

(No Model.)

2 Sheets—Sheet 1.

H. C. CLEMENT.  
APPARATUS FOR HARDENING RAILS.

No. 584,988.

Patented June 22, 1897.

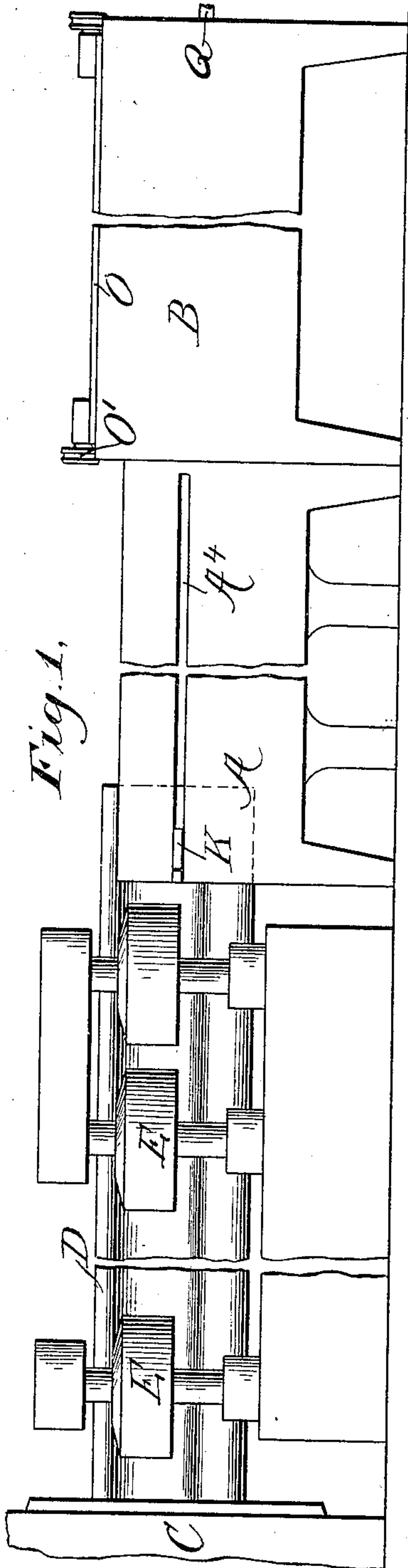


Fig. 1.

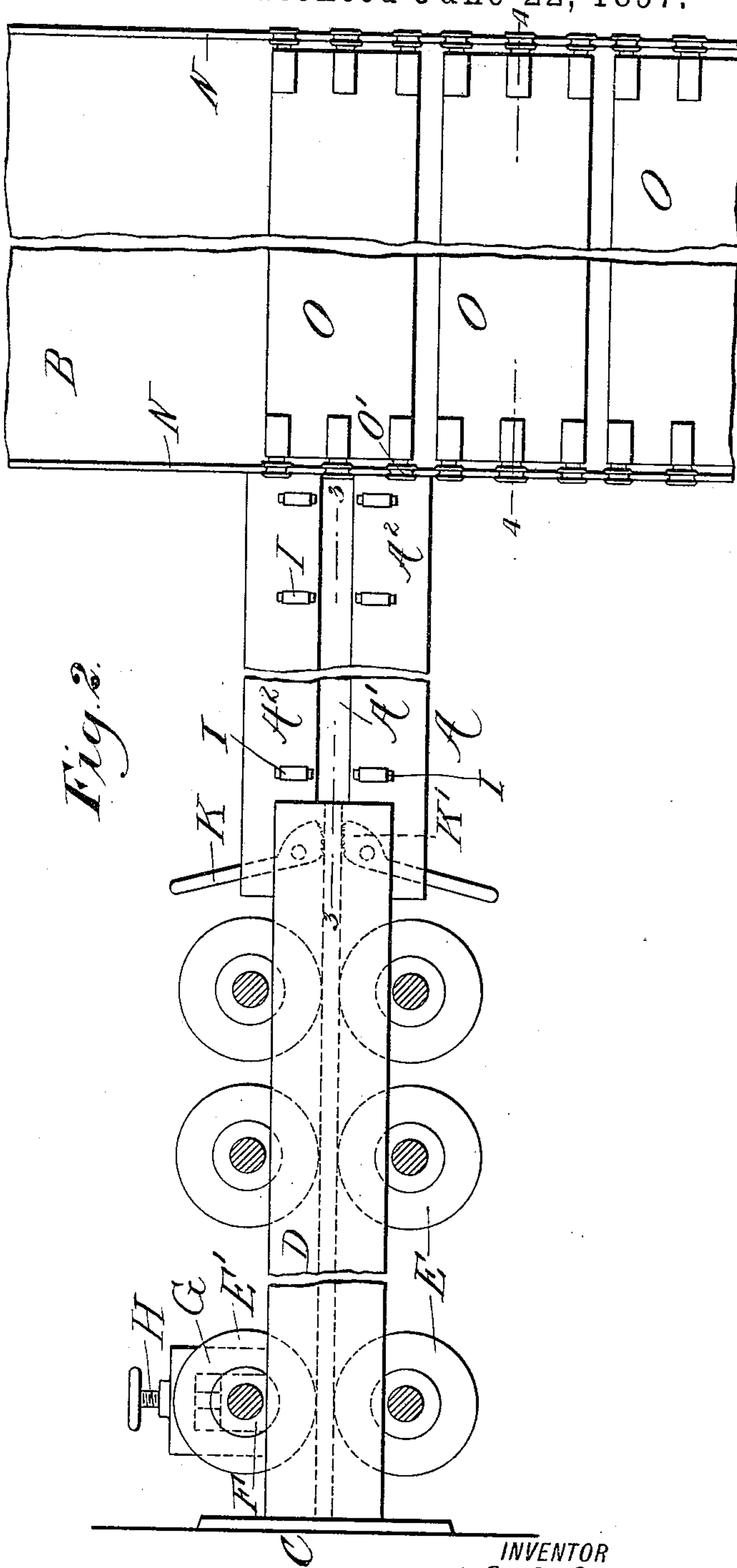


Fig. 2.

WITNESSES:

Edward Thorpe.  
John Lottka

INVENTOR

H. C. Clement

BY

*Murray*

ATTORNEYS.

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2 Sheets—Sheet 2.

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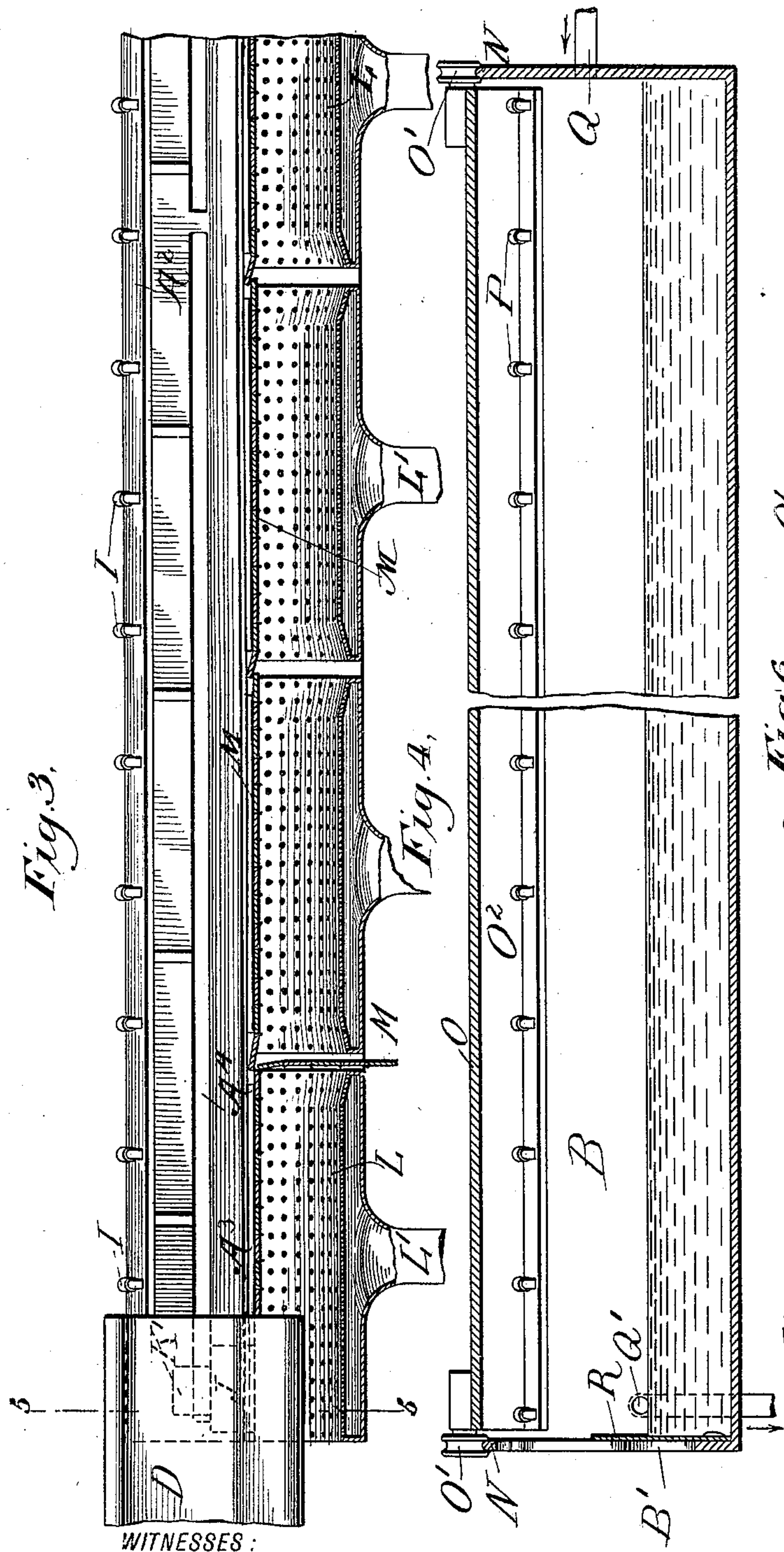


Fig. 3.

Fig. 4.

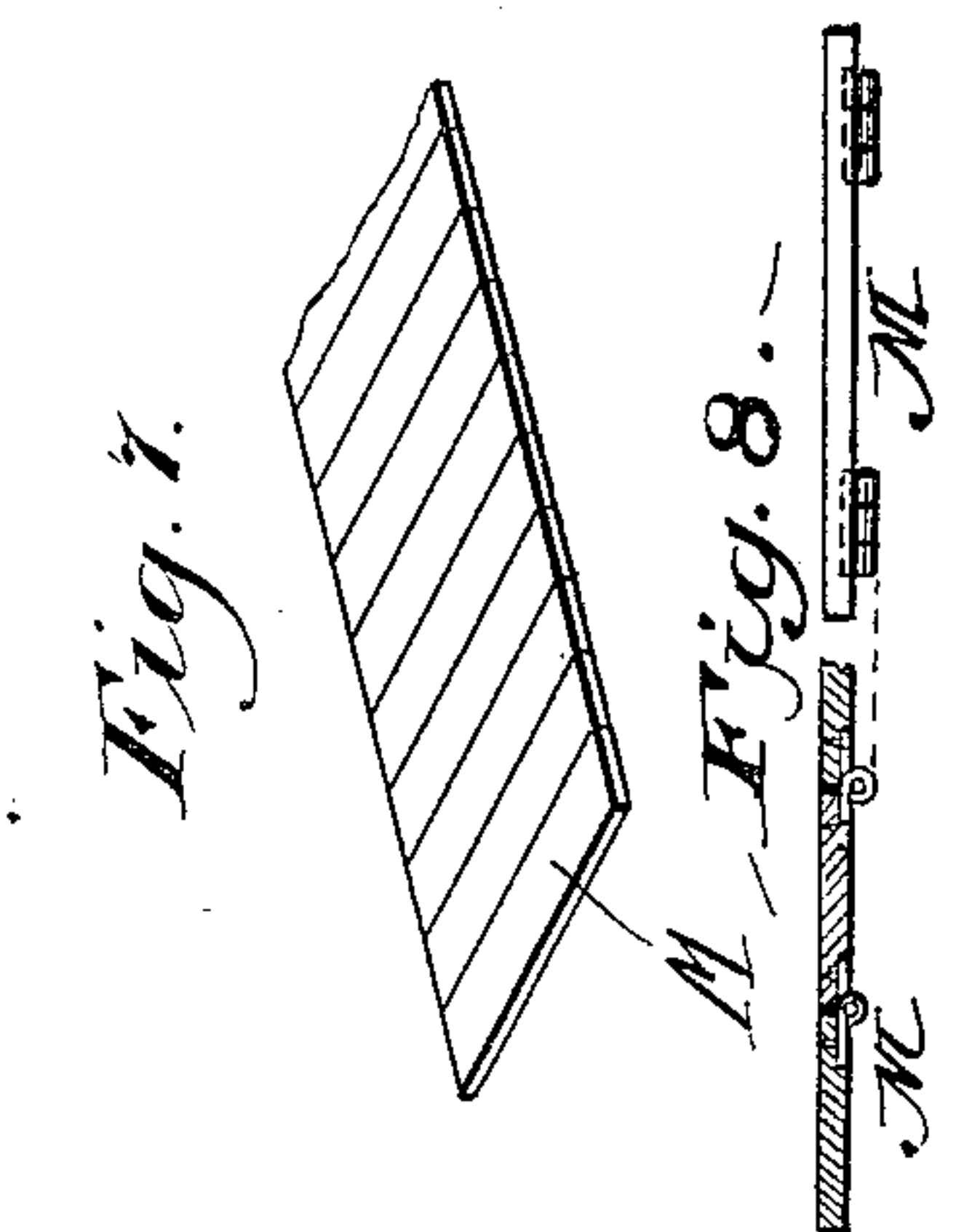


Fig. 7.

Fig. 8.

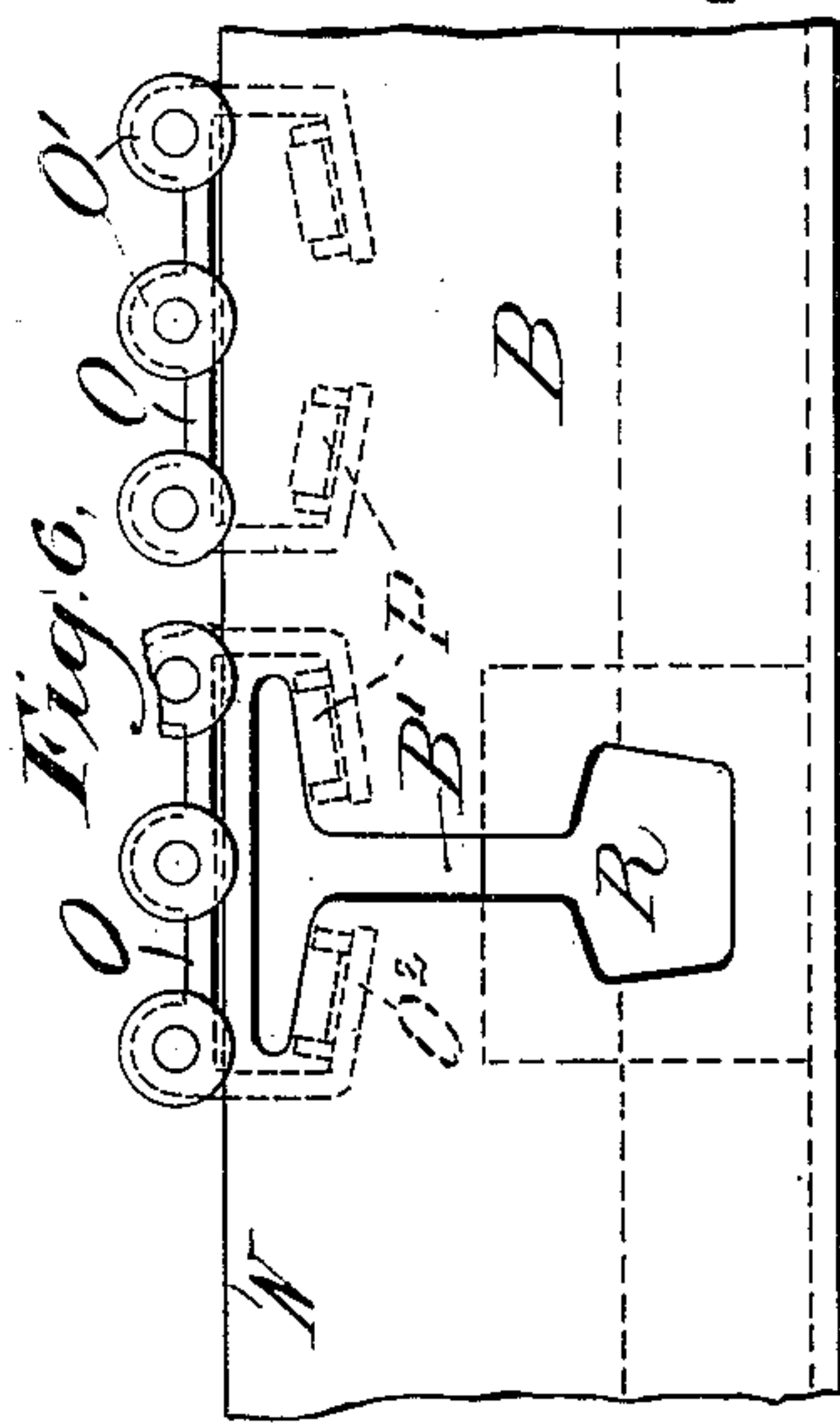


Fig. 6.

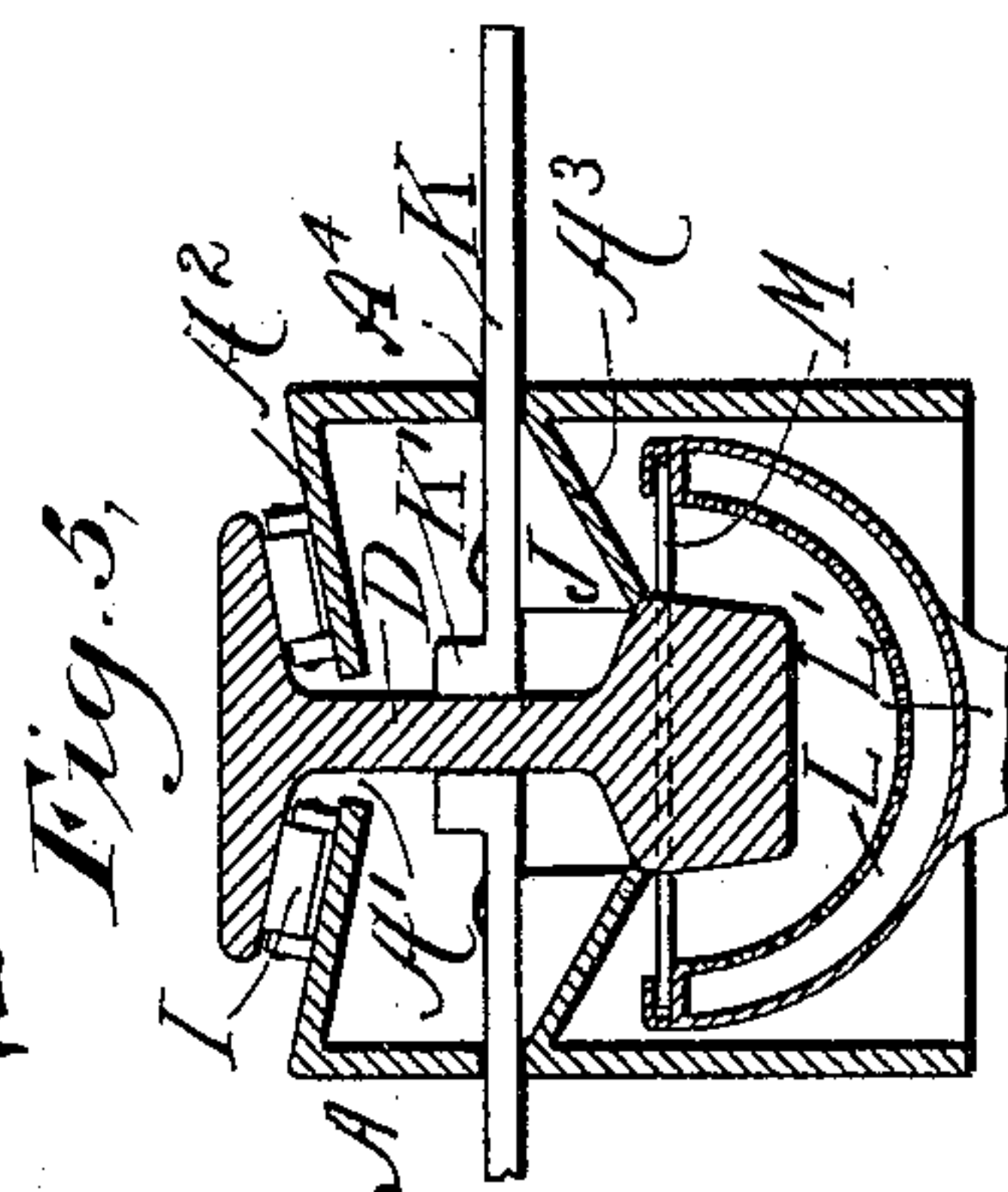


Fig. 5.

WITNESSES:

Edward Thorpe.  
John Lottka

INVENTOR

H. C. Clement

BY

*Mumford*

ATTORNEYS.



# UNITED STATES PATENT OFFICE.

HARRY C. CLEMENT, OF NEW YORK, N. Y.

## APPARATUS FOR HARDENING RAILS.

SPECIFICATION forming part of Letters Patent No. 584,988, dated June 22, 1897.

Application filed January 4, 1897. Serial No. 617,978. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY C. CLEMENT, of New York city, county and State of New York, have invented a new and useful Improvement in Hardening Rails, of which the following is a full, clear, and exact description.

My invention relates to means for hardening rails and the like, and has for its object to provide improved means for this purpose permitting of securing a more uniform and thorough hardening action than hitherto and obviating the warping of the rails due to uneven contraction. The means whereby I attain this result will be fully described hereinafter, and the novel features of my invention will be pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a rail-hardening plant constructed according to my invention, parts of the apparatus being broken away. Fig. 2 is a plan corresponding to Fig. 1. Fig. 3 is a broken longitudinal sectional elevation of the hardening-tank on line 3 3 of Fig. 2. Fig. 4 is a like view of the cooling-tank on line 4 4 of Fig. 2. Fig. 5 is a cross-sectional elevation of the hardening-tank on the line 5 5 of Fig. 3. Fig. 6 is an end view of part of the cooling-tank. Fig. 7 is a perspective view showing a guard employed in conjunction with the hardening-tank, as shown in Figs. 3 and 5; and Fig. 8 is a sectional elevation of a portion of said guard, showing the connection between the members thereof.

In carrying out my invention I heat the rail or the like in any approved manner and then sprinkle water against the head of the rail only, the rail being inverted, so that the water which becomes heated by contact with the same falls off immediately and the head comes continually in contact with a fresh supply of cool water, securing a thorough hardening. The rail thus hardened is, while still inverted, immersed with its head in water, whereby the rail is cooled to normal temperature.

The apparatus shown in the drawings comprises two main parts—viz., the hardening-tank A and a cooling-tank B.

C indicates a furnace of any approved construction, in which the rail D is heated to a proper temperature. The rail is drawn forward by means of any suitable mechanism—

for instance, by means of sets of feed-rollers E engaging its web and base. One of the feed-rollers adjacent to the furnace, such as the roller E', may be made adjustable toward and from its companion roller for the purpose of providing an enlarged space for the introduction of the rail, it being understood that after the end of the rail has been placed between the roller E' and its mate said roller is moved inward to firmly engage the rail. For this purpose the bearing F of the roller E' may be mounted to slide in transverse guides G, the movement being obtained by means of a screw H. The rollers are arranged in perfect alinement, so that the rail if slightly bent will be straightened.

The hardening-tank A may be open at the bottom, as shown best in Fig. 5, and has a longitudinal central opening A' in its top for the passage of the web of the rail. The top is made in two sections A<sup>2</sup>, slanting downward toward said opening A' and corresponding to the inclination of what is normally termed the upper surface of the base of the rail. On said inclined sections I arrange at suitable intervals transverse inclined rollers I, adapted to support the rail, as shown. Within the tank A, I arrange shields A<sup>3</sup>, extending into proximity to the base of the head of the rail, so that the space above said head is practically separated from the lower compartment into which said head projects. The shields A<sup>3</sup> may also form guides for longitudinally-slidable blocks J, to which are pivoted levers K, provided at their inner ends with jaws K', adapted to engage the rail. The levers K extend outwardly through slots A<sup>4</sup> in the tank A, it being understood that the slots, preferably, are not continuous, as this would deprive the top sections A<sup>2</sup> of the necessary support, but the slots are interrupted so that there is on each side of the tank a plurality of longitudinally-alining slots, as indicated in Fig. 3. Of course there will be one set of levers K for each couple of slots A<sup>4</sup>. These levers are used for feeding the rail forward after it has become disengaged from the feed-rollers E, and in operating said levers two workmen take hold of



them, one on each side of the tank, so as to grip the rail between the jaws K' and pull it forward. In the lower compartment of the tank A are located a series of sprinklers L, shaped to surround or partly surround the rail's head. These sprinklers preferably consist of approximately semicylindrical hollow bodies perforated on their inner surfaces and connected by means of inlet-tubes L' to a suitable water-supply pipe. (Not shown.) The inner ends of the inlet-tubes are preferably made flaring, so as to distribute the water toward the ends of the sprinklers. The upper portions of the sprinklers are provided with longitudinal guides for the reception of a sliding guard M, which, by fitting against the front end of the rail, Fig. 3, prevents the water from being thrown up at that point into the upper compartment of the tank, so that the water cannot reach any portion of the rail but the head. This guard is preferably made in the nature of slats hinged to each other, as shown in Figs. 7 and 8, and the several sprinklers are spaced sufficiently to allow the guard to drop gradually into the spaces between them, as indicated in Fig. 3. The main object of spacing the sprinkler-sections, however, is to provide for a ready discharge of the heated water falling from the rail. For this purpose the bottom of each sprinkler-section may be inclined downwardly toward said spaces. It will be understood that the slat at the rear end of each guard is raised to overlap the slat at the front end of the adjacent guard, so that only one guard will be pushed forward at a time by the advancing rail.

The cooling-tank B is much wider than the hardening-tank A, as will be seen best in Fig. 2. At its top the cooling-tank is provided with rails or runways N, arranged transversely of the direction of the opening A' in the tank A. On the track N is adapted to travel a series of independent carriages O, having rollers O', said carriages being provided with inclined arms O<sup>2</sup>, spaced for the passage of the rail's web and carrying supporting-rollers P, (see Fig. 6,) whose function is the same as that of the rollers L. (Shown in Fig. 5.) In the end of the tank B, exactly in line with the opening A' of the tank A, is provided an opening B' of the shape of an inverted rail, so as to allow the rail to pass into the tank B. The tank is further provided with a water-inlet Q and an overflow Q', whereby the water is prevented from rising above the head of the rail. A flap R, made of rubber or other suitable material, is secured within the tank adjacent to the aperture B' and is normally pressed against the same by the weight of the water. When the length of the carriages O is such that a simple straight beam, such as shown in Fig. 4, would not be strong enough, I may reinforce said beam by a truss construction of any approved type.

To catch and collect the overflow from the tank B and the drippings from the tank A, I may provide any suitable construction, such as an inclined channel extending longitudinally of the tank A. Such means are so well known in the art that I have not deemed it necessary to show them.

The operation is as follows: The rail after being heated in the furnace C is carried forward by the feed-rollers into the hardening-tank A, head downward. The rail rests on the inclined transverse rollers and its front end engages the guard M. The water is turned on so that a spray is delivered from the sprinklers against the head of the rail. The guard M prevents the spray from reaching the stem or web of the rail at the end thereof, and the shields A<sup>3</sup> protect the rail at the sides in a similar manner. One great advantage of sprinkling the water against the lower surface of the rail is that the water does not long adhere to the rail, but falls off the same almost directly, so that the water heated by contact with the rail is continuously replaced by a fresh supply of cool water. The hardening action is therefore much quicker and more thorough than with the usual procedure, in which the heated water remains in contact with the rail. As the water is sprinkled on the head of the rail only, there is little or no liability of the rail becoming warped by unequal contraction. The rail is fed forward by the feed-rollers and then by the levers K. In its forward travel it causes the first guard M to drop, as shown in Fig. 3, and when the end of the first sprinkler is reached the lapping rear end of the second guard will drop to be engaged by the rail, this action being repeated at the end of each sprinkler. The guards M are replaced by hand after the rail has passed from the tank A into the tank B.

When the rail has been hardened on the head, as above described, it is fed into the tank B through the opening B' thereof, it being understood that at that time one of the carriages O is moved into a position opposite the opening to receive the rail. The entering rail pushes back the flap R, and preferably water is supplied through the inlet Q until the rail is fully within the tank and the flap again closes to make up for the leakage which will occur at the opening B' as long as the flap is removed therefrom. Another rail is then fed into the tank A to be hardened therein, and when this second rail is ready to be transferred to the tank B the carriage holding the first rail is moved laterally on the track N and an empty carriage is brought into registry with the opening B'. In this manner the tank B may receive any number of rails desired.

I desire it to be understood that I do not limit myself to the specific construction shown; but various modifications may be made without departing from the nature of my invention.



Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An apparatus for hardening rails and the like, comprising a hardening-tank having a passage or track for the rail, a sprinkling device within said hardening-tank, a cooling-tank having an entrance for the rail, and carriages adapted to receive a rail and arranged to travel on the cooling-tank transversely of the passage or track of the hardening-tank, substantially as described.

2. A tank for hardening rails and the like, said tank having a top made in two sections spaced to form a passage for the web of the rail, transverse rollers arranged on each side of said passage, and a sprinkling device in the lower part of the tank, substantially as described.

3. A tank for hardening rails and the like, said tank having a top made in two sections spaced to form a passage for the web of the rail, transverse rollers inclined toward said passage and arranged on the top sections at each side of said passage, and a sprinkling device in the lower part of the tank, substantially as described.

4. The hardening-tank provided with a runway for supporting the base of the inverted rail, and a sprinkling device located below said runway to throw a cooling medium against the head of said rail, the sprinkling device consisting of a hollow shell having perforations on its inner side, and a fluid-inlet on its outer side, said inlet flaring toward the ends of the sprinkler to better distribute the cooling medium, substantially as described.

5. The hardening-tank provided with a runway adapted to support the base of an inverted rail, longitudinally-slidable feed devices adapted to engage the web of the rail, and a sprinkling device for throwing a cooling medium against the head of the rail, substantially as described.

6. The hardening-tank provided with a runway for the rail or the like, a sprinkling device below said runway, and a longitudinally-slidable guard arranged above the sprinkling device and adapted to be engaged and moved forward by the end of the rail, substantially as described.

7. The hardening-tank provided with a support for the rail or the like, a sprinkling device consisting of a series of spaced sections, and flexible longitudinally-slidable guards adapted to be engaged by the end of the rail and to drop between the sections of the sprinkling device, substantially as described.

8. The hardening-tank provided with a support for the rail or the like, and a sprinkling device consisting of a series of spaced sections open at the end whose bottoms are inclined downwardly toward the spaces separating the sections, as and for the purpose set forth.

9. The hardening-tank provided with a runway for the rail or the like, a sprinkling device, and a longitudinally-slidable guard adapted to engage the end of the rail, said guard consisting of hinged slats ranging transversely of the rail, substantially as described.

10. The cooling-tank having an aperture for the entrance of the rail or the like, carriages having runways or supports adapted to receive a rail and to register with said aperture, and a track for said carriages extending transversely of said runways, substantially as described.

11. The cooling-tank having an aperture for the entrance of the rail or the like, carriages having depending spaced arms adapted to support the base of the rail, and a track for said carriages extending transversely of said spaced arms, whereby any carriage may be brought to register with the aperture in the tank, substantially as described.

12. The cooling-tank having an aperture for the entrance of the rail or the like, a support for the rail, and a valve such as a flap, adapted to close said aperture, substantially as described.

13. The cooling-tank having an aperture for the entrance of the rail or the like, carriages having runways or supports adapted to receive a rail and to register with said aperture, a track for the carriages extending transversely of said runways, and a flap located within the tank and adapted to close the aperture thereof, substantially as described.

HARRY C. CLEMENT.

Witnesses:

JOHN LOTKA,

JNO. M. RITTER.