

(No Model.)

5 Sheets—Sheet 1.

J. W. CLOUD.

APPARATUS FOR COOLING STEEL RAILS AND BARS.

No. 468,788.

Patented Feb. 16, 1892.

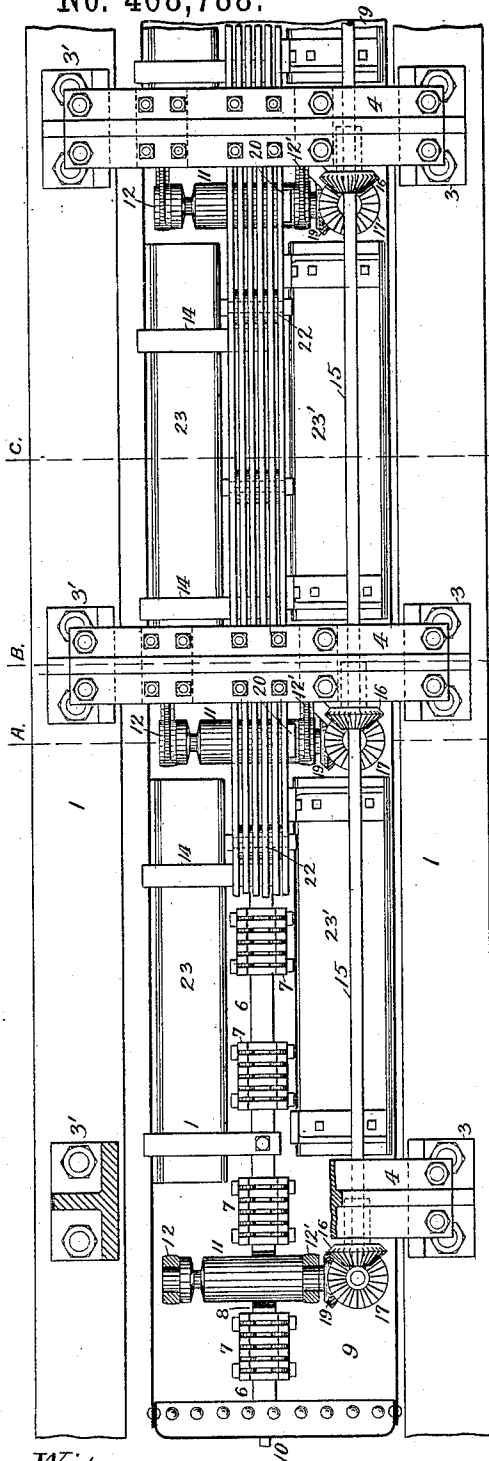


Fig. 1.

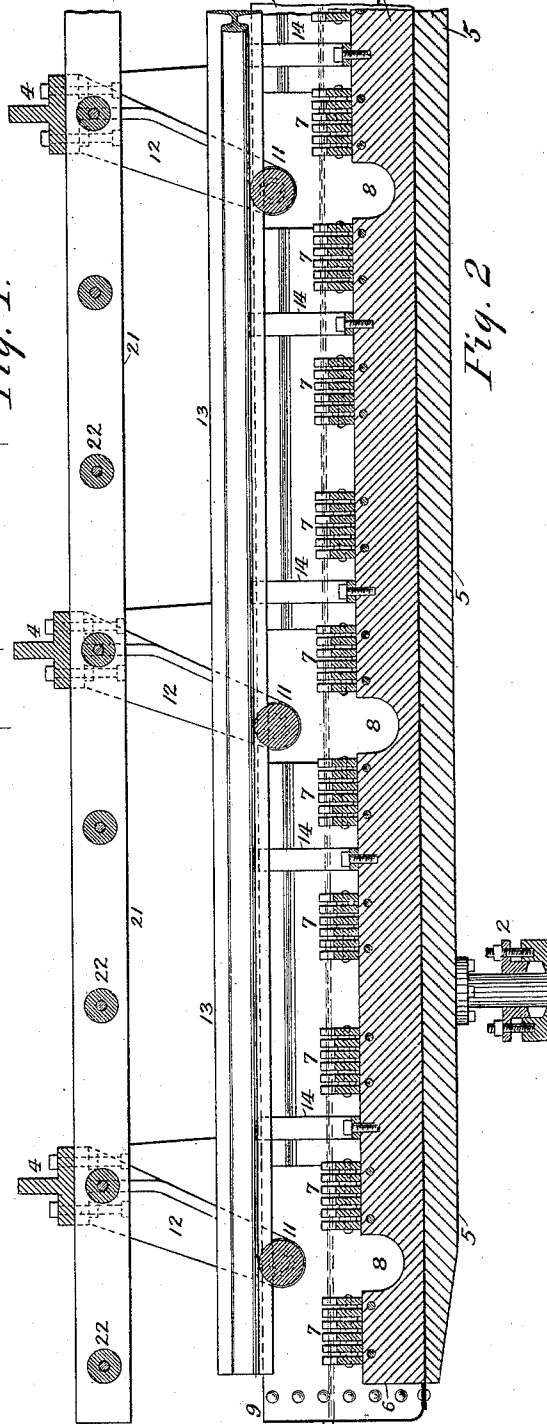


Fig. 2

Witnesses

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Inventor.

By his Attorneys. *M. O'Connell*
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(No Model.)

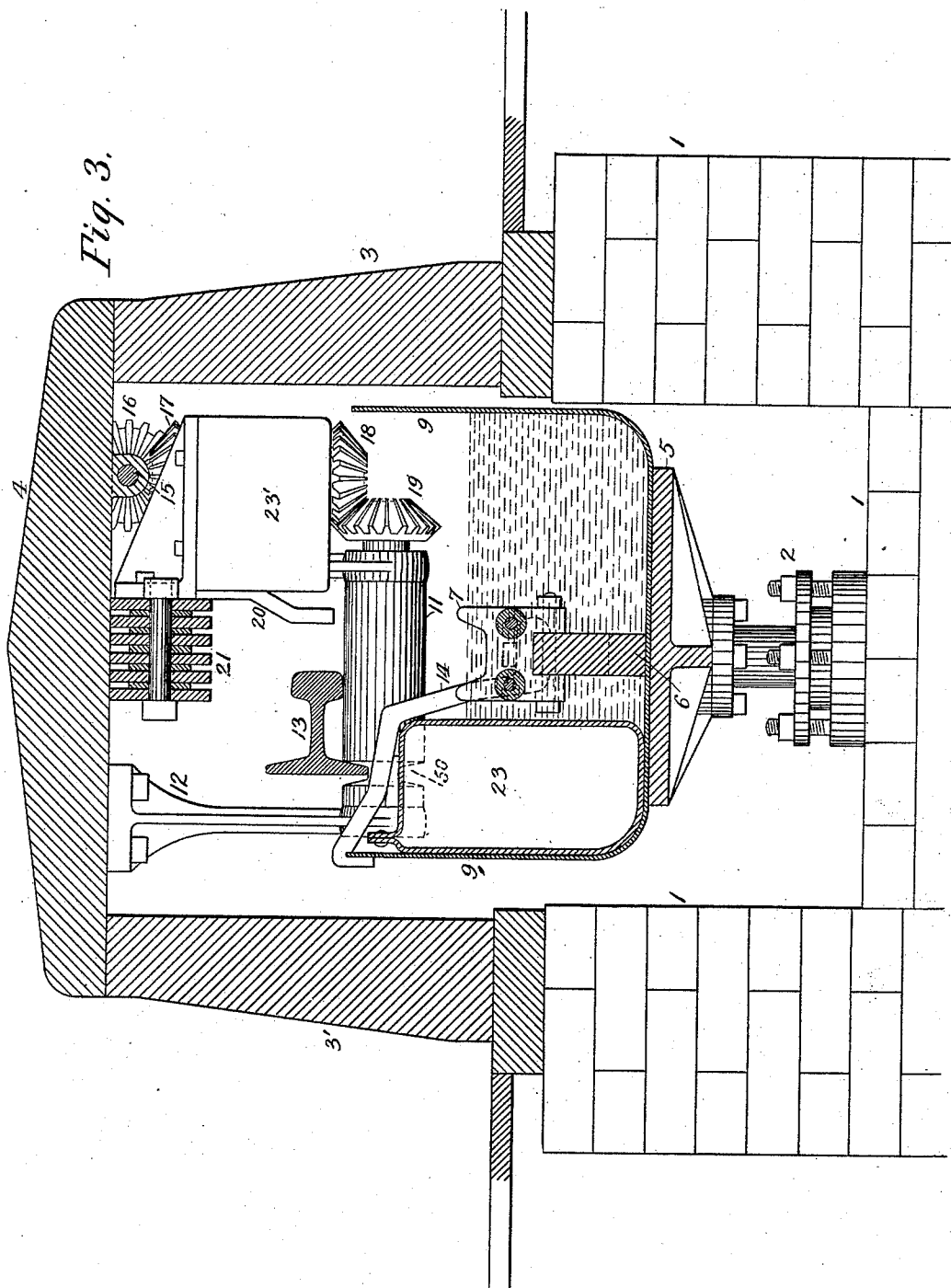
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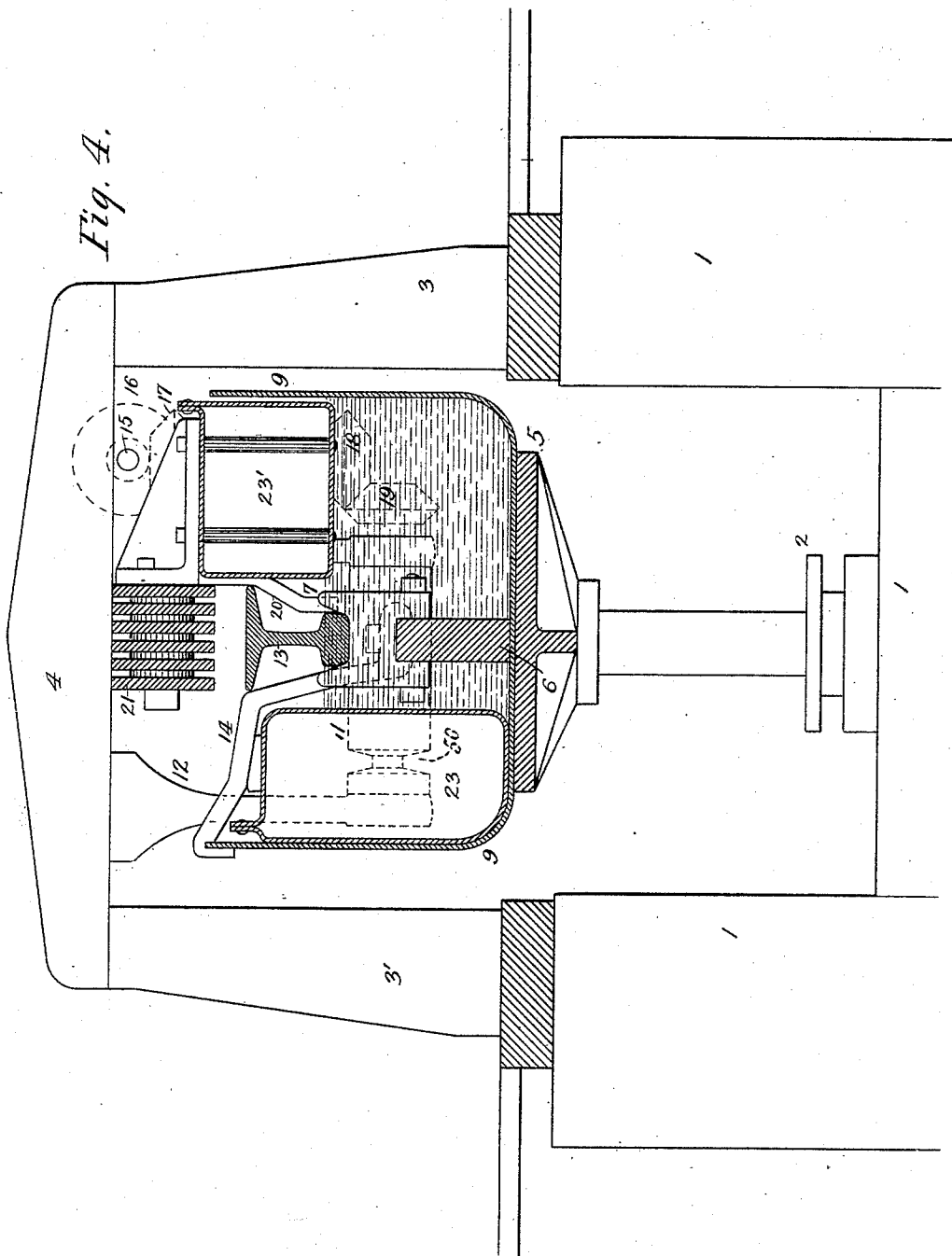
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Fig. 4.



Witnesses.

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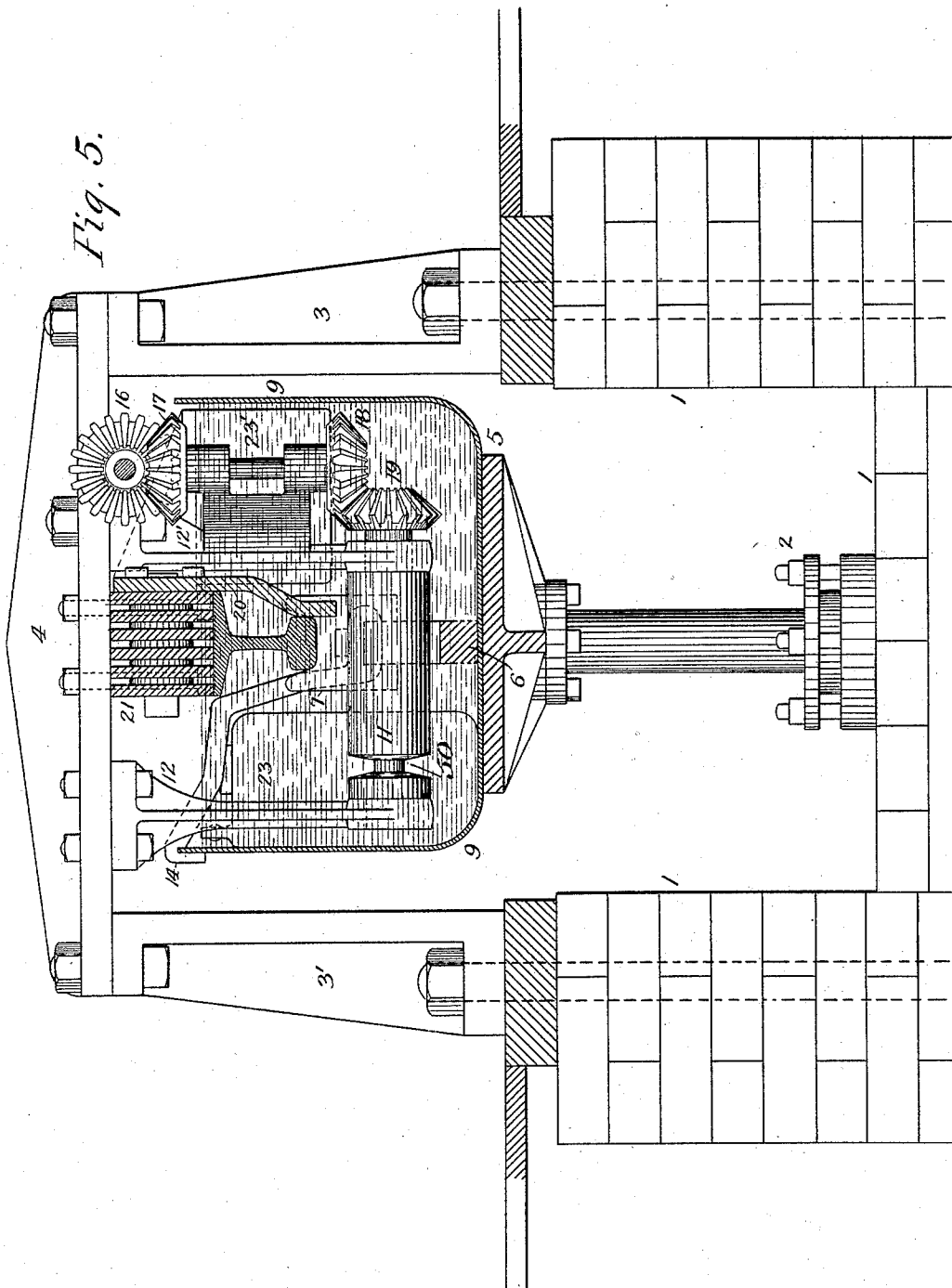
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Patented Feb. 16, 1892.



Witnesses.

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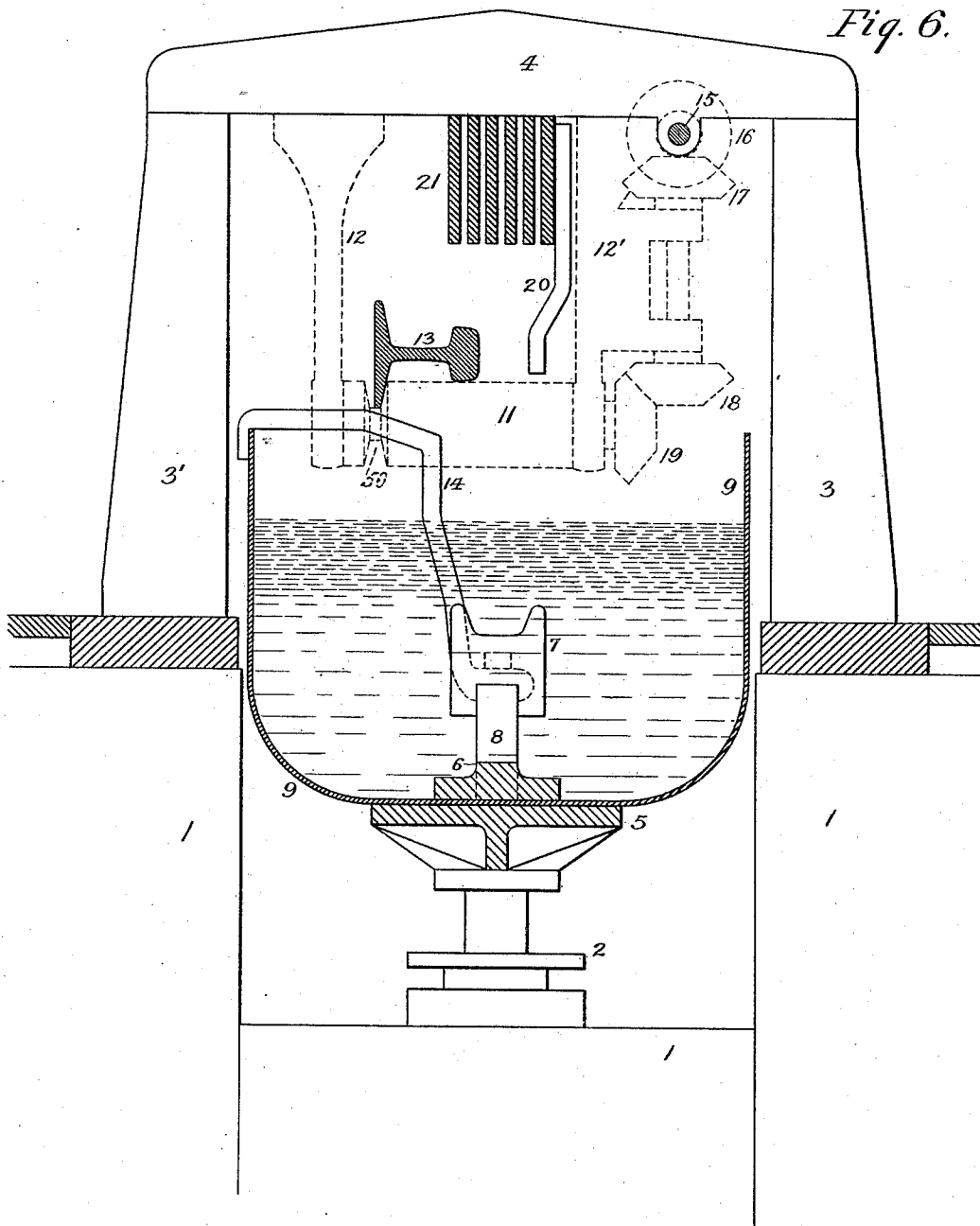
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Witnesses

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UNITED STATES PATENT OFFICE.

JOHN W. CLOUD, OF CHICAGO, ILLINOIS.

APPARATUS FOR COOLING STEEL RAILS AND BARS.

SPECIFICATION forming part of Letters Patent No. 468,788, dated February 16, 1892.

Application filed November 28, 1890. Serial No. 372,773. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. CLOUD, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Apparatus for Cooling Steel Rails and Bars, of which the following is a specification.

My invention relates to means for cooling steel rails and bars in which the hot rail is carried by proper mechanism over a tank containing the cooling-fluid and immersed and cooled to the desired temperature by lifting the tank and fluid up to and about the said rail or bar and by continuing the action of the mechanism to straighten the said rail or bar when immersed, my object being to provide a means and process for rapidly reducing the temperature of a steel rail or other steel bar through a range of degrees of temperature determined by the grade of steel being treated, in one and the same operation with the least possible expenditure of time and labor. I attain this object by means of the mechanism and process shown in the accompanying drawings, in which—

Figure 1 is a plan view of one end of the mechanism. The other end being exactly similar and of any length is not shown. Fig. 2 is a vertical sectional view in the middle line of the mechanism, showing the piston of the press shaded. Fig. 3 is a vertical cross-section of the mechanism in the line B B, showing the tank lowered. Fig. 4 is a vertical cross-section of the mechanism in the line C C, showing the tank and contents raised. Fig. 5 is a vertical cross-section of the mechanism in the line A A, showing the tank and contents raised and the rail submerged in the process of straightening. Fig. 6 is a vertical cross-section of the mechanism on the line A A, showing the mechanism in its simplest form with the tank lowered and the tilting bar elongated.

Similar figures refer to similar parts throughout the several views.

To secure the result obtained by rapidly cooling steel rails and bars through a definite range of temperature after they have left the rolls, the advantage of which rapid cooling is well known to those skilled in such matters and is not necessary to be enlarged upon, I

have devised the following-described mechanism and process by which this result may be obtained.

I construct a suitable foundation 1 1 1, and at a convenient point I erect upon the said foundation 1 1 1 arches composed of the pillars 3 3' and the truss 4. I suspend the arms 12 and 12' securely to the truss 4 by suitable bolts and nuts. The arm 12 carries the bearing for supporting one end of the roller 11 and the arm 12' carries the beveled cog-wheel gearing 16, 17, 18, and 19, running in appropriate bearings, and the arm 12' also supports in an appropriate bearing the other end of the roller 11, to which roller 11 power is imparted by the beveled cog-wheel 19 through the beveled cog-wheel 18 17 16 and the shaft 15, to which power is imparted by any appropriate mechanism. In the roller 11, at a convenient point is made a groove 50 to fit the flange of the rail or bar 13. In the middle line or at any other convenient point is made an inverted straightening-bed 21, of beams of steel or other suitable material, secured together by bolts and washers 22 and suspended to the truss-beam 4 by bolts or other appropriate device. Secured to the straightening-bed 21 at convenient points is a series of angle-arms 20, projecting downward and made of such shape that the rail or bar 13 when tilted up will be prevented from falling over on its side and held with the head downward. At convenient points beneath the arch composed of the pillars 3 3' and truss 4 I place any number of hydraulic or other presses 2 as may be required to give proper pressure. In the present case two are indicated, one at either end of the mechanism. Extending from the one to the other of the said presses 2 is made a rigid table 5, and upon this said table 5 is made a tank 9, of any required size and shape and provided with an inlet and outlet 10 for water, having in such cases as are necessary a displacement tank or tanks 23 and 23' within it; or, if desired, these tanks may be omitted, as shown in Fig. 6.

Within the tank 9 and upon the table 5, in a line directly beneath the straightening-bed 21, is made the table 6, which is at convenient points 8 notched to allow the rollers 11 to descend in the tank 9. In the upper edge of the table 6 is made a series of bearing-blocks 7,

composed of sets of plates of suitable material bolted together and notched so as to conform to the head of the rail or bar 13, as the case may be. The plates composing the bearing-blocks 7 are separated by a washer to allow of free passage of fluid about the head of the rail 13 and are secured to the table 6 at convenient points. Secured to the table 6 and tank 9 are the tilting arms 14, bent at a proper angle to tilt over the rail 13 when they are lifted with the tank 9.

Having thus described the parts of my invention, I now proceed to explain the method of using the same and process of rapidly cooling the steel rail or bar. When the parts are all properly secured together, the press 2 is depressed and the tank 9 is dropped down, as shown in Fig. 3. The tank 9 is filled by the inlet 10 with water or other tempering-fluid to a desired depth. A rail or bar to be cooled is now run in on the rollers 11 by the beveled cog-wheel gearing 16, 17, 18, and 19, the power being imparted by the shaft 15. When the said rail 13 has reached a proper position on the rollers 11, (relative to the straightening-bed 21, which said bed is a little shorter than the tank 9,) the revolution of the shaft 15 is stopped and the presses 2 set in operation. This raises the table 5, tank 9, and table 6, with the bearing-blocks 7, and it also lifts the tilting arm 14, which at once raises the flange of the rail 13, and, as the upward motion of the table 5 is continued, tilts the rail 13 over till the said rail 13 rests upon the tilting arm 14 by its shank resting on the angle of the tilting arm 14. The tilting arm 14 steadily rising, the rail is tipped over, so that the head rests upon the rollers 11 and is supported by the arms 20, which hold it in an upright position. In this position by the raising of the tank 9 the cooling-fluid is raised till the head of the rail or bar is submerged in the fluid to a desired degree. The action of the presses 2 may be stopped with the head immersed, after which, if desired, the presses 2 are again set in motion in an upward direction, and when the head of the rail 13 comes in contact with the rising pressure-blocks 7 the rail is lifted till the base comes against the straightening-bed 21. By the gradual rising of the tank and cooling-fluid the rail is rapidly cooled. When the flange of the rail has been elevated till it reaches the straightening-bed 21, the rail is entirely submerged, and at this point pressure is exerted by the presses 2 to straighten the rail or bar 13. When cooled to a desired point, the tank 9 is lowered and the rail allowed to rest on the rollers 11 and run out to the cooling-beds by means of the mechanism operated by the shaft 15.

I am aware that prior to my invention of this process attempts have been made to rapidly cool steel rails and bars through a certain critical range of temperature, so as get the improvement in qualities of steel which such rapid cooling through such temperature

insures. I do not therefore claim the tempering of steel rails or bars in a broad sense; but

What I do claim, and desire to secure by Letters Patent, is—

1. In apparatus for cooling and straightening steel rails or bars, the press for imparting pressure and lifting the tank, a tank placed on the press, with the means for placing and sustaining the said rail in an upright position above the tank, and means for offering substantial resistance to the motion of the press for the purpose of straightening the rail, all substantially as and for the purpose set forth and described.

2. In apparatus for cooling and straightening steel rails or bars, the combination of a series of rollers and cog-wheel gearing for carrying the rail or bar, a tank for the cooling-fluid, arms attached to the side of the tank, said arms constructed in an angular form and secured in an inclined position, a press for raising the tank and rail and exerting pressure, and means for resisting the power applied to straighten said rail, all substantially as and for the purpose set forth.

3. In apparatus for cooling and straightening steel rails and bars, the combination of a sustaining-arch spanning the apparatus and having a straightening-bed offering resistance, a tank for cooling-fluid, means within the tank for supporting a rail, and means for lifting the tank, submerging the rail, and simultaneously pressing it against the bed to straighten it, all substantially as and for the purpose set forth.

4. In apparatus for cooling and straightening steel rails or bars, a tank for cooling-fluid to temper the said rail or bar, a longitudinal straightening-bed supported upon arms above the tank, means for supporting the heated rail, and means for lifting the tank, submerging the rail, and exerting pressure upon it while held against the said longitudinal bed, all substantially as and for the purpose set forth and described.

5. In apparatus for straightening and cooling steel rails or bars, a longitudinal table carrying a series of pressure-blocks composed of plates set at intervals on said table and within a tank and means for lifting the table and tank and simultaneously immersing the rail and exerting pressure on the said rail, combined with a straightening-bed for resisting the force exerted upon the said rail resting upon the said pressure-blocks, all substantially as and for the purpose set forth.

6. In apparatus for cooling and straightening steel rails or bars, a series of presses, a rigid longitudinal table carried by the presses and supporting a tank, a longitudinal table within the tank, having a series of pressure-blocks for straightening the said rail or bar, and a bed above the tank for opposing the thrust of the presses, all substantially as and for the purpose set forth.

7. In apparatus for cooling and straighten-

ing steel rails and bars, the combination of a tank, angular arms secured within the tank to upset the rail upon its head, a series of sustaining-arms secured above the tank to maintain the rail in the upright position, means for simultaneously lifting the tank, submerging the rail, and exerting pressure thereupon, and means for resisting the pressure brought to bear upon the rail to straighten it, all substantially as and for the purpose set forth.

8. In apparatus for cooling and straightening steel rails and bars, the sustaining-arch, a series of grooved rollers hung by arms there-

from, gearing placed at the end of said rollers, and means for introducing and ejecting the rail into and from the said apparatus, combined with a tank, pressure-blocks within the tank, a bed above the tank, and means for lifting the tank and pressure-blocks, thereby simultaneously submerging the rail in the bath and straightening it, all substantially as and for the purpose set forth and described.

JNO. W. CLOUD.

In presence of—

H. HAUPT, Jr.,

CHARLES E. TETLEY.