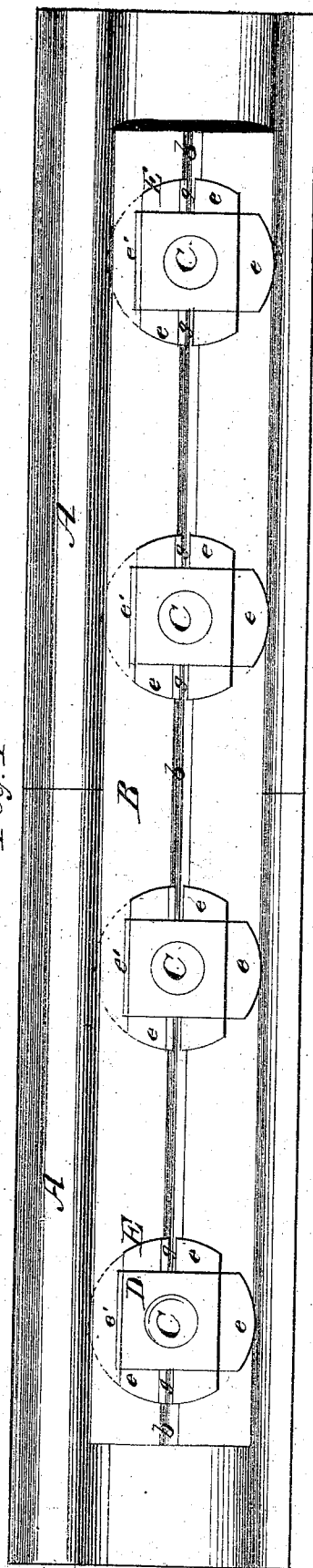
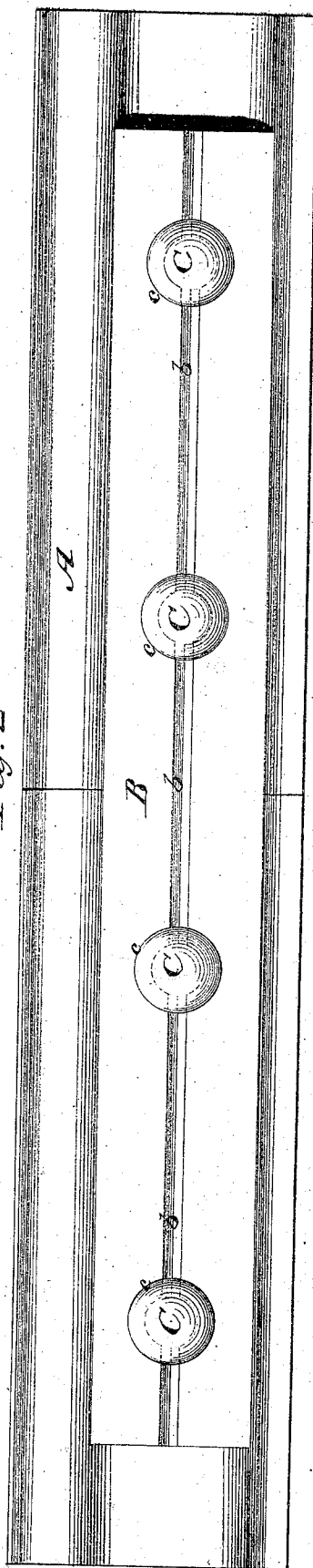


Fig. 2.



Witnesses.
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J. N. Campbell

Traveller

Wm. D. Small

Fig. 3

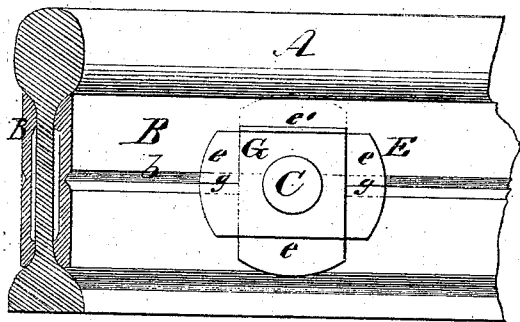


Fig. 4

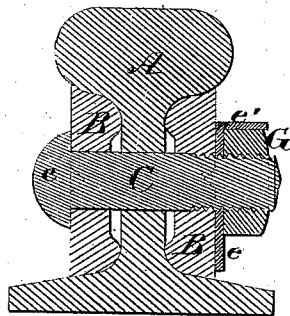


Fig. 5

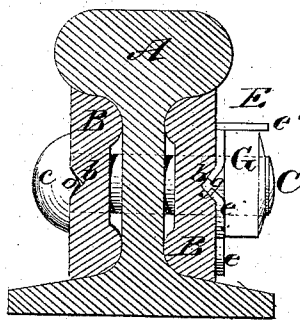


Fig. 7

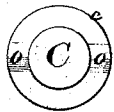


Fig. 6



Fig. 8

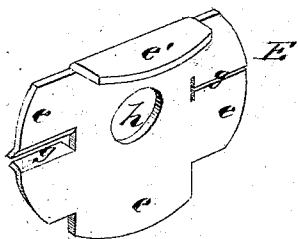
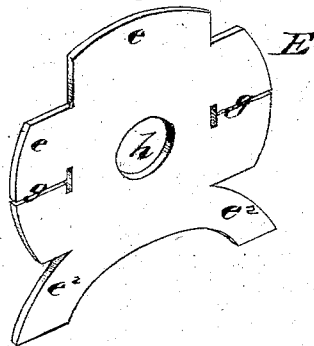


Fig. 9



Witnesses.

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Inventor

J. M. Connel

James M. Connell's Nut and Bolt Lock for Rails

Plate 3.

117517

Fig. 10

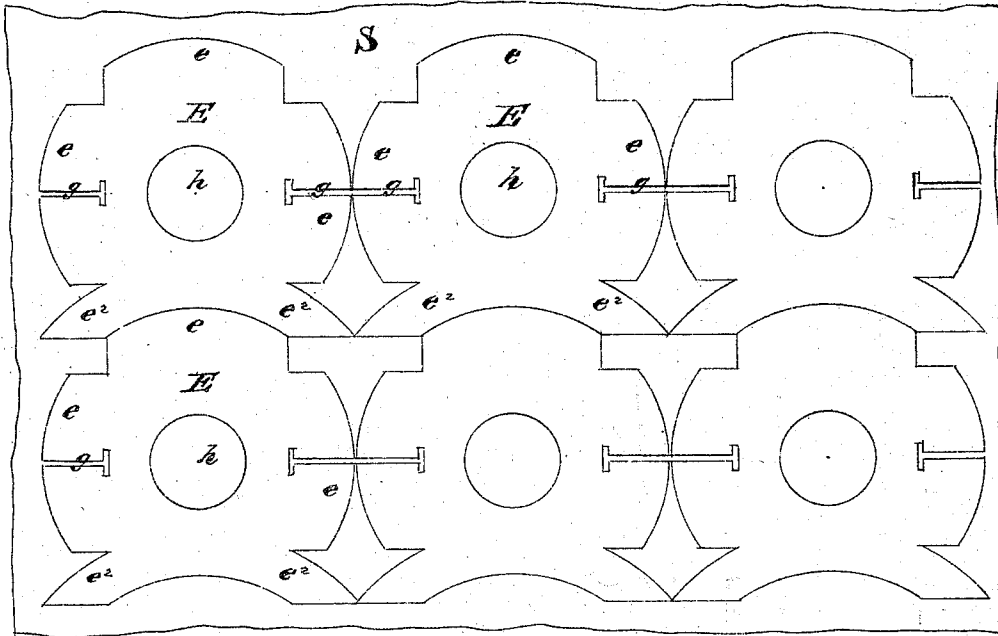
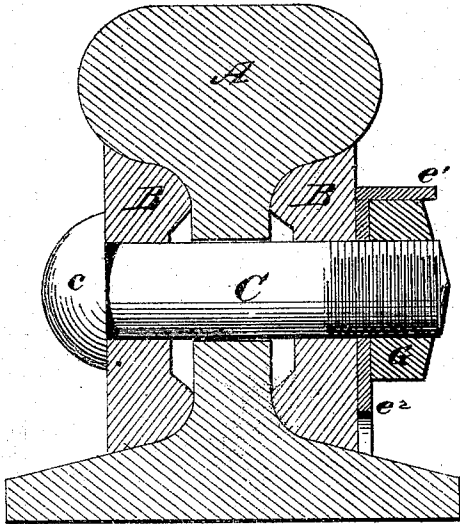
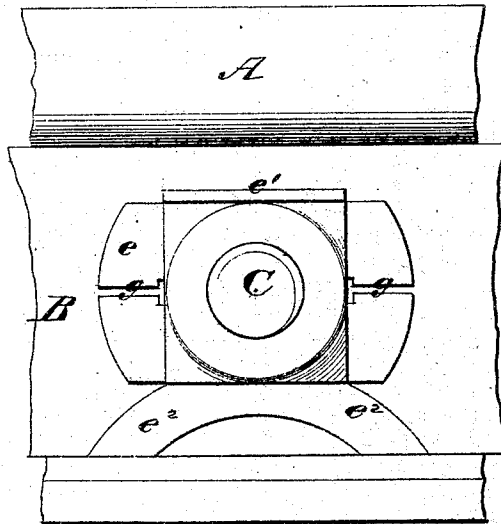


Fig. 11



Witnesses
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J. H. Campbell

Fig. 12



Inventor
J. M. Connell

UNITED STATES PATENT OFFICE.

JAMES M. CONNEL, OF NEWARK, ASSIGNOR TO HIMSELF AND WILLIAM STURGEON, OF DELAWARE COUNTY, OHIO.

IMPROVEMENT IN NUT-LOCKS.

Specification forming part of Letters Patent No. 117,517, dated August 1, 1871.

To all whom it may concern:

Be it known that I, JAMES M. CONNEL, of Newark, in the county of Licking and State of Ohio, have invented a new and Improved Nut and Bolt-Lock for Railroad Rails; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1, plate 1, is a view of one side of a railroad-rail joint, showing the fish-bar and nut-fastening. Fig. 2, plate 1, is a view of the opposite side of the rail-joint, showing the fish-bar and bolt-heads. Fig. 3, plate 2, is a side view, partly in section, of a rail and its two grooved fish-bars, showing a nut applied on its bolt and set up against a washer-plate, which latter is ready to be locked to the fish-bar. Fig. 4, plate 2, is a vertical transverse section through a rail, its fish-bars, bolt, nut, and nut-fastening. Fig. 5, plate 2, is a vertical cross-section through a rail and its fish-bars taken on one side of the nut and bolt-fastening. Figs. 6 and 7, plate 2, are views of the bolt with V-shaped tenons on its head. Figs. 8 and 9, plate 2, are perspective views of two different forms of locking-washers. Fig. 10 is a diagrammatic representation of the mode of cutting the locking-washers of Fig. 9 from a plate of sheet metal. Figs. 11 and 12 are views, showing how to apply my locking-washers to nuts and bolts on the old forms of fish-bars.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to a new and improved means for locking the nuts and bolts which are employed in conjunction with fish-bars for splicing railroad rails at their joints. The nature of my invention consists: First, in the washer-plate, which is perforated at its center for the passage through it of the screw-bolt, lipped outside of the margin of the nut under which it is to be applied, so as to be turned out or over against the side of said nut to prevent the nut from turning, and slitted to prepare it for being readily depressed and made to form a split tenon for entering a longitudinal groove in the fish-bar, substantially as shown and hereinafter described. Second, it consists in a fish-bar with a narrow longitudinal V-shaped groove in its outer side, in combination with the centrally-perforated, longitudinally-slitted, and lipped angular washer-plate, screw-bolt

and nut, all applied together upon a railroad rail in the manner and for the purpose hereinafter explained. Third, it consists in the combination of narrow V-shaped feathers on the under side of the heads of the screw-bolts, the centrally-perforated, longitudinally-slitted, and lipped angular washer-plate, and the pair of fish-bars with longitudinal V-shaped groove in their outer sides, all applied together and upon a railroad rail, in the manner and for the purpose hereinafter explained. Fourth, it consists in the combination of the arched extension or legs with the angular lipped and longitudinally-slitted washer-plate, whereby the washer-plate is adapted for either a grooved fish-bar or a plain one, or whereby both the split tenon and the arched extension may be used together on a grooved fish-bar for preventing the washer from turning, as will be hereinafter explained.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawing, A A represent the ends of two sections of railroad rail of the well-known T-form, and B B represent two fish-bars, which are intended for splicing these rail-sections together. C represents a bolt, and G its nut, which are used to clamp the fish-bars firmly to the two sides of the rails; and E represents a washer, which is interposed between the nut and the fish-bar, and which is used for locking the nut and preventing it from turning. Each fish-bar B is constructed with a groove, *b*, on its outer surface, extending its entire length and intersecting the centers of the bolt-holes. The interior surface of each bar B is so shaped as to conform to the shape of the side of the rail against which the bar is confined. These bars B may be readily produced, with the grooves *b*, in the well-known rolling-machines, by having a rib on one of the rollers corresponding in shape to this groove. The groove in cross-section is of a V-shape, for a reason which will be hereinafter explained. The grooved splicing-bars may be rolled out any desired length and afterward cut up into lengths suitable for application to the rail-joints. The bars may be rolled with the surfaces which are intended to lie next the webs of the rails concave, as represented in the drawing, although I do not confine myself to this feature. Each one of the bolts C is constructed with a cylindrical

screw-threaded shank, and with tenons *o o* on that surface of its head *e* which abuts against the outer surface of a fish-bar. The tenons or ribs *o o* are V-shaped, and are adapted to enter the longitudinal groove *b* in the fish-bar B, as shown clearly in Fig. 5. The tenons *o* are slightly shorter than the depth of the groove *b* into which they are intended to be received, in order to allow the head of the bolt to be drawn snugly home against the fish-bar under all circumstances, and to provide for imperfections which may exist in the grooves of the bar B. The V-shape is given to the groove *b* and tenons *o o* in order that the tenons may more readily find their places than if the grooves and tenons were square. These tenoned bolt-heads *e*, in combination with the grooved bars B, will effectually prevent the bolts C from turning after they are properly set up.

Having constructed fish-bars with grooves adapted to receive extensions of the bolt-heads, I now desire to utilize the bars, having the same form of groove in them, as a means for holding a washer which will lock the nut G fast on its bolt when screwed up tightly thereon. I desire to do this for the purpose of obviating the objections to the use of fish-bars of different forms or kinds on opposite sides of the rails, and also for another reason, which will be hereinafter explained. In Figs. 1, 3, 4, 5, and 8 I have represented my improved locking washer-plate E, which is centrally perforated at *h* and constructed with wings or lips *e e e'*, forming segments of a circle. The wings or lips are separated by rectangular notches which include a surface equal to the area of a bolt, G, as shown in Figs. 1, 3, and 8. Thus it will be seen that when the nut G is set up against a washer, the latter being held against the fish-bar on the nut-side of a rail, the said wings or lips will be exposed beyond the abutting side of the nut. Having thus confined the washer E by its nut, one lip, *e'*, is turned out against the edge of the nut by means of a suitable tool, so that the washer then presents the appearance represented in Fig. 8, and will not now turn around the bolt C without the nut also turning. The washers may, therefore, be prepared as shown in Fig. 8 before applying them to the bolts, and they may be then applied to the bolt at the same time the nut is applied.

Having thus shown how to lock the nut and washer together it only remains to lock the washer, which is done as follows: When the grooved fish-bars are employed in the manufacture of the washer from sheet-metal plates, they are produced with slits *g* in one or more of their lips *e*, which slits leave portions of the metal free to be driven into the groove *b*, in the manner shown in Fig. 5, thereby preventing a washer from turning with its nut G, and, consequently, (with a lip, *e*, turned up against the nut,) preventing the nut from turning or working loose on its bolt. The slit portion of the washer may be driven into the groove *b* by means of any double-beveled edge-tool, and in removing a nut which has been locked as above described it will only be necessary to flatten out the turned-up lip *e'*, when the nut can be unscrewed.

Plate 3 of the accompanying drawing represents a mode of adapting my improved slit-washer to fish-bars which are not grooved, and thereby adapting the washers to rail-splices, which are at present in use. These washers differ from those shown by Figs. 1, 3, and 8, in that the former have curved legs or standards *e² e²* formed on them, instead of one of the lips *e* of the latter washers. These washers, shown by Figs. 9, 10, 11, and 12, are applied between the nuts and fish-bars, and are prevented from turning by their legs resting or impinging against the upper surfaces of the rail basis. The nuts are locked by turning out the lips *e¹*, as in the washers above described. The slits *g* are made in these washers last described in order that the washers with the legs, as well as those without the legs, may be employed in combination with the grooved rails, and fastened directly thereto by depressing the lips on opposite sides of the slits into said grooves *b*. Fig. 10 shows a mode of stamping the washers with legs out of sheet metal without any material loss of the stock. S represents a plate of sheet metal, and E E represent several washers marked thereon as they would be cut. It will be seen that the upper edges of the highest lips *e* of one row of washers correspond to the lower curved edges of the succeeding row of washers, and that the extremities of the legs are produced out of those portions of the metal occupying the spaces between the washers. Thus each washer with its legs is produced from a rectangular piece which is not wider in one direction than the greatest diameter of the complete washer, and which is not as wide in the opposite direction as such washer.

I am aware that a pair of fish-bars has been grooved and held in place by nut-and-bolt-locking devices or washers, but in such cases it has been necessary to make the grooves as wide as the washer-plates and as wide as the head of the bolts. This requires heavy work at the rolling-mill to produce the bars. It also requires that the weakening of the bars by the removal of so large a quantity of metal to form the large grooves shall be compensated for by the thickening of the bars; thus much expense for labor and waste of metal are incurred, and still only a clumsy joint-fastening is secured. Besides this, great accuracy in the size of the washers and in the heads of the bolts is necessary. My narrow V-groove in the fish-bars, and split and lipped washer and bolts with feathers on them, obviate all these difficulties, as the washer plates may be applied over the grooves, their size not being arbitrary; and, at the same time, my lipped split washer-plate is useful for either grooved or plain fish-bars, and may be used for fastening nuts on rails and fish-bars in use. I also am aware that screw-bolts with wings and square heads are not new. I also am aware that washer-plates have been made of soft metal and used in combination with a new style of recessed or shouldered nut; also, that such washer-plates have been partly pressed down into a longitudinal groove of a fish-bar; but such washer-plates are not designed for use with ordinary or common nuts, nor are they

lipped and turned over or out against the side of the nut, nor are they slitted so as to form a split tenon, which, without difficulty, and with a very slight force with a V-punch, will find its place and become seated upon the sides of a V-groove in the fish-bar. I further am aware that a washer-plate with a lip turned up, or out, or over, at right angles, is not new; and that the same has been used in connection with nicks formed in a foundation plate; but such nicks were never intended to be regarded as a longitudinal V-shaped groove, such as I have represented and described. I further am aware that portions of the head of a screw-bolt have been mashed down; also, portions of a nut on such screw-bolt; but I am not aware that any one has ever made one or two-rolled fish-bars with narrow longitudinal V-grooves, and used the same in combination with screw-bolts having V-tenons on the under side of their heads, and with washer-plates which are split longitudinally and lipped, and all applied as and for the purpose set forth. I finally am aware, also, that keys, in connection with washers and nuts, have been used; also, that washer-plates have been formed by depressing thin portions of metal to form teats or tenons. I also am aware that such plates have had a lip turned up. I further am aware that a plate has been slitted so as to turn up its lips easily, but for no other purpose; but never have I seen a plate slitted longitudinally with the length of the groove in

a fish-bar for the purpose of forming a split tenon, which will find its seat immediately upon the sides of the V-groove of the fish-bar. Therefore, while I do not claim any of the plans hereinbefore referred to as being old,

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The washer-plate E perforated at *h* for the passage of the bolt, lipped at *e* so as to be turned up or against the nut, and slitted as at *g* to prepare it for being readily depressed, and made to form a split tenon for entering a longitudinal groove in the fish-bar, substantially as shown and described.

2. The combination of the fish-bar B, longitudinal V-shaped groove *b* of the fish-bar, perforated washer-plate E and *h*, split tenon at *g* of the washer-plate, which enters the groove *b*, and the turned-over lip *e*¹, nut G, and screw-bolt C, all in the manner substantially as described.

3. The within-described nut and bolt-fastenings *o o E h g e*, in combination with the pair of longitudinally-grooved fish-bars *B b B b*, as and for the purpose set forth.

4. The washer-plate E, with lips *e*, splits *g*, and legs *e*², substantially as described.

JAMES M. CONNEL.

Witnesses:

J. N. CAMPBELL,
EDM. F. BROWN.