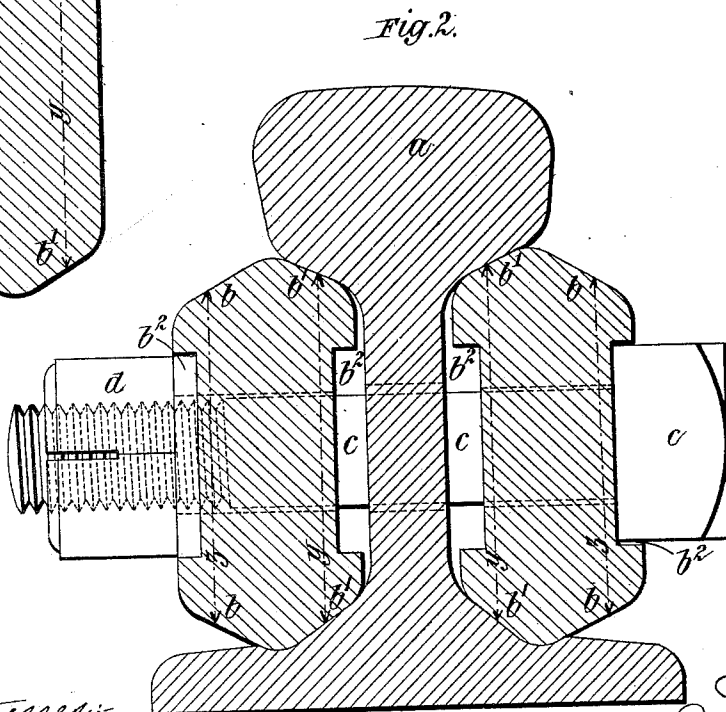
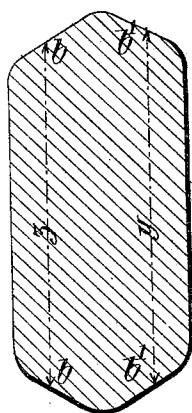


3 Sheets—Sheet 1.

No. 467,812.

Patented Jan. 26, 1892.



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(No Model.)

3 Sheets—Sheet 2.

A. B. IBBOTSON.
FISH PLATE FOR RAILWAY RAILS.

No. 467,812.

Patented Jan. 26, 1892.

Fig. 4.

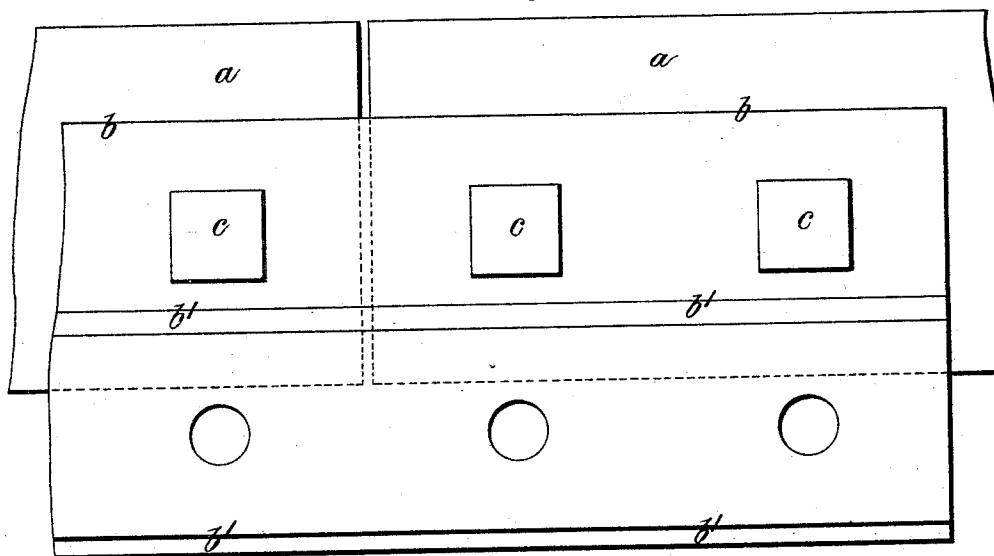


Fig. 5.

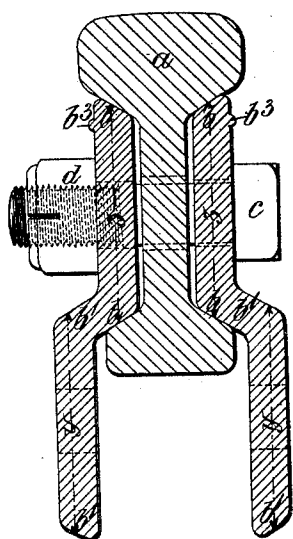
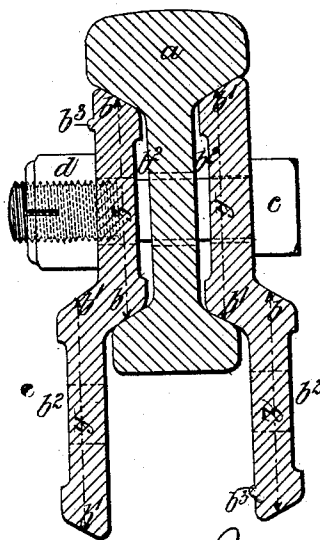


Fig. 6.



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3 Sheets—Sheet 3.

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Fig. 7.

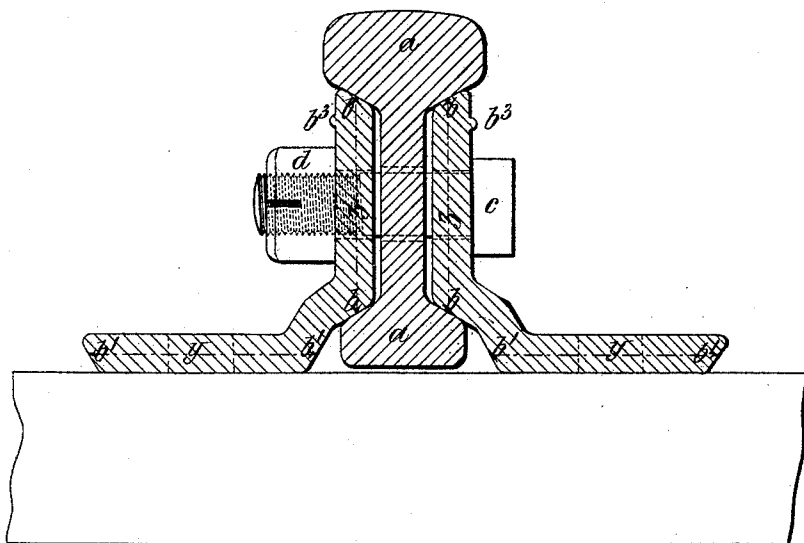


Fig. 8.

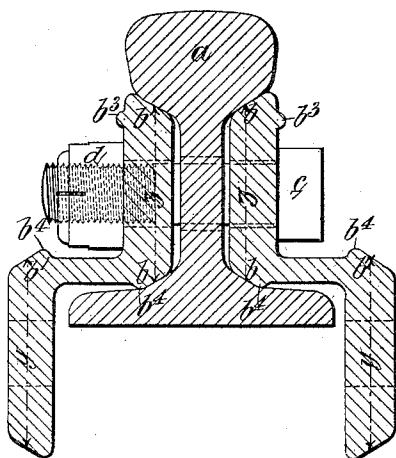
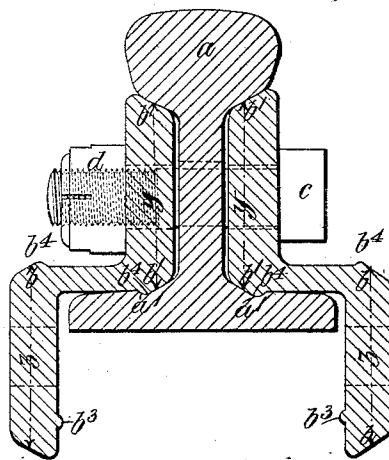


Fig. 9.



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UNITED STATES PATENT OFFICE.

ALFRED BUCKINGHAM IBBOTSON, OF SHEFFIELD, ENGLAND.

FISH-PLATE FOR RAILWAY-RAILS.

SPECIFICATION forming part of Letters Patent No. 467,812, dated January 26, 1892.

Application filed June 1, 1891. Serial No. 394,720. (No model.)

To all whom it may concern:

Be it known that I, ALFRED BUCKINGHAM IBBOTSON, merchant, a subject of the Queen of Great Britain, and a resident of Sheffield, England, have invented certain new and useful Improvements in and relating to Fish-Plates for Railway-Rails, of which the following is a specification, reference being had to the accompanying drawings.

My invention is designed to provide more efficiently and economically than heretofore for uniting the ends of railway-rails; and my said invention comprises improved fish-plates, the durability of which will be much greater than that of the fish-plates hitherto employed, whether the latter are of the ordinary form or of the form known as "deep" fish-plates.

The fish-plates ordinarily employed, when first applied to the rails, bear at their upper and lower edges against the under side of the heads and the upper side of the feet of the rails, and the surface of each fish-plate is in contact with the rails only at these parts, there being a space between the inner surface of each fish-plate and the web of the rails, so that as the rails and fish-plates become worn down on their respective bearing parts where in contact the said fish-plates can from time to time be further tightened up again upon the rails by the fish-bolts and nuts used therewith and will thus be brought closer to the said web. When, however, a sufficient amount of wear of the rails and fish-plates has taken place between their respective parts that are in constant contact and the fish-plates have been repeatedly retightened, the vertical inner surfaces of the fish-plates come in contact with the web of the rails, so that no further tightening up can be effected, and it has been customary to then remove these fish-plates and substitute therefor ordinary new fish-plates which had been rolled to suit the section of new rails, and which therefore do not properly fill up the spaces in worn rails; but by my invention I provide an improved fish-plate, the durability of which is not only more than double that of an ordinary fish-plate, but which affords very much greater vertical support to the rails than the ordinary fish-plates. For this purpose I make each of my improved fish-plates double

and reversible—that is to say, my improved reversible fish-plate consists of a single piece of metal resembling two fish-plates, one slightly larger than the other, united together by solid metal, so that when the rails and the bearing-surfaces of the smaller or first operative part or section of my reversible fish-plate are too much worn for this smaller or first operative part or section to be of any further service the fish-plate can be reversed and the bearing-surfaces of the larger or second operative part or section thereof be caused to bear properly against the rails and fill up the increased space left between the head and foot of the rails by reason of the wear of the same.

I make the distance between the bearing-surfaces of the operative part or section of the reversible fish-plate to be used second (after the rail has been worn) so much greater than that between the bearing-surfaces of the operative part or section to be used first (before the rails are worn) as to compensate for the wear of the rails, which occurs while the smaller or first operative part or section is in use for connecting the said rails. Therefore when it becomes necessary by reason of the wear of the sloping parts of the rails and of the smaller or first operative part of my reversible fish-plate first put in use to reverse the said fish-plate the larger or second operative part or section thereof will correspond to the greater space (caused by wear) between the head and foot of the rails, the space between the inner surface of the larger or second operative part or section of the reversible fish-plate and the web of the rails being equal or about equal to that which existed between the inner surface of the smaller or first operative part or section of the reversible fish-plate and the web of the rails when the smaller or first operative part of my said reversible fish-plate was first applied to the rails.

In the accompanying drawings I have shown various forms or modifications of my double reversible fish-plates.

Figure 1 is a transverse section through a rail-joint fastened with two of my reversible fish-plates and showing the bearing-surfaces *b b* of the smaller or first operative part or section thereof bearing against the sides near

the ends of new rails of corresponding section. Fig. 2 is a similar view showing the said fish-plates reversed after some wear and showing the bearing-surfaces b' b' of the larger or second operative part or section thereof bearing against the sides near the ends of worn rails and filling up the greater space due to wear of the rails. It will be observed in this figure that the distance between the plates and the web of the rail is the same or about the same as in Fig. 1 when the rail was new. Fig. 3 shows in transverse section another form of my reversible fish-plate. Fig. 4 is a side elevation, and Fig. 5 a transverse section showing two of my deep-dipping reversible fish-plates applied to the rails. Fig. 6 is a transverse section illustrating a slight modification in the form of my deep-dipping reversible fish-plates. Fig. 7 is a transverse section showing a rail to which are applied two of my laterally-extended reversible fish-plates. Figs. 8 and 9 are transverse sections showing a further modification of my said invention.

Like letters indicate corresponding parts throughout the drawings.

a a are the rails.

b b' are the two operative parts or sections of my improved reversible fish-plate.

b^2 b^2 are recesses in the fish-plates.

b^3 b^3 are ribs for distinguishing first from second operative parts.

b^4 b^4 are projecting ribs to produce indentations in the upper surface of the rail-foot.

a' a' are indentations in the rail-foot.

cc are the fish-bolts, which are provided with nuts d .

z indicates by dotted lines and arrow-points the distance between the bearing-surfaces of the portion to be used first, and y indicates by dotted lines and arrow-points the distance between the bearing-surfaces of the portion to be used second.

Each of the reversible fish-plates shown in Figs. 1 and 2 consists of a single piece of metal somewhat resembling at first sight two ordinary fish-plates placed back to back and solidly united; but the operative part or section b of each reversible fish-plate, which is to be put in use first, is made to fit new or unworn rails, as shown in Fig. 1.

The operative part or section b' of each reversible fish-plate, which is to be put in use last, has its bearing-surfaces at a greater distance apart than those of the section b —that is to say, the distance between the bearing-surfaces b' at the line y is so much greater than that between the bearing-surfaces b at the line z that when the bearing-surfaces of the latter section and of the rails in contact with each other become worn to such an extent that no further tightening up of this section is practicable, then the section b' will properly fit the worn rails as if the rails had not been worn, as shown, for example, in Fig. 2.

I find it advantageous to reduce the thickness or distance between the sides of my re-

versible fish-plate, except at the operative edges thereof, so as to facilitate the punching of the bolt-holes. For this purpose the fish-plates shown in Figs. 1 and 2 are made with a recess b^2 in each side thereof, and I may so form my said reversible fish-plates that the bolt-heads will fit into either of the said recesses b^2 , and the bolts will thus be restrained from rotation, for, as is well known, I can then dispense with square holes in my reversible fish-plates and with square necks on the fish-bolts. It is evident, however, that I can, if desired, make the said reversible fish-plates without such recesses, as shown in Fig. 3.

According to another modification of my said invention illustrated in Figs. 4 and 5 my improved reversible fish-plate consists of a single piece of metal somewhat resembling in shape or configuration what is known as a "deep-dipping" fish-plate, excepting that in an ordinary deep-dipping fish-plate only the upper part is designed to bear against the rails, the deep-dipping part being for vertical strength and not capable, by reason of its section, of being reversed, while in my improved deep-dipping reversible fish-plate the deep-dipping part is so designed—*i. e.*, made larger than the upper part—as to be capable, when reversed after wear of rail, of filling up the increased space caused by wear of the rail.

One of the operative parts or sections b b' of my said reversible fish-plate dips below the base of the rails and is beneath and parallel to the other part or section, and has its upper edge united by solid metal to the lower edge of the latter, the operative part or section not in use for the time being facing outward below the rail and the operative part in use being recessed inward against the sloping parts of the rails without touching the web of the rails, so that the lower or dipping part or section for the time being will be clear of the foot of the rails. By these means when the rails and the smaller or first operative part or section b of my reversible fish-plates become worn to such an extent that such smaller or first operative part or section of the reversible fish-plates can no longer be caused to bear tightly at the upper and lower edges against the sloping parts of the said rails the reversible fish-plate can be reversed or inverted and the deep-dipping larger second operative part b' be placed against the sloping bearing-surfaces of the worn rails, and thus become the immediately-operative part or section, and filling up the space caused by wear be bolted as securely thereto as if the rails and reversible fish-plates were new. In some instances I form a rib or projection b^3 on the smaller or first operative part or section b which is to be first applied to the rails, as shown in Figs. 5 and 6, so that a plate-layer can easily distinguish this smaller or first operative part or section from the larger or second operative part or section b' when applying the reversible fish-plates to

the rails. To reduce the weight of my reversible fish-plate recesses b^2 may be formed in the sections $b\ b'$, as shown in Fig. 6.

According to a further modification of my invention, instead of forming my reversible fish-plates so that they shall be used as shown in Figs. 1 and 2, or as deep-dipping reversible fish-plates, as above described, I extend the operative part thereof which is not in use—*i. e.*, the larger or smaller operative part, as the case may be—from the rails outward at any suitable angle to that part which is bolted to the rails, but by preference at such an angle that it shall be at or about the same level as the bottom of the rails, as shown in Fig. 7, so that it may, if desired, rest upon the joint-sleepers or other sleepers and until required to be reversed, be bolted, or spiked thereto to prevent the rails from creeping on the sleepers and to give the rails at their joints additional support. It must, however, be understood it is not a fish-plate of "angle form" in the ordinary sense of the term, but rather a laterally-extending form, because, as will be seen in Fig. 7, the fish-plate dips down as far as the sleeper under the joint will allow it to dip, and thus gives the before-mentioned additional advantage of a greatly-increased vertical support to the rails.

In the case of flat-bottomed rails it may be advantageous to construct my improved reversible fish-plate with a projecting rib b^4 , as shown in Fig. 8, so that the projecting rib b^4 of the smaller or first operative part or section b thereof will gradually in course of wear form a depression or indentation a' in the upper surface of the foot of the rails, and the projecting rib b^4 of the larger or second operative part or section b' , when placed in its turn in position against the rails, will fit into and fill up such depression or indentation a' , while no part of the reversible fish-plate will be liable to take a bearing against the foot of the rails at any point farther from the center of the rails than the said indentations a' . I thus provide not only for the increased life of the reversible fish-plate, but also for the diminishing of the stress to which the bolts and nuts are subjected, and in the case of my reversible deep-dipping and laterally-extended fish-plates I am enabled to diminish to some extent the weight of such reversible fish-plates. Fig. 9 is the same as Fig. 8, but with my reversible fish-plate applied to old or worn flat-bottomed rails. The larger or second operative part is here shown in position, the projecting ribs b^4 being firmly seated in the indentations a' , which were gradually in course of wear made in the upper surface of the foot of the rail by the projecting ribs b^4 of the smaller or first operative part.

It will be readily seen that when the smaller or first operative part of my reversible fish-plate is worn out the larger or second operative part can be fixed in its place against the rails, and the second operative part being made larger than the first operative part, as above described, will afford a much better fitting support to the already-worn rails than would a new fish-plate that has been rolled to fit rails which had not been worn. Consequently my improved reversible fish-plate, being made with one operative part larger than the other, will be serviceable for a longer period than two of the ordinary fish-plates. Moreover, by making fish-plates in the manner above described I considerably increase the strength and rigidity thereof.

I find it important in all cases that the bolt-holes of both the operative faces or parts of my fish-plates should in position only—*i. e.*, not necessarily in shape—precisely correspond with the holes in the rails.

In order to obtain the great desideratum of all eminent railway engineers—*viz.*, one continuous strength of line—I use, in connection or in combination with my improved reversible fish-plates, what are known as "Ibbotson's" steel fish-bolts with self-locking steel nuts of the most approved type, now patented and used in many countries.

What I claim is—

A reversible fish-plate formed in one piece and having two distinct operative parts and four bearing-surfaces, each of the said operative parts having two bearing-surfaces distinct from both of the bearing-surfaces of the other of the said parts, the said bearing-surfaces being adapted to engage with the sloping parts under the head and above the foot of the rails and so constructed that while one part of the fish-plate has such a distance between its two bearing-surfaces as to adapt it for use with new rails the other of the said parts has a greater distance between its two bearing-surfaces and is thus adapted to fit and properly support the same rails when the said sloping parts of the rails and the bearing-surfaces of the first operative part of the fish-plate are so far worn as to render the said first operative part incapable of properly supporting the rails, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ALFRED BUCKINGHAM IBBOTSON.

Witnesses:

BENJ. BURDEKIN,
Solr. and Notary Public, Sheffield.
C. B. HOBBIS,
His Clerk.