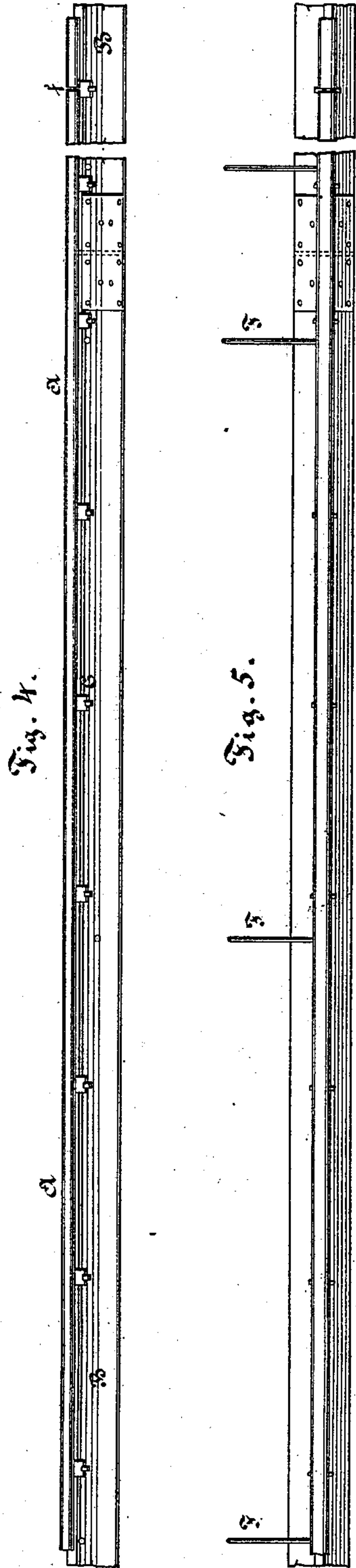
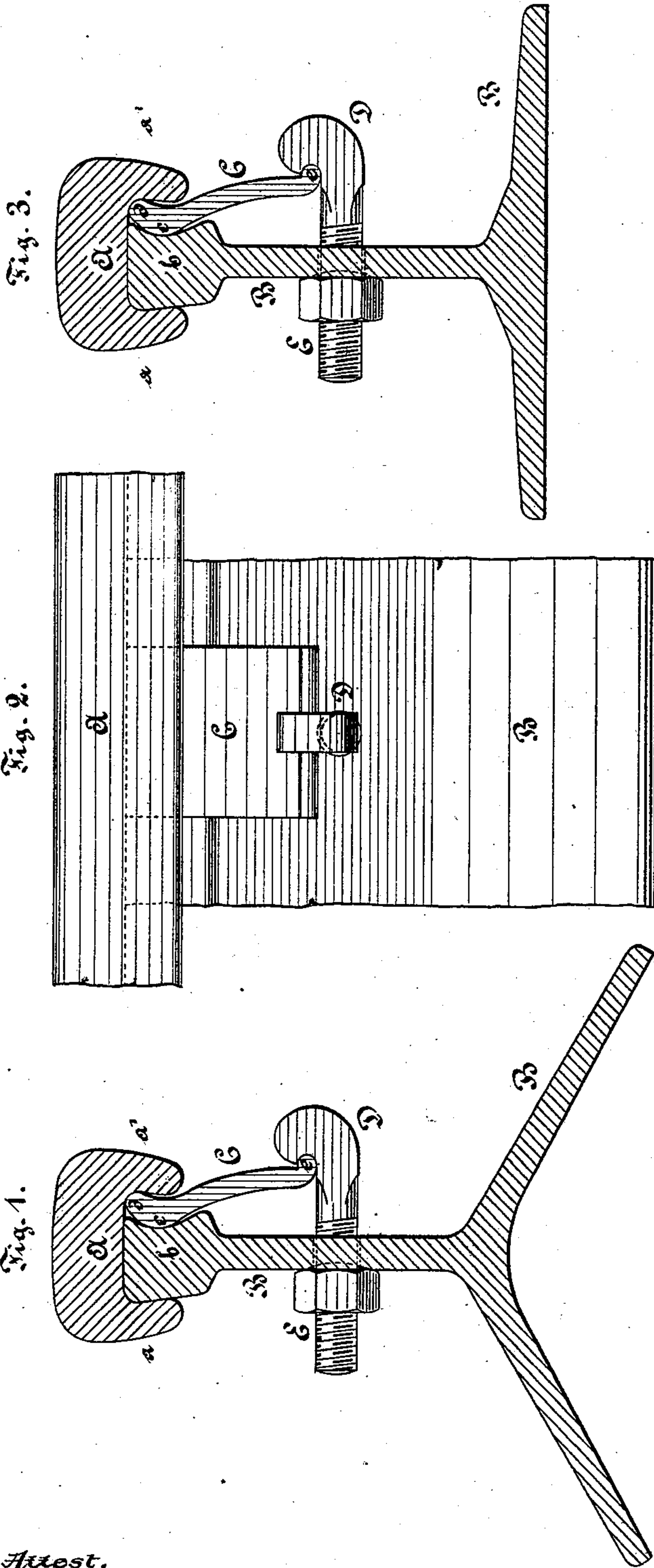


G. SCHWARTZKOPFF.
Permanent Way for Railways.

No. 227,705.

Patented May 18, 1880



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UNITED STATES PATENT OFFICE.

GEORG SCHWARTZKOPFF, OF FRANKFORT-ON-THE-MAIN, GERMANY.

PERMANENT WAY FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 227,705, dated May 18, 1880.

Application filed March 1, 1879.

To all whom it may concern :

Be it known that I, GEORG SCHWARTZKOPFF, of Frankfort-on-the-Main, Germany, have invented certain Improvements in Permanent Ways with Longitudinal Iron Sleepers, of which the following is a specification.

Among the different systems of permanent way with longitudinal iron sleepers the combination of a rail with a sleeper consisting of but a single part has, when properly arranged and executed, been proved by experience to be the most advantageous in technical respects as well as in regard to cost of construction and maintenance.

Various objections having, nevertheless, been raised against the systems of this kind hitherto introduced, I have endeavored to design an improved system in which great simplicity is combined with solidity and economy. The same is represented on the annexed sheet of drawings in Figures 1 and 5.

The sleeper B is in its general sectional outline of double-T shape. Its bottom flanges are, by preference, inclined, as in Fig. 1, whereby a greater stability is attained, and which form allows the water to run off more freely; but they may be in a plane, as shown by Fig. 3, or of other suitable shape. The head *b* of the sleeper has on one side a dovetail profile, which fits to the flange *a* of the rail A, while the other side of the head is concave. C is a clamping-lever, which bears with its convex part *c* against the concave part of the sleeper-head *b*, and with its end *d* against the inside of flange *a'* of the rail A. The said flanges *a* and *a'* are inclined toward each other, so as to form, together with the top of the rail, a dovetail groove. The lower end of the clamp C has a bead, *e*, corresponding with the hook on the bolt D, which passes through the vertical web of the sleeper.

The clamp is made of spring-steel and tempered to the proper degree, so that it may spring slightly when the nut E is screwed down.

A number of such clamps being applied over the length of the rail and the sleeper, as shown by Fig. 4, and the nuts E of the bolts D being drawn tight, it is evident that the rail and the sleeper will be firmly united, as neither the clamps can shift up or down in

the hollow of the sleeper-head nor the rail become loose on the latter on account of the dovetail shape of its groove. The solidity of this connection has been proved by experience. Nevertheless it is not so rigid as to prevent the rail from sliding to the requisite amount on the sleeper when they expand or contract from variations of temperature. Moreover, the elasticity of the clamps affords complete security against an accidental slackening of the nuts E, so that no special means, such as spring-washers or lock-nuts, are required for this purpose.

Instead of the hook-bolts D common bolts may be used, which pass through a hole in the clamp; but the former are preferable, as the bead *e* on the clamp may be formed by rolling, while the said holes must be drilled or punched separately; and, besides, the hook on the bolt D, together with the bead *e*, prevents the bolt from turning when the nut E is screwed down.

The described method of uniting the rail and the sleeper by the clamps C may also be applied in other cases where a secure but not absolutely-rigid connection between two parts of any construction is to be attained.

The butts of the rails and of the sleepers are, by preference, to be shifted with regard to each other. Each butt of two rails, which is, in this case, supported by the center of a sleeper, may be secured by a single clamp, as shown at *f*, Fig. 4. The sleepers are united at their ends by angular or other suitably-shaped fish-plates, close to and at either side of which a clamp should be placed. (See Fig. 4.)

The sleepers are maintained laterally at the proper distance from each other by stays F, Fig. 5; and, moreover, if preferred, a cross-bar of T-iron may be bolted under the butts of the sleepers, as well for the purpose of additional security as for fixing the lateral incline of the rails and sleepers. When the sleepers are formed according to Fig. 1 this cross-bar must of course be suitably bent at the ends, so as to correspond to the foot of the former.

The described system of permanent way presents various advantages, which may be enumerated as follows: The rail and sleeper combined may be regarded as a single piece in respect to resistance against bending, and,

moreover, the sectional shape of the sleeper is such as to present the greatest possible strength for a given amount of material. The entire weight of rail and sleeper combined is
5 therefore lower than with any other system of permanent way of the kind having equal solidity. Especially the rail is reduced in weight to a minimum; and as this is the only
10 part subject to wear and tear, it may be renewed at a small cost. It has also to be taken into account that the rail, having the same sectional shape on both sides, may be reversed when worn off on one side.

The rolling of the rails, the sleepers, and
15 the bars out of which the clamps and the fish-plates are made, as also the bending of the former when they are to be used in curves, presents no material difficulties. The laying down of the sleepers and rails can be done
20 speedily and without any ponderous apparatus; and, on the other hand, a permanent

way of this kind may be made unserviceable with facility by simply removing the rails and the clamps, but without destroying the bed of the road or disturbing the line of sleep- 25
ers, in consequence whereof the system is especially adapted for field purposes in times of war.

I claim as my invention—

1. The combination of the longitudinal iron 30
sleeper B with the rail A and the clamps C, substantially as and for the purpose described.

2. The combination, with the sleeper B and rail A, of the clamp C and fastening-bolt D, 35
substantially as described.

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

GEORG SCHWARTZKOPFF.

Witnesses:

A. S. HOGUE,
DAMIAN SCHÄFER.