

No. 658,356.

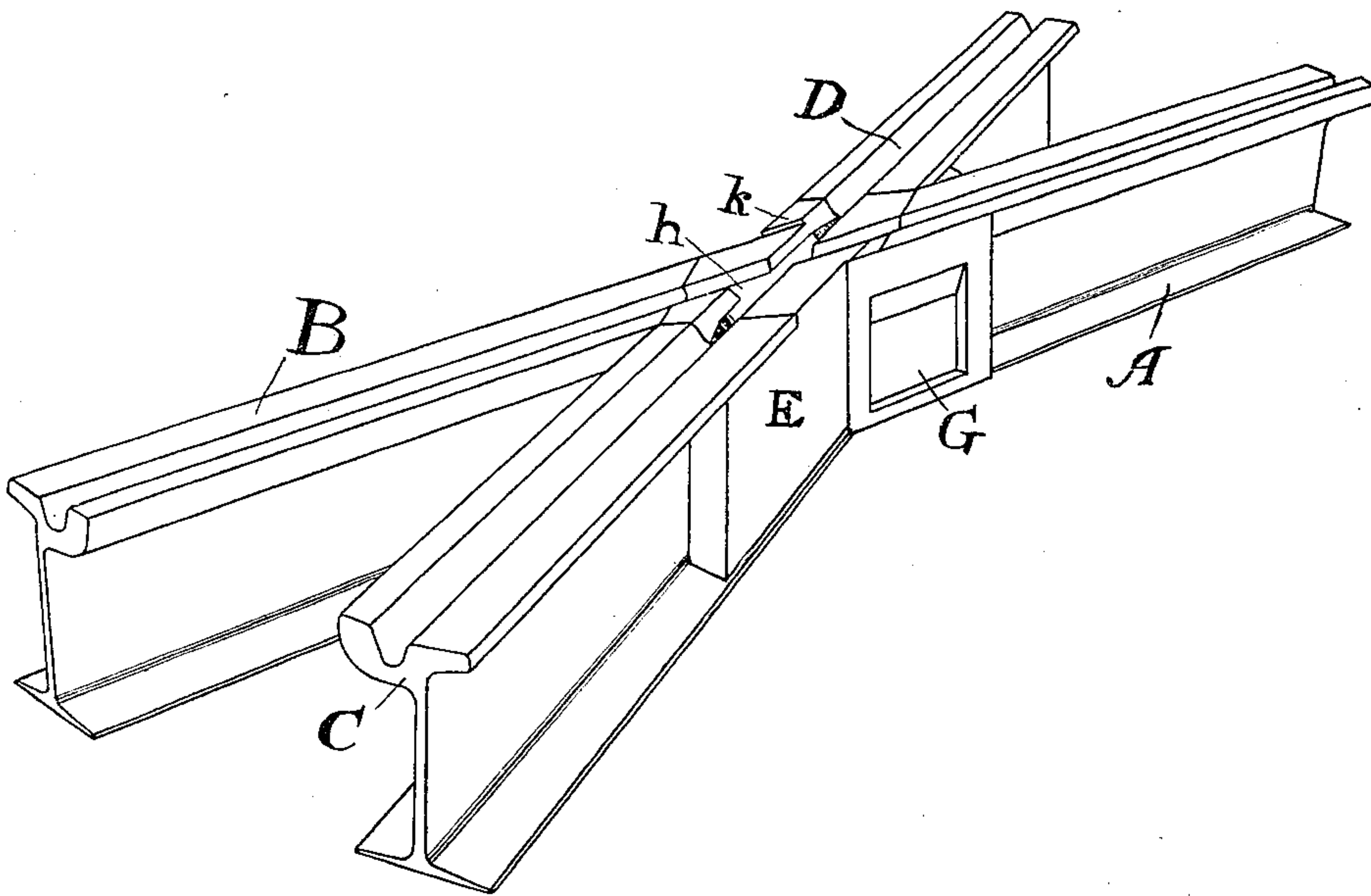
Patented Sept. 25, 1900.

T. C. DU PONT.  
RAILWAY TRACK STRUCTURE.

(Application filed Dec. 1, 1899.)

(No Model.)

3 Sheets—Sheet 1.



*Fig. 1.*

WITNESSES:

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*Annie M. Moore.*

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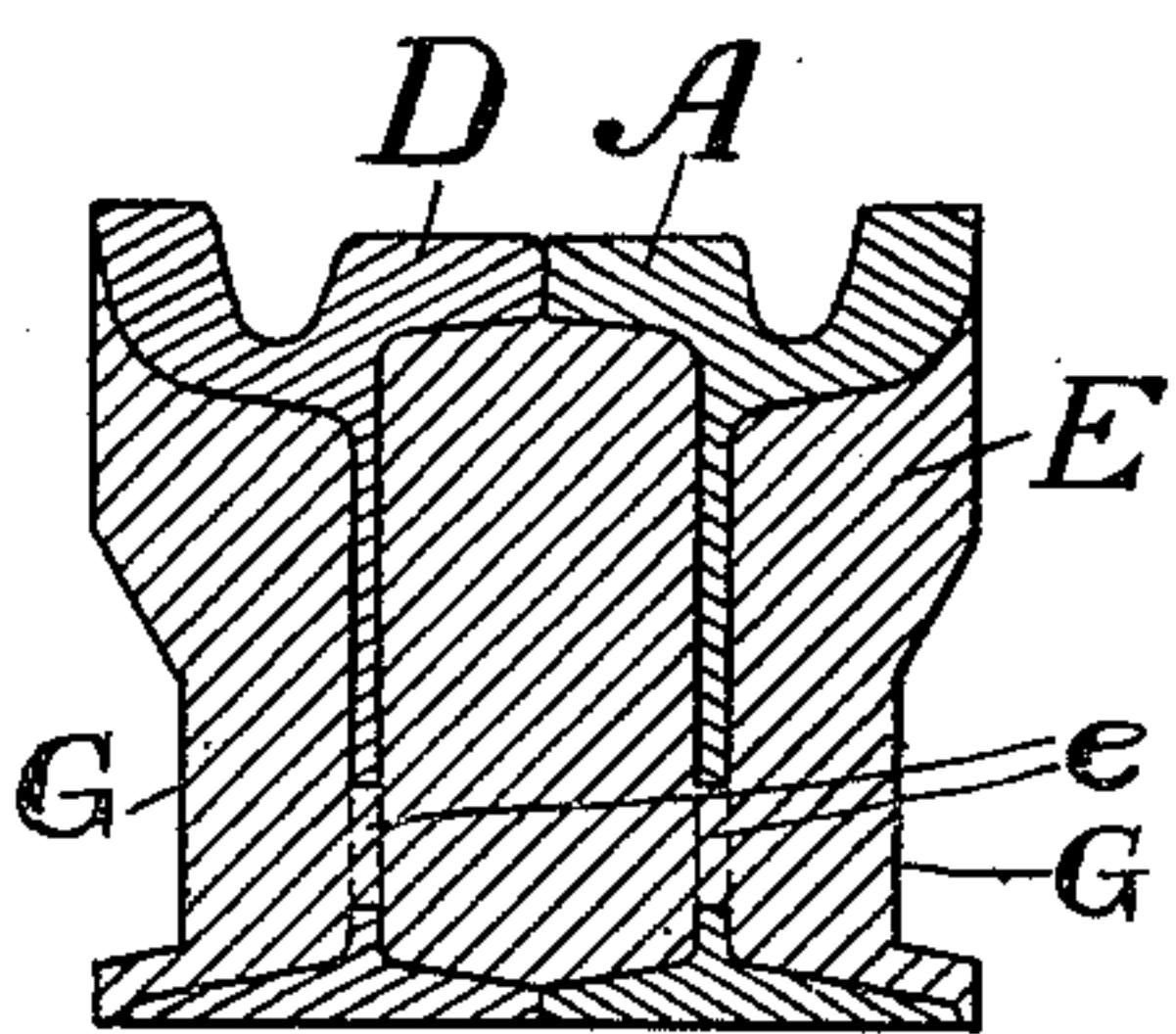
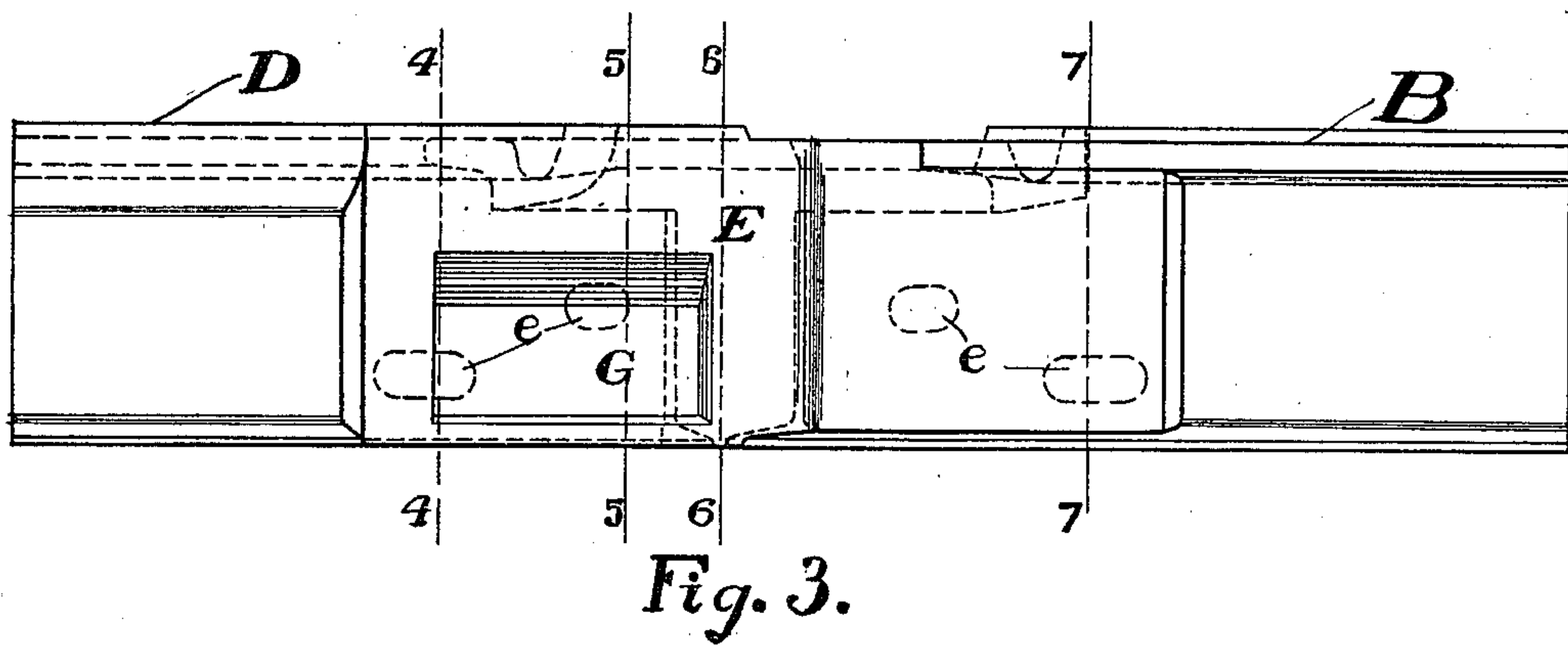
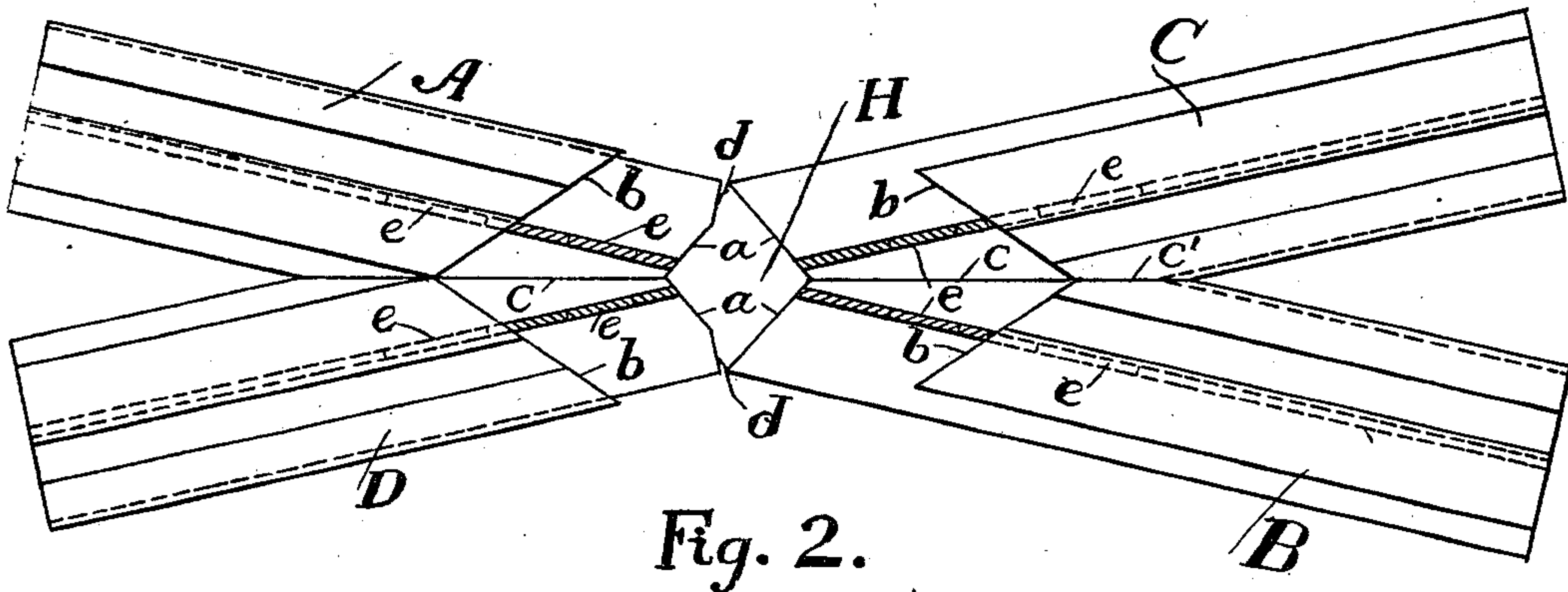


Fig. 4.

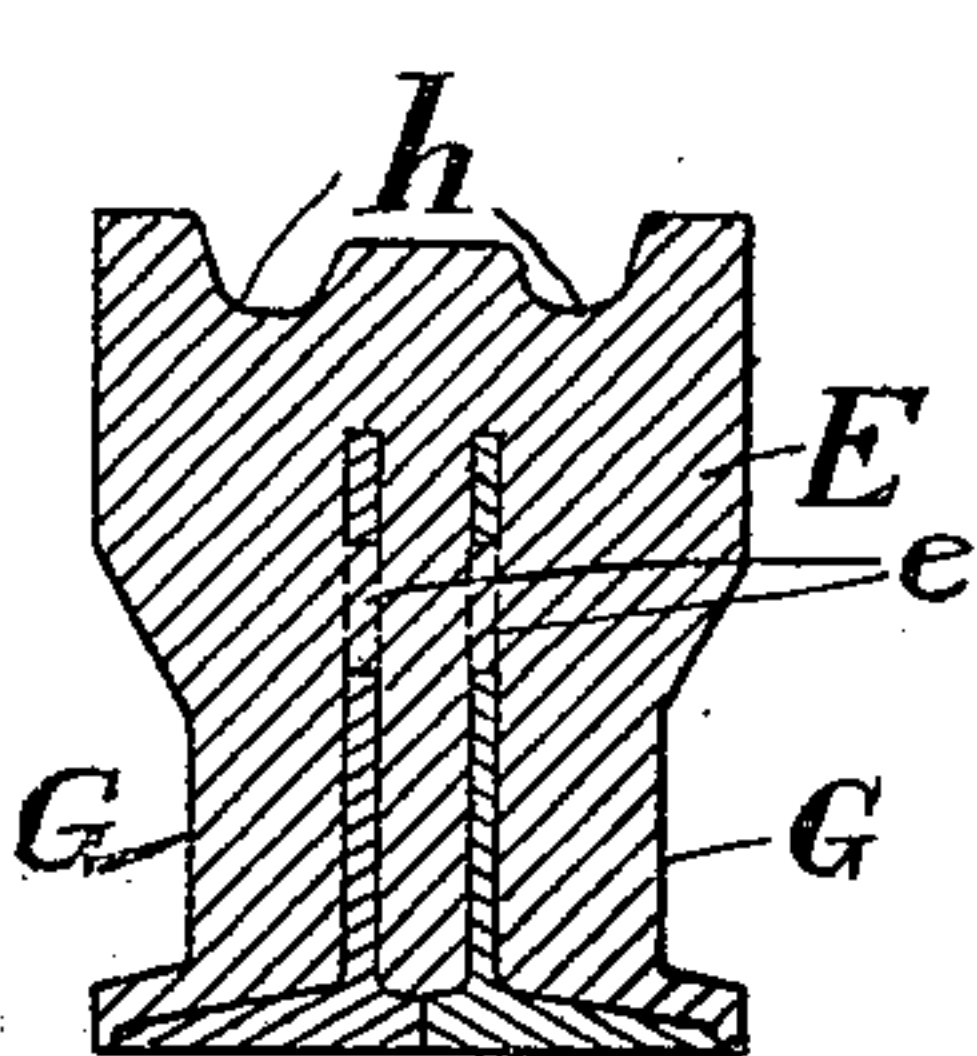


Fig. 5.

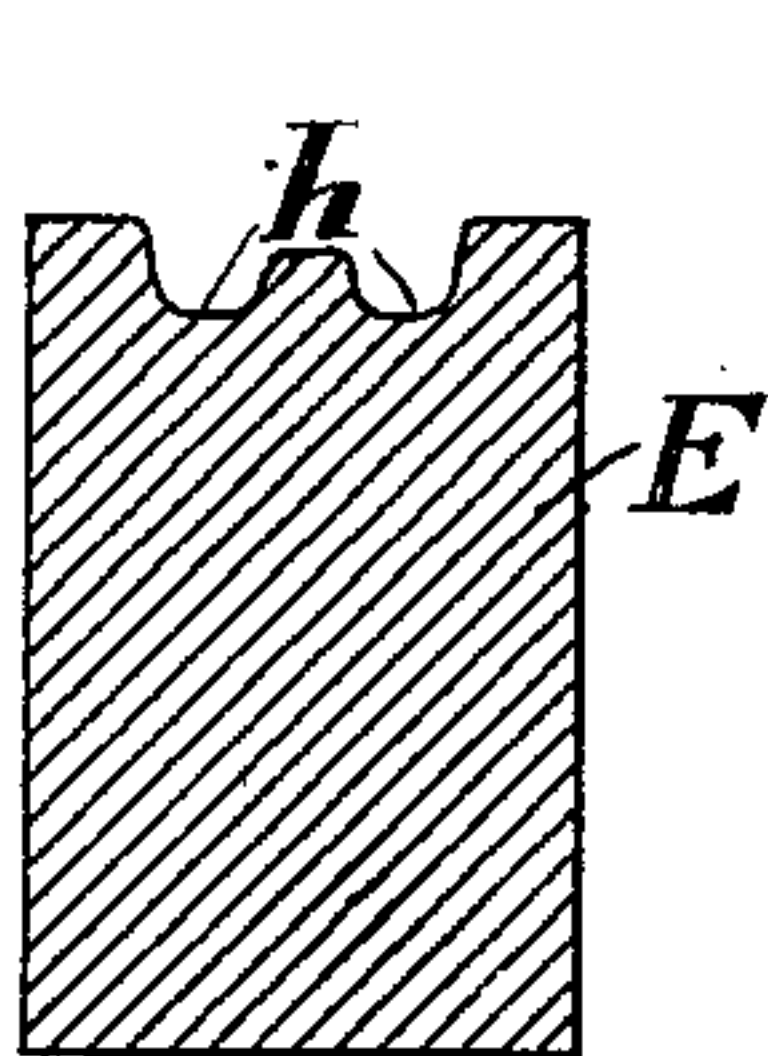


Fig. 6.

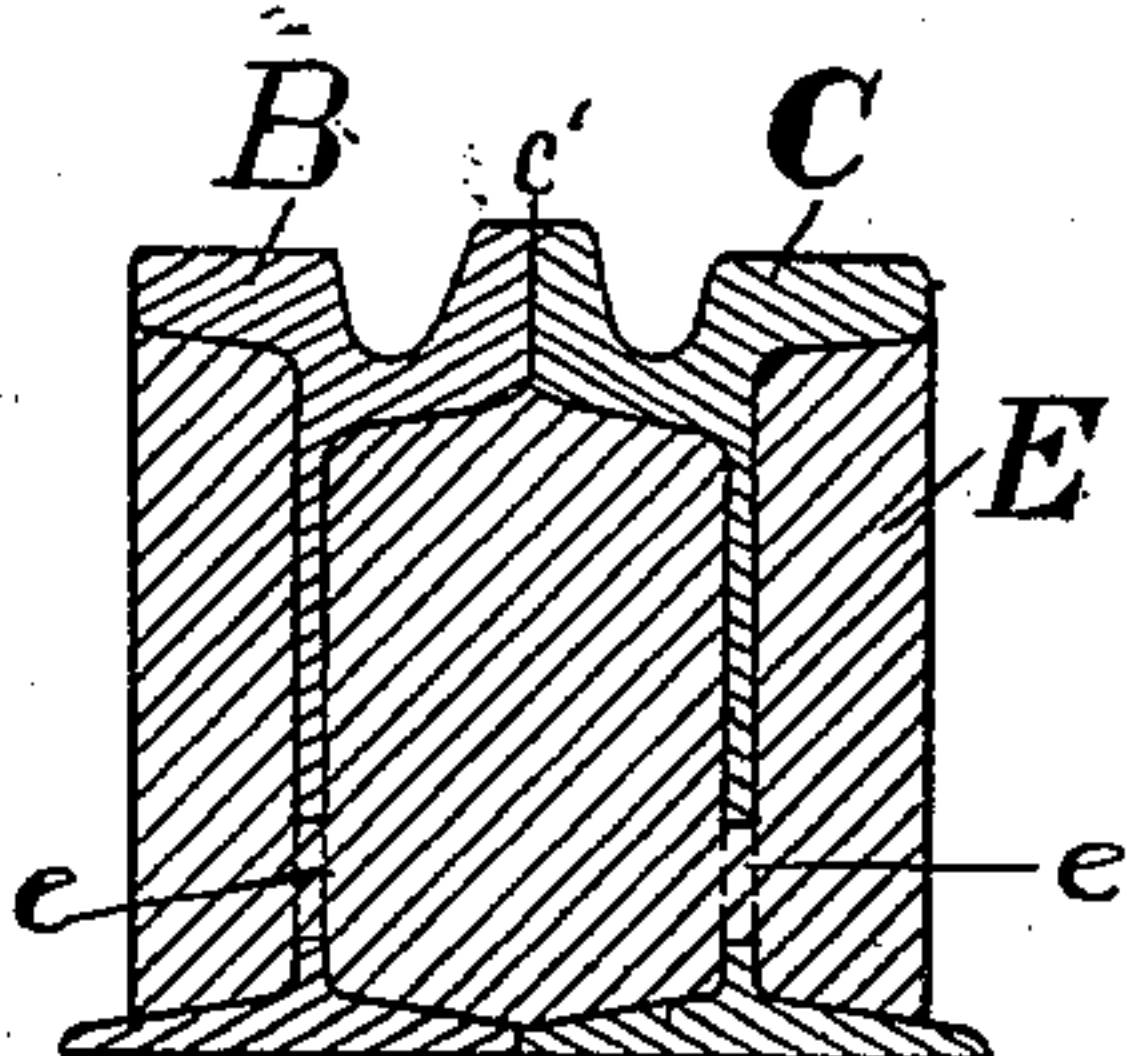


Fig. 7.

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No. 658,356.

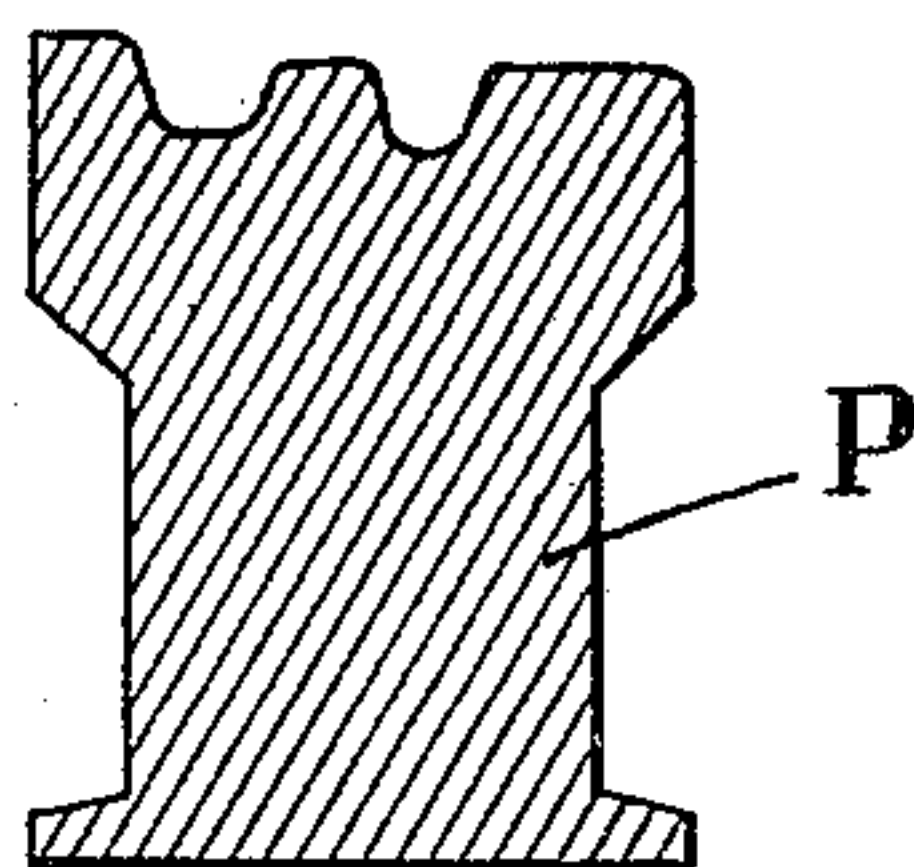
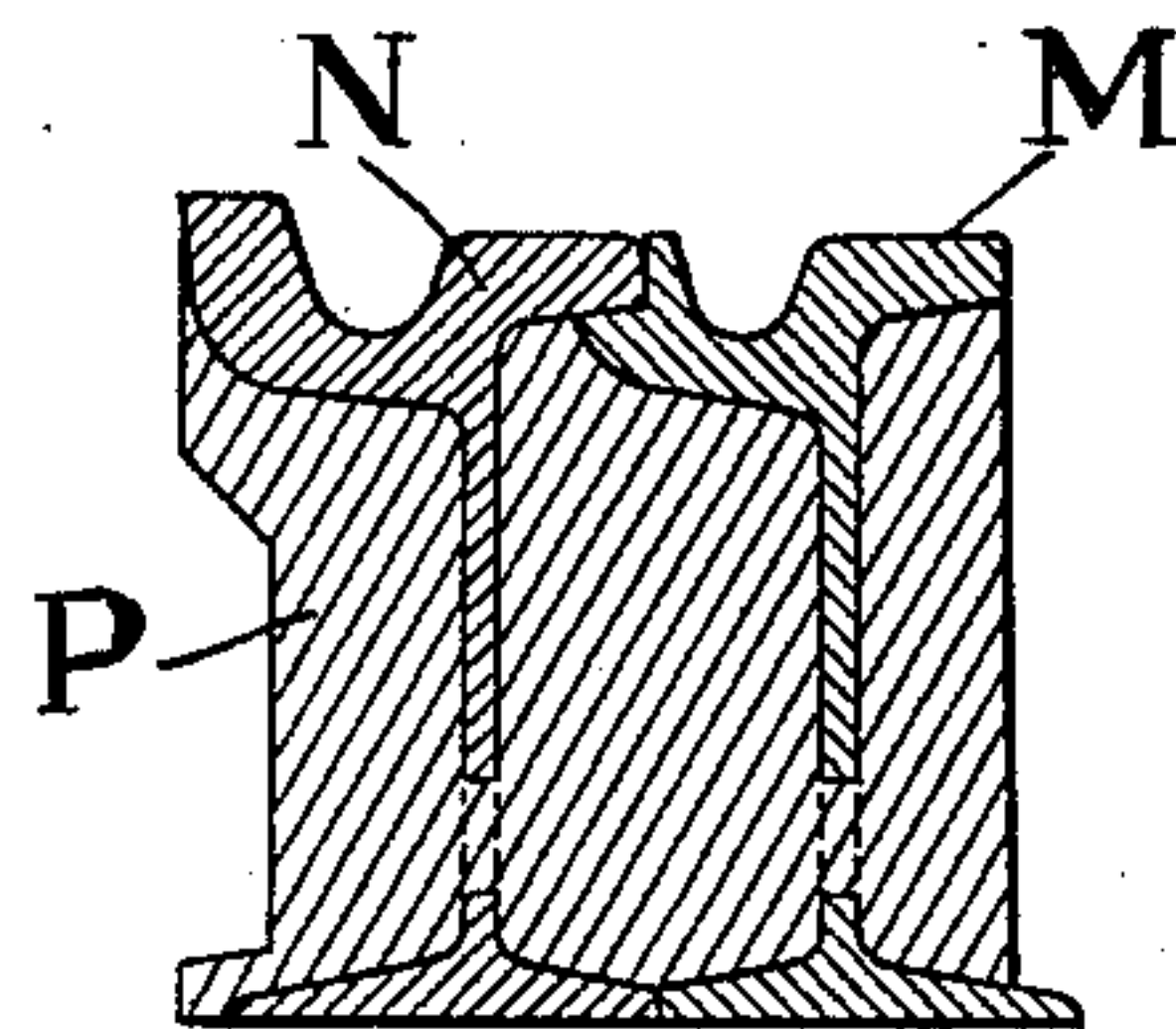
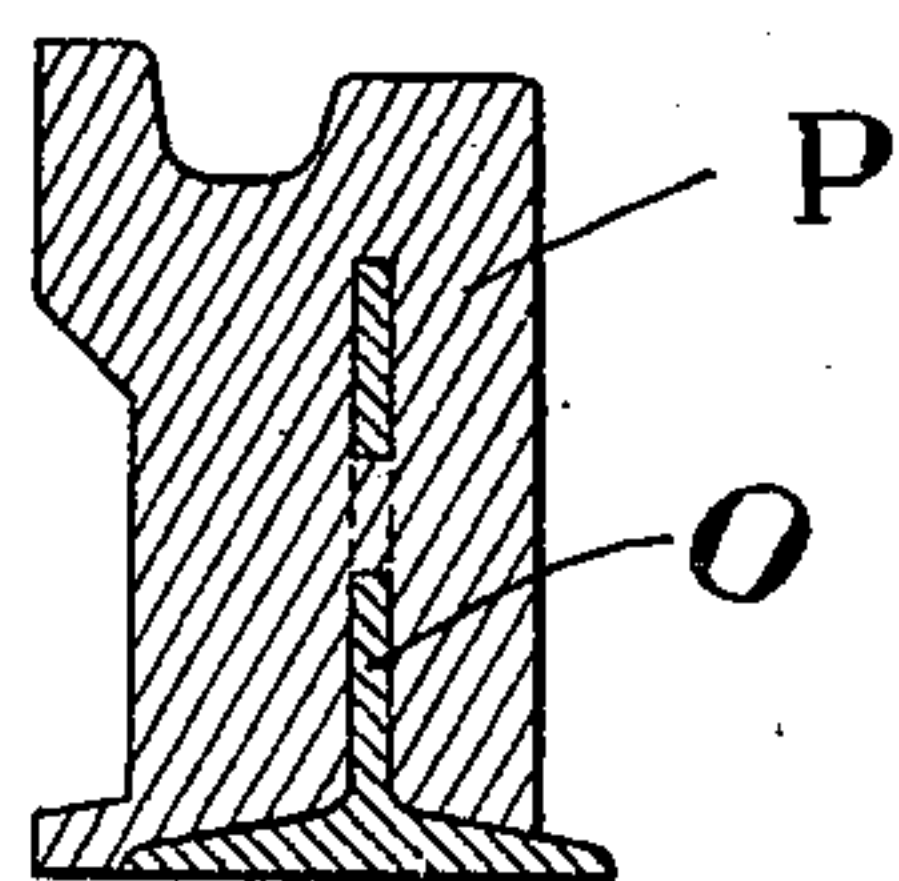
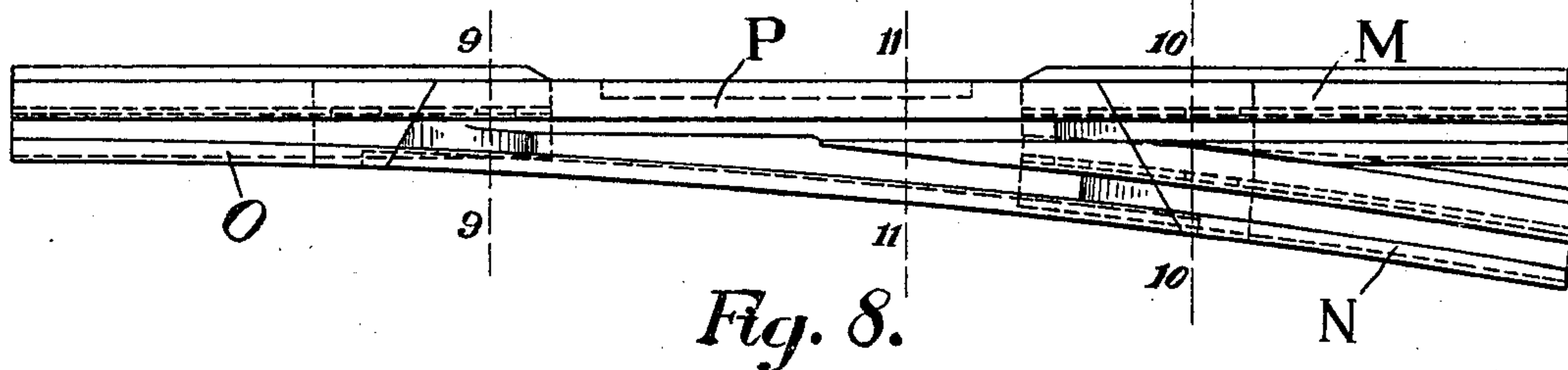
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3 Sheets—Sheet 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## RAILWAY-TRACK STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 658,356, dated September 25, 1900.

Application filed December 1, 1899. Serial No. 738,879. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS C. DU PONT, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Railway-Track Structures, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention has relation to certain new and useful improvements in railway-track structures, and more particularly to frogs, switchmates, and crossings of that class which are constructed of a plurality of rail ends or sections united by a central portion of cast metal, in which their adjacent ends are embedded. Heretofore in structures of this class in a certain high grade of work it has been the practice to form the central cast-metal portion of cast-iron poured in a liquid state around and between the rail ends and also through openings or perforations in their webs, the whole forming a massive body, in which the weight of the cast metal alone is several hundred pounds. Cored in the upper central portion of the cast-iron body is a pocket or recess, in which is subsequently fitted and secured an intersection or wear-plate of harder metal, having flangeways and gage-lines in alinement with the gage-lines of the rail-sections and constituting that part of the structure which is subject to greatest wear. While structures of this construction have given excellent service and have been very largely used in street-railway-track construction, they are open to several objections, both from the standpoint of the manufacturer and the user, which may be briefly stated as follows: The large body of cast-iron necessary to give the structure the requisite strength renders it bulky and heavy to handle and ship, while the operation of properly fitting and securing therein the hardened metal wear or intersection plate with due regard to the alinement of gage-lines is one which requires considerable time and labor, involving, as it does, the passage of each piece through several different shops or departments before the structure is finally completed and ready for shipment. Furthermore, the large lateral

projection of the cast-iron body increases the difficulty of fitting the adjacent pavement thereto when the structure is placed in the street and provides a considerable amount of metallic surface in the street.

The present invention has for its object to provide a track structure which shall be equally durable in service to that above described in that the parts subject to greatest wear are composed of hardened metal, but which obviates the objections above stated.

To this end my invention consists in a railway-track structure composed of a plurality of rails or rail-sections properly fitted together and placed to form the particular structure in view and united by a central portion of hardened cast-steel cast in place between and through the rails or rail-sections and having its upper surface provided with flangeways and gage-lines which aline with those of the rails or rail members. Owing to the greater strength of the cast-steel and the manner in which it is preferably used, as hereinafter described, I am enabled to very materially reduce the size and weight of the cast body to such an extent that it need have little or no lateral projection beyond the structure, and at the same time I provide the structure with an intersection wear-surface of the same durable character as heretofore without the necessity for using and fitting separate plates, as heretofore. The construction is, in fact, designed to be more durable, since being practically one piece throughout there is no opportunity for looseness and play or hammering under the action of passing car-wheels.

The invention also consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a frog or cross constructed in accordance with my invention. Fig. 2 is a plan view of the same, showing the rails fitted and placed to form the frog and ready to receive the cast metal. Fig. 3 is a side view of the completed frog. Figs. 4, 5, 6, and 7 are sections taken, respectively, on the lines 4 4, 5 5, 6 6, and 7 7 of Fig. 3. Fig. 8 is a plan view of a switch-mate em-



bodying the invention; and Figs. 9, 10, and 11 are sections, respectively, on the lines 9 9, 10 10, and 11 11 of Fig. 8.

Referring more specifically to the frog or cross shown in Sheets 1 and 2 of the drawings, the letters A, B, C, and D designate, respectively, the four rail members of the frog, and E designates the central connecting portion of cast-steel.

According to the preferred method of construction I take two rails cut to the proper length and each of these I cut in two on oblique lines, (indicated at *a* in Fig. 2,) forming the said members A, B, C, and D. Each member is then again cut obliquely through its head on the lines indicated at *b*, the cut extending entirely through the head and terminating, preferably, at the point where the web joins the head. These severed head portions are then entirely removed by another cut along the line joining the head to the web. The inner portions of the base flange or foot of each member is also planed off on the line *c*, and on the members B and C the guard side of the heads are also slightly planed, as indicated at *c'*. The outer corners of said flanges on the members A and B are also preferably cut off, as indicated at *b*, Fig. 2. Openings *e* are also formed through the web of each member. These openings are preferably at different levels, as shown in Fig. 3. The four members are now set up in a mold placed as shown in Fig. 2, the members B and C having their planed bases and guard sides of their heads abutted and the members A and D having their bases abutted and the tread sides of their heads cornered together and forming at the center an angular opening H. Fluid cast-steel is now poured into the mold and, flowing between and around the projecting bases and webs of the rail members, fills the entire space between the obliquely-cut ends *b* of the heads to the top level of the latter and also between the rails and underneath their heads, as shown in Figs. 4, 5, 6, and 7. By means of a suitable top core in the mold arranged in a manner well known to the art flangeways *h* may be formed in the top surface of the cast-steel, with gage-lines registering with those of the rail members. Side cores may also be used, as indicated at G, for the purpose of lightening the structure and to give opportunity for spiking. The cast metal used may be similar to that which has heretofore been used in the manufacture of the separate hardened cast intersection-plates. Constructed in this manner the structure is practically one piece throughout and is of very great strength and rigidity, while comparatively light. All the parts subject to greatest wear are formed entirely of the hardened cast-steel, and owing to the great strength of this metal and the extended grip it has upon the rail members, due to the fitting and construction of the latter, as above described, its mass may be made comparatively small, thereby not only saving in weight and expense of material,

but also avoiding lateral projection beyond the lines of the sides of the heads of the rail members. Thus it will be seen that in the frog illustrated in the drawings the cast metal is entirely included within the outer lines of the rail members, its least width being at the center or intersection portion of the structure. The structure has therefore regular lines, to which when placed in the ground the paving may be easily fitted. It also presents a minimum area of metallic surface, and in case of removal necessitates but little disturbance of the adjacent paving.

It should be noted that the feature of cutting the rail-heads obliquely, as shown at *b*, has a double function. In the first place, it provides a considerable increase in the surface area of the cast metal E without materially increasing the bulk of the latter, and, in the second place, it enables the car-wheels to pass gradually from the harder cast metal to the softer metal of the rail members, and vice versa, instead of making a sudden jump from one to the other. It will also be noted that the guard projections shown at *k* serve to protect or act as a fender to the joint between the cast metal and the ends of the rail members.

Referring now to the switchmate shown on Sheet 3 of the drawings, it will be seen that the construction is essentially the same as in the frog, except that three rails M, N, and O are used instead of four, said rails having portions of their heads removed and projecting into the cast metal P, the entire body of which is formed of hardened steel cast in place in substantially the same way as in the frog and constituting the solid central portion of the structure.

Instead of providing holes through the web for the fluid metal to flow through the webs of the rails may obviously be provided with projections or roughened surfaces, or depressions or pockets may be formed in the rails in order that the cast metal may take hold of the same. In fact, a structure may be made having considerable strength in which the metal is simply poured about the end portions of the rails.

If desired, the structures may be subsequently annealed.

It will be readily understood that the invention may be readily applied to a right-angled crossing, to a crossing or frog in which one or both of the intersecting tracks are curved, and to other forms of track structures. I do not therefore limit myself to the details which I have herein shown and described, as these may be changed without departing from the essential features of my invention as pointed out in the appended claims.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. A railway-track structure, comprising a plurality of rail members or sections relatively placed to form the wing portions of the



structure, the head portions thereof at their adjacent ends being entirely removed, and a central connecting portion of hard cast-steel cast about and embedding said end portions, substantially as described.

2. A railway-track structure composed of a plurality of rail members whose web and base portions at their adjacent ends are extended beyond their head portions, and a central connecting portion of hard cast-steel cast about and through the extended webs and fitting the space between the adjacent rail-heads to the level thereof, and forming the track intersection, substantially as described.

3. A railway-track structure, composed of a plurality of rail members having their heads cut obliquely at their adjacent end portions, and their web and foot portions extended beyond their heads, and a cast-steel central portion cast in place around and through the said end portions, to the full height of said members, substantially as described.

4. A railway-track structure, composed of short rail-sections forming the wing portions of the structure, and a central connecting portion of hard steel cast about the end portions of said sections, with its upper surface level with the top surfaces of the heads of said sections, and meeting the same obliquely, substantially as described.

5. The herein-described frog or track-crossing consisting of four rail-sections placed to form the four wing portions of the structure, and having their heads formed with oblique ends and their base and webs extended beyond the said heads, and a central homogeneous connecting portion of hard steel cast to said sections and forming the track intersection, substantially as described.

6. The herein-described frog or track-crossing, consisting of four rail-sections forming the four wing portions of the structure, the two sections at each end having their web and base portions extended beyond their heads to substantially meet the corresponding portions of the two opposite sections, and a central portion of cast-steel cast to said sections and uniting the same, the lateral faces of said central portions being substantially flush with the outer lateral lines of the heads of said sections, substantially as described.

7. The herein-described frog or track-crossing, consisting of four rail-sections forming the four wing portions of the structure, the two sections at each end having their web and base portions extended to substantially meet the corresponding portions of the two opposite sections, and a central portion of hard steel cast to said sections, and forming the intersection portion of the structure, substantially as described.

8. In a track structure, a central member of hard steel cast to the wing members and forming the intersection portion of the structure, said central member joining the heads of the wing members obliquely, substantially as described.

9. In a track structure, a central member of hard steel cast to the wing members and forming the intersection portion of the structure, said central member joining the heads of the wing members obliquely, and having top projections at one end which guard the joints between said central and wing members, substantially as described.

10. In a track structure, a central member of hard steel cast to the wing members and forming the intersection portion of the structure, said central member having its side faces within the lines of the outer edges of the wing members, and cored out to form seats for spike-heads, substantially as described.

11. In a railway-track frog or crossing, the rail-sections A, B, C and D having their heads cut obliquely and their web and base portions extended beyond their heads, and also cut obliquely at their ends, and a central connecting portion of hard steel cast to said rail-sections, and forming the intersection portion of the structure, substantially as described.

12. In a railway-track frog or crossing, the rail-sections A, B, C and D having their heads formed with oblique ends and their web and base portions extended beyond their heads and also cut obliquely, the base portions of each pair of rails being also partly cut away and abutted at their inner sides, and a central connecting portion of hard steel cast to said sections and forming the intersection portion of the structure, substantially as described.

13. The herein-described railway frog or crossing, consisting of the two rail-sections A and B having their heads formed with oblique ends, their web and base portions extended beyond said ends, and their base portions partly cut away on the inner side and abutted, the two opposite rails B and C also having similarly-formed end portions, the projecting webs and bases of which substantially meet those of the rails A and B, and a central portion of hard steel cast to said rail-sections and forming the intersection portion of the structure, substantially as described.

14. The combination, in a railway-track structure, of a plurality of converging rails having their base portions extending beyond their head portions, and a body of cast-steel filling the central cavity between the heads of said rails and integrally connected to the said bases within said cavity, the top of said body of steel forming the intersection of the tracks, substantially as described.

15. In a railway frog or crossing, the combination of the converging members having their web and base portions at their inner ends extended beyond their head portions, said extended base portions being cut away and fitted to bring the web portions near each other, and a body of cast-steel uniting said members and forming the intersection of the tracks, substantially as described.

16. In a railway frog or crossing, a plurality of rail members having their head portions at their adjacent ends removed on con-



verging lines which meet at the inner corners  
of the rails, and their web and base portions  
extended beyond said heads and converging  
toward the center of the structure, together  
5 with a cast-steel body uniting said members  
and forming the intersection portion of the  
structure, substantially as described.

In testimony whereof I have affixed my sig-  
nature in presence of two witnesses.

T. C. DU PONT.

Witnesses:

M. E. SHARPE,  
H. W. SMITH.