

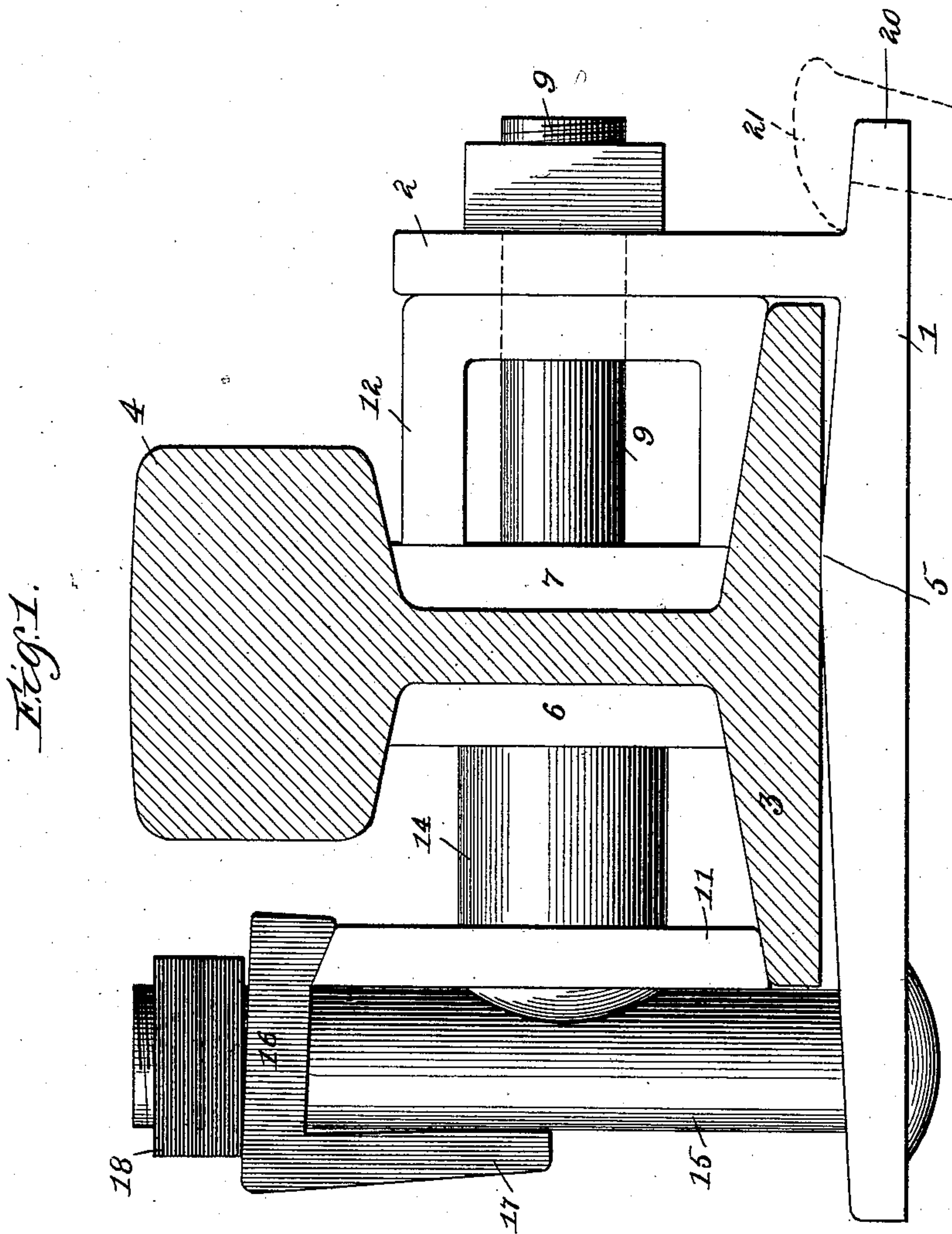
(No Model.)

3 Sheets—Sheet 1.

M. C. NILES.  
RAIL JOINT.

No. 507,382.

Patented Oct. 24, 1893.



*Witnesses.*

Stu M. Rhein.  
Wm. F. Fleming.

*Inventor*

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By Elliott H. Hughes  
Atty's.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 2.

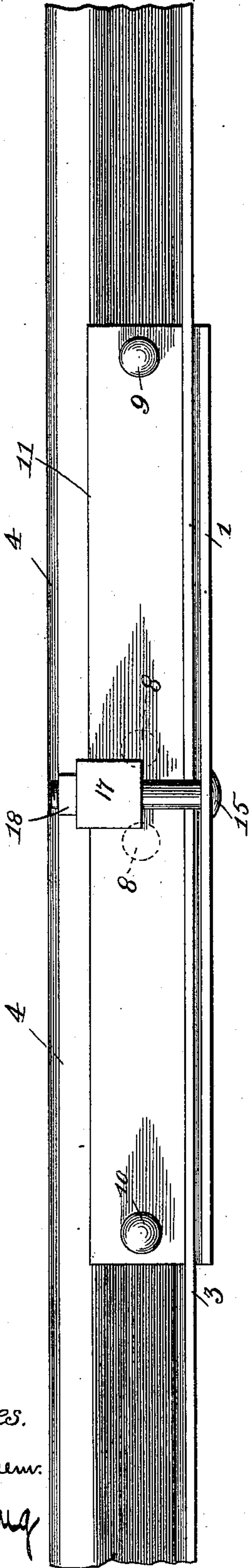


Fig. 3.

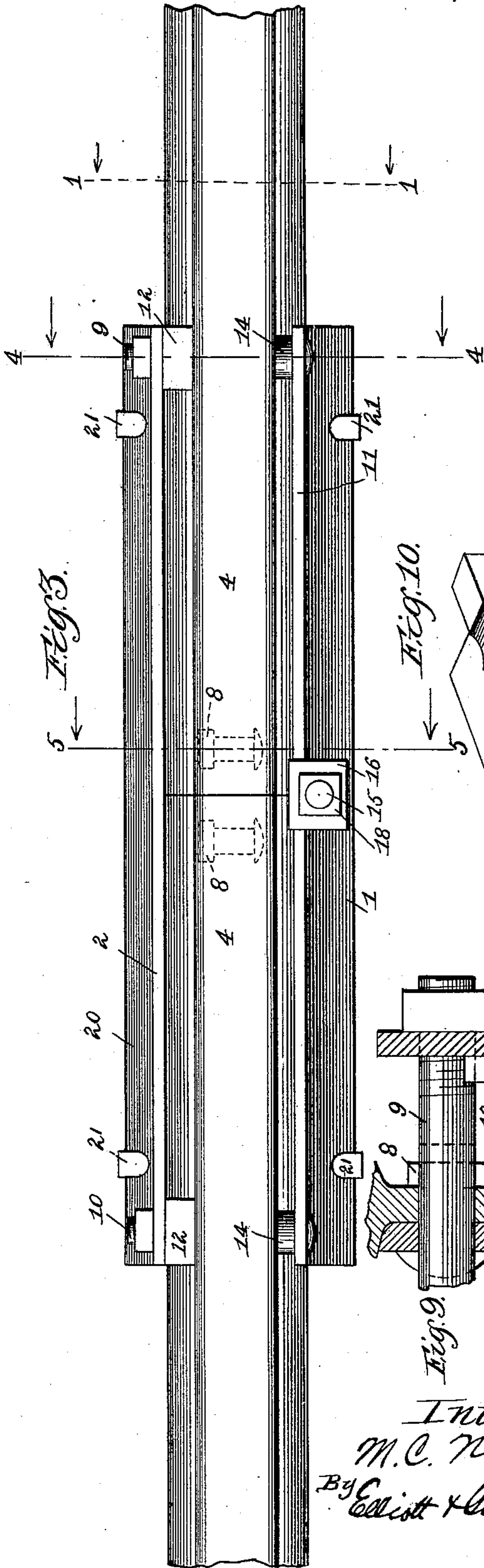


Fig. 10.

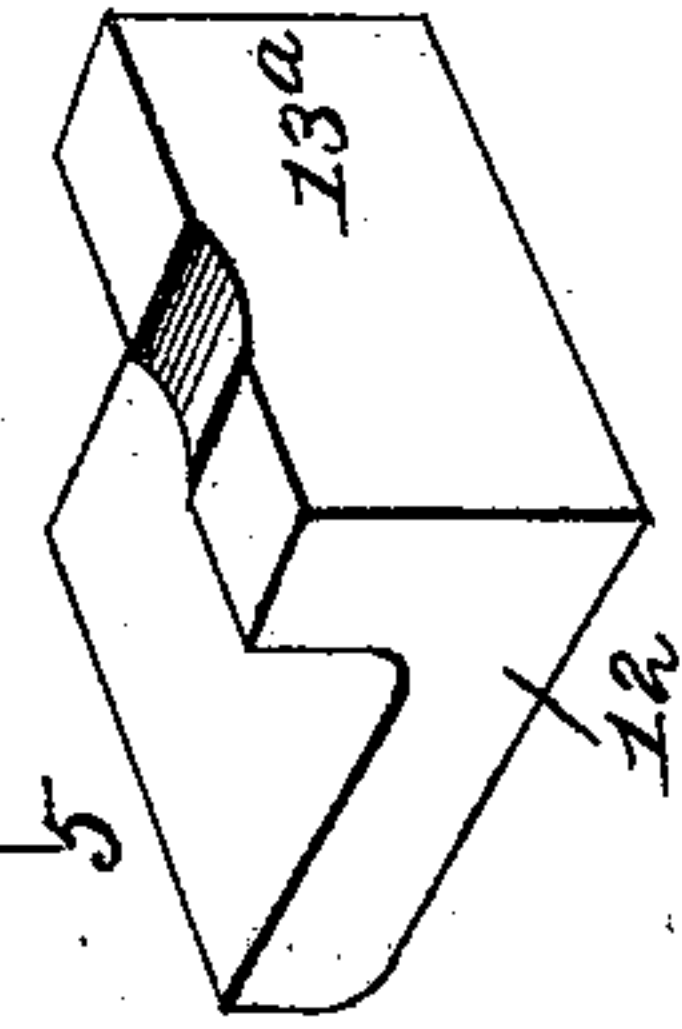
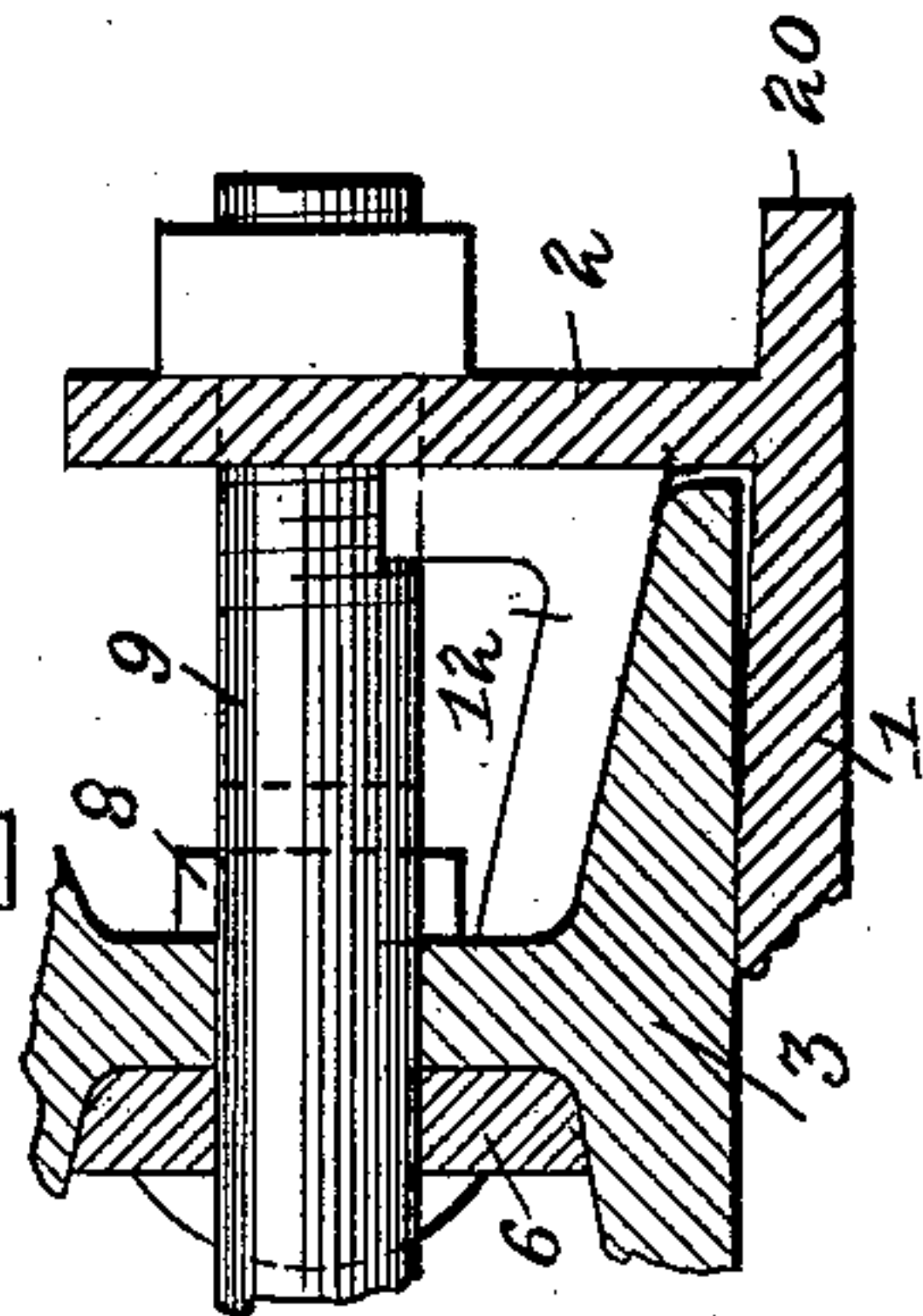


Fig. 9.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 6.

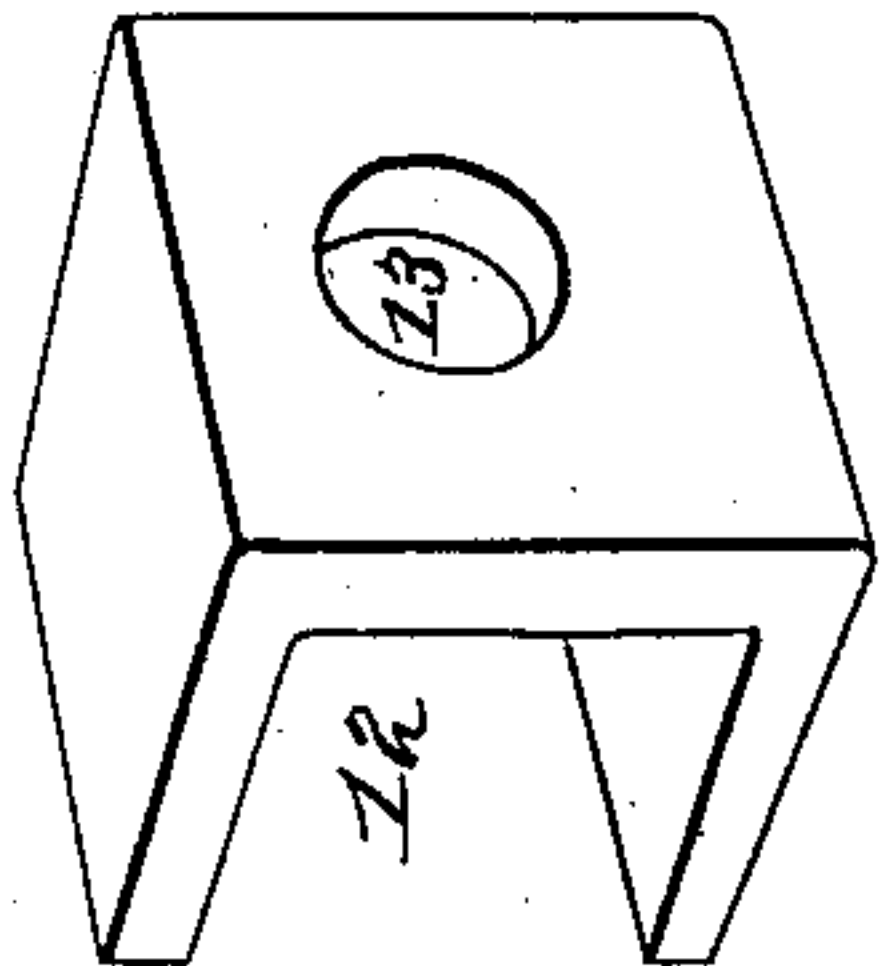


Fig. 5.

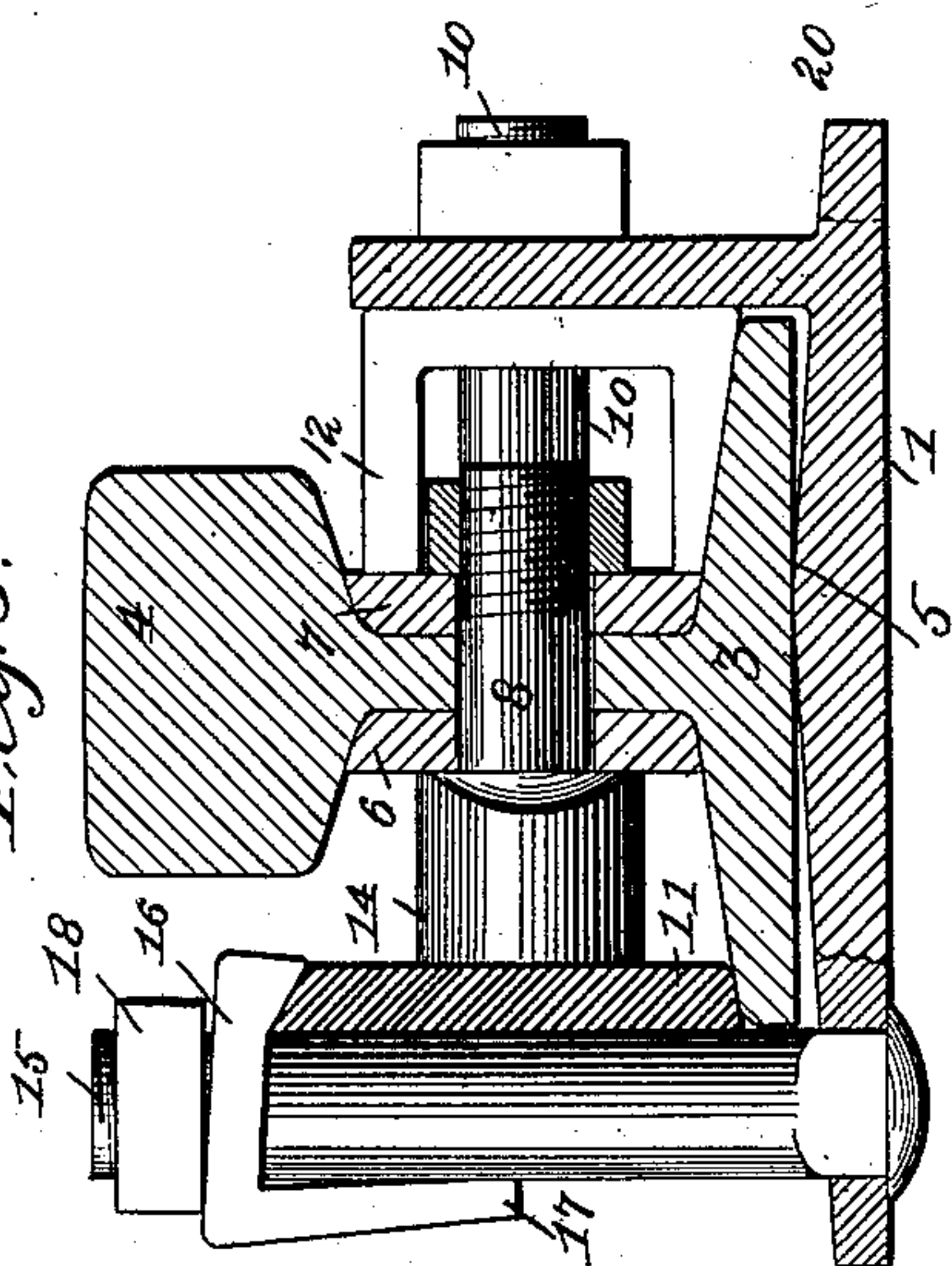
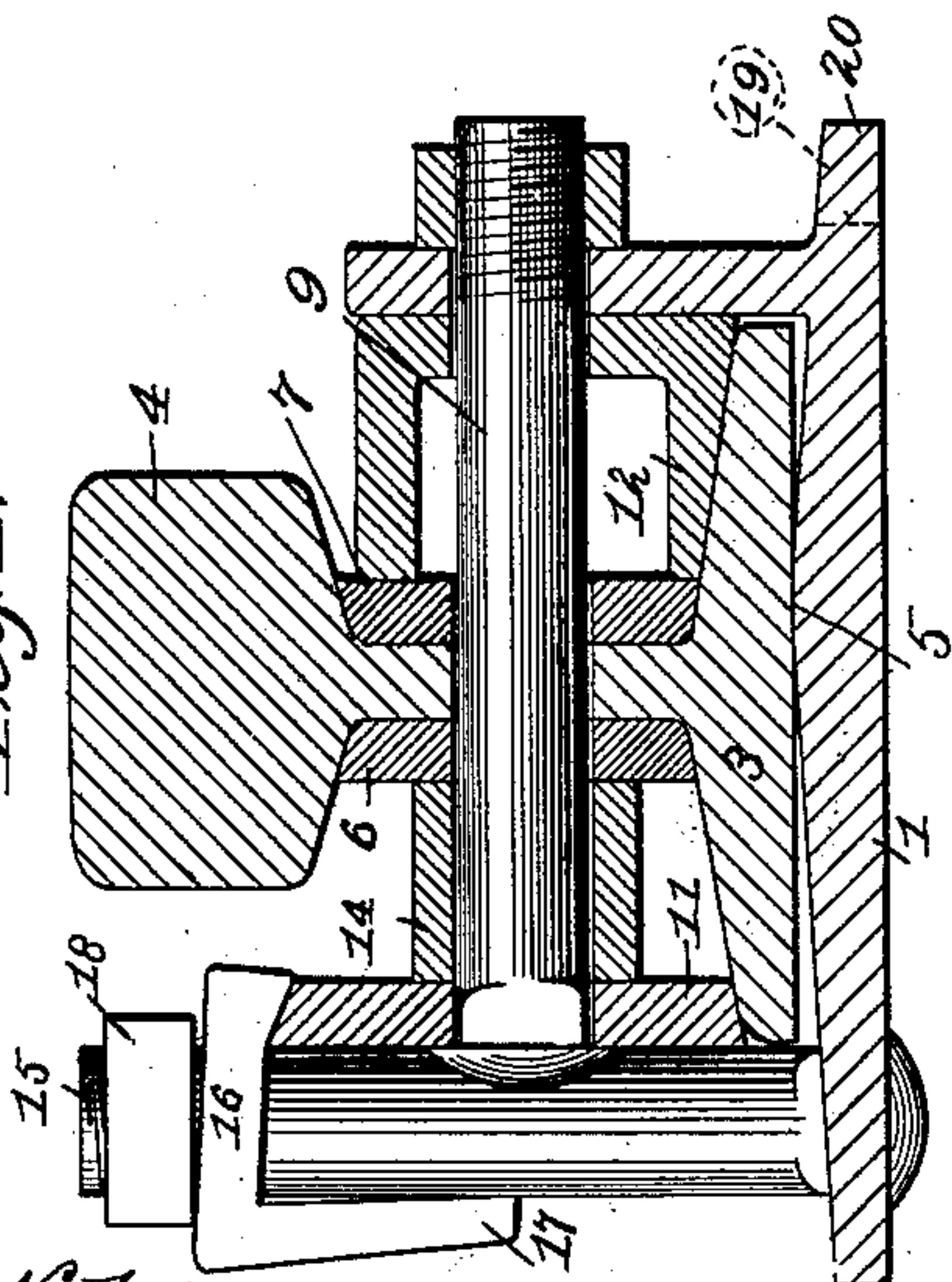


Fig. 4.



Witnesses.  
J. M. Rheem.  
W. L. Fleming

Fig. 7.

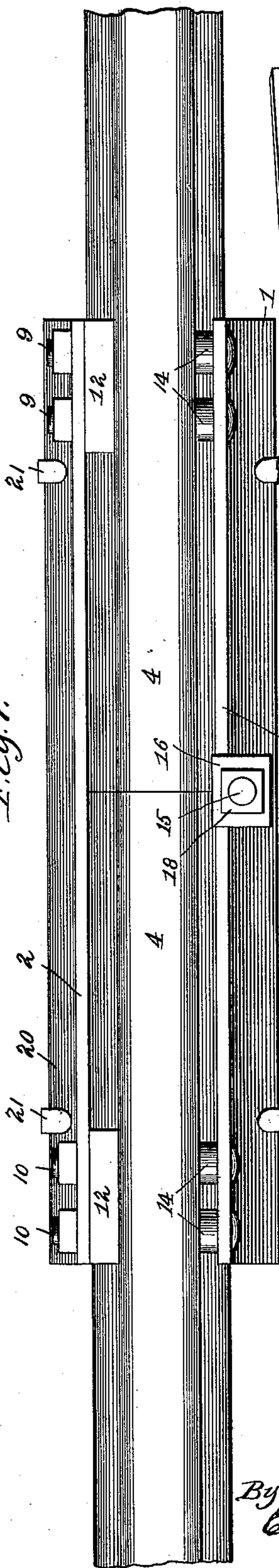


Fig. 13.

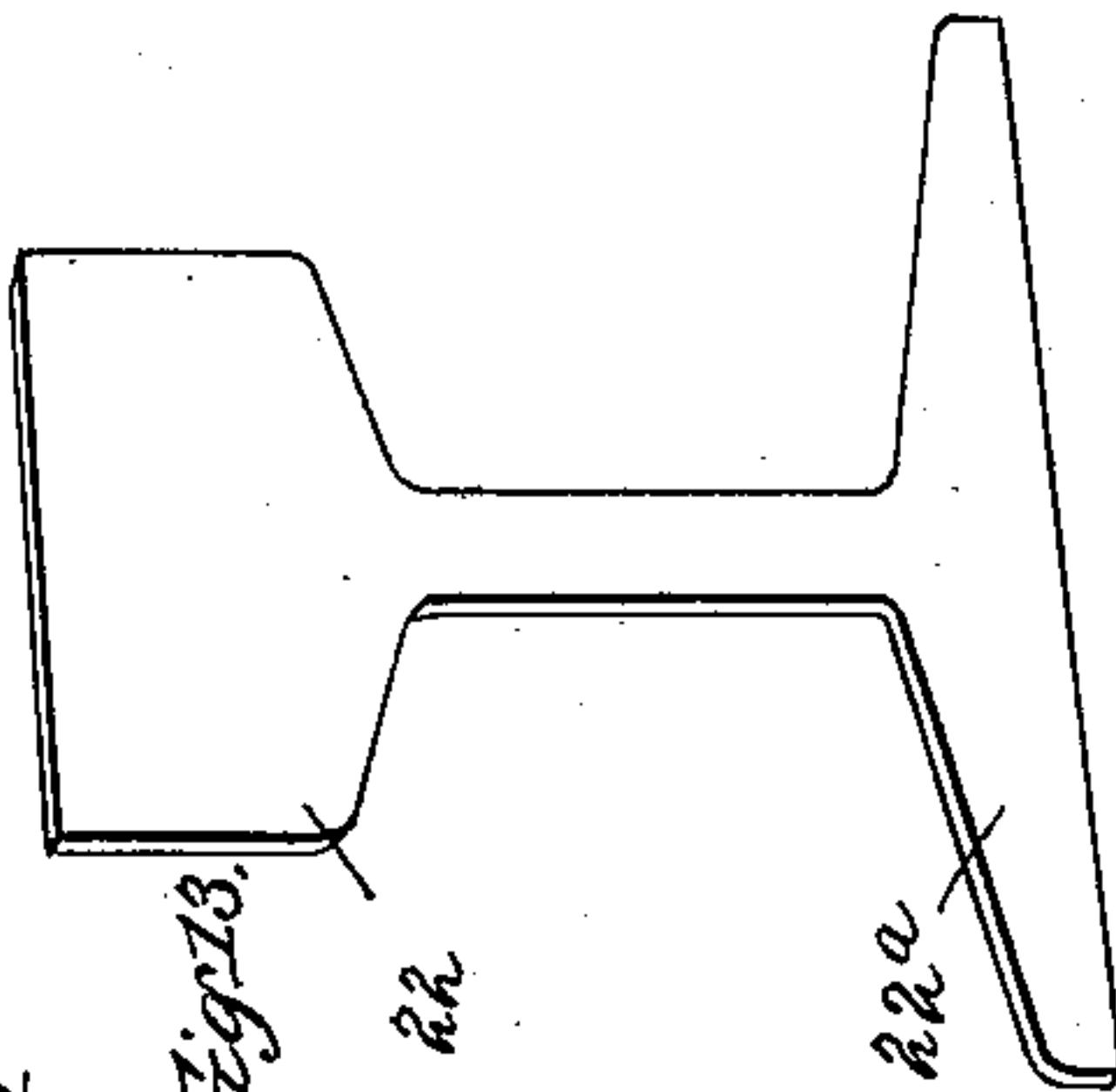


Fig. 12.

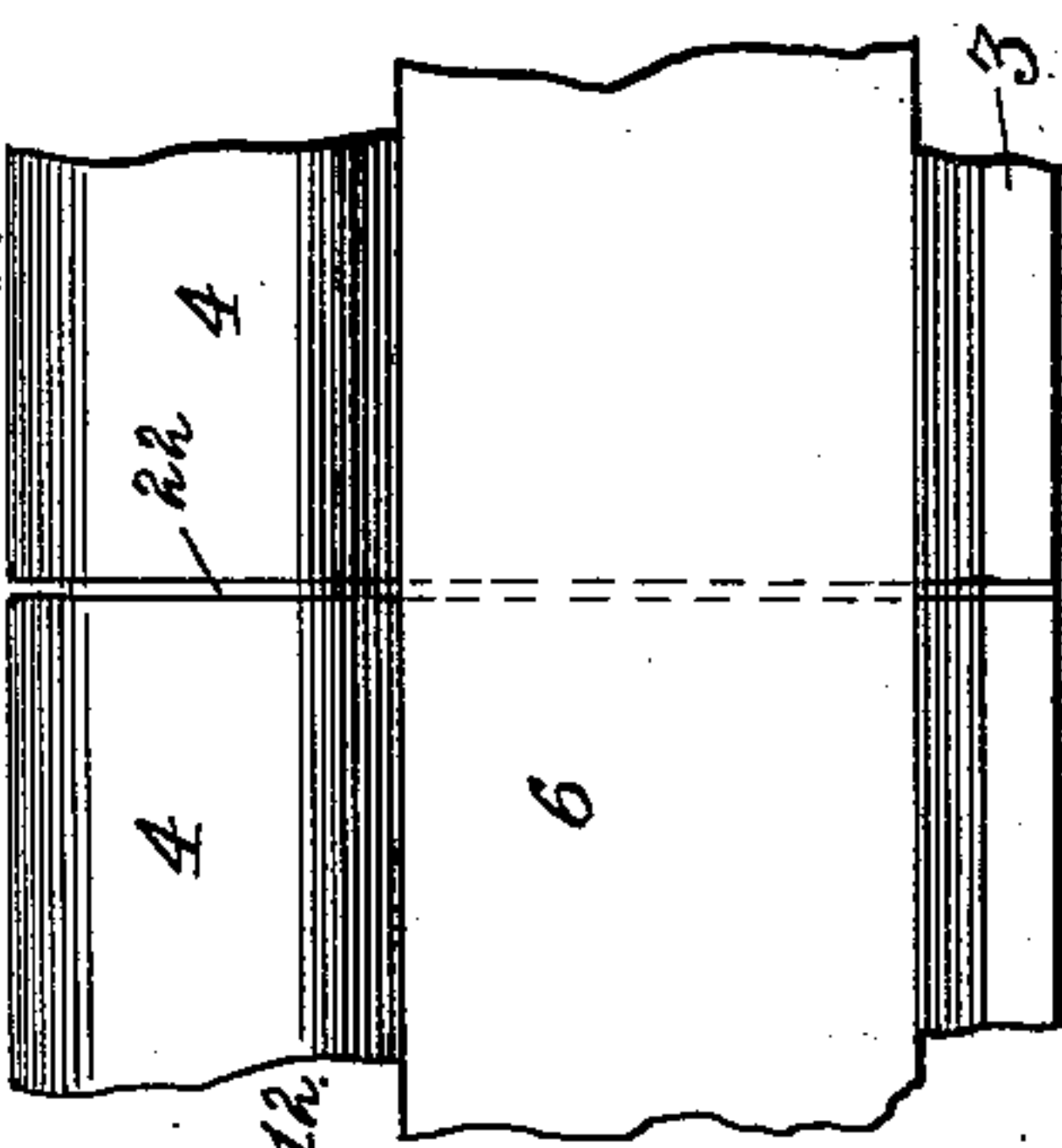


Fig. 11.

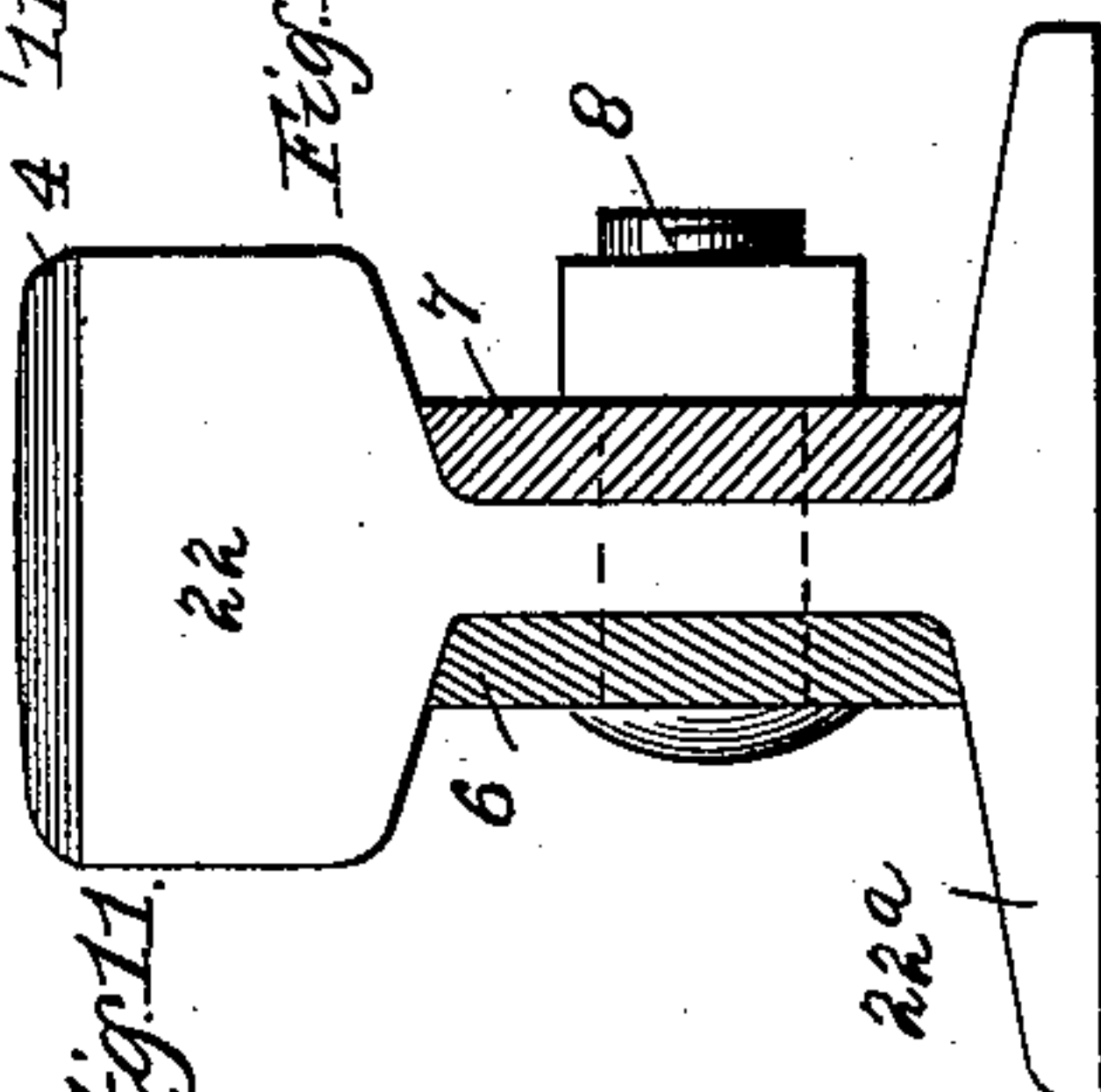
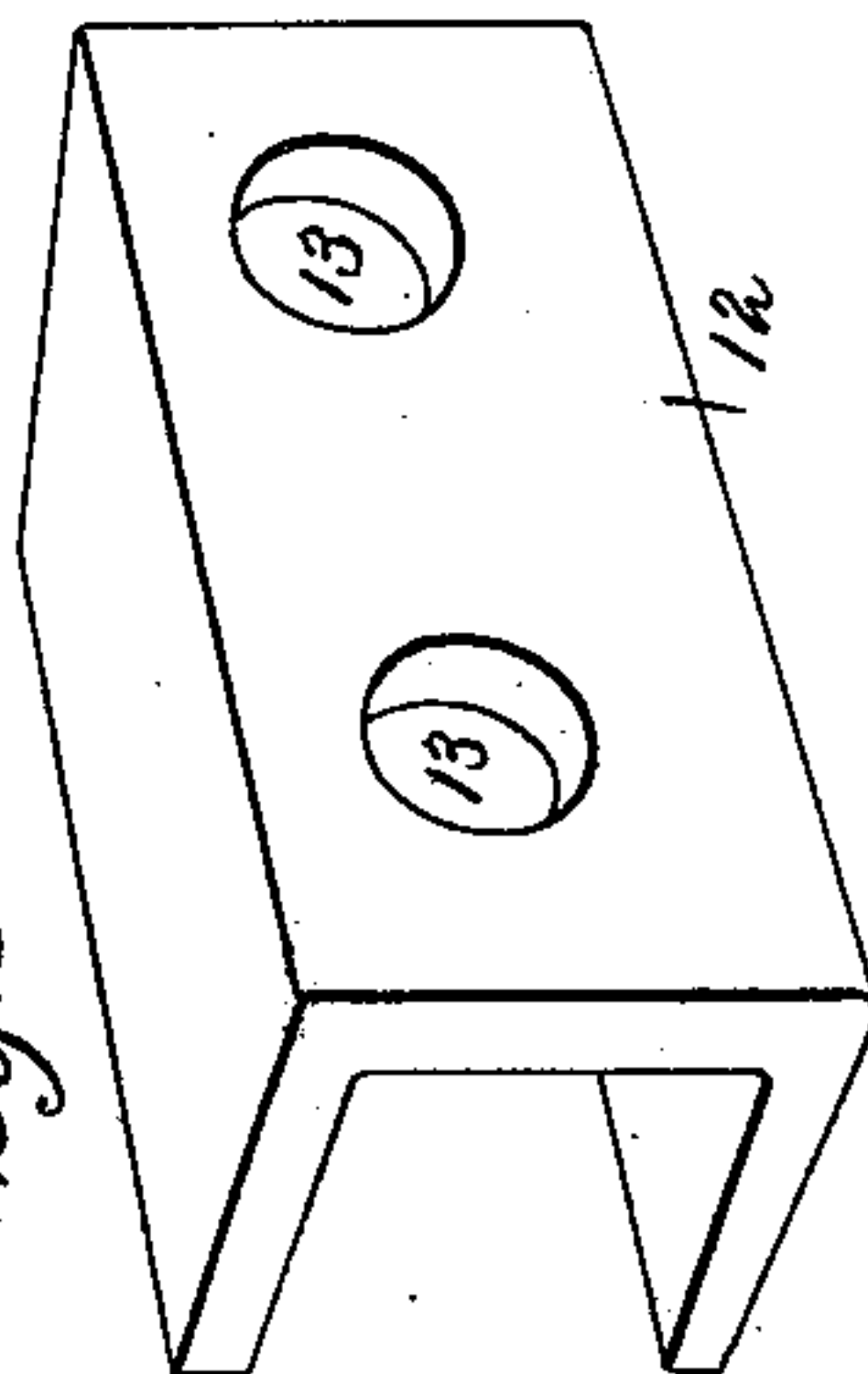


Fig. 8.



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Attys



# UNITED STATES PATENT OFFICE.

MILTON C. NILES, OF OAK PARK, ILLINOIS.

## RAIL-JOINT.

SPECIFICATION forming part of Letters Patent No. 507,382, dated October 24, 1893.

Application filed September 2, 1892. Serial No. 444,869. (No model.)

*To all whom it may concern:*

Be it known that I, MILTON C. NILES, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rail-Joints, of which the following is a clear, full, and exact specification.

My invention relates to that class of rail joints in which the rails are supported against downward movement at their meeting ends by means of a base-plate or chair clamped to the under side of the foot flanges of the rails by clamps, taking their bearing upon the upper side of the foot flanges, while the lateral stress on the rails is resisted and the rails held in alignment by means of fish plates secured to one or both sides of the rail webs.

In devices for this purpose it is essential that the construction be simple and practical and such as to sustain the rails at their meeting ends or joints, with a power that equals but does not exceed the strength of the rail itself; whereby the rails at their joints will be neither more or less elastic or yielding than they are throughout their length. But the rails, even where there are no joints, undergo a slight deflection when subjected to the weight of the rolling stock, and hence, a joint that does not give is an impractical device. When the rails expand and their ends are crowded snugly together, as usual in warm weather, this deflection at the joint causes the upper edges of their ends to shear off, resulting in a depression into which the wheels beat, and ere long laminate or wear away the rails to such an extent as to produce a perceptible jar when the wheels pass such depressions,—a result disagreeable to the passengers and detrimental to the rails and rolling stock.

One of the objects of my invention, therefore, is to provide a rail joint which shall be as elastic as the rail itself, and at the same time, capable of supporting the rail with a pressure equal to the strength of the rail, and yet consist of the minimum number of simple, durable and easily made parts.

Another object of my invention, is to hang the base-plate or chair on the rail flanges on one side by means of the bolts which hold the rails in alignment or against lateral play,

and to provide the other side of the chair with means for clamping it to the rail with a variable pressure.

A further object of my invention is to hold the upper edges of the ends of the rails asunder, whereby the shearing off of such edges will be prevented.

With these ends in view, my invention consists in certain features of novelty in the construction, combination and arrangement of parts, by which the said objects, and certain other objects hereinafter described, are accomplished, as fully explained with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1, is a transverse section of a rail, to which my improvements are applied, taken on the line 1—1, Fig. 3. Fig. 2, is a side elevation on a smaller scale. Fig. 3, is a plan view thereof. Fig. 4, is an enlarged transverse section, taken on the line 4—4, Fig. 3. Fig. 5, is a similar sectional view, taken on the line 5—5, Fig. 3. Fig. 6, is a detail perspective view of one of the filling blocks, hereinafter described. Fig. 7, is a plan view, drawn to the scale of Figs. 2 and 3, showing two bolts instead of one, through each filling block. Fig. 8, is an enlarged perspective view of one of the modified forms of filling blocks. Fig. 9, is a transverse sectional view, similar to Fig. 4, showing a still further modified form of filling block, portions being broken away. Fig. 10, is a detail perspective view of such modified form of filling block. Fig. 11, is an end view of a rail showing a plate or filling held between the fish plates, for preventing the upper edges of the rails from striking when deflected as above described. Fig. 12, is a side elevation of the rails, showing the plate or filling interposed thereinbetween, and Fig. 13, is a detail perspective view of the said plate or filling.

Like signs of reference indicate like parts throughout the several views.

In carrying out my invention, I employ a base-plate or chair 1, which is provided at one side only with an upright flange, 2, its other side being perfectly flat, whereby it may be readily slipped under the foot flanges, 3, of the rails, 4. The upper side of this base plate 1, however, is provided with a horizontal rib



or boss, 5, which serves as a fulcrum and takes its bearing to one side of the center or webs of the rails, whereby the base-plate may be utilized as a lever for proportionally distributing the strain, as shown and described in my application, Serial No. 436,676, filed June 14, 1892.

If desired, ordinary fish plates, 6, 7, may be clamped or bolted to both sides of the webs of the rails for holding them against lateral play, and in alignment, in the usual manner. These fish plates may be secured to each of the rails near their intersection, by means of the ordinary short-bolts 8, but at other places throughout the length of the fish plates, I prefer to dispense with such bolts and employ long, stout bolts, 9, 10, which are of sufficient length to project through the rails and both fish plates, and also through the upright flange 2, on the base-plate 1. These bolts, 9, 10, are preferably located at the extreme ends, respectively, of the flange 2, and they also pass through a truss plate 11, supported by the rail flanges on the opposite side to the flange 2, and being conterminous therewith. In order that the bolts 9, 10, may be utilized for firmly clamping the fish plates 6, 7, against the webs of the rails, I interpose between the plate 7 and the flange 2, on one side, and the truss 11 and plate 6 on the other side, a suitable filling which will give the flange 2 and plate 11 solid bearings against the fish plates. This filling on one side consists of a filling block, 12, which is preferably a section of channel iron, as shown in Fig. 6, provided with a perforation 13, in its vertical side, for the passage of the bolts 9—10, and having horizontal portions of sufficient length to come against the fish-plate 7, and arrest the inward movement of the flange 2, before the latter strikes the edge of the rail flange. On the other side of the rail the said filling consists of a washer 14 which I sleeve upon each of the bolts 9—10 and which may be, if desired, composed of a section of pipe of sufficient length to hold the upright truss-plate 11 at or near the outer edge of the foot flanges. Thus, it will be seen, that by tightening up the bolts 9, 10, the filling blocks, 12, whose lower sides are preferably inclined and rest directly upon the rail flanges, will be caused to slide up such rail flanges until the inner ends of their horizontal members find a firm bearing against the fish plate, 7, while at the same time, the truss-plate, 11, whose lower edge is also, by preference, made complementary to the surface of the flanges 3, will be drawn toward the rails and crown the washers 14 firmly against the fish-plate, 6.

Located at a point near the mid-length of the joint, preferably directly opposite the intersection of the rails, is a stout bolt, 15, which passes vertically through the base-plate 1, near the edge of the rail flanges, and supports one side of the base-plate on the truss 11, while the other side of such plate, as before explained, is hung from the foot flanges

of the rail by means of the bolts, 9, 10, by which the fish plates, 6, 7, are clamped against the rail web. As a means for supporting the bolt 15 upon the truss 11, I pass the bolt through the horizontal portion 16 of an angle iron, or plate, which has a bearing upon the upper edge of the truss-plate 11, and rests with its vertical portion, 17, against the outer side of the bolt 15. The upper edge of the truss-plate 11, is preferably beveled, and the portion 16 of the angle iron is provided with a beveled nose or edge complementary to the bevel of the truss-plate, and engages therewith so as to preclude the possibility of the angle-iron slipping off the truss-plate when the bolt 15 is tightened up. The angle of the portions 16, 17, is preferably slightly less than a right angle, so that when the nut 18, which has its bearing upon the horizontal portion 16, is tightened, the lower edge or end of the portion 17 will firmly impinge the bolt 15, and by the time the nut 18, has been fully tightened, the portion 17 will bear throughout its entire height, against the bolt, and the portion 16 will be horizontal and afford a firm and uniform bearing for the nut,—the angle-iron being of course, sufficiently elastic to permit of this independent movement of its members. The truss-plate 11 is arranged on the opposite side of the rails to that on which the wheel flanges pass, and hence it may be made of much greater vertical extent or diameter than the flange 2, thereby greatly adding to the strength of the joint. When the bolt 15, is tightened up, the effect will be to support one side of the base-plate, upon the truss plate 11, while the other side of such base-plate will be drawn down transversely of the bolt 9, 10; but this downward movement will be resisted by the filling blocks 12, which bear upon the rail flanges near their outer edges and support the bolts 9, 10, adjacent to the flange 2, through the medium of which latter the strain is transmitted. The tendency of the bolt 15, when tightened up, is, of course, to cant outward or away from the rail, but this movement is resisted by the downwardly projecting member, 17, of the angle-iron, which holds the horizontal member, 16, in a strictly horizontal position, that is, at right-angles to the truss-plate 11, and consequently causes the strain to be transmitted to the vertical diameter of such truss-plate. The inward movement of such bolt is, of course, resisted by the plate 11, against which it bears.

The base-plate 1, and its flange 2, may be of any desired length, as it is not dependent for its support upon the cross-ties; but in order that the creeping of the rails may be avoided, I prefer to extend such base-plate across at least two of the ties and provide notches, 19, in a projecting flange 20, through which spikes, 21, may be driven into the cross-ties, or other support (not shown) for the rails.

The fish plates 6, 7, are, of course, put on and their bolts tightened up before the other members of my joint are put in place, and in



order that there may be no difficulty arising from the loosening of the nuts on the bolts 8, such nuts may be locked by any of the well known forms of nut locks. By this arrangement I gain or utilize the full vertical strength of the truss-plate 11, at the point where it is most needed, that is, the inter-section of the rails, and by supporting the rails on the base-plate 1, while the latter is held at both ends, and at a remote point from the inter-section of the rails, I gain in addition, not only the full strength of the base-plate, but also the full vertical strength of the upright flange 2.

While it is believed that a single one of the bolts, 9, 10, at each end of the joint is sufficient for all practical purposes, I wish it to be understood, nevertheless, that it would not involve a departure from the spirit of my invention, to arrange two such bolts at each end of the joint and make the filling blocks 12 of sufficient length to accommodate them, as shown in Figs. 7 and 8.

If desired, one of the fish plates may be omitted and the horizontal members of the filling blocks 12 made of sufficient length to bear directly against the rail web. And to further simplify the construction, the upper half of each of the filling blocks 12 might be cut away, as shown in Figs. 9 and 10, leaving in each a depression or concavity 13<sup>a</sup>, in which the bolts are seated, and by which the filling blocks are held against displacement. In the event that one of the fish plates is omitted, the nuts of the short bolts would, of course, find their bearing directly against the webs of the rails, as shown in dotted lines in Fig. 9.

Inasmuch as the purpose of the angle-iron consisting of the portions 16, 17, is to form a firm and solid bearing for the nut 18 and prevent the bolt 15 from canting outward, it is quite evident that the particular form herein shown and described is not essential for the attainment of the objects of my present invention, and if desired, any of the forms shown and described in my aforesaid application might be employed in its stead.

The bolts, 8, 9, and 10, may be passed through the bolt holes usually formed in the ends of the ordinary rails and fish-plates, and the fish-plates may be of any well known or suitable form.

As an effective means for holding the upper edges of the ends of the rails asunder, so as to prevent the shearing off of such edges before described, I employ a thin filling or plate, 22, which may be composed of steel or any other substance sufficiently hard to withstand the compression resulting from the expansion of the rails, and the additional compression caused by the downward movement of the rails at the joint, when subjected to the weight of the rolling stock. This plate 22, may be approximately the shape of the cross-section of the rail, but whatever its shape be, its upper edge should, of course, be located a slight distance below the surface of the rails, as shown in Figs. 11 and 12, in order that the

upper edges of the rails may be free from contact with each other or with any other hard substance when they are deflected. The plate or filling 22, may be placed between the ends of the rails and held in place by means of the fish plates 6, 7, as shown in Fig. 11, or by any other joint that might be used. By providing the plate 22 with a "T" foot, 22<sup>a</sup>, like the foot flange of the rail, the fish plates or other parts of the joint will hold the plate from being purposely withdrawn or accidentally jarred upward above or flush with the surface of the rails.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a rail joint, the combination with the rails, of a base plate having a fulcrum on the under side of the rails and being supported at one side upon one side of the rail flanges and means for adjustably suspending the other side of said base plate on the other side of the rails, and being adapted to force the base-plate upward relatively to the rails substantially as set forth.

2. In a rail joint, the combination with the rails, of a base-plate supported at one side upon one side of the rail flanges and a bolt adjustably supporting the other side of said base-plate upon the other side of the rail flanges, and being adapted to force the base-plate upward relatively to the rails, substantially as set forth.

3. In a rail joint, the combination with the rails, of the bolts for holding the rails in alignment or against lateral play, a base-plate supported by said bolts on one side, and means for adjustably suspending the other side of said base-plate from the foot flanges of said rails, substantially as set forth.

4. In a rail joint, the combination with the rails, of the bolts for holding the rails in alignment or against lateral play, a base-plate supported by said bolts on one side and having a boss or fulcrum resting against the under side of the rails, and means for clamping the other side of said base-plate upon the foot flanges of the rails, substantially as set forth.

5. In a rail joint, the combination with the rails, of the bolts for holding the rails in alignment or against lateral play, a base-plate supported by said bolts on one side, a truss-plate supported by the foot flanges of the rails and means for supporting the other side of the base-plate, on said truss-plate, substantially as set forth.

6. In a rail joint, the combination with the rails, of a base-plate having a flange on one side thereof, a truss-plate supported by the foot flanges of the rails, bolts passing through said truss-plate and flange for drawing them toward the rails, and means for adjustably clamping the foot flanges of the rails between said truss and the other side of said base-plate, substantially as set forth.

7. In a rail joint, the combination with the



rails, of a base-plate having an upright flange on one side thereof, a truss-plate supported by the foot flanges of the rails, bolts passing through the rails, flange and truss-plate, fillings interposed between the rails and said truss-plate and flange, and means for drawing the other side of said base-plate and truss-plate toward each other, substantially as set forth.

8. In a rail joint, the combination with the rails, of a base-plate having an upright flange on one side thereof, a truss-plate supported by the rail flanges, bolts passing through the rails, said truss-plate and upright flange, filling blocks interposed between the rails and said upright flange and arranged to support said upright flange against downward movement, washers interposed between said truss-plate and rails, and means for drawing the other side of said base-plate and truss-plate toward each other, substantially as set forth.

9. In a rail joint, the combination with the rails; of a base-plate having an upright flange on one side thereof, a truss-plate supported by the foot flanges of the rails, fish-plates, bolts passing through said truss-plate, the upright flange, and the fish plates and rails, washers interposed between said truss-plate and one of said fish-plates, filling blocks interposed between the other of said fish-plates and said upright flange, and being arranged under and supporting said bolts, and means for drawing the other side of the base-plate and the said truss-plate toward each other, substantially as set forth.

10. In a rail joint, the combination with the rails, of the base-plate fulcrumed against the under side of the rails, and being provided on one side with an upright flange, a truss-plate supported by the foot flanges of the rails, bolts passing through the rails and through said truss-plate and upright flange, washers and filling blocks interposed between

the rails and said truss-plate and upright flange, and a bolt for supporting the other side of said base-plate upon the upper edge of said truss-plate, substantially as set forth.

11. In a rail joint, the combination with the rails, of a base-plate supported upon one side thereof, a truss-plate arranged on the other side of the rails, bolts passing through the rails for holding said truss-plate against outward movement, and a bolt passing through the base-plate and having a bearing or support on the said truss-plate, substantially as set forth.

12. In a rail joint, the combination with the rails, of a base-plate fulcrumed against the under side of said rails and having an upright flange on one side, a truss-plate supported upon the foot flanges of the rails, fish-plates, filling blocks and washers interposed between said fish-plates and truss-plate, and upright flange, bolts passing through said truss-plate, the rails and fish plates, and supporting said upright flange upon said filling blocks, a bolt passing through the other side of said base-plate and arranged to rest against the said truss-plate, and an angle-iron through which said bolt passes, resting upon said truss-plate and forming a bearing for the said bolt, substantially as set forth.

13. In a rail joint, the combination with means for holding the rails in alignment, of a thin plate interposed between the ends of the rails and having its upper edge arranged below the surface of the rails, the shape of said plate being approximately that of the cross section of the rail, whereby it will be held in place by the said means for holding the rails in alignment, substantially as set forth.

MILTON C. NILES.

Witnesses:

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