

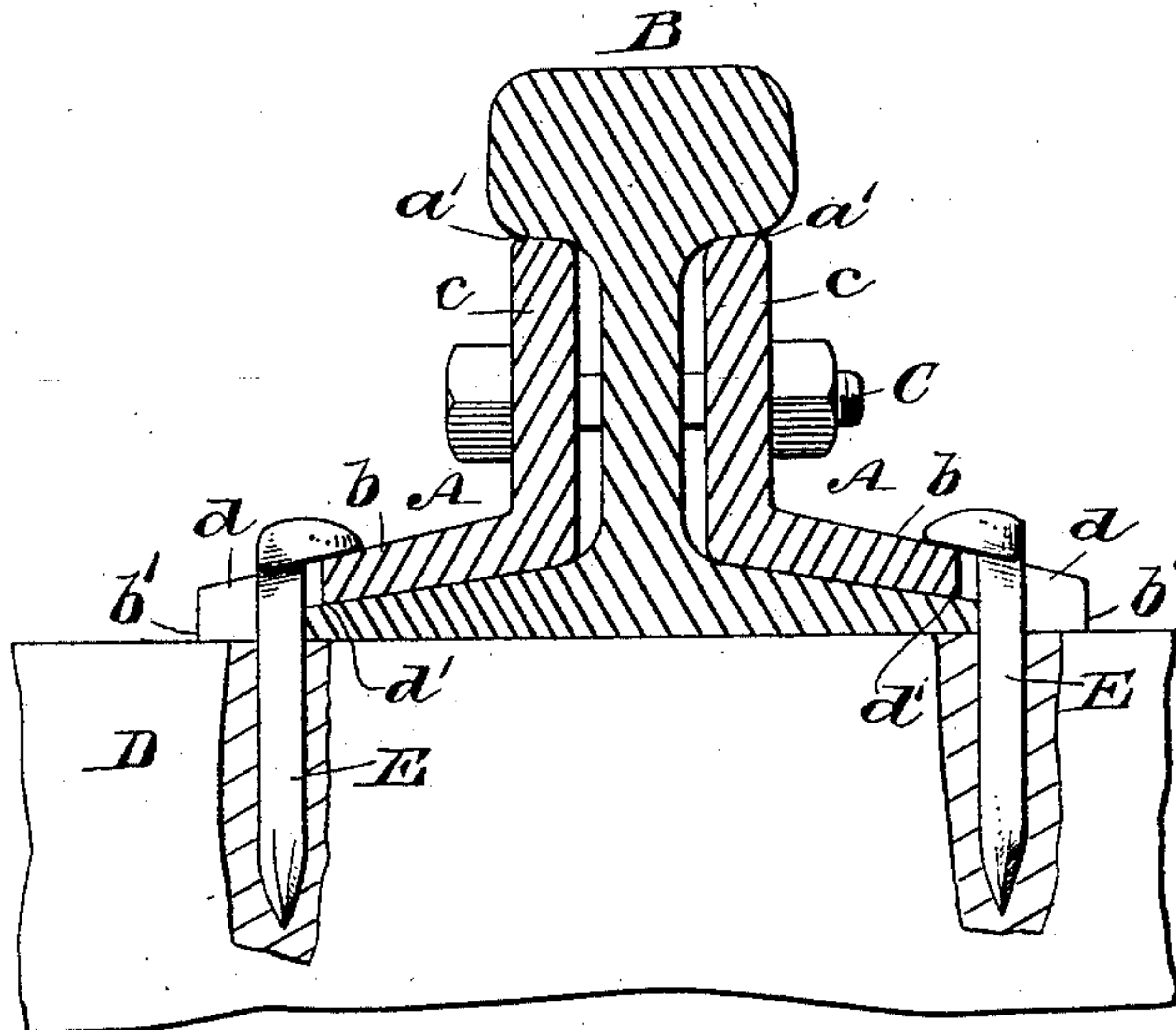
(No Model.)

T. A. DAVIES.  
RAILWAY FISH PLATE.

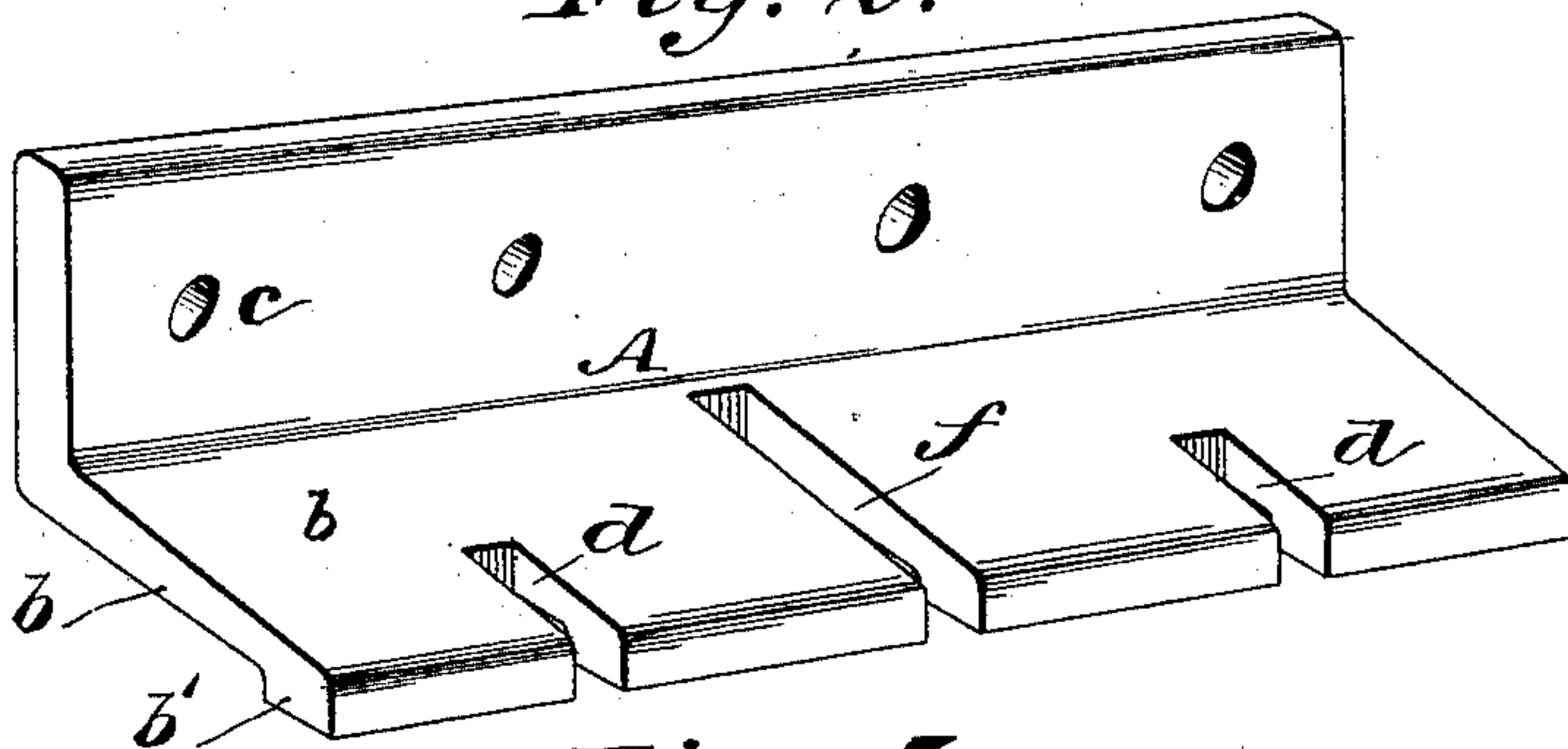
No. 362,251.

Patented May 3, 1887.

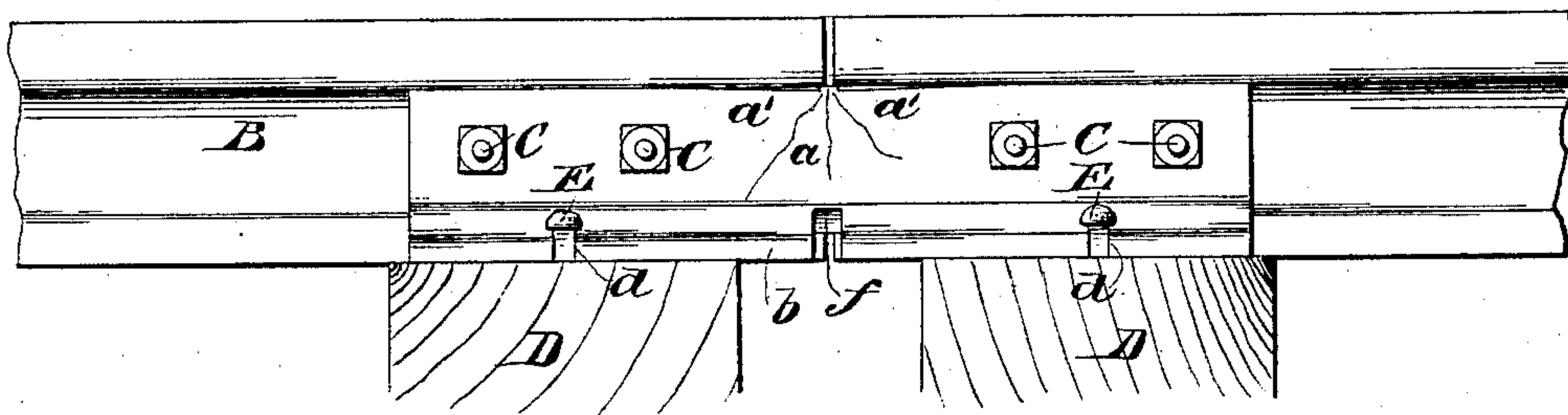
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

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## RAILWAY FISH-PLATE.

SPECIFICATION forming part of Letters Patent No. 362,251, dated May 3, 1887.

Application filed February 17, 1887. Serial No. 227,955. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS A. DAVIES, of the city, county, and State of New York, have invented a new and Improved Railway Fish-Plate, of which the following is a full, clear, and exact description.

My invention relates to the angle railway fish-plate constructed to be bolted to the webs of the rails, and to have a bearing at the outer edge of its base-flange upon the cross-ties.

The necessity for a certain elasticity to exist in railway-tracks is well understood, which permits a yielding of the rails under passing trains and produces the undulation or "wave" motion, as it is termed. This motion causes constant chafing of the treads of the rails upon the upper edges of the fish-plates, where the ends of the rails meet and rest thereon, causing the plates to be rapidly worn away at that point, and it is a desideratum that the wave motion should not be interrupted at the joints, for if the track is stiffer at the joints than at other parts throughout the lengths of the rails a jumping and unsteady motion is given to the trains. Another desideratum is to provide for the restoration of the bearings of the fish-plates upon the treads of the rails by tightening up the bolts after the unavoidable wear has worked a partial destruction of the plates, thus enabling the proper conditions to be preserved without the necessity of often replacing old fish-plates with new ones.

As commonly constructed, the angle fish-plate possesses no elasticity in itself whatever, and the wave motion, if it takes place at all at the joints of the rails, must take place in spite of the rigid opposition of the plates to such motion. It is not uncommon for fish-plates of the usual construction to fracture at the upper edge of the vertical flange, as indicated at *a*, Figure 3. This indicates the intense strain to which the plates are subjected, and also the opposition they exert to the wave motion. If, to avoid breaking, the plates are made sufficiently heavy and strong to stand the strain, they interrupt the wave motion and cause jumping.

It is also observed, as above intimated, that the ends of the rails wear rapidly into the upper edges of the fish-plates, as indicated at *a'*, Fig. 3. This is due largely to the rigid forma-

tion of the plates, and to the common method of applying them to the rails and cross-ties, which latter precludes all lateral movement of the plates, the spikes always being driven hard against the inner edges of the slots made in the base-flanges of the plates to receive them. If the wear at *a'* is but slight, it prevents independent depression of the rails, which exposes them to pounding. When this takes place, the old plates must be removed and new ones put on, for, owing to the rigid construction of the common plates, their bearings beneath the treads of the rails cannot be restored.

The object of my invention is, first, to avoid as much as possible the friction of the ends of the rails upon the upper edges of the fish-plates, which I accomplish in a large degree by avoiding lateral contact of the base of plate with the spikes, so that the depression of the rail will not be resisted by the spikes which hold the fish-plates to the cross-ties.

Another object of my invention is to render the fish-plates flexible both vertically and laterally, so that they will not interrupt the wave motion nor fracture, will hold the rails with perfect security, will receive less wear at the upper edges than the common plate, and when so worn may be tightened upon the rails to restore the bearings.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Fig. 1 is a transverse sectional elevation, showing the application of my new and improved fish-plates to a railway-joint and cross-tie. Fig. 2 is a perspective view of one of my new fish-plates; and Fig. 3 is a side elevation of a railway-joint, indicating the wear and strain upon the fish-plates.

The fish-plates *A* are bolted to the rails *B B* by bolts *C*, in the usual manner, and are secured to the cross-ties *D* by the spikes *E*, passed through the slots *d d*, made in the base-flanges *b* of the plates. The outer edges of the base-flanges of the plates are formed with the steps *b'* to rest upon the ties, as shown clearly in Fig. 1; but these steps may be omitted and the plates constructed in any suitable manner to have no bearing upon the cross-ties, and the upper edges of the vertical flanges *c* bear



snugly beneath the treads of the rails in the usual manner. The slots  $d$  in the base-flanges are cut in beyond the outer edges of the base of the rails, as shown at  $d'$ , and the spikes E are driven in the cross-ties in close contact with the base-flanges of the rails. By thus slotting the fish-plates beyond the edges of the base of the rails there is no lateral contact of the fish-plates with the spikes; but the rails themselves are held from lateral movement by the direct contact of the spikes. In this manner the fish-plates are relieved of the bracing action of the spikes and have what is called "repose bearings," so that the plates are free to take the movement of the rails when depressed by passing trains, and this largely does away with the grinding and friction at the ends of the rails upon the edges of the fish-plates and prolongs the life of the plates.

The base of each fish-plate is slotted, as shown at  $f$ , in the middle, up to, or nearly to, the vertical face  $c$ . This to a great extent destroys the mutual truss action of the flanges  $b$   $c$  upon each other and renders the fish-plate flexible both vertically and laterally, which obviates wear at  $a'$ , prevents the interruption of the wave motion, and, when wear takes place at  $a'$ , enables the bearing to be restored by tightening the center bolts of the plates.

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

1. As a new and improved article of manufacture, an angle fish-plate whose vertical flange is relieved of the truss action thereon

of the base-flange by a complete severance of the base-flange at or near its center, substantially as described.

2. The angle fish-plate A, formed with the slots  $d$ , cut into the flange beyond the edge of the base of the rail, so as to leave a space between the plates and the spikes, substantially as and for the purposes described.

3. The fish-plates A, secured to the rails B by the bolts C, in combination with the spikes E, driven into the cross-ties in contact with the edges of the base of the rails, the fish-plates being slotted in beyond the edges of the base of the rails, substantially as described.

4. The two angle fish-plates A, separate from each other and applied to opposite sides of the rails B and held by bolts C, and slotted at  $f$  near the centers of the base-flanges, in combination with the spikes E, driven into the cross-ties, with the heads of the spikes engaging the base-flanges at points above the base of the rails B, substantially as described.

5. The fish-plates A, resting upon the cross-ties at  $b'$ , and bolted to the rails by the bolts C and slotted at  $d$ , in combination with the spikes driven into the cross-ties in contact with the edges of the base of the rails, the slots  $d$  being extended into the plates beyond the edges of the base-flanges of the rails to form a space between the plates and the spikes, substantially as and for the purposes described.

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