(No Model.)

2 Sheets—Sheet 1.

# H. R. KEITHLEY.

## RAIL JOINT.

No. 601,262. Patented Mar. 29, 1898.

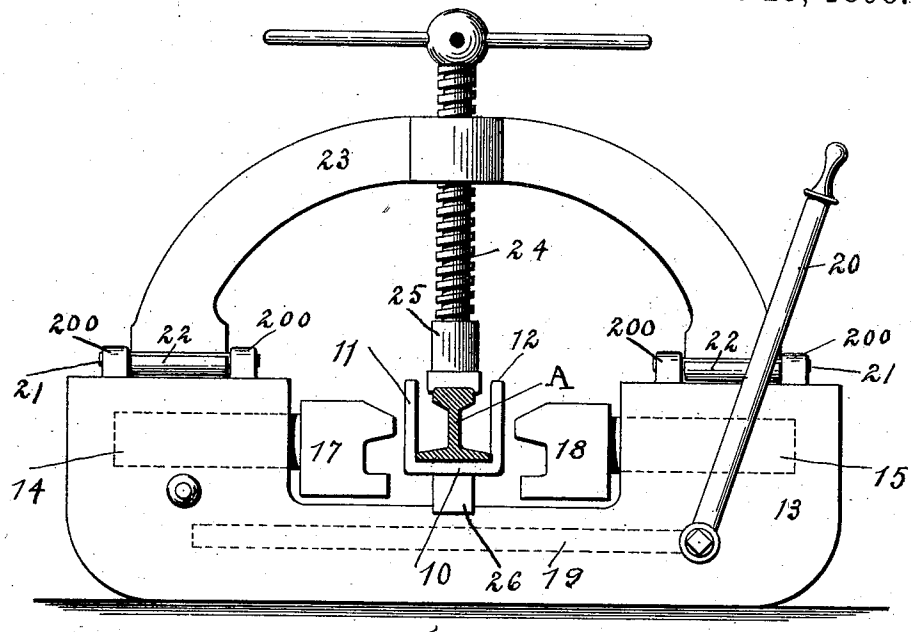



Fig. 1.

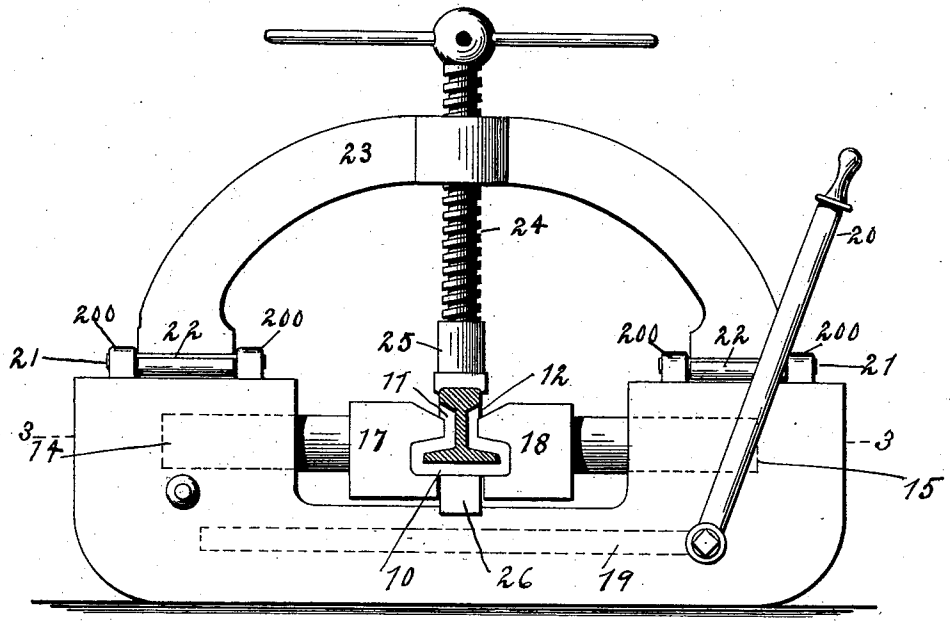



Fig. 2.

Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

# H. R. KEITHLEY.

## RAIL JOINT.

No. 601,262. Patented Mar. 29, 1898.

Fig. 4.

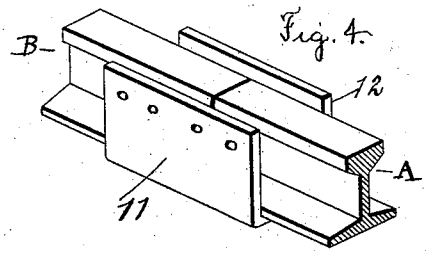



Fig. 5.

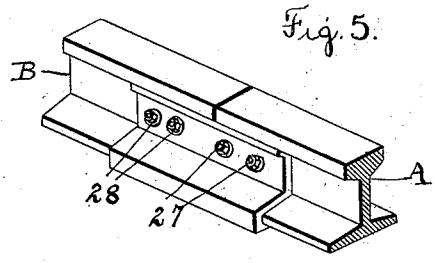



Fig. 6.

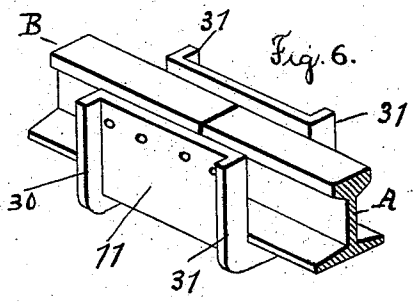



Fig. 7.

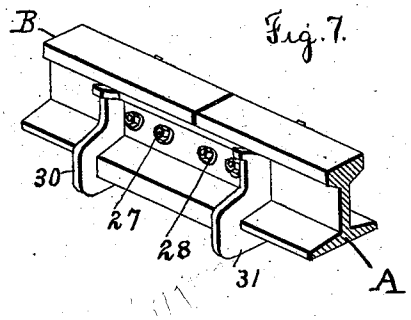



Fig. 8.

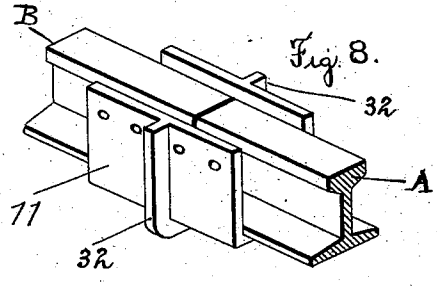
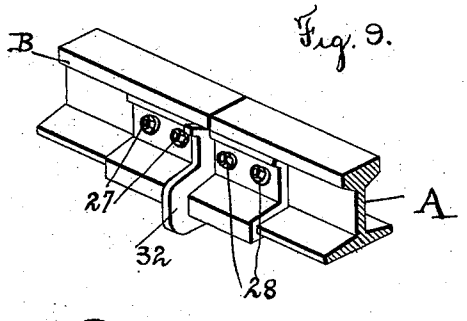



Fig. 9.



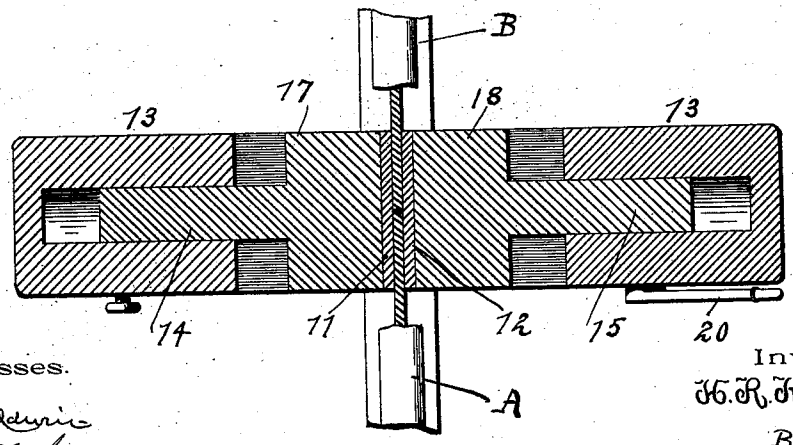




Fig. 3.

Witnesses.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

HERBERT R. KEITHLEY, OF NEW YORK, N. Y.

## RAIL-JOINT.

SPECIFICATION forming part of Letters Patent No. 601,262, dated March 29, 1898.

Application filed October 6, 1897. Serial No. 654,206. (No model.)

*To all whom it may concern:*

Be it known that I, HERBERT R. KEITHLEY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Rail-Joints, of which the following is a specification.

The aim of this invention is to provide a perfect joint for the meeting ends of two rails. Even with the most perfect methods of rolling it is not possible to obtain an accurate fit between the whole length of a fish-plate or angle-plate and the head and flange of a rail. There can never be contact over the whole length of the fish-plate, but only at a few odd points, which may be anywhere. Excessive stresses are unavoidably produced in the neighborhood of these points when the bolts are tightened. Pressures of an injurious character are set up. More particularly is this the case in the fish-plates through the vertical pressure at the joint. In addition the tightened fish-plates tend to produce shearing at the head and at the flange of the rail, which leads to its destruction. To remedy these evils, I have found that by using a joining-piece made of a single piece of metal and by forging the sides thereof into permanent contact with the meeting ends of two rails a contact equal to the surface contact between the joining-piece and head and flange of the rails is normally provided. This will tend to give, as much as possible, the continuity of an unbroken rail, the great area of contact between the joining-piece and the rails giving great stiffness and strength at the joint. The joining-piece is preferably forged to fit to the head, web, and base of the meeting rails; but in some cases the joining-piece may be forged only to fit the head and base of the meeting rails. This permanent contact is not broken as the rails expand and contract from the changes in temperature, the expansion and contraction simply causing slight molecular abrasion without affecting the intimate permanent contact between the joining-pieces and the rails. In this application I have further shown a press which may be advantageously employed to make this new and improved joint.

In the accompanying two sheets of drawings, Figure 1 is an elevation illustrating the manner in which a hydraulic press is used to forge the blank onto the meeting ends of two rails. Fig. 2 is a similar view showing the parts in their position after they have been actuated to forge the rail-joint. Fig. 3 is a sectional plan view taken on the line 3 3 of Fig. 2. Fig. 4 is a perspective view showing the blank which I preferably employ for making the joining-piece. Fig. 5 is a perspective view of the completed joint. Fig. 6 is a perspective view illustrating a modified form of blank. Fig. 7 is a perspective view illustrating the joint formed from the blank shown in Fig. 6. Fig. 8 is a perspective view of a second modified form of blank, and Fig. 9 is a perspective view illustrating the joint formed from the blank shown in Fig. 8.

A joining-piece for connecting the meeting ends of rails constructed according to my invention is formed from a single piece of metal formed, preferably, into a substantially U-shaped blank or any other shape suitable for forging. This blank is preferably heated to a high temperature, placed on the meeting ends of two rails, and then is forged by a press, preferably a hydraulic press, to encircle the meeting ends of two rails, the press being kept under a high pressure on the blank—say from one hundred to three hundred tons—until the blank cools. This will force the joining-piece into permanent contact with the meeting ends of the two rails, so that the same when in place will tend to bite and grip the rails. The ordinary bolts are then preferably secured in place merely as safeguards, but can be omitted if desired. This mode of construction will insure a permanent contact between the joining-piece and the rails independent of the pressure applied from the bolts, so that even if the bolts or nuts should become loose there is still a solid contact between the joining-piece and the rails. This gives practically an integral structure, so that when pressure is applied to the joint the same will act approximately as a continuous rail, giving the necessary compressive elastic resistance and approximately the respective stiffness of a continuous rail.

I am aware that it has been previously proposed to use a single joining-piece of metal; but so far as I know the same has never been forged into permanent contact with the meet-

ing ends of the rails, the only contact previously obtained being due to the pressure of the nuts, and this being obtained only at a few accidental points.

By my invention there will be a normal permanent engagement between the joining-piece and meeting ends of the rails, which will tend to make, so far as is possible with separate pieces, an integral joint.

Referring to the drawings and in detail, A and B designate the ordinary T or track rails which are to be connected.

The blank which I preferably employ for forming my rail-joint, as illustrated in Figs. 1 to 5, is formed from a single piece of metal, comprising a base-section 10 and integral outwardly-extending flanges 11 and 12, adapted to be forged into engagement with the meeting ends of the rails, preferably into engagement with the head, web, and base of said rails.

A hydraulic press is preferably used to form the joint, the same consisting of a base-piece 13, in which are mounted two plungers 14 and 15, which carry jaws 17 and 18. The jaws are adapted to engage the opposite sides of the joining-piece to forge the same firmly into engagement with the rails, and the jaws are shaped to forge the joining-piece to approximately correspond with the contour of the rails. The jaws are forced simultaneously toward each other by any suitable piston 19, which may be operated by any suitable handle 20 in the manner common in hydraulic presses, the hydraulic details of which it is not deemed necessary to show in this case.

Projecting up from the framing are lugs 200, in which are secured pins or bolts 21. Engaging these bolts 21 are the curved ends 22 of a yoke 23, in which is tapped a screw 24, carrying a bearing-piece 25, adapted to engage the top of the rail. A bridge-piece 26 is arranged in the press so that the same will be properly set relatively to the rails.

Other forms of press may be devised; but the hydraulic press is preferred. The joint may be also formed by drop-forging.

The way my rail-joint is attached is as follows: The two rails are first butted together. The blank is then preferably heated to a high temperature and is placed in position on the joint. The hydraulic press is then slipped under the joint and the screw actuated to raise the bridge-piece onto the under side of the joining-piece, thereby holding the parts tightly and accurately in place for the forging operation. The hydraulic press is then actuated, so that the two jaws or dies approach each other and forge the blank into intimate contact with the sides of the rails, as shown in Fig. 2. A pressure of from one hundred to three hundred tons is about what is used. The jaws are left in position until the blank cools, so that the same will set into normal permanent contact with the rails. Then when the joint is thus formed the ordinary bolts 27 may be applied through the joining-piece and held in place by nuts 28.

Instead of employing the blank as thus far described I may employ blanks having strengthening-flanges, and I have illustrated such construction in Figs. 6 to 9.

The blank illustrated in Fig. 6 is provided at its ends with strengthening-flanges 30 and and 31, so that the same when completed will have substantially the shape illustrated in Fig. 7. The blank illustrated in Fig. 8 is provided near its center with a strengthening-flange 32, so that the completed joining-piece will have substantially the shape illustrated in Fig. 9.

I am aware that other changes may be made in the construction of my rail-joint by those who are skilled in the art without departing from the scope of my invention as expressed in the claims.

I do not wish, therefore, to be limited to the forms which I have shown and described; but

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

1. A rail-joint comprising a single metallic piece, the sides of which are forged into permanent contact with the meeting ends of two rails, substantially as described.

2. A rail-joint comprising a single metallic piece, the sides of which are forged into permanent contact with the head and base of the meeting rails, substantially as described.

3. A rail-joint comprising a single metallic piece, the sides of which are hot-forged into permanent contact with the meeting ends of two rails, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HERBERT R. KEITHLEY.

Witnesses:

LOUIS W. SOUTHGATE,

PHILIP W. SOUTHGATE.