H. A. STOCK.

PROCESS OF AND APPARATUS FOR TEMPERING STEEL RAILS.

APPLICATION FILED DEC. 8, 1920.

1,418,985.

Patented June 6, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

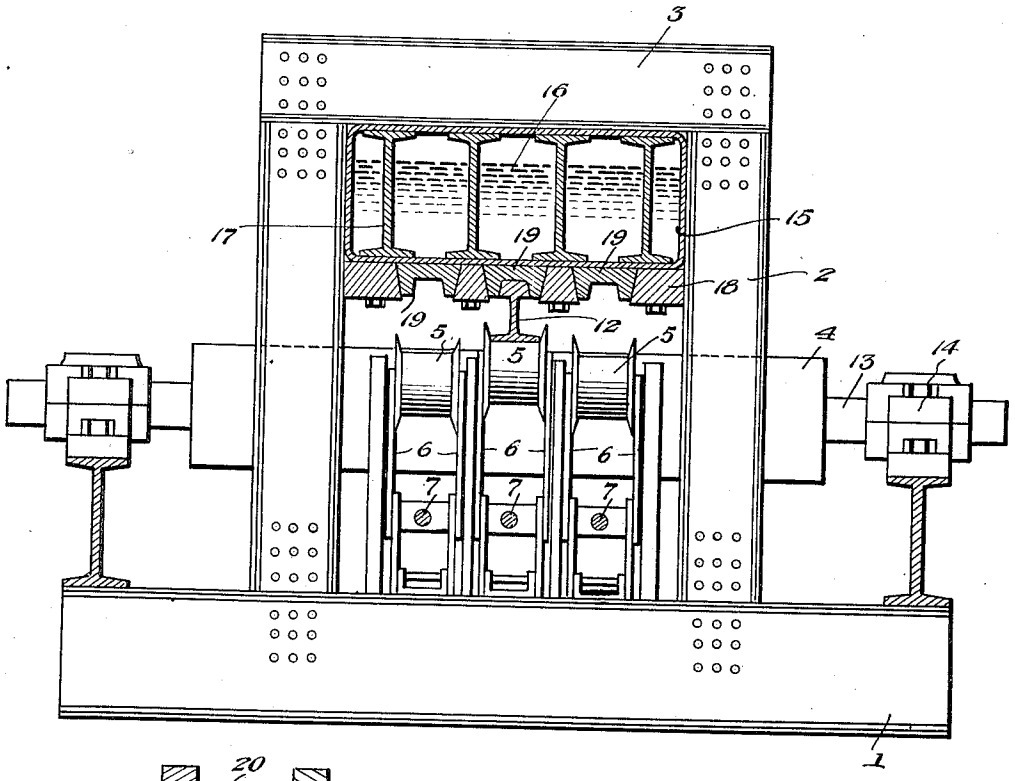


Fig. 3.

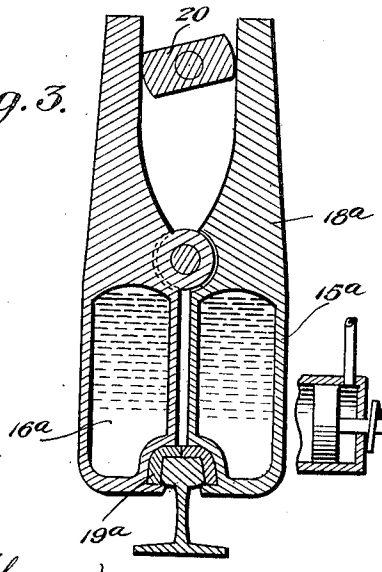
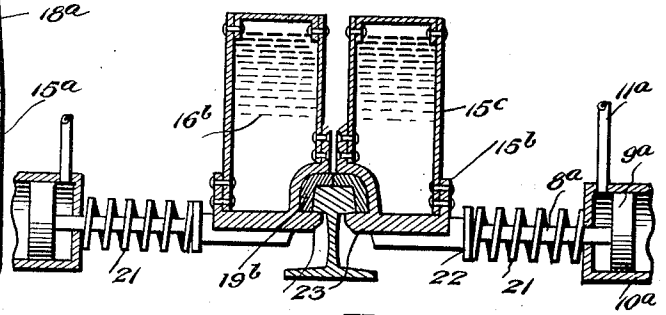


Fig. 4.



Harry A. Stock

INVENTOR

BY Victor J. Evans

ATTORNEY

Geo. Ackman Jr.

WITNESS

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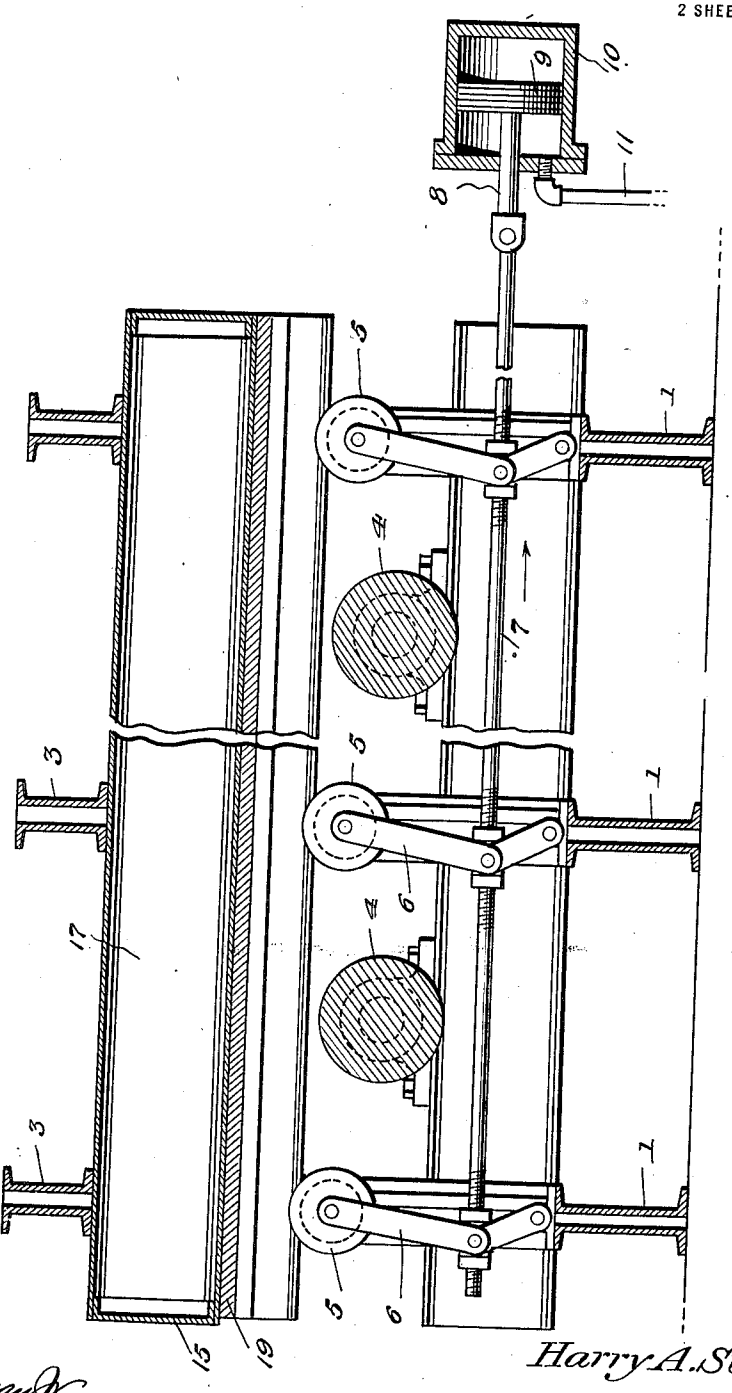


Fig. 2.

Witness:
F. S. Ackerman Jr.
Thomas E. Thompson

Harry A. Stock
INVENTOR

By Victor J. Evans
ATTORNEY

UNITED STATES PATENT OFFICE.

HARRY A. STOCK, OF STEELTON, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM J. MARTIN, OF STEELTON, PENNSYLVANIA.

PROCESS OF AND APPARATUS FOR TEMPERING STEEL RAILS.

1,418,985. Specification of Letters Patent. Patented June 6, 1922.

Application filed December 8, 1920. Serial No. 429,182.

To all whom it may concern:

Be it known that I, HARRY A. STOCK, a citizen of the United States, residing at Steelton, in the county of Dauphin and State of Pennsylvania, have invented new and useful Improvements in Processes of and Apparatus for Tempering Steel Rails, of which the following is a specification.

It is a desideratum in the art of tempering steel track rails to subject a rail to the action of the tempering means until the critical stage of tempering is reached, and to then quickly disassociate the tempering means from the rail or vice versa.

One object therefore of my present invention is the provision of a tempering process that renders feasible the quick and accurate tempering of a rail an important factor in which is the quick disassociation of the rail from the tempering means or vice versa.

Another object of the invention is the provision of means for expeditiously and accurately tempering rails, and this in such manner that disassociation of the rails from the tempering means or the tempering means from the rails may be quickly brought about.

To the attainment of the foregoing, the invention consists in the improvement, an important characteristic of which resides in the interposition of a heat collecting medium between the cooling or tempering means and the rail that is being tempered, as hereinafter described and definitely claimed.

The heat collecting medium may be copper or an equivalent metal or material in the form of a die of any shape to conform with the section of the rail or other shapes to be tempered. The cooling or tempering means may be any cooling liquid such as water or brine of any chemical analysis. This cooling agent may be refrigerated or circulated when the occasion demands. The great advantage of this invention is the control that can be obtained of the cooling or tempering means, thus being able to vary the rate or degree of cooling within any required limits, without impinging directly on the surface of the rail any cooling fluid, thus obviating fine cracks from the surface of the rail. Another great advantage of this invention is the heat collecting medium being in the form of a die to conform with the section or shape of the rail to be tempered. This prevents the rail from warping or drawing, also insures a perfectly uniform cooling over the surface to be tempered. Also this die can be so formed as to give the rail the proper curve so that in the final cooling the rail will be reasonably straight.

In the accompanying drawings, illustrative of apparatus for carrying out the process, and forming part hereof:—

Figure 1 is a view partly in elevation and partly in transverse section showing a rail in position to be tempered.

Figure 2 is a longitudinal vertical section of the same.

Figures 3 and 4 are transverse sections of modifications hereinafter explicitly referred to.

Similar numerals designate corresponding parts in Figures 1 and 2 to which reference will first be made.

Among other elements the apparatus includes a frame having transverse base beams 1, uprights 2 and crown beams 3.

The apparatus also comprises a plurality of rest rollers 4 for each rail, and a plurality of elevating rolls 5 for each rail, the said rolls 5 being carried by the upper members 6 of toggle levers which are arranged in longitudinal series with the levers of each longitudinal series connected to a longitudinal actuating rod 7. It is within the purview of my invention to move the rod 7 in the direction indicated by arrow in Figure 2 by any suitable means. For instance each rod 7 may be connected with the rod 8 of a piston 9, arranged to work in a cylinder 10, connected through the medium of a conduit 11 with a source of fluid pressure supply so that by letting fluid under pressure into the conduit 11 an operator may bring about powerful movement of the rod 7 in the direction indicated so as to raise the elevating rolls 5 and a rail 12 positioned thereon. The rest rolls 4 are carried by shafts 13, journaled in stationary bearings 14 as illustrated in Figure 1.

The apparatus further comprises a holder 15 for a cooling medium; the said holder 15 being preferably in the form of a tank to receive a cooling liquid 16 which obviously may be refrigerated or circulated when occasion demands. In the tank 15 are reinforcing elements 17, preferably in the form of beams as illustrated calculated to

resist upward pressure exerted against the bottom wall of the tank.

At the underside of the tank 15 are clamping blocks 18, and disposed and held between the said clamping blocks are the several means 19 for collecting heat from the rails to be tempered and for giving off said heat to the cooling means. The said means 19 are designed to rest in interposed relation between the cooling means and the rails and so that the cooling means does not come into direct contact with the rails, and in this resides a highly important characteristic of my invention inasmuch as it contributes materially to the facility with which the rails and the tempering means may be associated and disassociated. The interposed tempering means 19 of Figures 1 and 2 are each in the form of a die of copper or equivalent material into which heat will readily pass from the rails and from which the heat will be readily given off to the cooling agent in the holder or tank 15. Each of the dies 19 corresponds in length to the rail to be treated therein as well as to the cross sectional size of the rail, and it will be readily understood that my invention contemplates the use in the apparatus of different size dies 19 for the treatment of rails of different sizes and sections.

In the practical use of the apparatus as described, and the practice of my invention the hot rails are run on the rest rolls 4, and are then raised by the means described to position the heads of the rails in the dies 19 after the manner shown in Figure 1. Then when the critical stage of tempering is reached, the mechanism is quickly actuated to permit gravitation of the rails from the dies 19, when the tempered rails may be carried off in the ordinary well known manner or in any other manner compatible with the purpose of my invention.

When the rails are positioned as illustrated with their heads in the dies 19, it will be manifest that the tread and side surfaces only of the rail heads will be tempered as is desirable.

In the modification shown in Figure 3 the heat collecting means 19^a is in the form of two separable sections of copper or equivalent metal or material, and the said sections are carried by levers 18^a, in the lower arms of which are holders 15^a for bodies of cooling agent indicated by 16^a. The said lower arms of the levers 18^a are moved toward each other and held against casual outward movement through the medium of a cam 20 interposed and operable between the upper arms of the levers.

In the modification shown in Figure 4 the sections 19^b of the heat collecting means are carried by laterally movable bodies 15^b on which are holders 15^c for cooling agent 16^b, the said holders 15^c being in close proximity to the heat collecting means 19^b. Any appropriate means may be utilized to move the bodies 15^b toward and away from each other. For example the said bodies 15^b may be connected to the rods 8^a of pistons 9^a in cylinders 10^a, designed to be connected by conduits 11^a with a source or sources of fluid pressure supply so that by letting fluid under pressure into the conduits 11^a the operator may bring about movement of the bodies 15^b outwardly or away from each other. For inward movement of the said bodies 15^b springs 21 may be employed, the said springs surrounding the rods 8^a and being interposed between abutments 22 on the bodies 16^b and the abutments afforded by the inner ends of the cylinders 10^a. It will also be observed that in the apparatus shown in Figure 4 the bodies 15^b are provided with flanges 23, designed to be thrust under the head of a rail subsequently to the upward movement of the rail and the positioning of the head of the same between the sections 19^b of the heat collecting means.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:—

1. The process of tempering steel rails which consists in the interposition between a rail and cooling means, of means to collect heat from the rail and to give off such heat to the cooling means, quickly associating the heat collecting means and the rail, and quickly disassociating the same.

2. The process of tempering steel rails which consists in the interposition between a rail and cooling means, of means to collect heat from the rail and to give off such heat to the cooling means, quickly associating the rail with the heat collecting means, and quickly disassociating the rail from said heat collecting means.

3. Rail head tempering means comprising a holder for cooling means, and heat collecting means arranged in close proximity to the cooling means and adapted for direct contact with a rail head to be tempered, whereby heat will be collected from the rail head and given off to the cooling means without contact between the cooling means and the rail head; the said heat collecting means being shaped to straddle the rail head.

4. Rail tempering means comprising a holder for cooling means, and heat collecting means arranged in close proximity to the cooling means and adapted for direct contact with a rail to be tempered, whereby heat will be collected from the rail and given off to the cooling means without contact between the cooling means and the rail; the said heat collecting means being of copper or equivalent material.

5. Rail tempering means comprising a holder for cooling means, heat collecting

means arranged in close proximity to the cooling means, and means to quickly associate and disassociate the heat collecting means and a rail.

6. Means for tempering rail heads comprising a holder for cooling means, a heat collecting means carried by said holder and shaped to receive and straddle a rail head, and means for quickly associating and disassociating the heat collecting means and a rail.

7. Means for tempering rail heads comprising a holder for cooling means, a heat collecting means carried by said holder and shaped to receive and straddle a rail head, and means for quickly associating and disassociating the heat collecting means and a rail; the latter means including quick acting rail elevating means.

8. Rail tempering apparatus comprising a frame, a holder for cooling means, a conductive die at the underside of the holder and shaped to receive the head of a rail and adapted to collect heat from said head and give off heat to the cooling means, rest rolls, elevating rolls, toggle levers carrying the elevating rolls, and a rod connected to the said toggle levers.

9. Rail tempering apparatus comprising a frame, a holder for cooling means, a conductive die at the underside of the holder and shaped to receive the head of a rail and adapted to collect heat from said head and give off heat to the cooling means, rest rolls, elevating rolls, toggle levers carrying the elevating rolls, and a rod connected to the said toggle levers; the said heat collecting die being detachably associated with the holder and adapted for use interchangeably with a larger or smaller die or a die of a different shape.

In testimony whereof I affix my signature.

HARRY A. STOCK.