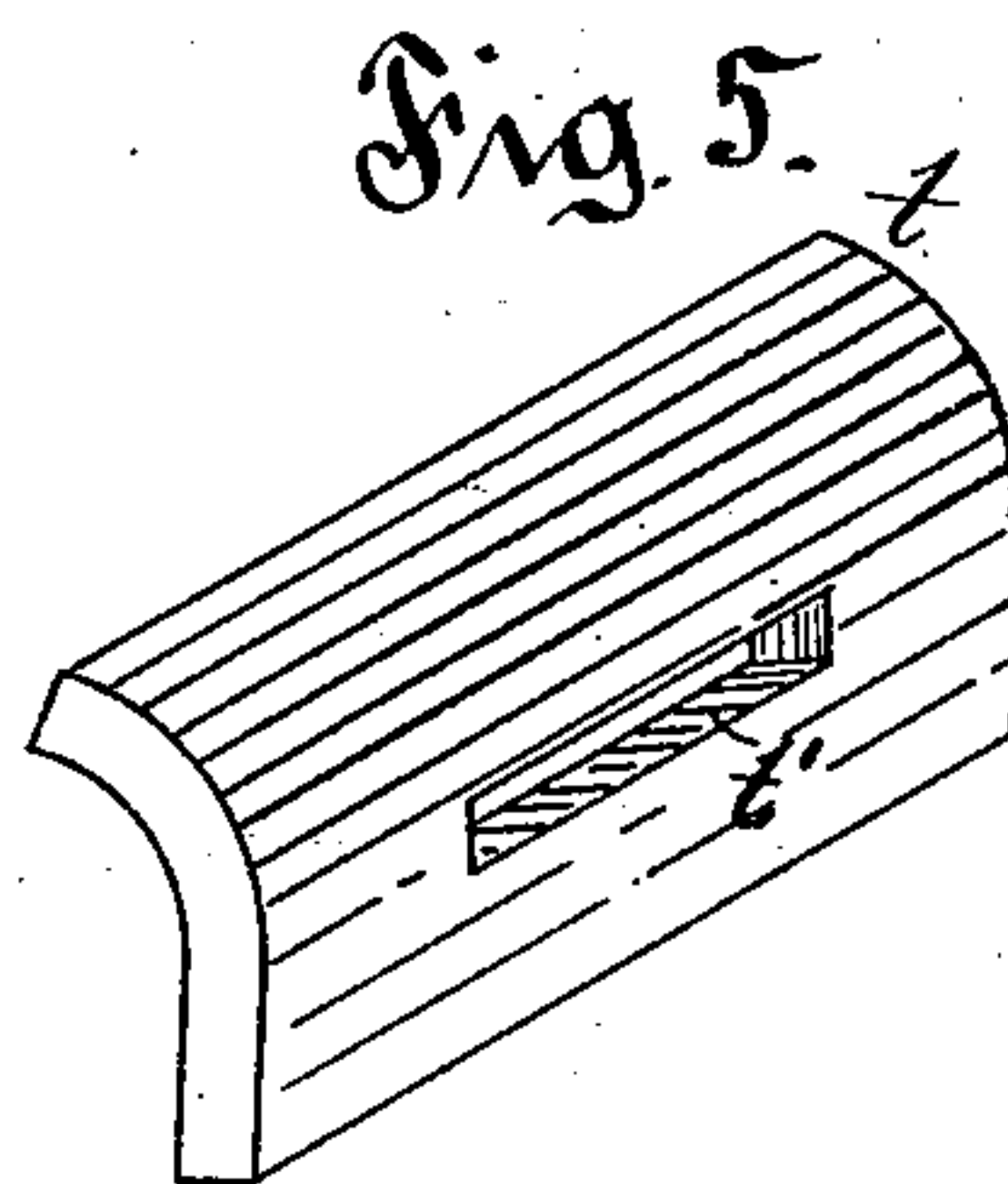
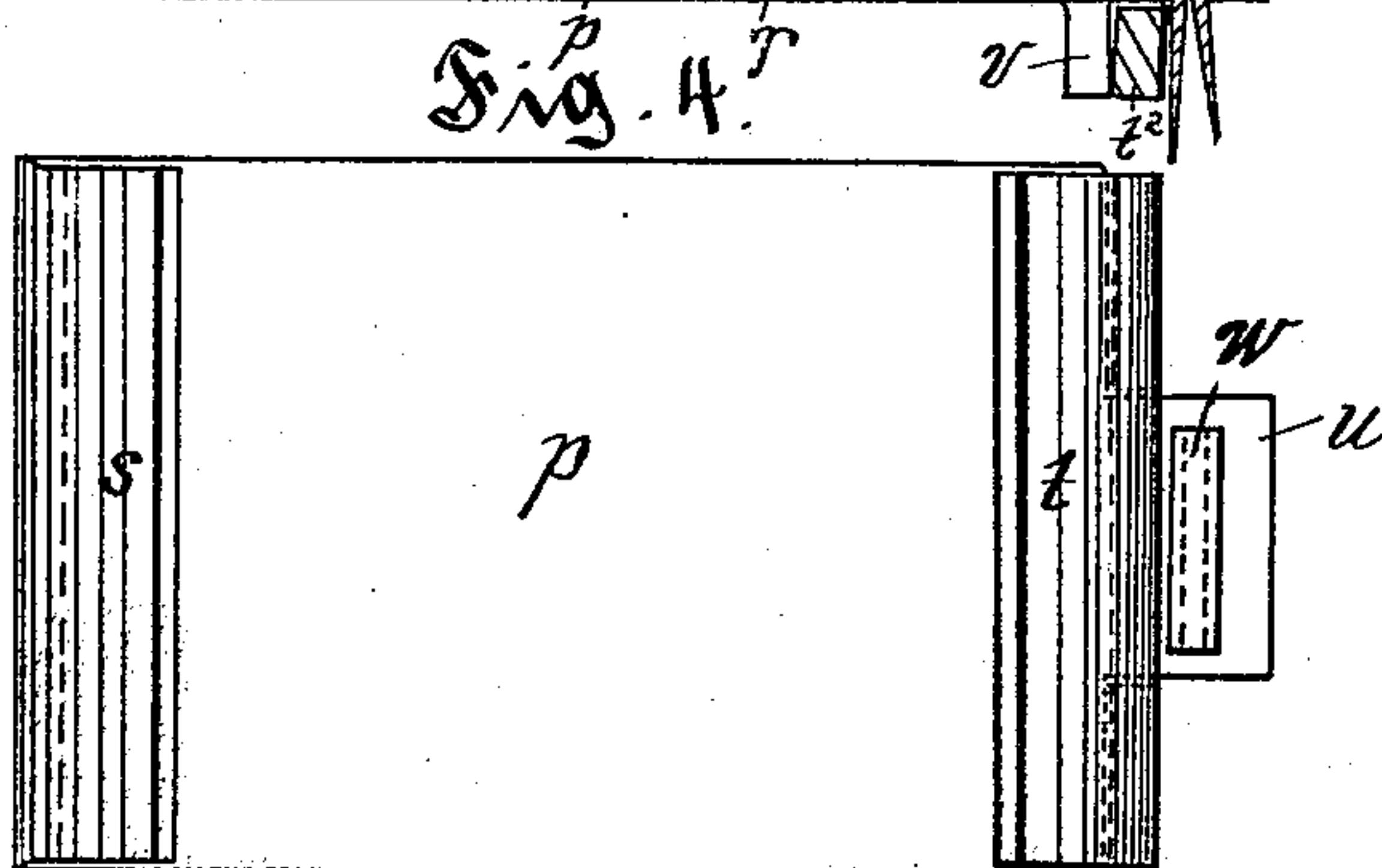
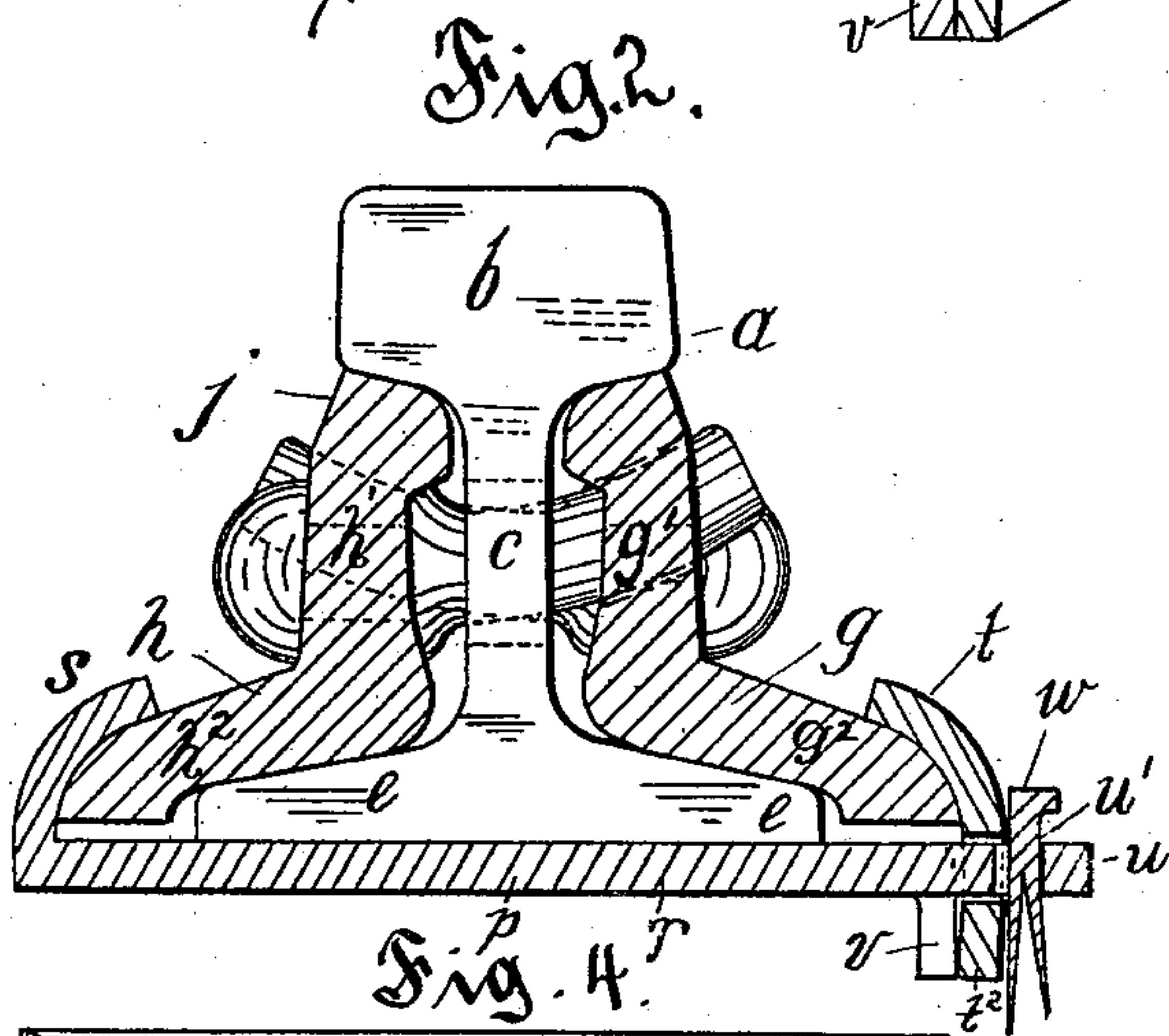
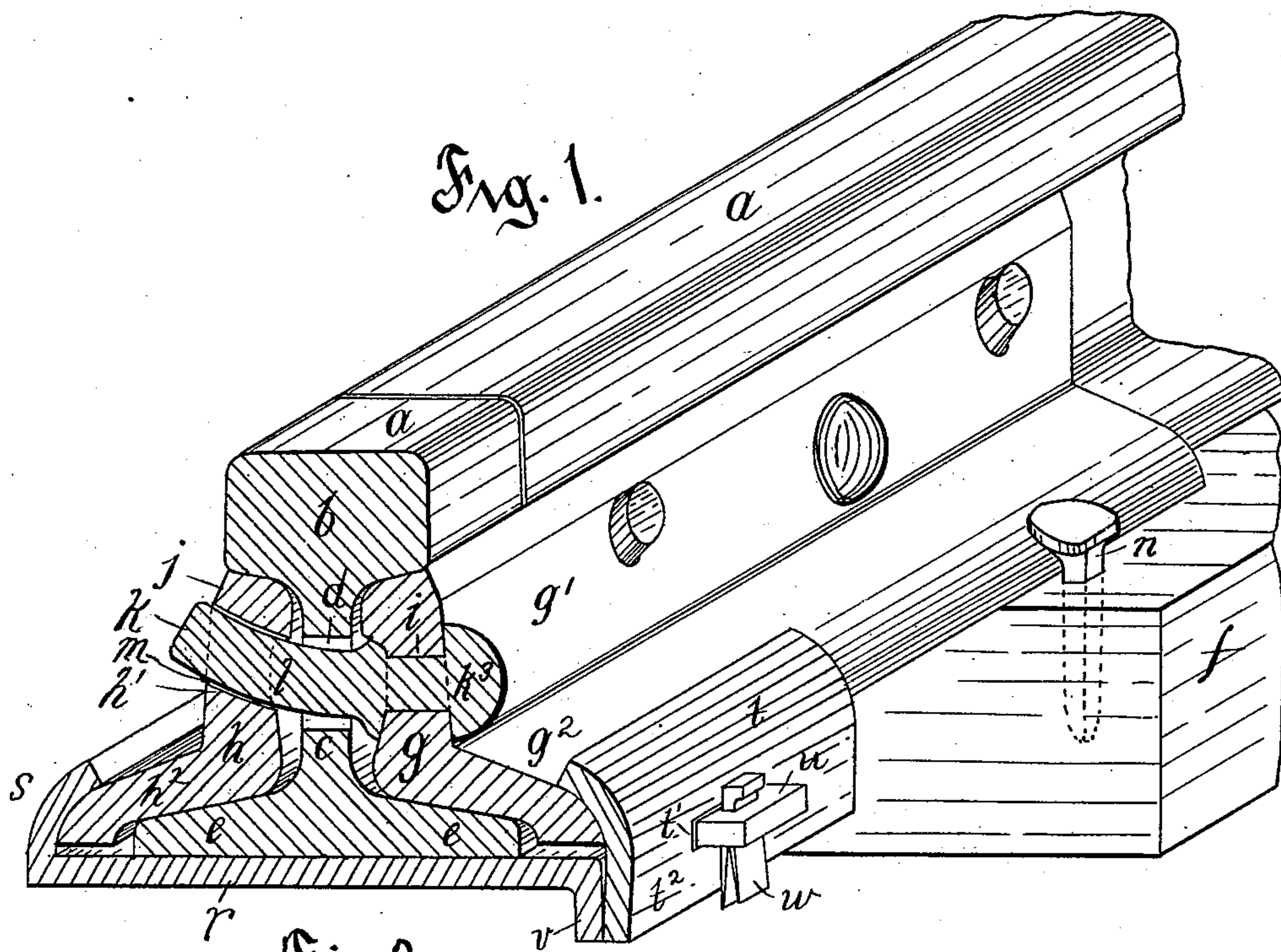


(No Model.)

C. M. KEEFER.
RAIL JOINT AND CLAMP.

No. 552,291.

Patented Dec. 31, 1895.



Witnesses
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UNITED STATES PATENT OFFICE.

CALVIN M. KEEFER, OF NEW CASTLE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM DEVLIN, OF SAME PLACE.

RAIL JOINT AND CLAMP.

SPECIFICATION forming part of Letters Patent No. 552,291, dated December 31, 1895.

Application filed July 12, 1895. Serial No. 555,711. (No model.)

To all whom it may concern:

Be it known that I, CALVIN M. KEEFER, a resident of New Castle, in the county of Lawrence and State of Pennsylvania, have invented a new and useful Improvement in Rail Joints and Clamps; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to rail-joints, and has reference to the same class of rail-joint as described in Letters Patent No. 287,296, granted to me October 23, 1883, its object being to improve the construction of such joints in such a way as to increase their holding power and strength and to so construct them that the weight on the rail, if there is any yield thereto, will increase the strength and rigidity of the joint, as well as to improve the construction of such rail-joints in other particulars.

To these ends my invention consists, generally stated, in the combination, with the rails, of fish-plates on each side thereof, one fish-plate having a bolt riveted thereto and extending out from the inner face thereof and curved with a continuous or radial curve upwardly from the fish-plate, and the other fish-plate having an upwardly-curved perforation into which the bolt enters and locks, and holding means for the lower ends of the fish-plates, whereby, in the making of the joint, the two fish-plates on opposite sides of the rails can be so operated that as their upper edges are placed below the rail-head and their lower ends or flanges drawn down to fit over the flanges of the rails the bolts will pass through the holes in the rails and thence through the curved perforations of the fish-plate on the other side, and when the fish-plates are held by spikes or other means from rising a secure joint will be obtained, in which, by the pressure of the rail-head upon the fish-plate on account of the radial curved bolts and the clamping-seats therefor, the fish-plates will be forced by the pressure or weight toward each other and bind tightly upon the rails and hold the same firmly as the train passes over.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a perspective sectional view of a rail-joint illustrating the invention. Fig. 2 is a cross-section at the meeting-points of the rails illustrating the holding means between the fish-plates and the construction of the clamp. Fig. 3 is a side view of the bolt before it is riveted in the fish-plate. Fig. 4 is a top view of the clamp, and Fig. 5 is a perspective view of the removable holding-hook of the clamp.

Like letters indicate like parts in each of the figures.

As illustrated in the drawings, *a a* are the rails, which are of the usual or of any desired section, each having the head *b*, the web *c*, through which extend the usual holes or perforations *d*, and the flanges *e*, the rails resting, as shown, upon cross-ties *f*, and the joint being shown as a suspended joint, though it is of course to be understood that a supported joint may be employed if desired. The fish-plates *g h* are of the usual section, having the vertical portions *g' h'* and the flanges *g² h²* extending over the flanges *e* of the rails.

As shown in the drawings, instead of employing the regular bolt-holes in line with each other the fish-plates each have the holes or perforations *i*, through which the bolts *k* pass, the shape of these bolts before they are secured in place being illustrated in Fig. 3, the bolts having curved body portions *l* which are radially curved—that is, formed on a regular curve from the shoulders *k'*, which bear against the inner faces of the fish-plates—while the neck portions *k²* of the bolts extend through the holes *i* in the fish-plates and are riveted on the opposite side, as at *k³*, so securing them rigidly and permanently in the fish-plates. The bolts are of course heated before being riveted in place, and the shoulders *k'* thereof caused to conform to the inner faces of the fish-plates, so that a strong support for the bolts is obtained by such shoulder and the rivet-heads on the opposite side of the fish-plate. This is the simplest and most desirable way of securing the bolts in place, but any other suitable way of riveting or means of permanently securing the bolts may be employed, the main point being that wrought-metal bolts should be rigidly secured in the wrought-metal fish-plates, so that

the strength of the wrought metal may be employed in the joint instead of the ordinary malleable cast-iron which was necessary in the combined fish-plate and studs described in my former patent. It is found that a much stronger joint is obtained by means of the separate bolt riveted to the fish-plate. In the opposite fish-plate is formed a curved perforation *m*, which, as shown, extends upwardly from the inner face of the fish-plate to the outer face thereof and is curved corresponding to the upward curve of the bolt *k* to fit into the same; and it will be noticed that when so constructed the upper edge *j* of the fish-plate extends under the head of the rail, and this upper edge is at a less incline to the horizontal than the perforation *m*, so that any weight upon the upper edge of the fish-plate only forces the same down upon the curved body portion *l* of the bolt, and so draws the fish-plates toward each other and enables them to hold the joint more firmly when the weight of a passing train is thrown upon the rails. Any suitable number of such curved bolts and curved perforations or holes to receive them may be employed in the fish-plates, the drawings showing three such connections in each rail which, would make six connections between the two fish-plates.

In building up the joint with such fish-plates and their bolts after the rails are brought in line resting upon the ties, the two fish-plates are placed with their upper edges *j* under the rail-heads and their flanges *g*² raised, and as the flanges are lowered toward the rail-flanges the bolts *k* pass through the holes or perforations opposite them in the rails and fish-plates, so forming the joint; and it is necessary only to secure the fish-plates from rising to make the joint permanent. For this purpose, whether as a permanent device or as a means for clamping the fish-plates in place before the spikes *n* are driven into the ties and the fish-plates in this way held in place, I prefer to employ a suitable clamping device which will extend under the rail-flanges and engage with the flanges of the fish-plates, and so hold them firmly in place, such clamp where joints are subjected to very severe strains forming part of the permanent joint; but for the ordinary rail-joint the spikes *n* give a sufficient holding means to hold down the fish-plate flanges and form a secure joint, and after the joint is made the clamp is removed.

The form of clamp preferred by me is illustrated in the drawings at *p* and has the flat body portion *r* which extends under the rail-base and under the flanges of the fish-plate, and has at one end the hook *s* which fits up over the flange of one fish-plate, while a removable hook-plate *t* extends over the flange of the other fish-plate and is secured to the body portion *r* in any suitable way. For example, the body portion *r* has the perforated tongue *u* which extends out therefrom, and extending down from the body portion on

each side of said tongue are the vertical flanges *v*; and the hook-plate *t* has the slot *t'* which fits over the tongue *u*, the hook-plate extending below said slot, as at *t*², so that its lower edge may rest against the vertical flanges *v* of the clamp-body, and when in such position the wedge-key *w* is driven through the perforation in the tongue *u*, outside of the hook-plate *t*, so clamping the hook-plate firmly in position over the flange of the fish-plate. Where such clamp is to remain as part of the permanent way the wedge-key *w* is formed as a split key and may be opened out, as shown in Figs. 1 and 2, to secure the clamp permanently in place.

In the building up of the joint in the way above described, after the fish-plates have been secured in place with the curved bolts of the one plate extending through the curved perforations of the other plate, the clamp *p* is secured in place in the way above described, and the spikes *n* are then driven into the ties, and where the joint is between simple straight rails without great side strain upon them the clamp can either be removed or, if desired, it may remain in position to aid the bolts in holding the fish-plates in position. Where a supported rail-joint is employed two such clamps may be employed, one at each end of the fish-plate. The joint thus serves by means of the upwardly-curved bolts and correspondingly-curved perforations to bind together the fish-plates, and when a strain comes upon the joint, as in the passing of a train, in case the joint is loose, the strain upon the rail will be transferred to the fish-plates by means of the lower faces of the head resting upon the upper edges of the fish-plates, and as a result, if there is any movement in the joint, it will force the fish-plates down the curved body portions *l* of the bolts and cause the clamping of the fish-plates upon the rails and the more rigid holding thereof. The joint is thus constructed in such a way that the weight of the train upon the rails causes the clamping of the fish-plates upon the rails and renders the joint more rigid.

Another advantage from the construction is that by employing the continuous regular radial upward curve of the bolts this clamping action is obtained without causing any great tendency of the outer flanges of the fish-plates to rise, and as a result the rails are united in such a way that there is no great strain upon the holding-spikes or holding-clamp, except of course upon a curve, and even when in such position the action above described takes place and the only strain which it is required to resist is the side strain, which in turn would also cause the movement of the fish-plates toward each other and a more efficient holding of the joint. At the same time I am enabled by the employment of wrought-metal fish-plates and of riveted bolts to very much increase the strength of the joint by forming it entirely of wrought

metal instead of malleable iron, as in the joint shown in said Patent No. 287,296, and as I am enabled to roll the finished plates to shape they can be produced at less cost.

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

1. In a rail joint, the combination with the rail of fish plates on each side thereof, one having an upwardly curved bolt riveted thereto
10 and the other having a correspondingly upwardly curved perforation into which the bolt enters to lock the plates together, and holding means for the lower ends of the fish plates, substantially as set forth.

15 2. In a rail joint, the combination with the rails, of fish plates on each side thereof, one having a bolt with a body portion projecting inwardly from the plate and having a continuous regular upward curve from the fish
20 plate, and the other having a correspondingly curved perforation into which the bolt enters to lock the plates together, and holding means for the lower ends of the fish plates, substantially as set forth.

25 3. In a rail joint, the combination with the rails, of fish plates, one having a straight perforation and the other an upwardly curved perforation, and a bolt having an upwardly curved body, a shoulder fitting against the
30 inner face of the plate and a neck extending

through the straight hole of the plate and riveted on the opposite side, substantially as set forth.

4. In a rail joint, the combination with the rail, of fish plates on each side thereof, one
35 having an upwardly curved bolt and the other a correspondingly upwardly curved perforation into which the bolt enters, and a clamp having hook portions extending over the flanges of the fish plates, substantially as set
40 forth.

5. In a rail joint, the combination with the rail, of fish plates on each side thereof, one having an upwardly curved bolt and the other
45 a correspondingly upwardly curved perforation into which the bolt enters, a rail joint clamp adapted to extend under the rail and having a hook portion extending up from one end thereof, and a perforated tongue at the
50 opposite end, of a removable hook plate having a slot through which such tongue passes and a key for securing it to the clamp body, substantially as set forth.

In testimony whereof I, the said CALVIN M. KEEFER, have hereunto set my hand.

CALVIN M. KEEFER.

Witnesses:

JAMES I. KAY,

ROBERT C. TOTTEN.