(No Model.) 3 Sheets—Sheet 1.

G. J. FERGUSON.

RAIL JOINT.

No. 374,529. Patented Dec. 6, 1887.

Fig. 1.

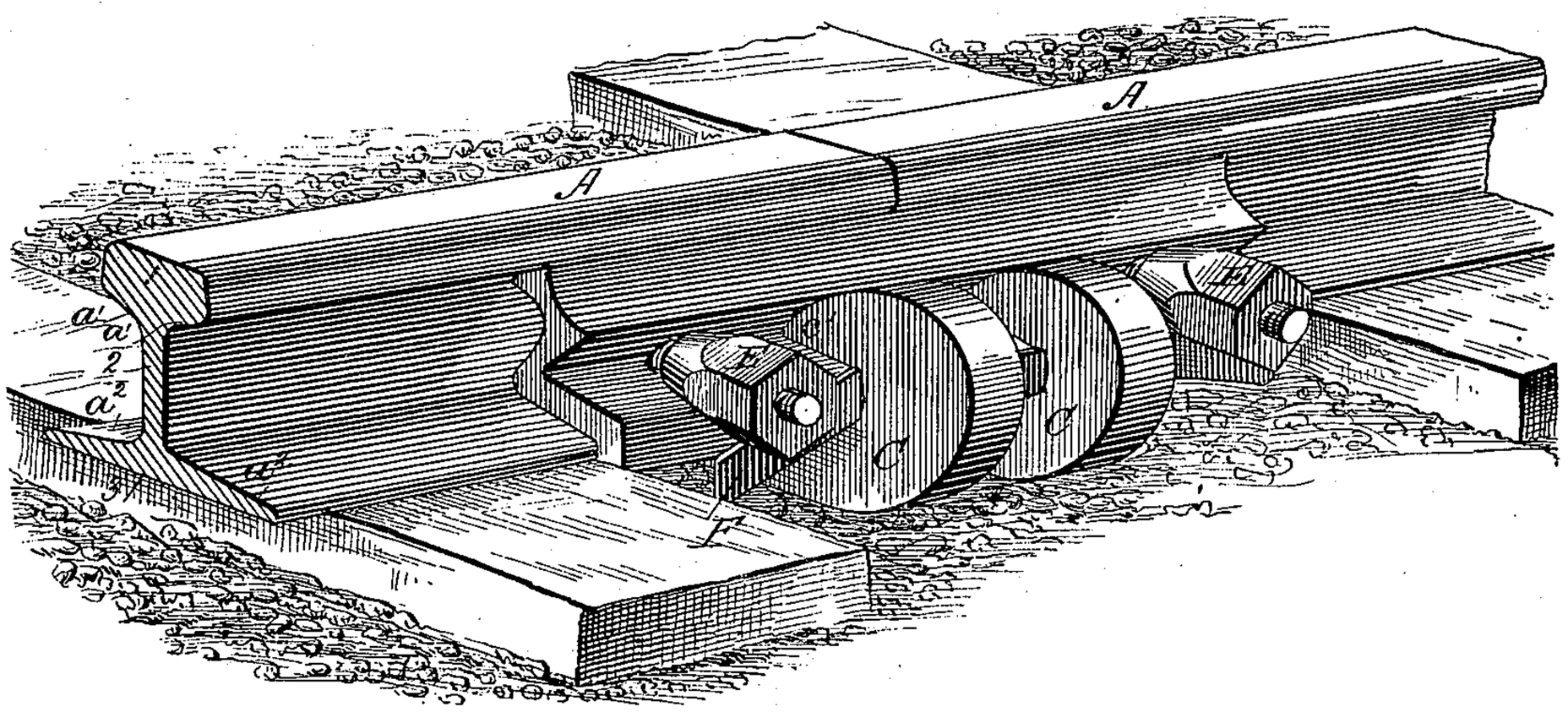
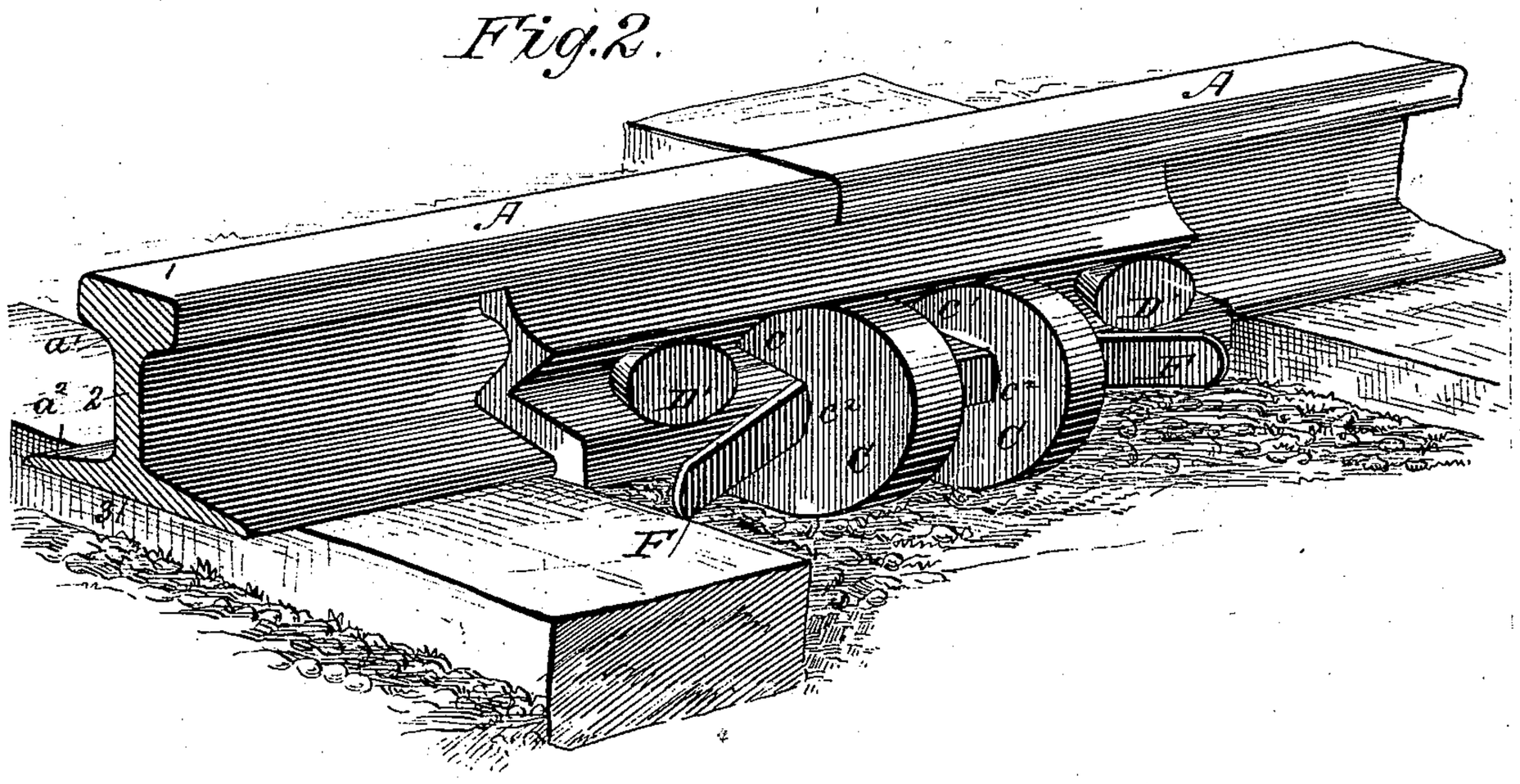


Fig. 2.



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P. B. Turpin.

INVENTOR:

Geo. J. Ferguson

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(No Model.) 3 Sheets—Sheet 2.

G. J. FERGUSON.

RAIL JOINT.

No. 374,529. Patented Dec. 6, 1887.

Fig. 3.

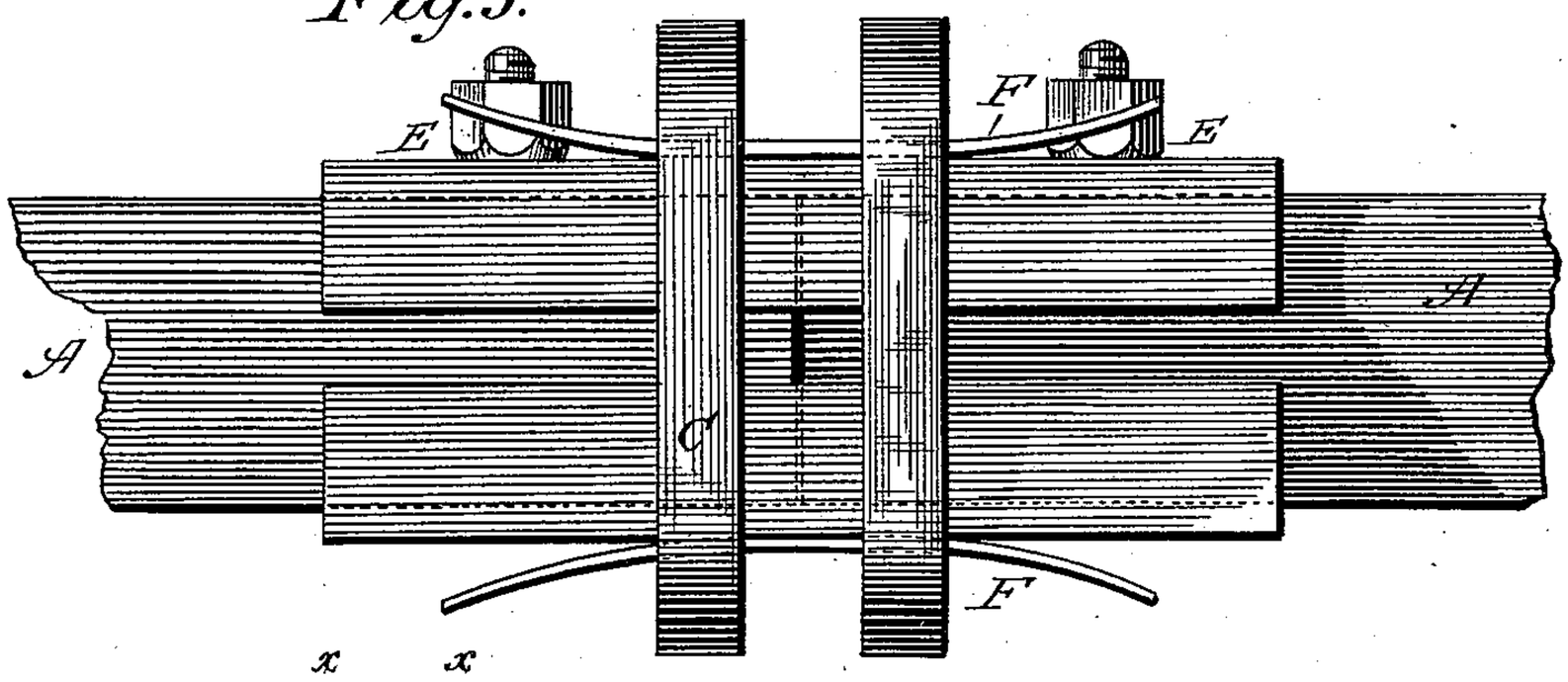


Fig. 4

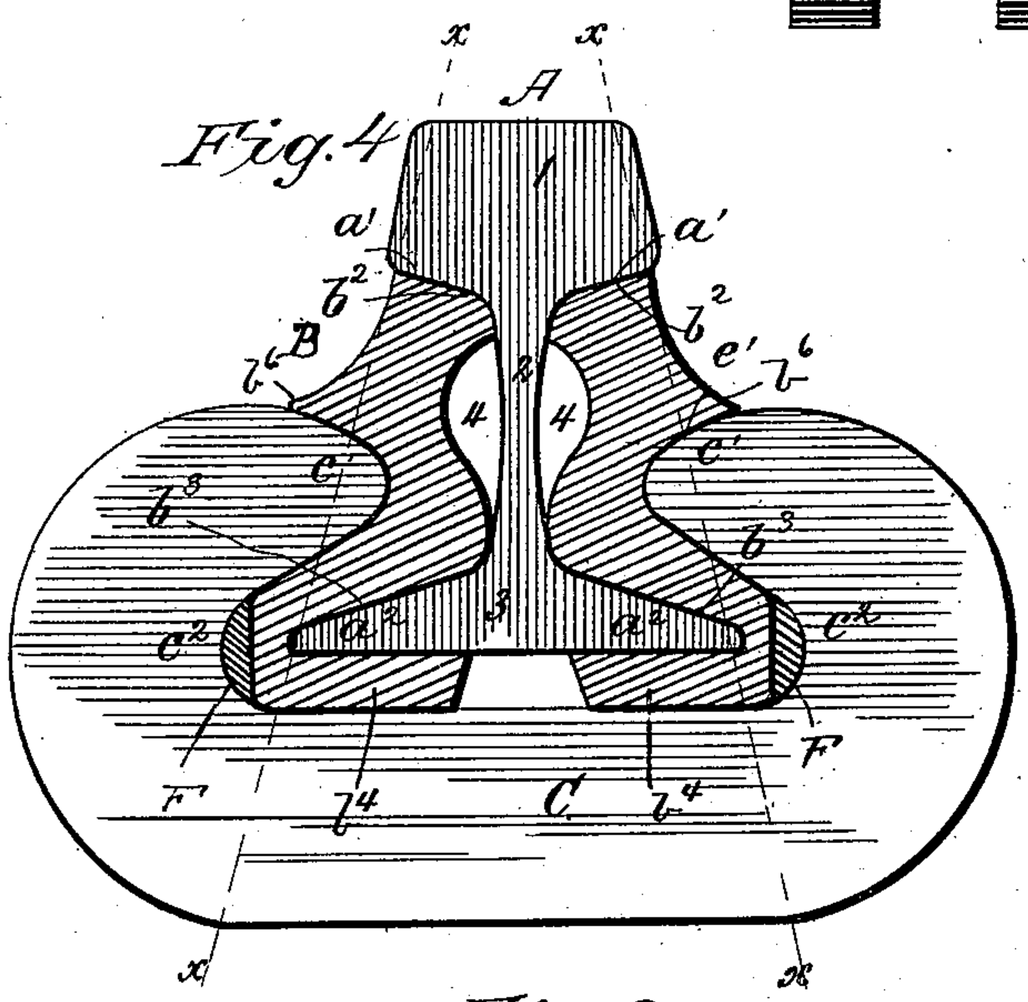


Fig. 5.

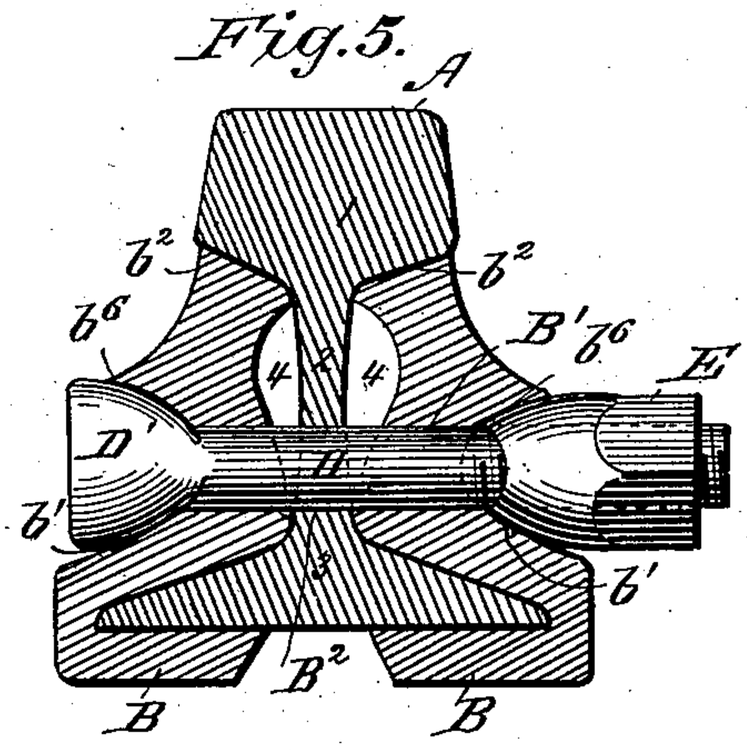


Fig. 8.

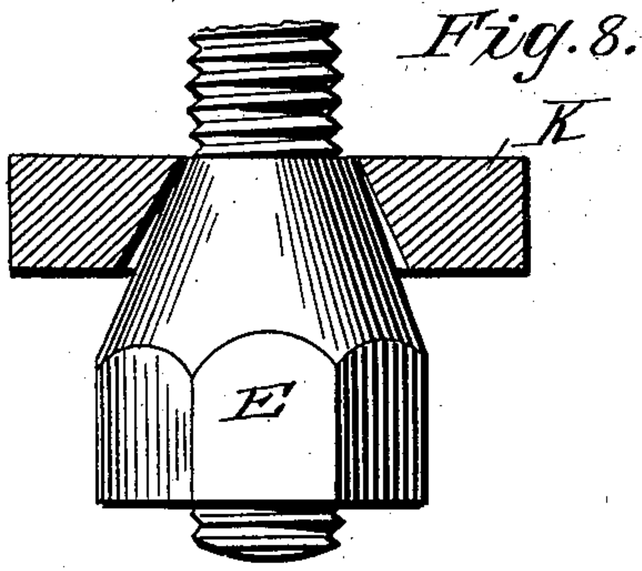
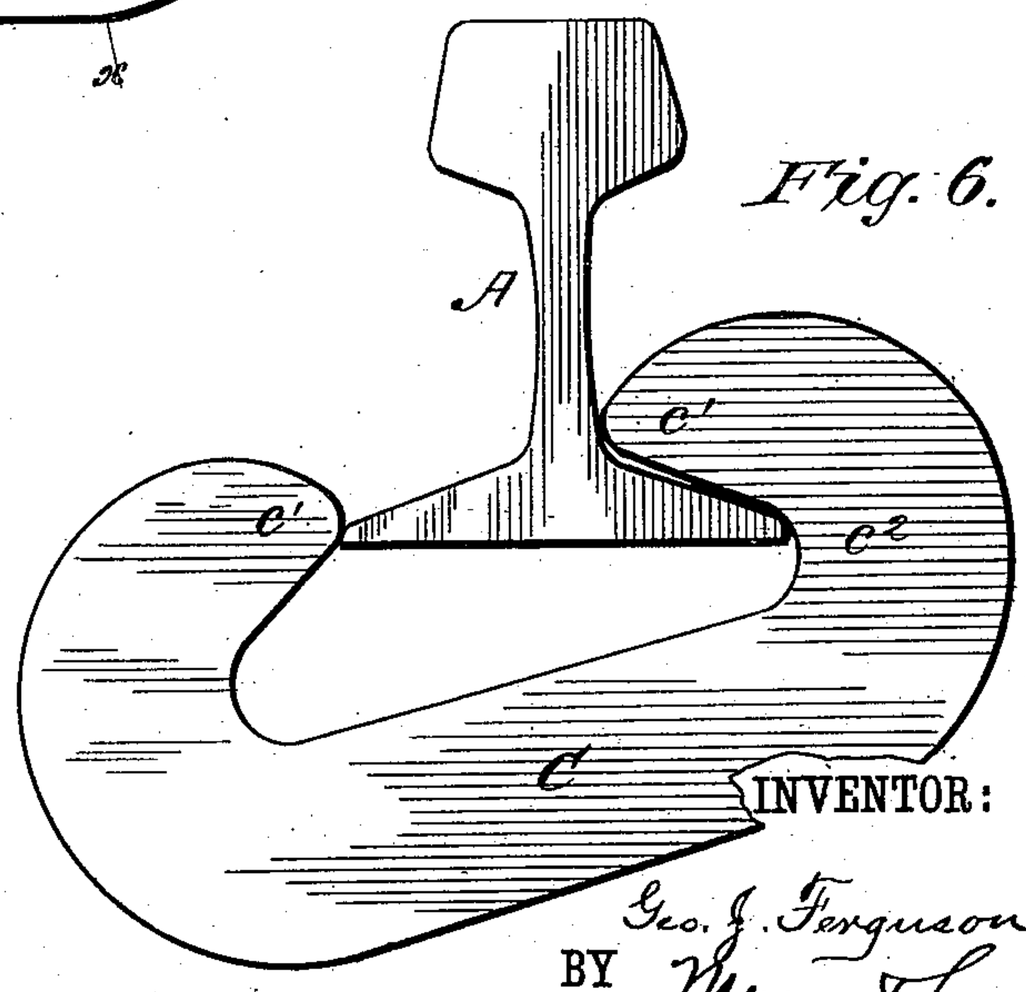


Fig. 6.



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(No Model.) 3 Sheets—Sheet 3.

G. J. FERGUSON.

RAIL JOINT.

No. 374,529. Patented Dec. 6, 1887.

Fig. 7.

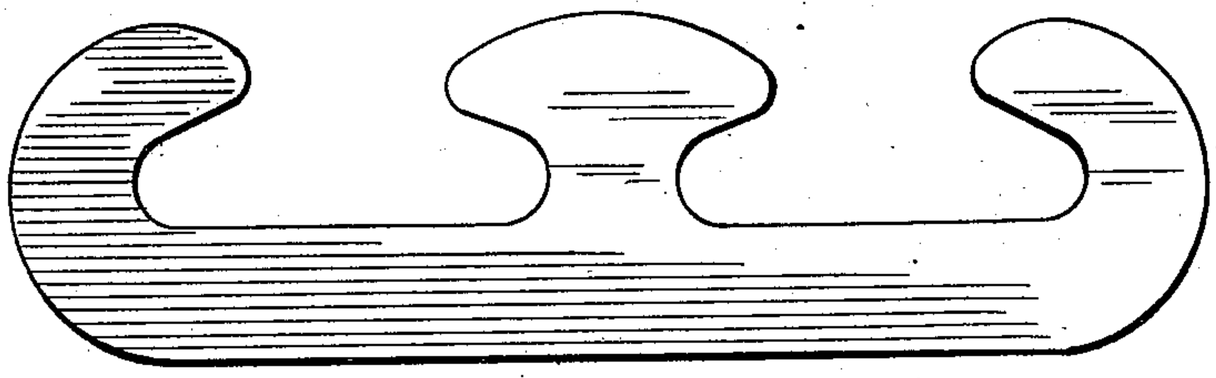


Fig 9.

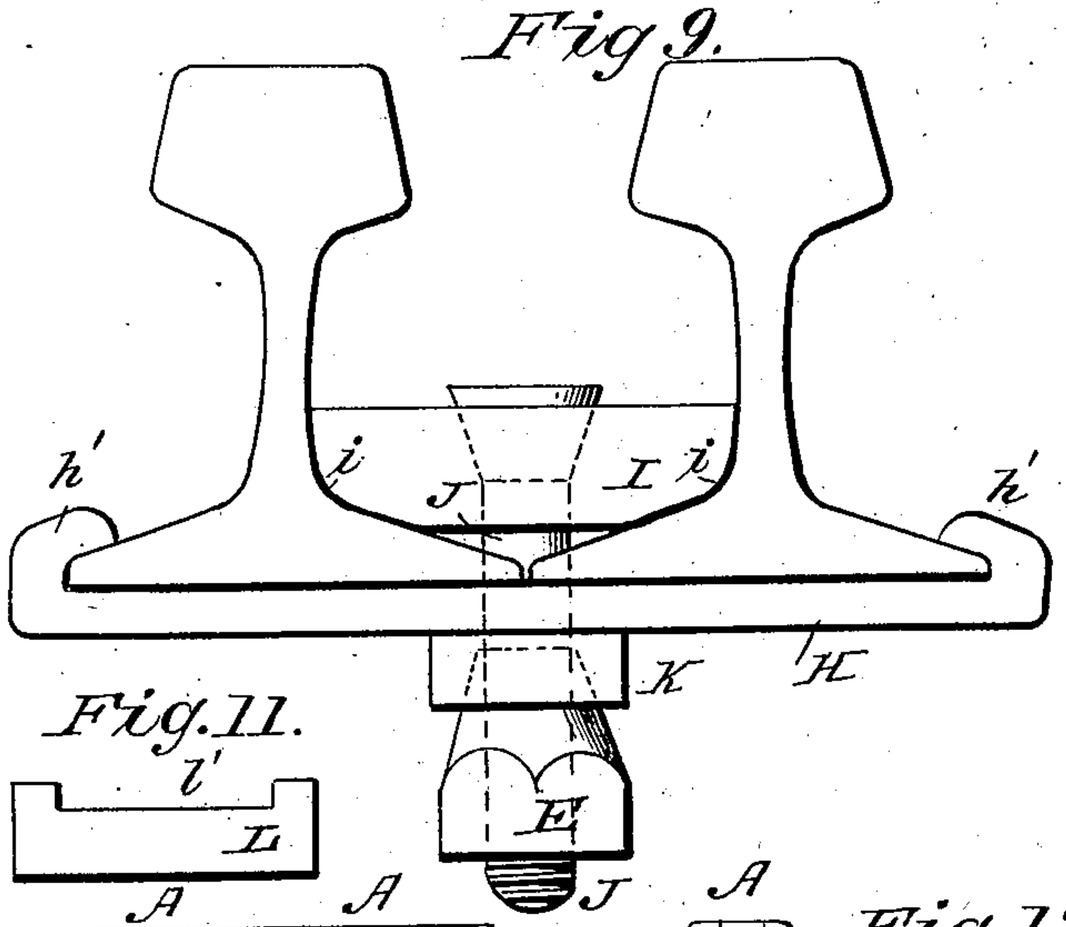


Fig. 11.

Fig. 10.

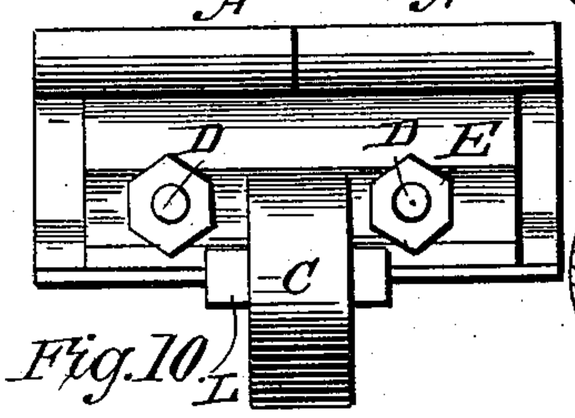


Fig. 12.

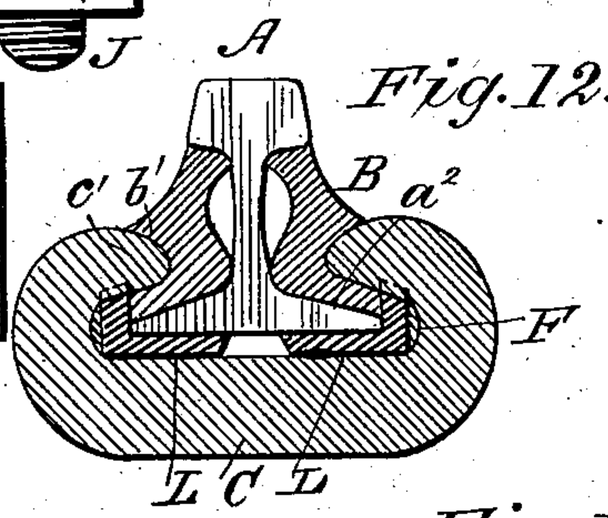


Fig. 13.

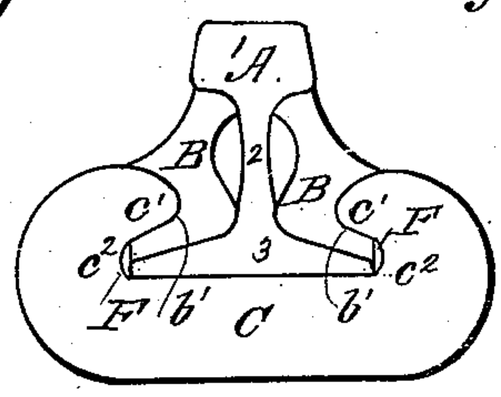


Fig. 14

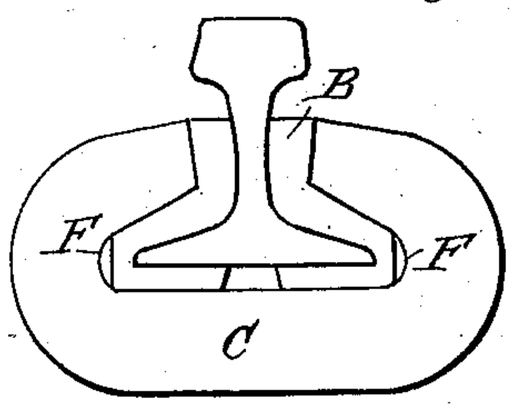


Fig. 15.

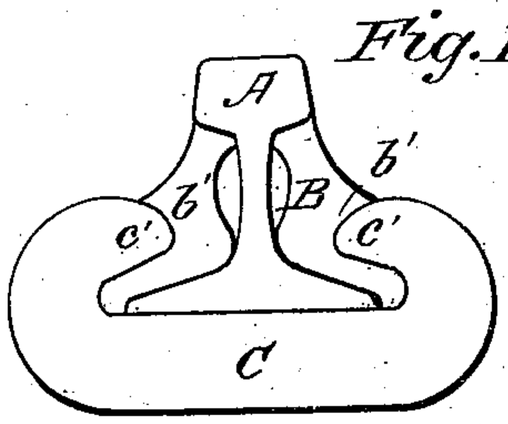


Fig. 16.

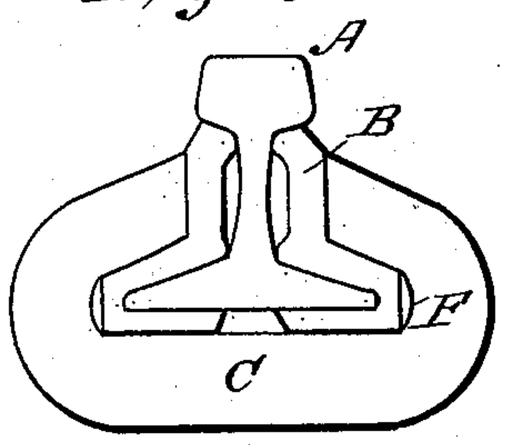
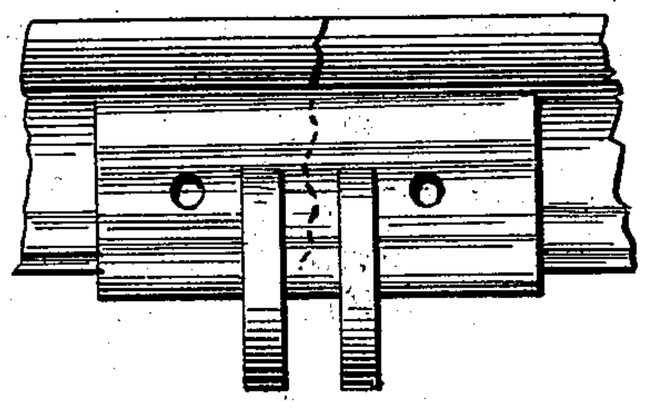


Fig. 17.



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UNITED STATES PATENT OFFICE.

GEORGE JONES FERGUSON, OF GREENVILLE, TEXAS, ASSIGNOR OF ONE-EIGHTH TO SAMUEL BRAUTHOFFER AND EDWIN F. STAHL, BOTH OF SAME PLACE.

RAIL-JOINT.

SPECIFICATION forming part of Letters Patent No. 374,529, dated December 6, 1887.

Application filed February 16, 1887. Serial No. 227,830. (No model.)

To all whom it may concern:

Be it known that I, GEORGE JONES FERGUSON, of Greenville, in the county of Hunt and State of Texas, have invented a new and useful Improvement in Rail-Joints; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the outside of rail-joint. Fig. 2 is a similar view of the inside of same. Fig. 3 is a bottom view of the joint, showing how sand and grit can escape; also showing how the retaining-strips are arranged. Fig. 4 is a cross-section through one of the clamps. Fig. 5 is a cross-section through one of the bolts and nuts. Fig. 6 shows how the clamp is applied. Fig. 7 is a detail view of the double clamp. Fig. 8 is a detail view of bolt, nut, and washer. Fig. 9 is a view showing close rail or guard-rail joint. Fig. 10 shows the single clamp-joint. Fig. 11 shows the angle-plate. Fig. 12 is a cross-section of single clamp and sectional angle-plates. Figs. 13, 14, 15, and 16 are cross-section views of modifications; and Fig. 17 shows a fractured rail with angle-plates and clamps applied.

The object of this invention is to provide a railroad-rail joint for permanent way-rails, modifications and variations in structure being provided to make the improvement applicable to close joints at switches, frogs, and guard-rails; and the invention seeks to provide a device by which the joints will be made equally strong with other parts of the rails; and it consists in certain constructions and combinations of parts as will be described.

The rail A may be of ordinary construction, and may be formed, as usual, with a ball or tread 1, a web, 2, and a base, 3, the lower surfaces of the ball 1 being designated by the letters a', while the upper surfaces of the base 3 are lettered a^2. The angle-plates, as shown in Figs. 1, 2, 5, and some of the other figures, have their lower portions fitted to the base of the rail, the inner lower edges of such plates terminating near to the center of the base 3, and being separated from each other to permit the egress of sand, grit, and the like. The tops b^2 of the angle-plates in such figures bear snugly under the ball 1 and a', while the edges of the plates next the web 2 arch outwardly between the ball 1 and base 3, for a double purpose. In the first place, the recess at 4, so provided, permits the necessary expansion of the parts under variations in temperature. Such construction also enables me to secure the desired width between the points b^6 b^6 of the opposite plates, B, and thereby increases their strength without adding to their weight.

In their outer sides, close above the base 3, I form the plates B with longitudinal grooves b', which are tapered in vertical cross-section and converge inwardly, as shown. The openings B′ for the bolt D, formed through these angle-plates, lead through the base or inner end walls of these grooves b', and the bolt-hole B^2, through the web of the rail, is formed close above the base, as shown, and being placed low, as shown, will firmly sustain strain by being in the direct line thereof.

The bolt-holes in the angle-plates may be slotted in the direction of length of said angle-plates, and the bolt-holes in rails round or slotted to allow of the necessary expansion and contraction of the rails through change of temperature.

The clamps C are formed to fit under the rails, and are bent at c^2, forming the hook-like ends c', which fit in the grooves b' of the plates B, and said points of clamps C, fitting tightly in grooves in angle-plates, prevent them from spreading and becoming loose as portions of angle-plates lap over said points.

The manner of applying the clamps to and removing them from the rails will be understood from Fig. 6. Both angle-plates and clamps are reversible, which permits of their easy application, as no mistake is possible, as they cannot be put on wrong. When applied to the rail, the angle-plates being in position, the clamps are forced to the positions shown in Figs. 1, 2, and 4.

I provide a means of retaining and at the same tightening the clamps by interposing a

strip of metal, F. This retaining-strip F is made half-oval in cross-section and tapers from center to ends. This same object could be attained by angle-plates being thicker in center than at the ends. The strips are placed against the angle-plates, and the clamps are driven from each end onto the strips until tight, when the ends of the strips are bent outwardly from the angle-plates and prevent the clamps from moving out of place. The bolt-head D′ and nut E will also act as a means of preventing the clamps from moving, as the bolts will be arranged as close to the clamps as possible, in order to permit the necessary turning of the nut.

The inner ends of the nut and of the bolt-head are formed to fit in groove *b′*, and are made slightly larger than said groove, so as to wedge and bind when forced thereinto. As the nut is turned on the bolt, it forces into the groove *b′*, which groove forms a tapering concave bearing for the nut and compresses its inner end or point, causing it to tightly embrace the bolt in addition to binding in its concave bearing *b′*, and also causing the bolt-head D′ to bind in its groove or concave bearing. The bolt-head can also be made oval to prevent its turning in concave bearing. Such construction securely locks the nut and prevents the bolt from turning, and also prevents the threads from being worn by coming in contact with a portion of angle-plates through which they pass, as the tapering point of nut and head of bolt will keep the bolt in center of hole and away from side of hole, and also prevents the threads from being stripped off, as by contracting the nut on the bolt it makes a tight fit on an otherwise loose-fitting bolt. The contraction of the nut, it will be seen, is gradual in proportion to the strain applied, making it a safeguard against stripping of threads. In the construction shown in Fig. 9 the concave tapering bearing for the nut is formed in a separate washer-plate, K, as shown in Fig. 8, instead of in angle-plates, as shown in Fig. 5.

The joint is by the described construction made doubly secure, it being held by both the clamps and the bolts. It also allows the free expansion and contraction in hot and cold weather, and by having free expansion in hot and cold weather, and by having free egress for anything dropping between the rails, the joint will be perfectly clean, so that when the expansion occurs there is nothing to prevent the rail ends coming close together. Such sand and grit as are discharged by the locomotives onto the rails to prevent them from slipping, obviously could fill up the joints if exit therefor were not provided, and also have a tendency to grind the base of rail and angle-bars, and thereby cause joint to become worn and loose.

My fastening can be applied without loosening or taking up the rails, and can be applied to a broken rail without drilling holes, so that a set of fastenings or joints may be carried by a track watchman and quickly applied wherever a broken rail is found.

The device, being short, can be placed between ties and does not necessitate the lowering or cutting down of the joint-ties, and it consequently can be conveniently used on broken joints, or when rails get accidentally broken.

As will be understood from Fig. 4, the points or hook ends of the clamps fit tightly in the grooves of the angle-plates, and are prevented from opening or spreading by portion b^6 b^6 of angle-plates bearing directly on these points C′, holding them rigidly in position, and thereby preventing the downward and upward strain of load from spreading them horizontally, and clamps sustain at *c′* the downward strain on the upper parts of such plates, while the lower portions of the angle-plates are held rigidly to position by portions c^2 of the clamp. This, together with the ball of rail resting on angle-plates at *a′* *a′* b^2 b^2, prevents the ends of the rails from springing downward while the load is directly over the joint. The reverse or upward strain, it should be understood, takes place when the load is about one-third the length of the rail distant from the joint, and is sustained by the clamps and bolts holding the angle-plates rigidly, as shown in Fig. 4 at c^2, and by holding the parts of angle-plates b^3 b^3 b^4 b^4 rigidly to each side of web of rail at a^2 a^2, and is assisted by wide cross-section of angle-plates from b^6 to b^6, together with the points or hook portions of the clamp filling the concave surface of the angle-plates, and thereby making a solid body of metal in the direction of dotted lines *x x*, Fig. 4, bracing against both downward and upward strain, and producing, as claimed, a short rigid joint as stiff and strong as a continuous rail would be.

A short rigid joint has the advantage of easy curvature, as each portion of the rail has the same strength, and also makes the use of irregular joints practical, as it is not necessary for joints to be opposite each other when using my improvement—in fact, it would be advisable to have them about opposite center of other rail, as it is impossible on curves to keep them exactly opposite without cutting rails or using a short rail.

When rail-joints are close to switch-frogs or guard-rails, I use a double clamp, as shown in Fig. 7, having end hooks and an intermediate double or T-shaped hook, and which clamps the angle-plates on both rails and keeps the rails the proper distance apart, as well as secures the angle-plates. This is a valuable feature, as it is difficult to spike rails properly when close together; but when rails are so close to each other that their bases touch I use the fastener shown in Fig. 9, which holds the rails rigidly together by hooked ends *h′* *h′* on clamp H, as well as in their relative positions, and effectually prevents the guard-rail from turning away from the permanent or main rail, and thereby destroying its usefulness.

This improvement is conveniently applied,

as it is only necessary to cut notches in the base of the rails so bolt J can be applied through block I, notches between rails, and clamp H, when washers K and nut E are put on and screwed up tight, when it cannot be displaced accidentally without breaking the bolt, and the only portion of bolt projecting is directly under clamp H, and therefore not exposed to accident. As the ties take the downward strain on a guard-rail, it is not necessary to make clamp H very strong, the heaviest strain being on the side of guard-rail next permanent rail. The block I is so constructed that its ends *i i* fit snugly against vertical sections or webs of the rail, and thereby push the bases of the rails tightly into the hooks *h'* of the clamp H, while the bolt J, passing at right angles through the block I and clamp H, together with the large flat surface of the bottom of the rails, causes the weight of train moving on the permanent rail to assist in holding the guard-rail to its place.

The clamp C can be applied hot and shrunk to a fit; but I prefer a driven application of them.

To apply my invention the clamps may be put on the rail and moved against the joint-ties. The angle-plates should then be put in place. Then start one clamp, if two are used. Then insert ends of both retaining-strips. Then start the other clamp and drive both clamps toward center of angle-plates until tight. Then apply the bolts. To keep the holes in angle-plates and rail in line or register, a short piece of iron can be inserted therein, so its ends do not project beyond the angle-plates and obstruct the movement of the clamps. When the clamps are driven to place, this piece of iron can be driven out and the bolts applied.

The nut E at one end is made angular, so it can be turned, its other or inner end being pointed or made cone shape. When used in connection with washer K, or in a countersunk bearing formed in material on which the nuts are used, the point of the nut will be compressed by the washer or countersunk bearing, and the nut will remain locked even if the bolt should, after being tightened, turn in the hole, or should the material on which the bolts are used shrink.

In Figs. 10, 11, and 12 I show the construction in which but a single clamp is used, and in which the angle-plates do not extend under the rail. In this construction the clamp is arranged opposite the joint of the rails, and bearing-plates L are arranged under the rails within the clamps and have at their outer ends upwardly-extended portions provided with notches *l'* to receive the bent or hook portions of the clamp.

In the construction shown in Fig. 13 the angle-plates terminate above the base of the rail and in common vertical planes with the outer edges thereof, the rail resting right in the clamp and the retaining-strips bearing between the clamp and the rail and the angle-plates, as shown.

In Fig. 14 the angle-plates are shown as terminating in line with the upper edges of the clamps, and the hook ends of such clamps are shown broader than in the construction shown in Fig. 4.

Fig. 15 shows the angle-plates as terminating at their lower ends in the horizontal plane of the under side of the rail.

In Fig. 16 the angle-bars are shown as extended above the clamps and bearing under the ball of the rail, but are not lapped over the hooked ends of the clamp.

I am aware of the prior invention of tapered or pointed nuts fitting in conical washers, said nuts having recesses or slots cut partly or wholly through nut to allow of their contraction on bolt; but I claim as an improvement thereon a solid tapering pointed nut made of soft tough metal, its point being slightly larger than base of conical hole in washer, so that point of nut only is compressed, the larger portion of taper offering a solid bearing to sustain strain and wedging in conical bearing-plate, and thereby precluding the possibility of wear or friction loosening it; and, furthermore, I avoid the liability of moisture being retained in slots or recesses, causing oxidation and consequent destruction of bolt and nut, and the nut would be rendered difficult of removal without injuring or stripping the thread, it being a necessary feature in a practical lock-nut to be capable of removal and reuse, and my improved nut can be produced cheaply on account of the omission of slots or recesses.

Having thus described my invention, what I claim as new is—

1. In a rail-joint, the combination of the rails and angle-plates B B, having longitudinal grooves tapering in vertical cross-section, and having projecting portions b^6 b^6, and clamps C, having hooked ends *c'*, fitting said grooves to prevent strain from spreading them horizontally, as and for the purpose described.

2. In a rail-joint, angle-plates B B, having in their outer sides a longitudinal groove, *b'*, and in their inner sides a half-oval recess, 4, as shown, and having projections b^6 b^6 to increase their width, and thereby strengthen and stiffen them without adding to their weight, substantially as set forth.

3. The combination of a plate having a tapering concave or countersunk bearing, a bolt, and the nut having its inner end pointed or formed tapering, its inner end being slightly larger than bearing, so it will be gradually compressed on bolt on its being tightened in proportion to strain applied, thereby avoiding the danger of stripping threads, and said nut being constructed solid and capable of removal and reuse, substantially as set forth.

4. The combination of the rails, the angle-plates having tapering concave grooves, the bolt having its head formed to fit in one of said grooves, and the nut having its inner end pointed or formed tapering, substantially as set forth.

5. The combination of the two rails and

the angle-plates having grooves b', and the hooked ends c' of the clamps fitting in same, forming a rail-joint, said angle-plates and clamps being reversible to permit of their easy application.

6. The combination of the rails, the angle-plates having longitudinal concave grooves b', and projecting portions b^6 b^6, the clamps having hooked ends fitting tightly in grooves b' and under parts b^6 b^6, and the tapering retaining-strips, said angle-plates and retaining-strips being thicker at center than at the ends, as and for the purpose described.

7. The combination of the rails, the angle-plates having tapering concave grooves, the clamps having their points fitted to said grooves, the bolts, the nuts having their inner ends pointed or tapered, and the retaining-strips, substantially as set forth.

8. The combination, in a rail-joint having an open space for the egress of sand and grit, of the rails, the angle-plates B B, the tapered retaining-strips F, a clamp, C, bolts D, and nuts E, substantially as set forth.

9. In a rail-joint, the combination, with the angle-plates and the two clamps C C, of the retaining-strips F, made thickest at the center and tapering gradually toward their opposite ends, substantially as set forth.

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