No. 845,025. PATENTED FEB. 19, 1907.

G. H. WILLIAMS.

ANGLE OR SPLICE BAR.

APPLICATION FILED MAR. 31, 1906. RENEWED DEC. 12, 1906.

Fig. 1.

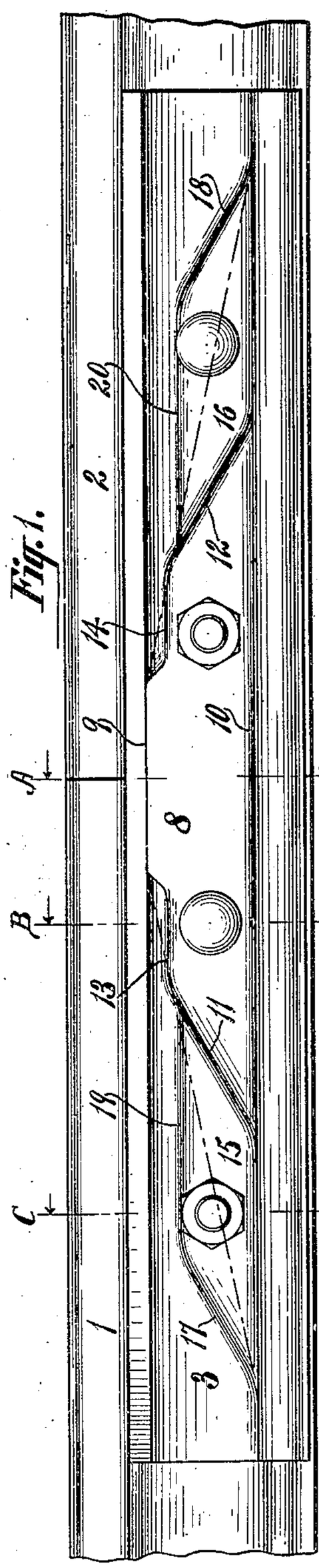


Fig. 3.

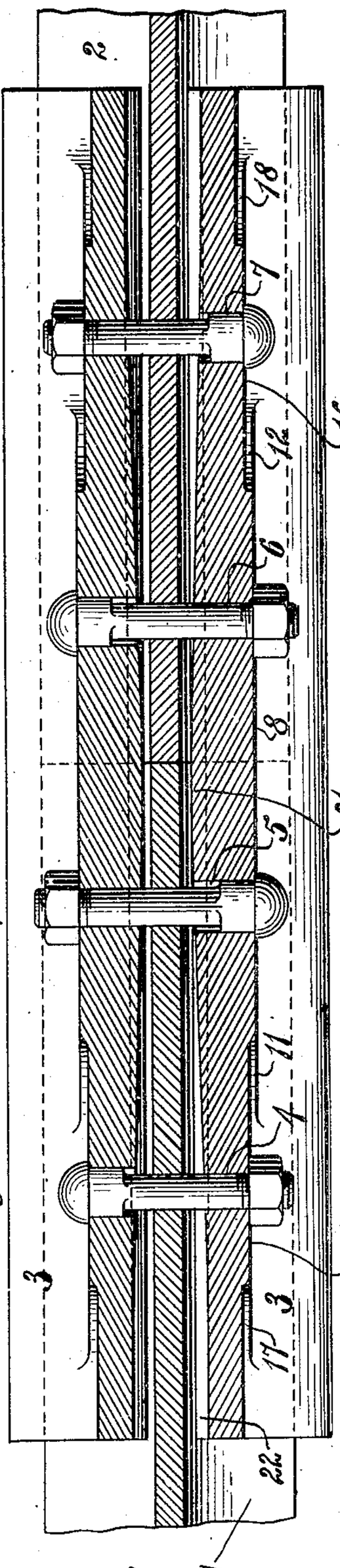


Fig. 2.

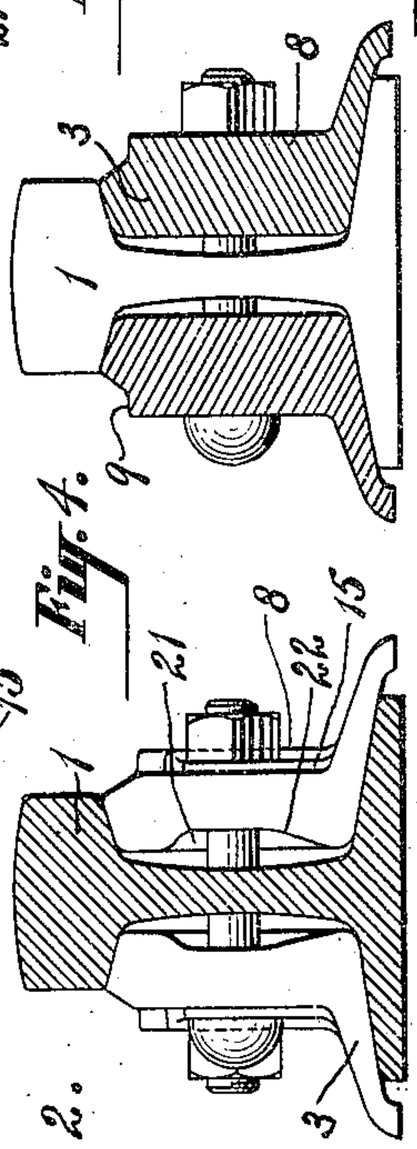


Fig. 6.

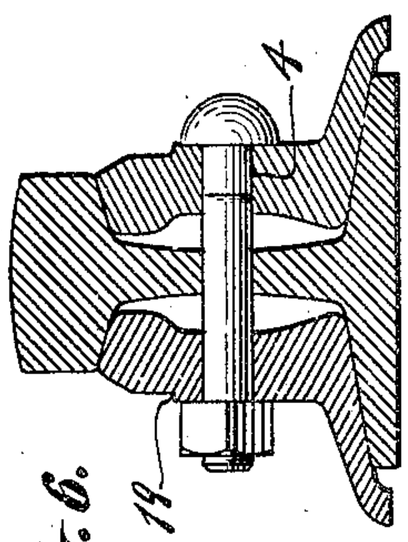


Fig. 5.

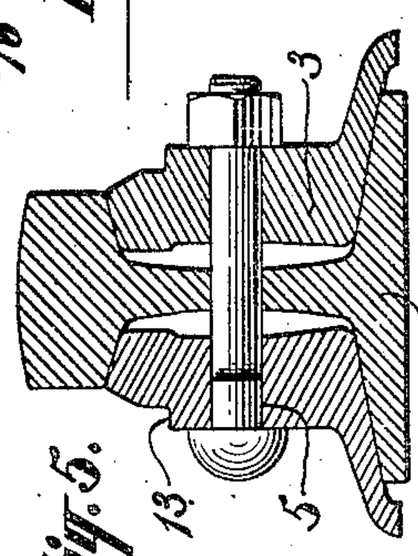
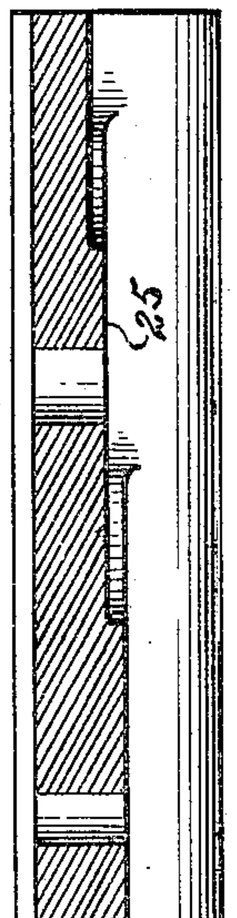


Fig. 7.



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ANGLE OR SPLICE BAR.

No. 845,025. Specification of Letters Patent. Patented Feb. 19, 1907.

Application filed March 31, 1906. Renewed December 12, 1906. Serial No. 347,552.

To all whom it may concern:

Be it known that I, GEORGE H. WILLIAMS, a citizen of the United States, and a resident of Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Improvement in Angle or Splice Bars, of which the following is a specification.

My invention relates to angle or splice bars for uniting the adjacent ends of railway-rails, with the object in view of economizing metal and at the same time maintaining the stiffness of the joint in harmony with the stiffness of the particular rail employed.

As engines and loaded cars move along railway rails their wheels produce waves in the rails somewhat similar to the wave produced by a person sliding over thin ice, the crest of the wave preceding the point of contact between the wheel and rail. If the joint between two consecutive rails be either too stiff or too limber, this wave in the rail will be thrown out of its normal shape and breakage or jolting, or both, will result.

My present invention provides for uniting the ends by angle or splice bars which at their middle portions have a combined stiffness and strength corresponding substantially to the strength of a mid rail-section and which decrease in stiffness as they extend away from the joint in substantially the same ratio as the rail increases in stiffness from its end toward a mid rail-section. The lengths of the waves hereinabove referred to have recently been determined with a fair degree of accuracy for the different weights of railway-rails in common use, and this enables me to practically construct angle or splice bars to suit the demands of the various roads using different weights of rails. It is also important that the bolt-holes for securing the angle or splice bars to the rails be taken into account, as these interrupt the otherwise uniform increase or decrease in stiffness in both rails and splice or angle bars.

In the accompanying drawings, Figure 1 is a view in side elevation of an angle-bar in position connecting the ends of two rails. Fig. 2 is an end view of the bars, the rail being shown in section. Fig. 3 is a horizontal section along the plane of the bolt-holes. Figs. 4, 5, and 6 are transverse sections of a bar on the lines A A, B B, and C C, respectively, of Fig. 1; and Fig. 7 is a horizontal section of a modified form in which the reinforce on the inner face of the bar is omitted.

The rails are denoted by 1 and 2, the body of the angle-bar by 3, and the bolt-holes, in the present instance four, are denoted by 4, 5, 6, and 7. While I have shown the angle-bar form of connecting-bar, my invention applies equally well to the splice-bar form, in which the base-flange is omitted. As the two bars employed at a single joint are quite similar in construction, the description of one will suffice for both.

At the middle portion the bar is provided with a reinforce 8 on its outer face, which reinforce has its outer face flat, its upper edge 9 comparatively short, and its base 10 comparatively long, giving to its opposite ends 11 and 12 a pronounced slant and forming a truss-like support. At points above the holes 5 and 6 nearest the joint the slanting ends 11 and 12 of the reinforce are carried along horizontally for a short distance, as shown at 13 14, to prevent the stiffness of the bar from diminishing too rapidly where it is cut away to form bolt-holes.

Secondary reinforcements (denoted by 15 and 16) of about half the thickness of the reinforce 8 extend from the opposite ends of the reinforce 8 past the bolt-holes 4 and 7, the outer ends 17 and 18 of these secondary reinforcements having a pronounced slant and their top edges 19 and 20 extending horizontally over the bolt-holes 4 and 7 to prevent a too rapid decrease in the stiffness of the bar at these points where the metal is cut away.

The most natural shape for the truss-like reinforce on the exterior of the bar while maintaining its outer surface flat to receive the bolt-heads and nuts would be a gradual slant from the top edge 9 to the base at or near the opposite ends of the bar, as shown by dotted lines, Fig. 1; but this would not afford the strength required at the weakest or bolt-hole portions of the bar, and this line may be of importance in determining the extent of the variations required at the bolt-hole portions to maintain the gradual decrease in stiffness without a waste of material.

To add to the stiffness of the bar along a plane more directly under the head of the rail, the bar 3 may have a reinforce 21 on its inner face and gradually tapered from its thickest central portion at the middle of the bar toward the opposite ends of the bar, vanishing into the wall of the bar within the cove 22 on the inner face of the bar.

In practice for uniting eighty-pound rails

each angle-bar may have an end area of 3.92 inches, a central area of 4.49 inches, and an area midway of center and end of 4.20 inches employing steel having an elastic limit not less than one-half its ultimate strength; ultimate strength per square inch, fifty to sixty thousand pounds elongation, .22 per cent. This will afford at the joint a combined angle-bar strength equal to the strength of the rail itself and, what is also important, a stiffness equal to the stiffness of the rail at its middle section, and the decrease in stiffness of the angle-bars, assuming them to be thirty inches in length, will approximately correspond to the increase in stiffness of the rail from its extreme end toward a section half a bar's length distant from the end, the bars extending in both directions from the joint a distance sufficient to bridge the extreme width of a wave in the rail under any normal train-load. This will cause the wave in advance of the wheel to pass over the joint without becoming distorted either by too great a depression of the end of the rail, as happens when the angle-bars are too weak or limber, or too great rigidity of the rail ends, as happens when the angle-bars are too stiff or rigid.

The reinforcement may be on the outer side of the angle-bar only, as shown in Fig. 7, in which form the primary reinforcement 23 and the secondary reinforcements 24 25 are somewhat thicker than where a part of the reinforce is on the inner face of the bar.

What I claim is—

1. A splice or angle bar provided with a plurality of vertically-tapered reinforcements of different heights arranged with their narrower ends uppermost whereby the ratio of stiffness in the splice-bar decreases from its middle portion toward its end substantially as the ratio of stiffness in the rail increases from its end toward the end of the splice-bar.

2. A splice or angle bar for uniting the ends of railway-rails, said bar being provided with vertically-tapered truss-like reinforcements on its outer face gradually decreasing in stiffness from the middle portion of the bar toward its opposite ends, the taper of the reinforcements being interrupted at bolt-hole intervals to maintain the desired strength at the bolt-hole portions.

3. A splice or angle bar for uniting the ends of railway-rails, the said bar being provided with reinforcements on both its outer and inner faces.

4. A splice or angle bar for uniting the ends of railway-rails, the said bar being provided with a reinforcement on its inner face tapered in a horizontal plane and with a reinforce on its outer face tapered in a vertical plane.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 27th day of March, 1906.

GEO. H. WILLIAMS.

Witnesses:

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