

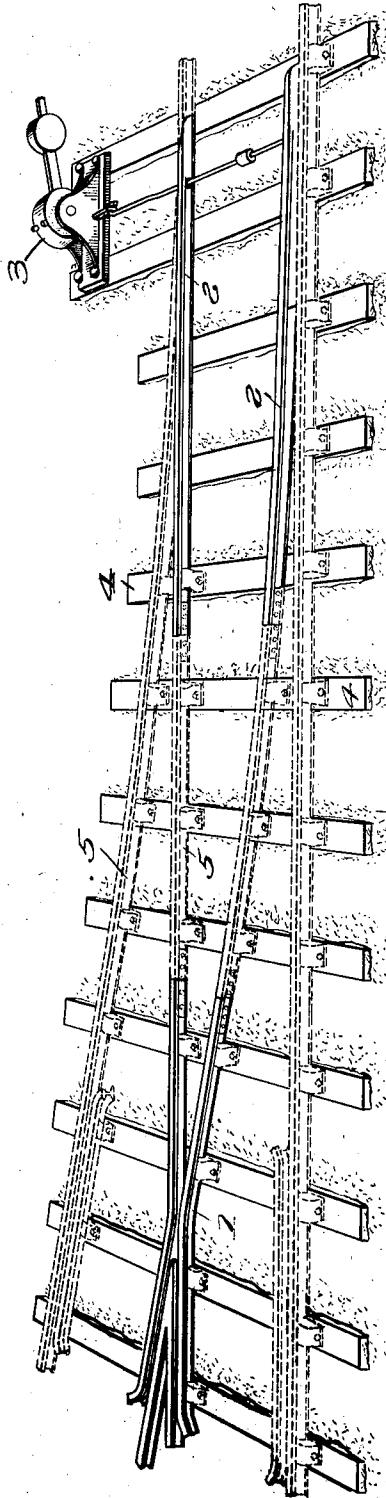
R. A. HADFIELD.

MANUFACTURE OF TRACK STRUCTURES FOR RAILWAYS AND THE LIKE.

APPLICATION FILED OCT. 2, 1907. RENEWED SEPT. 27, 1912.

1,058,967.

Patented Apr. 15, 1913.



WITNESSES:

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ROBERT ABBOTT HADFIELD, OF SHEFFIELD, ENGLAND.

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Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed October 2, 1907, Serial No. 395,658. Renewed September 27, 1912. Serial No. 722,763.

To all whom it may concern:

Be it known that I, ROBERT ABBOTT HADFIELD, a subject of the King of Great Britain and Ireland, residing at Sheffield, in the county of York, England, have invented new or Improved Manufacture of Track Structures for Railways and the Like, of which the following is a specification.

This invention has reference to a new or improved manufacture of track structures, more especially for what are known as steam railroads, and also for other similar purposes and it has for object to produce track structures, including points and crossings and other articles, of material which has much greater durability and safety than the track structures now commonly employed and usually made as built-up work from ordinary carbon steel rails.

According thereto, track structures are built up from suitably shaped pieces of forged manganese steel, preferably of the kind known as Hadfield's "Era" manganese steel, (made by Hadfield's Steel Foundry Company Limited of Sheffield). The required pieces of manganese steel may be produced by casting such steel into ingots, converting such ingots into rails or other shapes of suitable length by rolling, forming the rails or other shapes by sawing, or by forging, pressing or otherwise squeezing them into the required shapes to form parts of the desired track structure, subjecting the said parts to a toughening process, grinding the ends or other portions of the said parts where necessary, into the complete and finished shapes either after or before the toughening process, punching the necessary holes for bolts, or other fastening means or attachments, and finally assembling and bolting or otherwise securing the several parts together to form the desired track structure.

My invention is shown in the drawing herewith, in which 1 indicates a frog and 2 2 the two rails of a switch operated by a switch of any usual construction as indicated at 3.

4 4 are the ties and at 5 are indicated in dotted lines the rails of usual construction.

The invention may conveniently be carried into practice as follows:—I first cast ingots of Hadfield's "Era" manganese steel, preferably in the manner described in the specification of former Letters Patent granted to me No. 791,189, dated May 30th, 1905,

the shrinkage heads or risers of the ingots being preferably fed in the manner described in the specification of my pending application for Letters Patent Serial No. 316,451, filed May 12, 1906. The ingots are then, if desired, removed while hot, by which term I mean at any suitable temperature which does not allow the ingot to cool down to a dangerous point at which they may break through contraction. Or, if the ingots are allowed to go cold, I carefully reheat them by first heating them very slowly, so that the expansion which takes place will not break them. This is important as manganese steel is a very bad conductor of heat, and in this case it is necessary to carry out the heating very gradually, until the temperature of the ingots has reached about a dull red. The ingots are then further heated, it may be more quickly up to a temperature of from about 850° C. to 1000° C. (eight hundred and fifty degrees to one thousand degrees centigrade), varying according to the size and nature of the ingot. They are then forged into billets which are reheated, say to about the temperature just mentioned, and rolled into rails or other shapes, of suitable lengths. Or the ingots may be rolled direct, into rails or other shapes of suitable length, that is to say without the intervention of previous billeting. It is necessary to use great care to see that the ingots are uniformly heated or they cannot be satisfactorily rolled. The reduction of the ingot into rails or shapes should take place more gradually than ordinary steel ingots. The rails or other shapes when rolled into suitable lengths, are preferably cut hot into the desired lengths. In some cases where an oblique section is required, the rails or shapes can be sawed to such section while hot. In other cases the rails are ready for the further necessary treatment, which can, if desired, be effected while they are still in the heated condition, or, if they are allowed to cool, after being reheated, and which treatment consists in subjecting the ends or other parts of such rails to a forging, pressing, or other squeezing treatment whereby they are caused to assume approximately the finished shape desired for the production of the various taper or other sections and configurations necessary for the production of the required point crossing or other track structure. The parts thus produced are preferably then subjected to the required

toughening process such as described in my said former specifications, after which the ends or other portion of the parts are ground into the complete and finished shape in which it is necessary to prepare them. The toughening process may be carried out after this finishing process, but usually I prefer to first toughen the parts. Holes of the required shape for bolts and fish-plates or other fastenings or attachments are punched in the parts. The whole of the parts to form the required track structure are then assembled and bolted or otherwise secured together ready for putting down in the railroad bed.

By the means described, I am able to obtain suitable modifications, in fact, repetitions in form of the existing points and crossings now usually made of carbon steel. My special track work is far superior to ordinary steel castings, or even cast manganese steel, because the articles are practically quite sound and free from flaws. The whole of the material is thus produced of the best steel, having a high tenacity of say about 50 to 60 (fifty to sixty) tons per square inch, and an elongation of 30% to 45% (thirty to forty five per cent.), the material being nevertheless so hard that it cannot be drilled or machined. The section tested was about

eight inches long. There is thus obtained forged track work having exceptional durability and safety.

What I claim is:—

1. The herein described process of producing structures from manganese steel, which consists in casting the steel into ingots, reheating the ingots very gradually and uniformly to about a dull red heat if the ingots have cooled, then heating the ingot uniformly to from about 850° C. to about 1000° C., then gradually rolling into the shape of rails.

2. The herein described process of producing structures from manganese steel, which consists in casting the steel into ingots, maintaining the ingots hot or reheating to about a dull red heat very slowly and uniformly, then reheating the entire ingot uniformly to from about 850° C. to about 1000° C., forging into billets, then gradually rolling into rails.

Signed at 28 Hertford street, Mayfair, London, England this twenty ninth day of August, 1907.

ROBERT ABBOTT HADFIELD.

Witnesses:

JOHN WM. CROWLEY,
JOHN H. HALLATT.