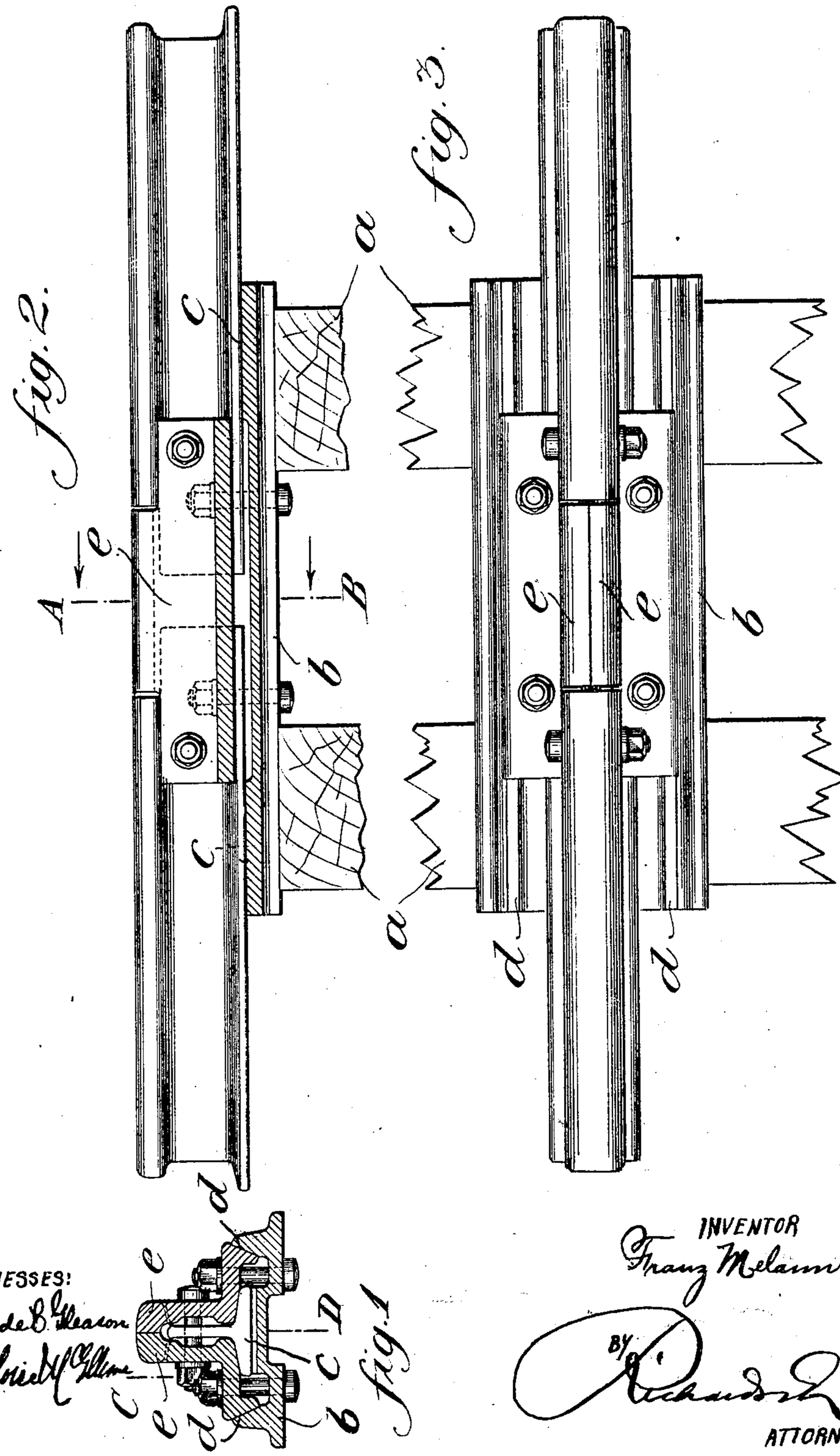
No. 679,087. Patented July 23, 1901.

F. MELAUN.

RAIL JOINT.

(Application filed Apr. 9, 1901.)

(No Model.) 4 Sheets—Sheet 1.



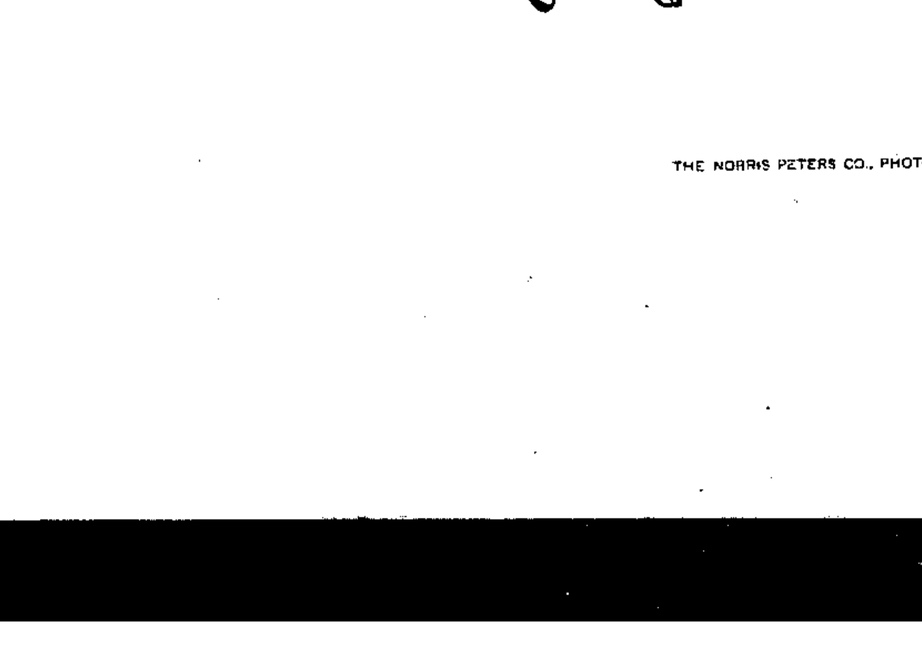


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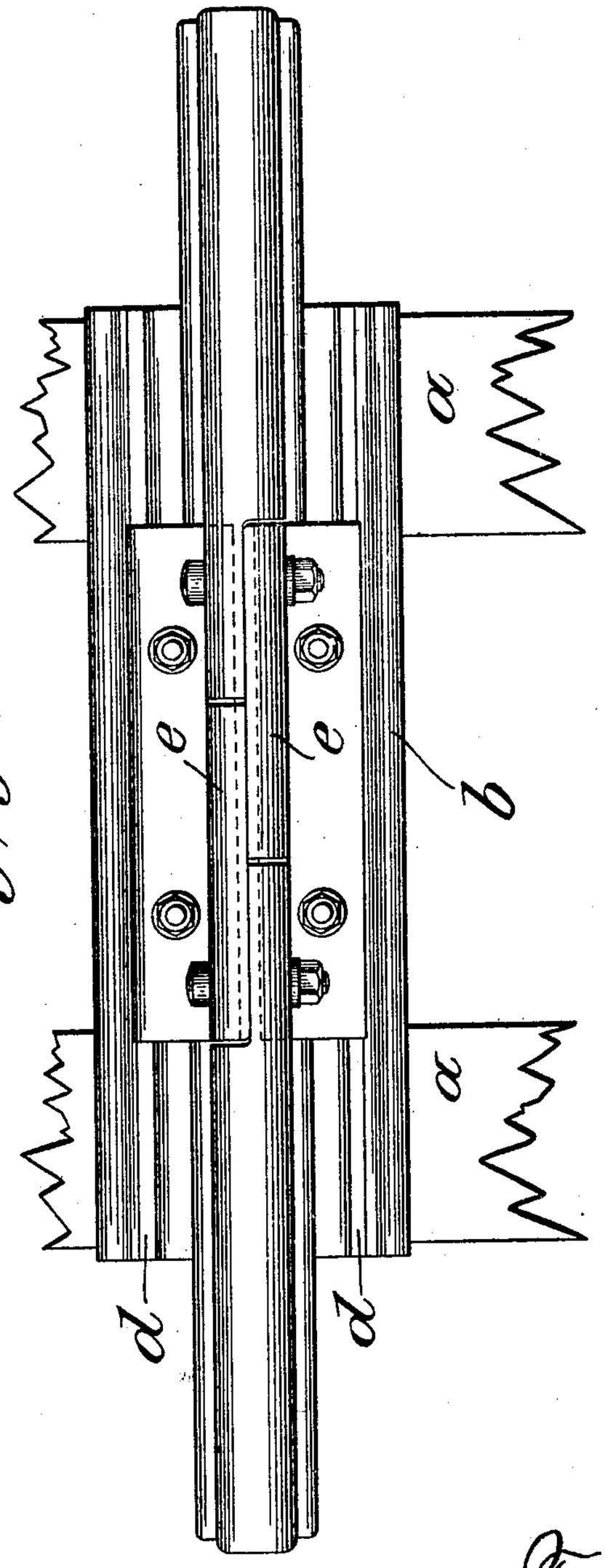
Fig. 4.



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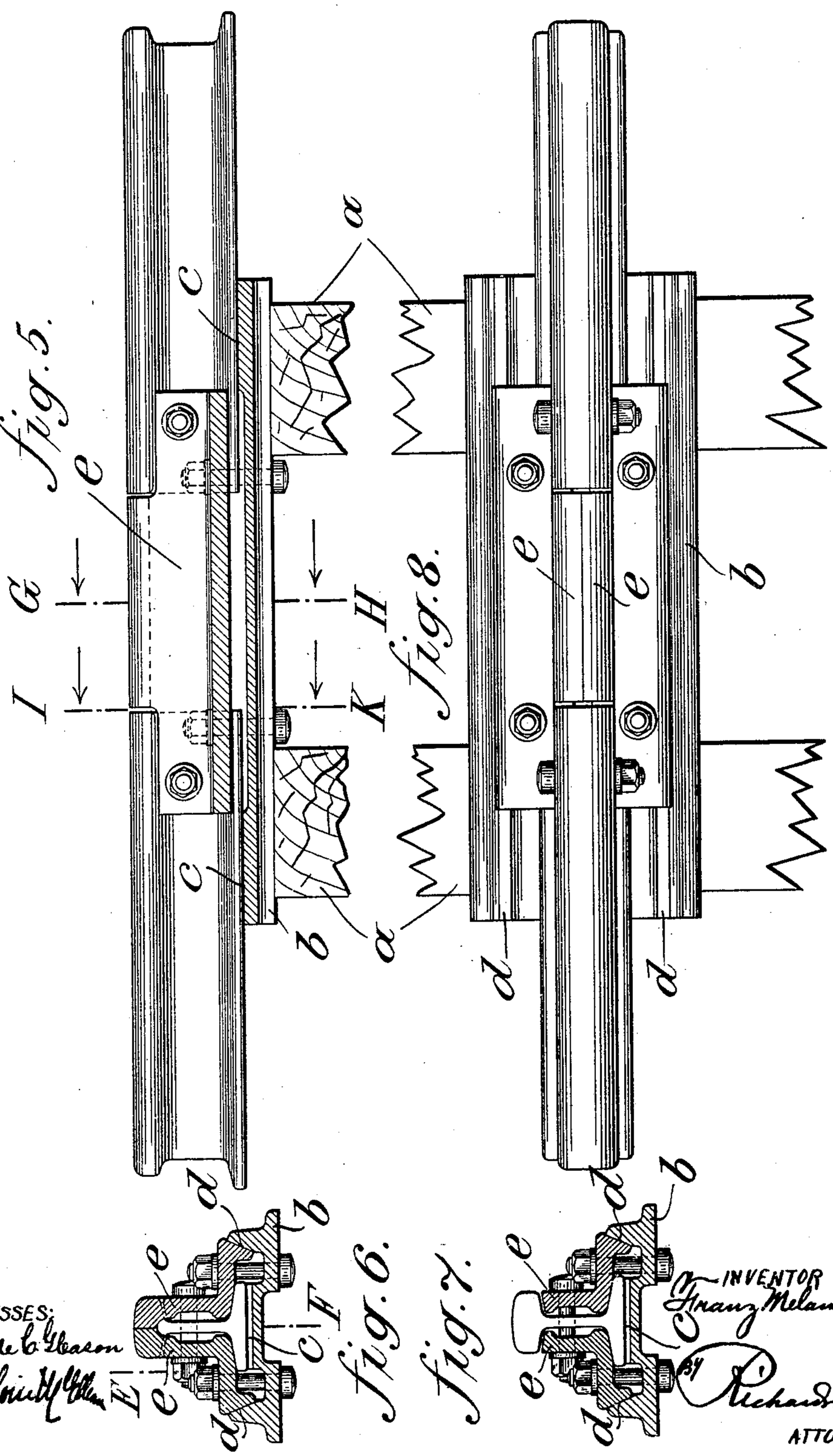

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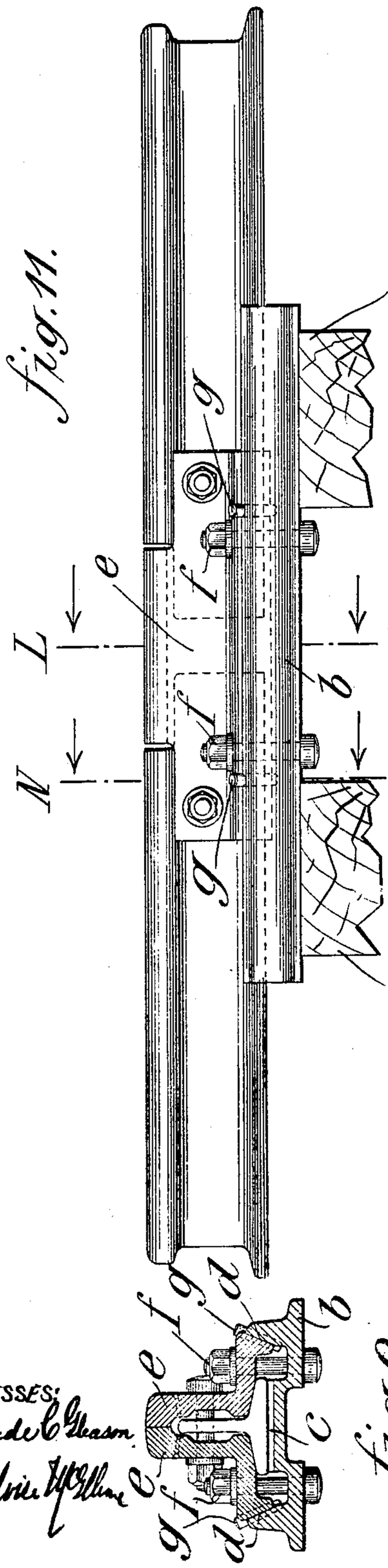

fig. 11.

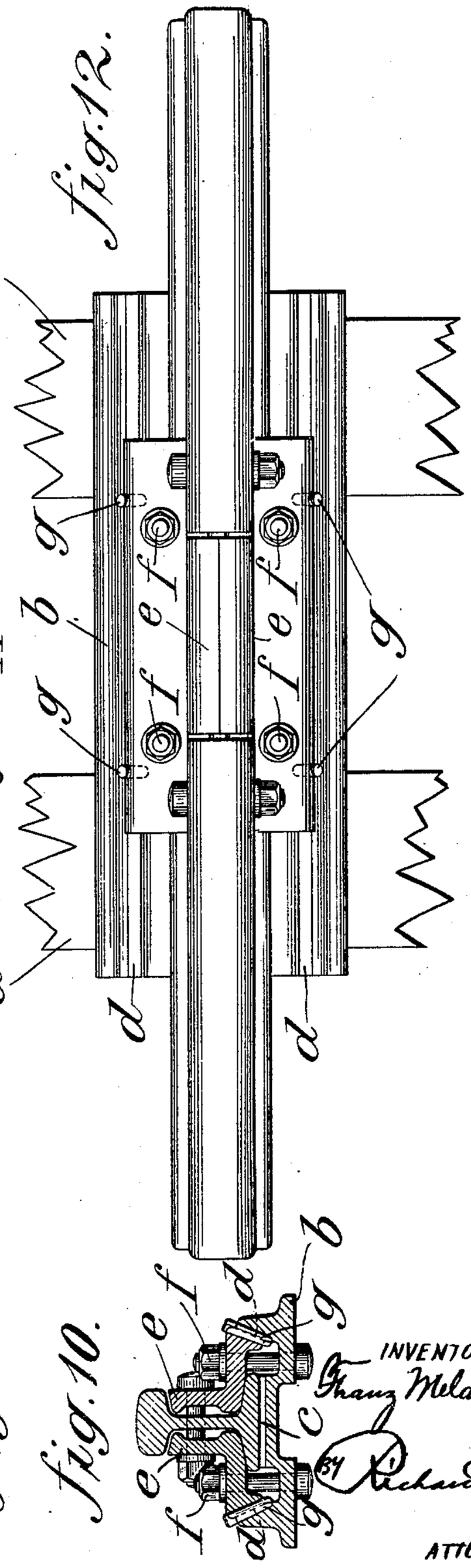

fig. 12.

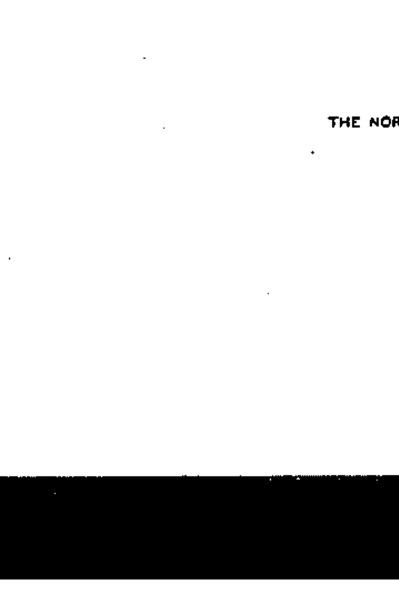

fig. 9.

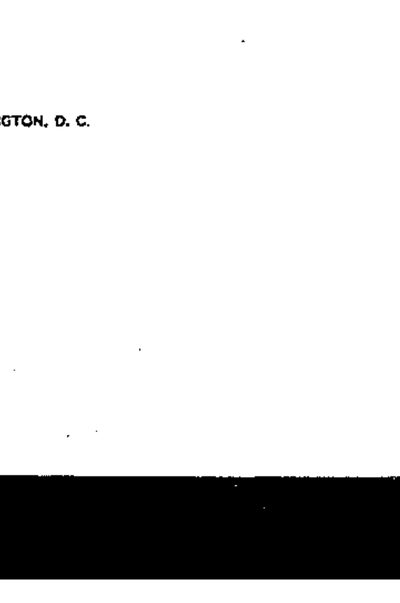

fig. 10.

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UNITED STATES PATENT OFFICE.

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RAIL-JOINT.

SPECIFICATION forming part of Letters Patent No. 679,087, dated July 23, 1901.

Application filed April 9, 1901. Serial No. 55,063. (No model.)

To all whom it may concern:

Be it known that I, FRANZ MELAUN, engineer, a subject of the King of Prussia, Emperor of Germany, residing at Fasanenstrasse 24, Charlottenburg, Germany, have invented certain new and useful Improvements in Rail-Joints, of which the following is a specification.

Rail-joints as hitherto constructed with bridge-pieces have been so arranged that the rail ends abutting on the bridge are rigidly supported at the lower surface of the foot or the support is afforded by means of lateral fish-plates below the rail-heads, the fish-plates themselves being rigidly supported on the bridge. All such rail-joints, however, after relatively short service show all the disadvantages of rigidly-supported joints, with which, in consequence of the anvil action, the rail-heads are hammered down by the wheels and the bearing-surfaces below the rail feet or heads flattened out. Furthermore, the rail-heads are driven like wedges between the fish-plates by the wheels, whereby great strain is put upon the fish-bolts. The joints can thus only be kept in effective condition by repeated tightening of the bolts, and after continued service, by reason of the great wear and tear of the bearing-surfaces, such tightening of the bolts becomes impossible or ineffective. These defects are overcome by means of the present invention, according to which—

First. The rail ends lie upon two raised bearing-surfaces provided on the bridge-piece and separated from each other and project beyond such surfaces to a certain extent. The rails are, moreover, connected by two headed fish-plates, which only rest upon the upper surface of the rail-feet lying beyond the said bearing-surfaces. The fish-plates, however, do not support the rail-heads, and consequently the wheels run over elastic rail ends, supported neither under the feet nor under the heads, and, furthermore, over the headed fish-plates only supported by such elastic rail ends. By this means the anvil action, the great disadvantage of rigid or supported rail-joints, and the defect of prior joints with bridge-pieces is entirely obviated.

Second. The headed fish-plates lying upon the upper surface of the feet of the rail ends sit wedged between the inclined bearing-surfaces of the bridge, whereby the bolts employed are saved from wear and all parts of the joint are only firmly held together by pressure of the wheels.

Third. The unavoidable vertical displacement of the rail ends relatively to each other under the action of the wheels is not prevented by rigid coupling of the rails, but the whole coupling, comprising bridge and two fish-plates, allows the rail ends a certain amount of motion.

In the accompanying drawings, Figures 1 to 3 show one form of construction of the new rail-joint. Fig. 1 is a cross-section on the line A B of Fig. 2. Fig. 2 is a longitudinal section on the line C D of Fig. 1, and Fig. 3 is a plan view of two rail ends joined according to the present invention. Fig. 4 shows in plan view a modification with overlapping rail and fish-plate heads. Figs. 5 to 8 show a second form of construction of the new rail-joint. Fig. 5 is a longitudinal section on the line E F of Fig. 6. Fig. 6 is a cross-section on the line G H of Fig. 5. Fig. 7 is a cross-section on the line J K of Fig. 5. Fig. 8 is a plan view of Fig. 5. Figs. 9 to 12 show a third form of construction of the new joint. Fig. 9 is a cross-section on the line L M of Fig. 11. Fig. 10 is a cross-section on the line N O of Fig. 11. Fig. 11 is an elevation, and Fig. 12 a plan, of the connected rail ends.

Referring to the construction illustrated in Figs. 1 to 3, the bridge-piece *b*, resting upon the sleepers *a a*, is provided with two bearing-surfaces *c c*, separated from each other. On these rest the rails with their ends projecting beyond the inner edge of each bearing-surface. The bridge *b* is further provided with two inclined lateral bearing-surfaces *d d*. The treads of the rails are removed for a certain distance at the ends and the rail ends connected by two fish-plates

e e, resting upon the upper surfaces of the feet of the rail ends, which project beyond the bearing-surfaces *c c*. These plates are also provided with inclined lateral bearing-surfaces and fit like a wedge between the correspondingly-inclined surfaces *d d* of the bridge. The fish-plates *e e* do not lie closely below the heads of the rails.

The manner in which the described joint operates is as follows: The headed fish-plates resting upon the upper surfaces of the feet of the rail ends (which project free beyond the bearing-surfaces *c c*) form, together with these rail ends, despite the bridge, a spring-beam which yields under the wheels, so that neither the treads nor the bearing-surfaces *c c* are subject to rapid wear and tear due to anvil action, such as is the case with other forms of rail-joint with bridge. Furthermore, when the rail-joint sinks under the moving load of the wheels the rail ends are presented at an angle to the fish-plates. Since now the latter only rest upon the upper surfaces of the feet of the rail ends projecting beyond the bearing-surfaces *c c*, these projecting rail ends turn on the lower surfaces of their feet about the inner edges of the bearing-surfaces *c c*, while the upper surfaces of the rail-feet are removed from the corresponding bearing-surfaces of the fish-plates. Thus the arrangement admits of a certain motion of the joint in a vertical direction corresponding to the yield of the sleepers without there being any strained separation of parts at any place, and thus without the headed fish-plates being elevated from the inclined bearing-surfaces of the bridge. The headed fish-plates, moreover, in any case, whether the joint is sinking under the load of the wheels or not, are always pressed down by the load directly upon the unsupported yielding rail ends and between the inclined bearing-surfaces *d d* of the bridge. In this manner a firm connection of all parts of the joint is effected by the pressure of the wheels alone, and the bolts are completely relieved. The firm connection cannot, moreover, be loosened by wear and tear of the inclined bearing-surfaces, since vertical adjustment is continually being effected automatically by the pressure of the wheels. Thus subsequent adjustment of the fish-plates by tightening up of the bolts, such as has hitherto been a necessity, is wholly obviated.

Fig. 4 shows how instead of the rail and fish-plate heads abutting abruptly the rail-heads may be removed at the ends in such manner that the rail and fish-plate heads overlap, so that in the tread four semicross-joints are formed. Such arrangement in no way alters the peculiar feature of the construction of the new rail-joint.

According to the second form of the construction, Figs. 5 to 8, in order to save removal of the tread at the rail ends the latter are drawn so far apart as to admit of the heads of the fish-plates, which carry the rolling load directly, being introduced between the rail-heads. With this arrangement also the lapped joint shown in Fig. 4 may be applied.

The new rail-joint possesses still another advantage in that the bridge with the two headed fish-plates may be united to form a single beam of great bearing strength, as described below.

In the third form of construction, as shown in Figs. 9 to 12, in contradistinction to rail-joints with bridges as previously constructed, according to which the fish-plates and bridge form girders independent of each other, the headed fish-plates *e e* are rigidly connected with the bridge *b* by means of bolts *f f* and pins *g g*, so as to prevent displacement in such manner that the individual girders cannot bend and move independently of each other under the rolling load, and therefore form one single girder, having a much greater bearing strength than the separate parts not so connected. This construction is based upon the following principle, hitherto applied only to timber beams: If two beams lying one upon the other are so connected with each other that they cannot bend or move independently, the bearing strength is increased in quadratic proportion to the total height. The connection necessary is effected by joggles or dowels. Since with two so doweled beams the displacement at the center is practically *nil*, being only noticeable at the ends, the dowels need only be inserted at the extremities. The central parts can be smooth and without any further connection. This doweling can also be employed with the first form of construction, Figs. 1 to 3, where the rail-treads are cut away, as also with the second construction, Figs. 5 to 8, where the rail ends are drawn apart either with or without overlapping of the rail and fish-plate heads.

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

1. In a rail-joint comprising a bridge, the combination of a bridge-piece having two separate horizontal bearing-surfaces and two inclined lateral bearing-surfaces, with the rail ends projecting beyond said horizontal bearing-surfaces and supported neither below the feet nor under the heads, and with fish-plates resting upon the upper surface of the feet of said rail ends, provided with inclined lateral bearing-surfaces wedging between said lateral bearing-surfaces of the bridge-piece, and bolted to the rail-webs and to said bridge-pieces, substantially as described.

2. In a rail-joint comprising a bridge, the combination of a bridge-piece having two separate horizontal bearing-surfaces and two

inclined lateral bearing-surfaces, with the rail ends projecting beyond said horizontal bearing-surfaces and supported neither below the feet nor under the heads, and with fish-plates resting upon the upper surface of the feet of said rail ends, provided with inclined lateral bearing-surfaces wedging between said lateral bearing-surfaces of the bridge-piece, and bolted to the rail-webs and likewise bolted and doweled to said bridge-piece so as to form one united girder with the latter, substantially as described.

Signed at Berlin this 26th day of March, 1901.

FRANZ MELAUN.

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