No. 751,129. PATENTED FEB. 2, 1904.

B. WOLHAUPTER.

TIE PLATE.

APPLICATION FILED AUG. 20, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

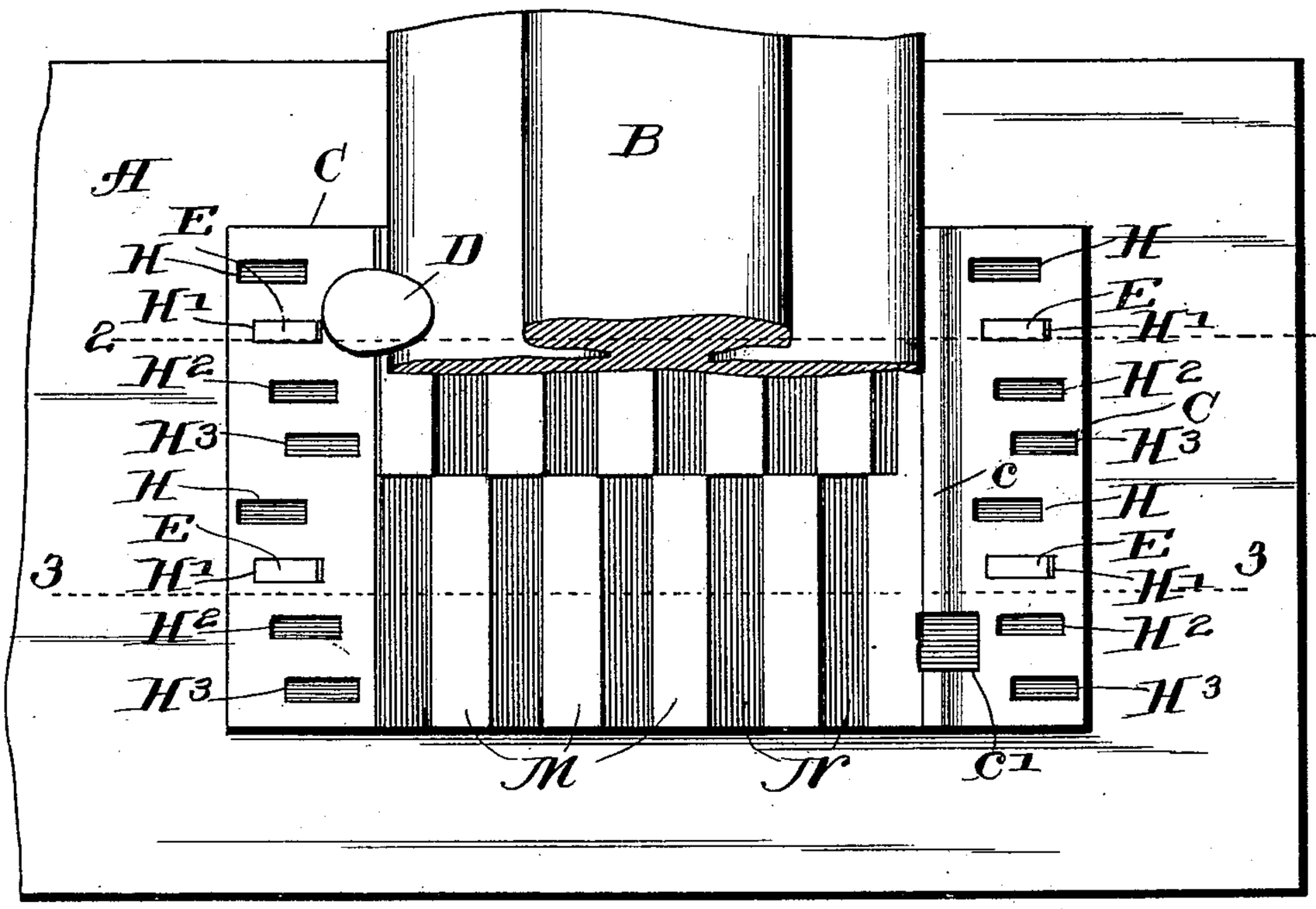


Fig 1

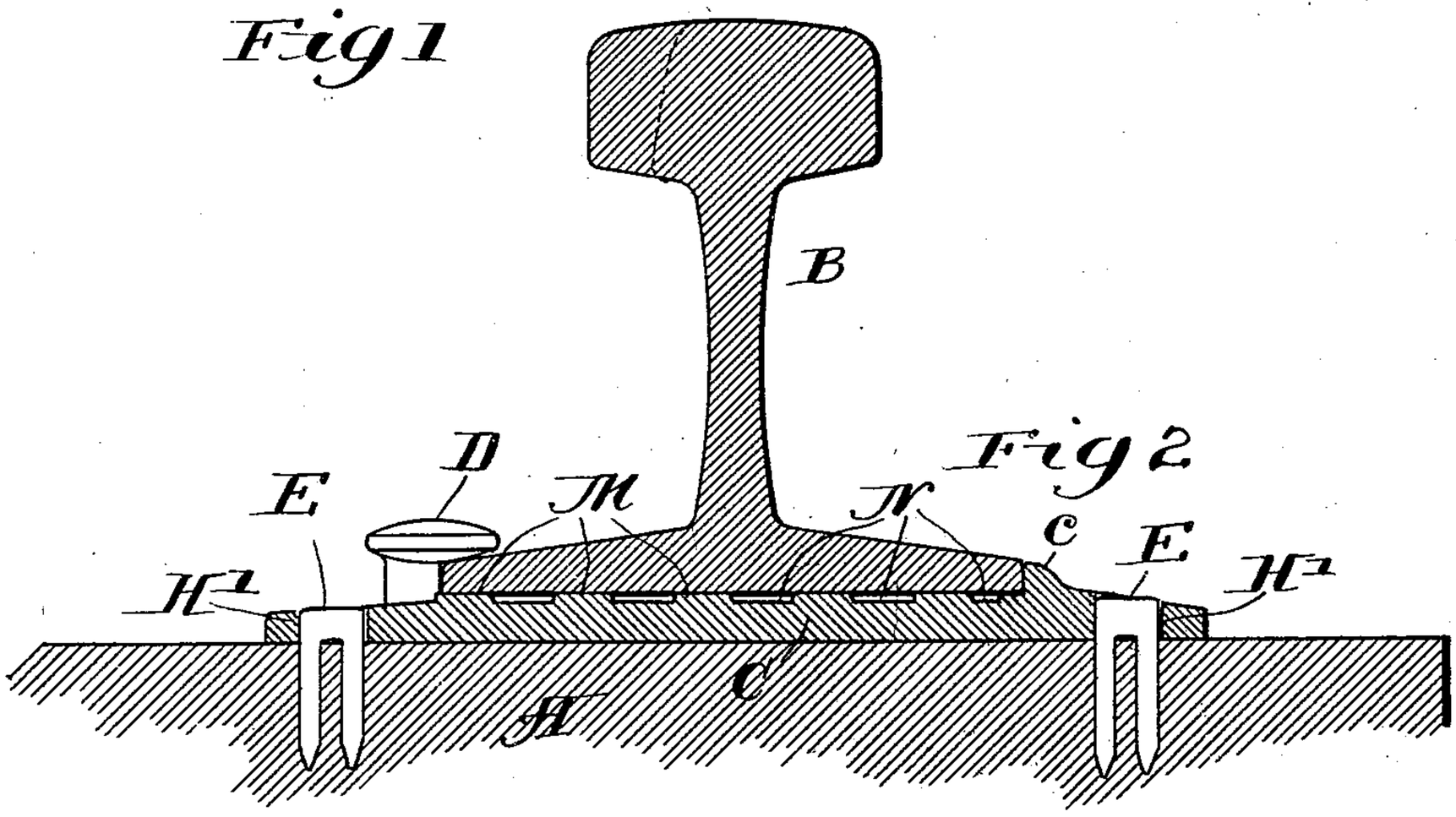
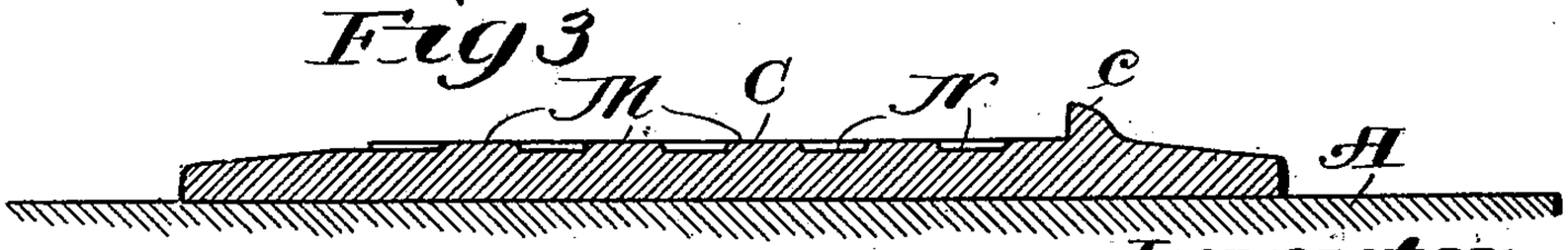


Fig 2

Fig 3



Witnesses:-
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NO MODEL. 3 SHEETS—SHEET 2.

Fig 4

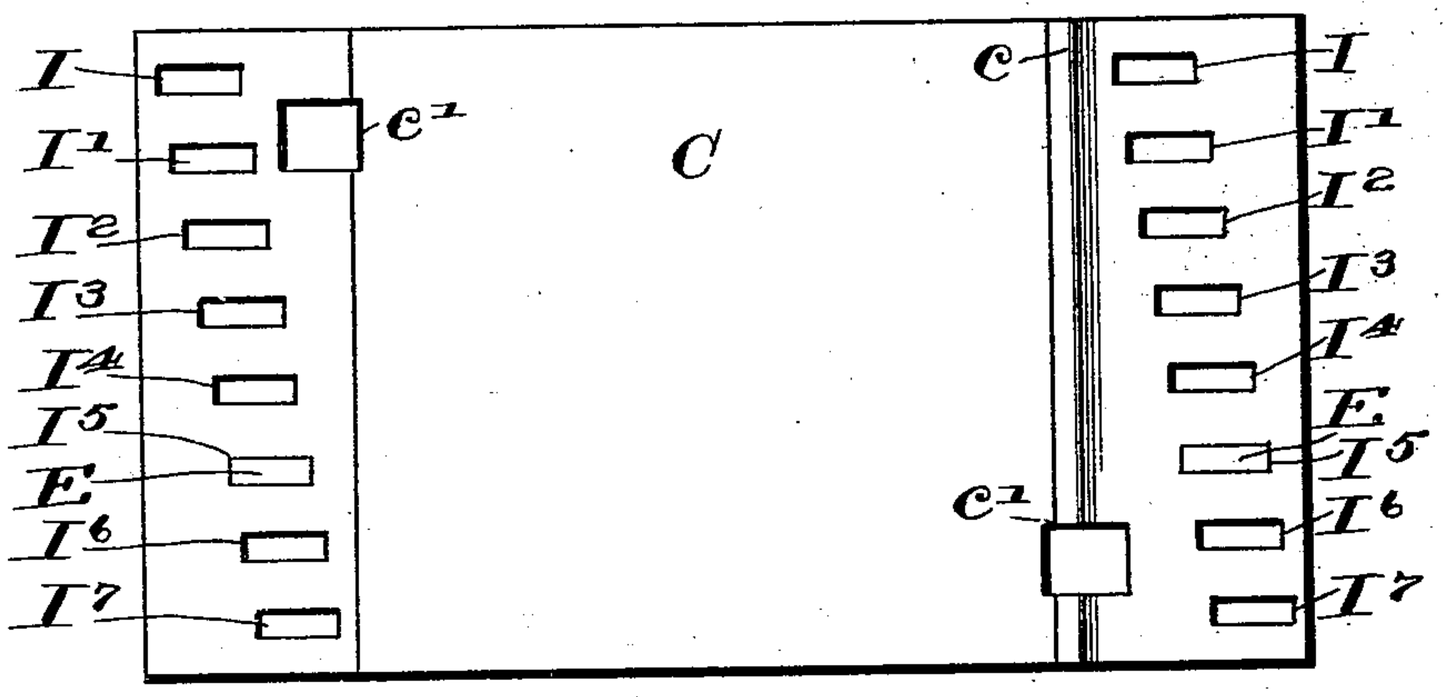
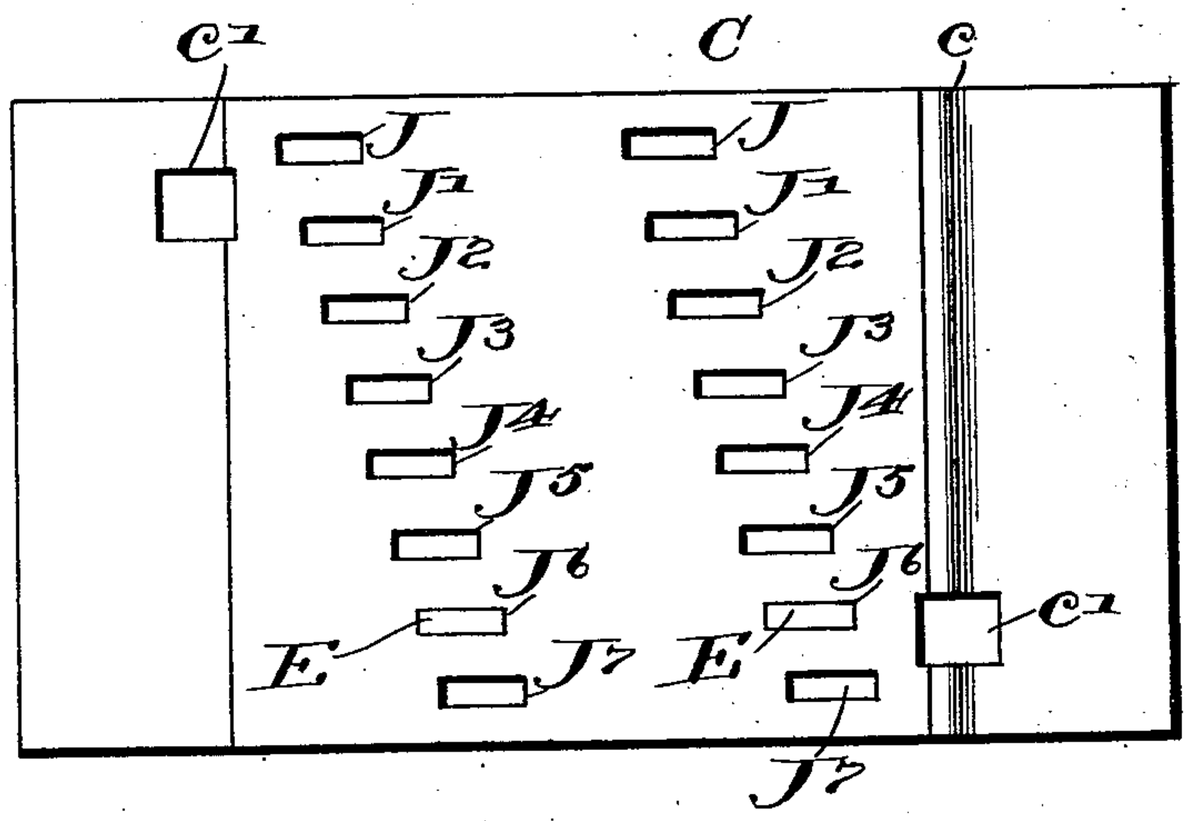


Fig 5



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NO MODEL. 3 SHEETS—SHEET 3.

Fig 6

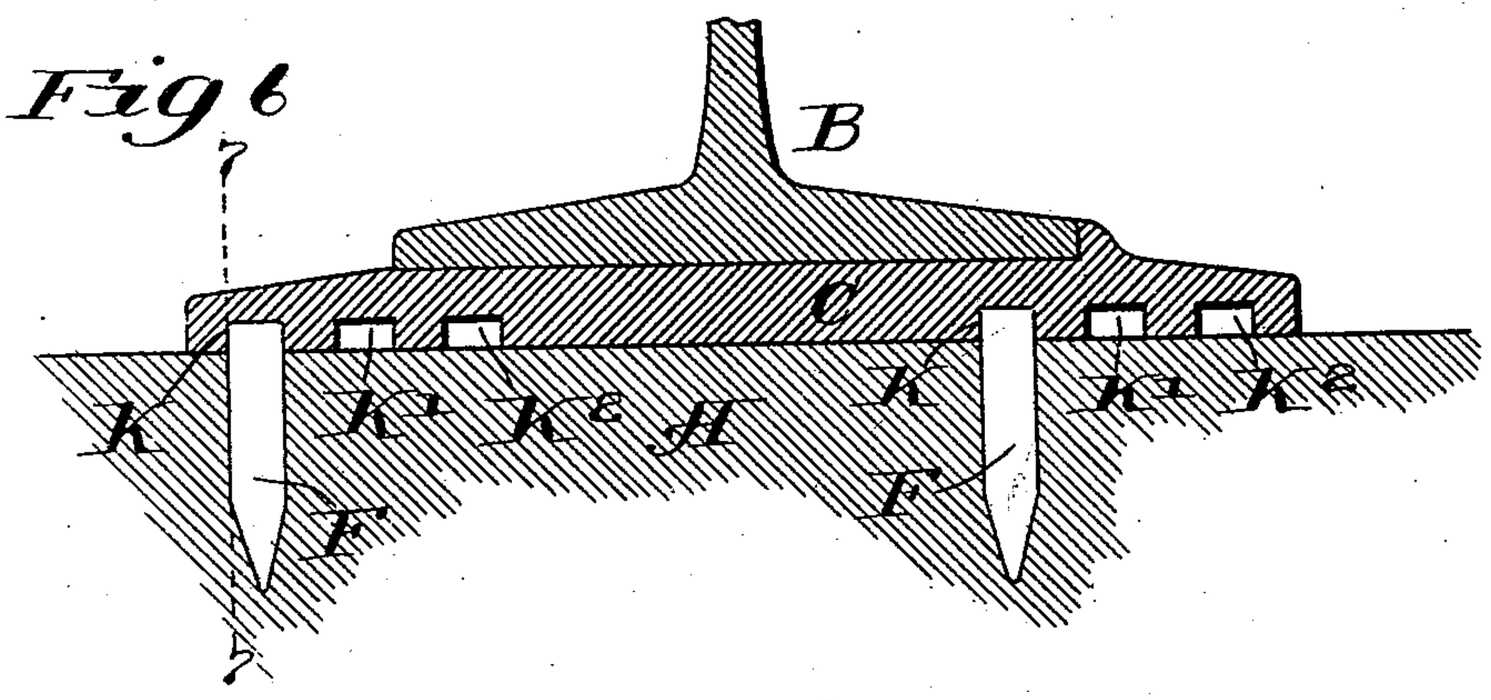


Fig 7

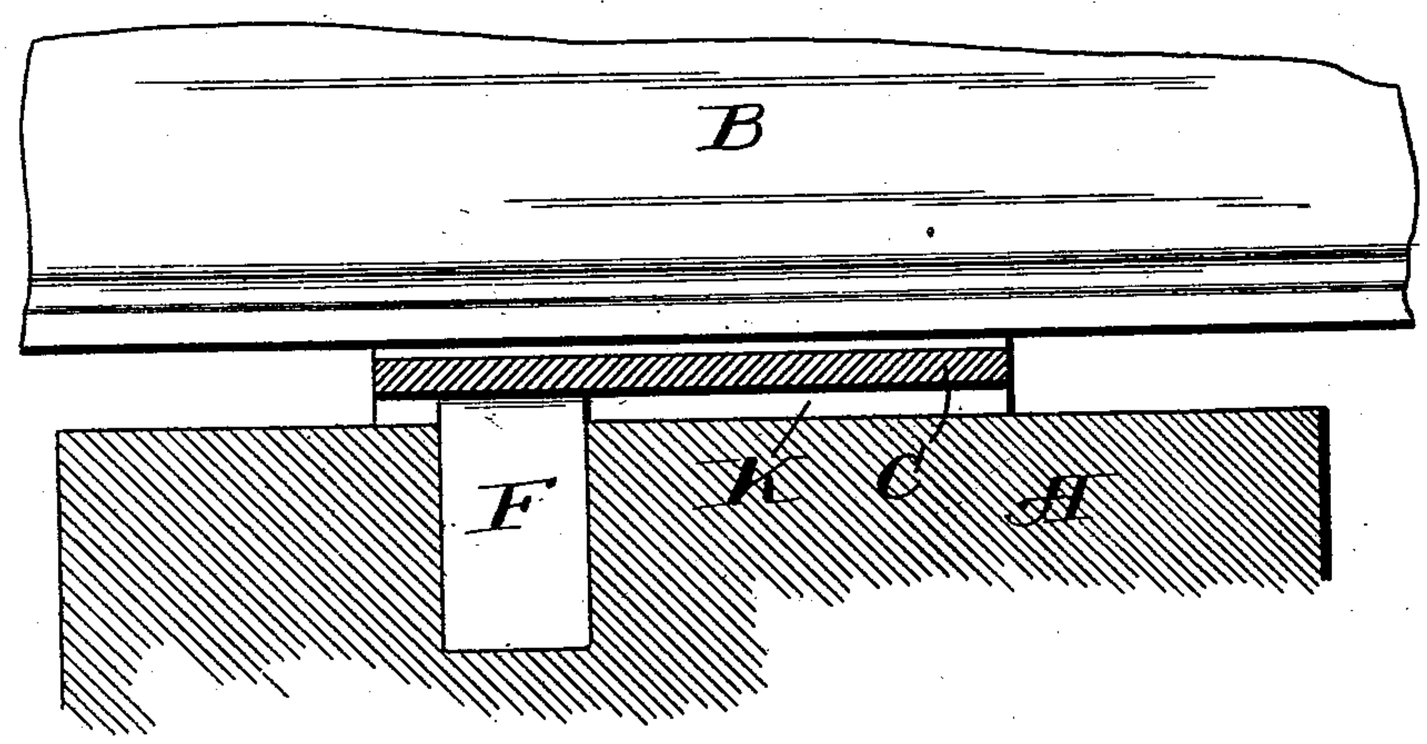
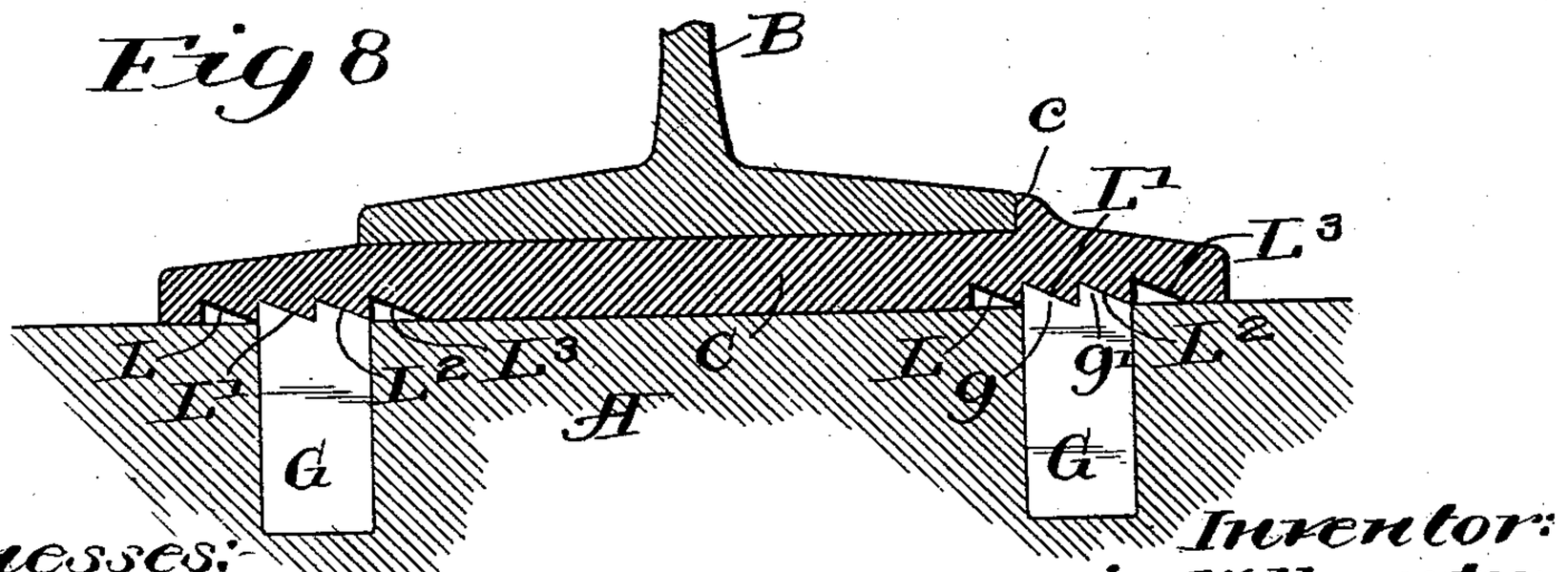


Fig 8



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No. 751,129. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

BENJAMIN WOLHAUPTER, OF CHICAGO, ILLINOIS.

TIE-PLATE.

SPECIFICATION forming part of Letters Patent No. 751,129, dated February 2, 1904.

Application filed August 20, 1903. Serial No. 170,139. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN WOLHAUPTER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tie-Plates; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in railway-tie plates, and it embraces improvements in several features of such tie-plates, as will hereinafter appear.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a plan view of part of a railway rail and tie plate, together with a portion of the tie on which the tie-plate rests. Fig. 2 is a cross-section of the rail and tie-plate, taken upon line 2 2 of Fig. 1. Fig. 3 is a cross-section of the tie-plate alone, taken on line 3 3 of Fig. 1. Fig. 4 is a plan view of a tie-plate differing in some of its details from that shown in the preceding figures. Fig. 5 is a plan view of still another form of tie-plate embodying the principal features of my invention. Fig. 6 is a view in section of still another form of tie-plate with adjacent parts of the tie on which the tie-plate rests and the base of the rail resting thereon. Fig. 7 is a cross-section through the tie-plate, rail, and tie shown in Fig. 6, taken on line 7 7 of said Fig. 6. Fig. 8 is a sectional view similar to Fig. 6, showing a modification of the construction shown in said Fig. 6.

As illustrated in said drawings, A indicates a wooden railway-tie, B a rail, and C the tie-plate, which rests upon the tie beneath the rail and serves, as do other such tie-plates, to afford a rigid bearing-surface for the rail and to prevent the wearing away of the tie through contact of the rail therewith. Said tie-plate is flat in its general form and provided with generally parallel top and bottom surfaces. The tie-plate is, moreover, provided at the outer margin of the rail-bearing seat with an elevated rib *c*, which extends across the plate, parallel with the ends thereof, and which forms a shoulder adapted for contact with the base-flange of the rail. Said flange is located at the outer side of the rail-base, so as to resist the outward pressure of the wheel-flanges on the rail or prevent the rail from spreading or moving outward. The tie-plate is, moreover, provided at opposite sides of the rail-seat with two or more spike-holes *c' c'*, through which are inserted the spikes D, by which the rail is secured to the tie.

One of the principal features of my invention is embraced in the construction of the tie-plate by which the same is provided, in connection with the shoulder against which the outer edge of the rail-base bears, with a plurality of separate bearing or contact surfaces which face laterally with respect to the rail, which are located at unequal distances from the said shoulder, and are adapted for contact or engagement with a holding-stud, which is driven into the tie, such as is indicated by E in Figs. 1 to 5, inclusive, F in Figs. 6 and 7, and G in Fig. 8. The engagement of said stud with one of said bearing or contact surfaces serves to hold the tie-plate from shifting endwise or laterally with respect to the rail, while the said surfaces are so constructed that by moving or shifting the tie-plate endwise or laterally of the rail either one of them may be engaged with the said stud to hold the tie-plate in a desired position upon the tie. This provision of a plurality of separate bearing-surfaces, which are spaced at unequal distances from the shoulder on the plate, is designed to enable the tie-plate to be adjusted or shifted on the tie endwise of the latter and laterally with respect to the rail, so that when it becomes necessary to shift the position of the rail to compensate for wear on the inner side of the rail-head or to correct the alinement of the rail the tie-plate may be shifted to bring another one of the said series of bearing-surfaces into engagement with the holding-stud without shifting or disturbing the stud, and thus insure the holding of the tie-plate rigidly in position and the holding of the rail positively from outward movement without depending on the rail-spikes for this purpose.

Referring to the illustration of the features

of the tie-plate last above referred to as contained in the drawings, Figs. 1, 2, and 3, the laterally-facing bearing or engaging surface of the tie-plate and the holding-studs coöperating therewith are made as follows: In the marginal part of the tie-plate exterior to the rail-seat are formed a plurality of stud receiving or engaging apertures H H′ H² H³, the end margins of which constitute the laterally-facing contact bearing-surfaces hereinbefore referred to. These apertures H H′ H² H³ are arranged in an oblique line and generally at unequal distances from the rib *c* on the tie-plate, or, in other words, are arranged at unequal distances from the side margins of the rail-base when the rail rests upon said tie-plate. The special form of tie-plate shown in said Figs. 1 to 3, inclusive, contains four sets or series of said slots H H′ H² H³, in each of which the slots are arranged in an oblique line or in stepped relation, two of said sets or series being located at each side of the rail-seat. In connection with each of the obliquely-arranged sets or series of slots thus arranged is employed one of the holding-studs E, which is driven into the tie, one of said studs being used for each set or series of the slots. When four sets of said slots are used, as shown in Figs. 1 to 3, four holding-studs will be employed, one for each set, and these will be driven through or located in position for engagement at their upper ends with the corresponding slots of each set. Ordinarily the adjustment of the rail and tie-plate will be inwardly, or toward the center of the track, for the reason that lateral adjustment of the rail is most often required because of the wearing away of the inner face of the rail-head, as indicated in dotted lines in Fig. 2. The holding-studs will therefore in the first instance usually be secured in position to engage the holding-slot H of each set which is nearest the center of the track. In first laying the track, therefore, the tie-plate will be placed beneath the rail, with its rib *c* bearing against the outer edge of the rail-base and the four holding-studs will be driven into the slots H H and will serve to hold the tie-plate firmly and rigidly in position without depending upon the rail-spikes for this purpose. When inward adjustment of the rail is required, the tie-plate will be shifted laterally on the tie and also inward thereon, so as to bring the studs E E into engagement with the next slots H′ H′, and a like shifting of the tie-plate may be effected to accomplish further adjustment of the rail as required. It will of course be understood that in adjusting the tie-plate the rail-spikes will be withdrawn to release the tie-plate and redriven after the tie-plate has been shifted to its new position.

The holding-studs E may be made of any suitable shape adapting them to be driven and engaged at their upper ends with the slots in the tie-plates. As shown in Figs. 1, 2, and 3, said studs E are made of U shape or staple form, having two prongs which are driven into the wood of the tie.

Fig. 4 illustrates a slight modification of the tie-plate embracing the general features of construction above set forth, but in which the tie-plate is provided at each of its side margins with a single series of slots arranged in an oblique line or in stepped relation and which are marked 1 to 17. In connection with this form of tie-plate two holding-studs E only will be used, one engaging each set of slots. The form of tie-plate shown in said Fig. 4 admits of closer adjustment than shown in Fig. 1, but has the disadvantage of requiring the shifting of the tie-plate a greater distance longitudinally of the rail in order to obtain a maximum range of movement in the tie-plate without moving the holding-studs. It will, however, of course be understood that in the use of the tie-plate shown either in Fig. 1 or Fig. 4 if the adjustment of the tie-plate brings it too near one edge of the tie the holding-studs may be withdrawn and redriven in a new position.

Fig. 5 illustrates another modification of the tie-plate, adapted for engagement with holding-studs, in which the construction is substantially like that shown in Fig. 4, but in which the slots to engage the studs are located in the bearing-surface of the tie-plate beneath the rail. In this instance the tie-plate is provided with two sets of slots (marked J to J⁷) and two holding-studs E are used, one engaged with one slot of each of the sets of slots. This construction has the advantage that the slots in the tie-plate are covered by the rail, so that access of sand or cinders to the slots will be prevented. It will of course be understood that in this instance the studs will be driven into the tie, so that their upper ends will come somewhat below the upper level of the tie-plate. It will of course be understood that when the slots are located in the rail-seat they may be arranged in a series of inclined sets in the manner illustrated in Fig. 1.

In Figs. 6 and 7 I have shown still another construction of the tie-plate, having a plurality of laterally-facing engaging surfaces adapted for use in connection with holding-studs which are driven into the tie. In this instance the tie-plate is provided in its bottom surface with a plurality of grooves K K′ K², arranged parallel with each other and with the rail-bearing shoulder on the tie-plate. Two sets of said grooves may be employed, located one near each of the side margins of the plate, as shown in said Fig. 6. In connection with said grooves K K′ K² are employed holding-studs F, which latter may be made of the same shape shown in Figs. 1 to 3 or of flat pieces of metal tapered at their lower ends at their flat or side faces, as shown in Figs. 6 and 7. Said studs F will be driven

with their flat faces parallel with said grooves, so that the upper ends of the studs, which project above the ties, will enter or engage said grooves. The drawing shows two of said studs F F as driven into the tie in position to engage the grooves K K of the two sets of grooves. In adjusting the tie-plate on the tie the tie-plate is shifted endwise thereon, or laterally with respect to the rail, and does not need to be moved endwise of the rail in effecting such adjustment. While the grooves shown in Figs. 6 and 7 extend entirely across the width of the tie-plate, yet this construction is used merely for convenience in the construction of the tie-plates by a rolling process, and such grooves may be made to extend only part way across the tie-plate or may have the form of short recesses of sufficient size to receive the upper ends of the studs.

In Fig. 8 I have shown a modification of the general construction in the tie-plate for providing laterally-facing holding-surfaces, in which the tie-plate is provided on its lower surface with a plurality of angular grooves L L′ L^2 L^3, so shaped as to form a plurality of vertical faces or shoulders which face toward the outer side of the rail. Two sets of such grooves are preferably employed, one located near each end of the tie-plate. In connection with the angular grooves thus formed are used holding-studs G, shaped at their upper ends to engage said grooves. As illustrated in said Fig. 8, the studs are provided at their upper edge with two prongs or projections *g g′*, adapted to engage two adjacent grooves, the studs in this instance being driven with their flat faces transverse to the rail, or parallel with the side of the tie.

As a further and separate improvement in tie-plates I have shown in Figs. 1 to 3, inclusive, the top bearing-surface or rail-seat of the tie-plate as provided with a plurality of sets of parallel ribs or ridges M, with intervening grooves N, which extend across the tie-plate, or parallel with the rail. The grooves and ridges in the several sets are made of substantially the same width and the ribs of each set are arranged in alternation with those of the other set, so that the ribs in one set will be in line with the grooves in the other. The drawings show the tie-plate as provided with two sets or series of such grooves and ridges, each set extending half the width of the plate; but more than two sets may be employed, if desired.

The general object of the rigid construction described is to afford a rail-seat or bearing-surface which will free itself from sand or cinders, or, in other words, will prevent the accumulation between the rail and the tie-plate of grit, sand, or cinders, which if permitted to remain between the bearing-surfaces of the parts would result in the rapid wearing away of the bearing-surface of the tie-plate. While this general result would be obtained by a construction embracing a single set of grooves and ridges extending entirely across the tie-plate, yet such construction would have the disadvantage that inasmuch as the base-flanges of the rail vary somewhat in width when the rail is brought with its outer edge in contact with the rib *c* its inner edge might rest over a groove instead of bearing upon and being supported by one of the ridges as is desirable in order to form a firm support for the rail. When, however, two or more sets of grooves or ridges arranged in opposite relation are employed, the inner edge of the rail-base will in a portion of the width of the plate invariably rest upon one of the elevated parts or ridges, and thus insure in all instances a firm support for the inner edge of the rail-base.

The tie-plates of the character shown are more economically manufactured by a process in which a long bar or plate is rolled into the desired cross-sectional shape and the individual tie-plates then severed from such long bar or plate. The construction of the bearing-surface of the tie-plate with a plurality of sets of grooves arranged in alternation, as described, permits the tie-plates in the grooves or ridges to be readily constructed by such rolling process, the alternating sets of grooves and ridges being made of such length in the rolled strip or blank from which the tie-plates are cut that each tie-plate when severed will have thereon two or more sets of similarly-arranged sets of grooves and ridges—as, for instance, in rolling a blank for the tie-plate illustrated in Figs. 1 to 3 each separate set of grooves and ridges will be made equal in length to the width of one of the tie-plates to be cut from the blank, so that when the blank is severed midway of the length of each set the tie-plate will have alternating sets of such grooves and ridges of equal length, and each set of grooves and ridges will terminate centrally of the plate, as shown in Fig. 1. The use of two sets of grooves and ridges on each plate is thought to be preferable, as this construction leaves the ends of the grooves of each set open at the sides of the plate for the escape of any sand, cinders, or grit which may enter said grooves.

I claim as my invention—

1. A tie-plate provided with a plurality of bearing-surfaces which are laterally separated with respect to the rail and are adapted for engagement with the upper end of a holding-stud driven into the tie.

2. A tie-plate provided with rail-bearing shoulders and with a plurality of laterally-separated bearing-surfaces adapted for engagement with the upper end of a holding-stud driven into the tie.

3. A tie-plate provided with a plurality of laterally-facing shoulders or surfaces which are separated both laterally and longitudinally and are adapted for engagement with a hold-

ing-stud driven into the tie by shifting the tie-plate both laterally and longitudinally with respect to the rail.

4. A tie-plate provided with a set or series of slots arranged in stepped relation and either one of which is adapted for engagement with the upper end of a holding-stud driven into the tie, by the lateral and endwise shifting of the tie-plate with respect to the rail.

5. The combination with a tie-plate provided with a plurality of laterally-facing bearing-surfaces, of a holding-stud which is driven into the tie and projects above the same into position to engage said laterally-facing surfaces.

6. The combination with a tie-plate provided with a plurality of slots arranged in stepped relation, and a holding-stud adapted to be driven into the tie with its upper end projecting above the same in position to engage either one of said slots.

7. A tie-plate provided at the outer side of its rail-seat with a shoulder adapted for contact with the base of the rail and having a plurality of laterally-facing bearing-surfaces arranged at unequal distances from the said shoulder, and adapted for engagement with a holding-stud driven into the tie.

8. The tie-plate provided at the outer side of the rail-seat with a shoulder adapted for contact with the base of the rail, and having a plurality of slots arranged in stepped relation and adapted for engagement with a holding-stud driven into the tie.

9. A tie-plate provided at the outer edge of its rail-seat with a shoulder adapted for contact with the base of the rail, and having spike-holes at either side of said rail-seat, and also provided with a plurality of laterally-facing bearing-surfaces, arranged at unequal distances from the said shoulder, and adapted for engagement with a holding-stud driven into the tie.

10. A tie-plate provided at one side of the rail-seat with a shoulder adapted for contact with the rail-base and having spike-holes at both sides of said rail-seat, and having also a plurality of stud-receiving slots arranged in stepped relation and adapted for engagement with a holding-stud driven into the tie.

11. A tie-plate provided in its upper surface with a plurality of sets of ridges and intervening grooves, extending transversely of the plate, the ridges in each set being arranged in line with the grooves of the adjacent set.

12. A tie-plate provided at one side of the rail-seat with a shoulder adapted for contact with the side margin of the rail-base, and provided in said rail-seat with a plurality of sets of ridges and intervening grooves arranged parallel with said shoulder, the ridges in each set being arranged in line with the grooves of an adjacent set.

13. A tie-plate provided on its rail-bearing surface with a plurality of ridges and grooves extending transversely of the tie-plate and parallel with the rail, the ridges of each set being arranged in alinement with the grooves of adjacent sets and the grooves of each set being open at the side margins of the plate to permit the escape of sand or grit from said grooves.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 13th day of August, A. D. 1903.

BENJAMIN WOLHAUPTER.

Witnesses:

C. CLARENCE POOLE,

TAYLOR E. BROWN.