

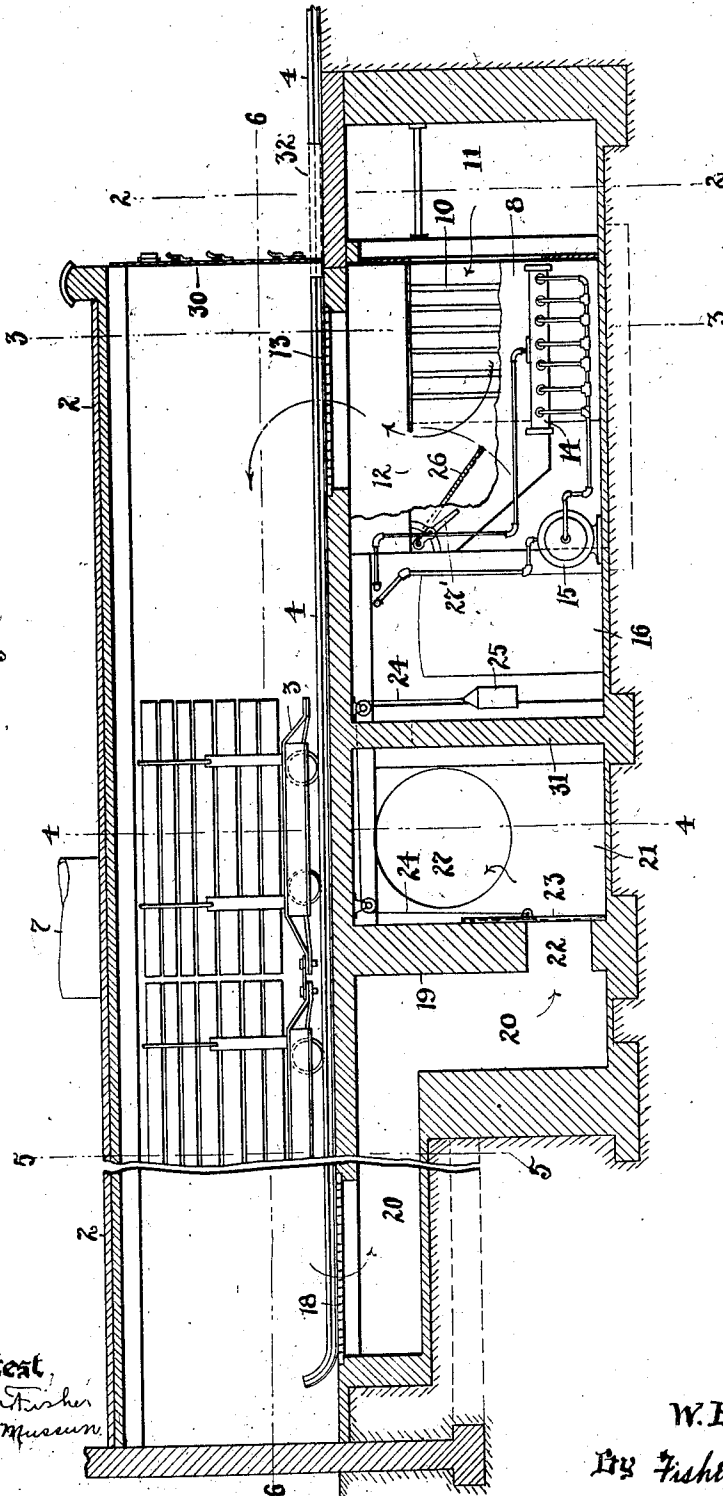
W. F. GOLTRA.
 DRYING APPARATUS FOR RAILWAY TIES
 APPLICATION FILED JAN. 2, 1912.

Patented Dec. 17, 1912.

6 SHEETS-SHEET 1.

1,047,406.

Fig. 1.



Attest
 E. M. Fisher
 S. C. Museum

Inventor.
 W. F. GOLTRA
 By Fisher & Moser Attys

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6 SHEETS—SHEET 2.

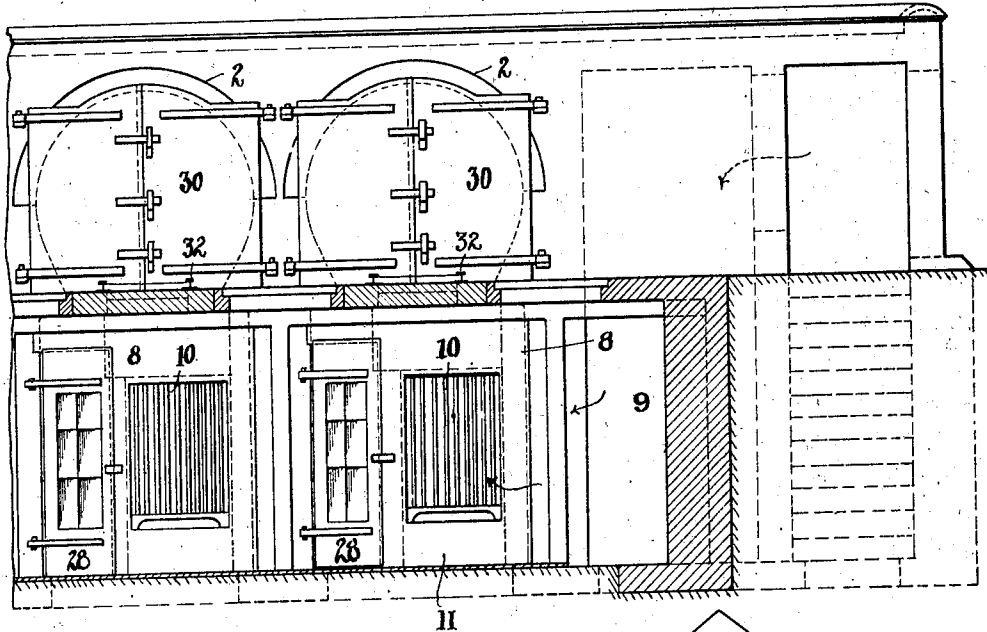


Fig. 2.

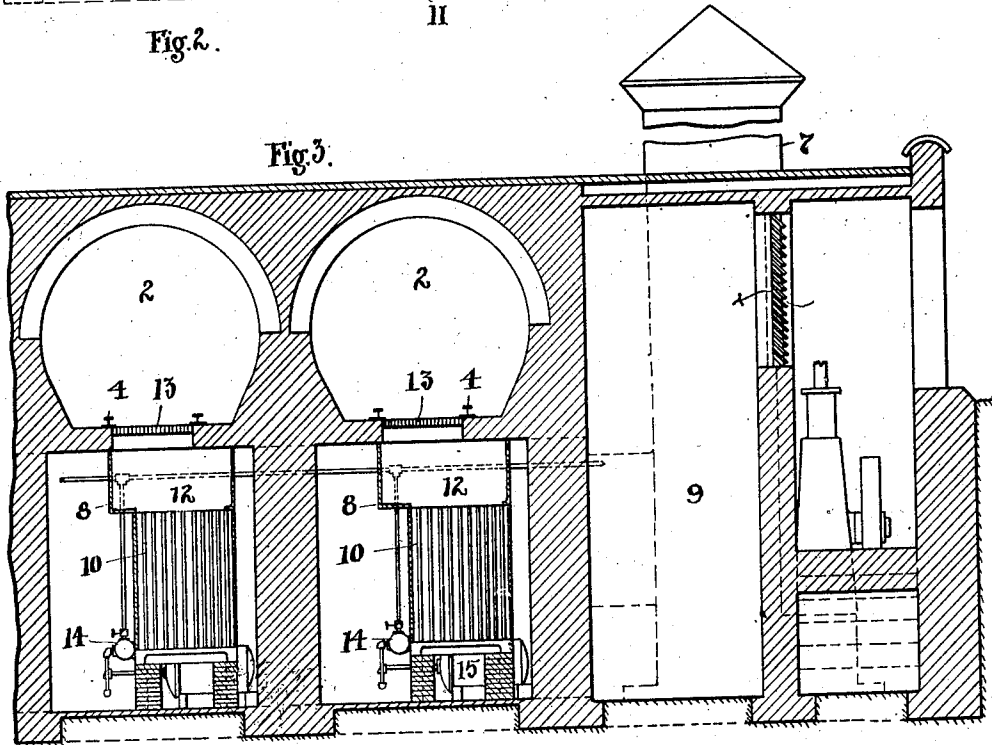


Fig. 3.

Attest.
 S. M. Fisher
 F. C. Museum.

Inventor.
 W. F. GOLTRA
 By Fisher & Alcott Attys.

W. F. GOLTRA.
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6 SHEETS—SHEET 3.

Fig 4

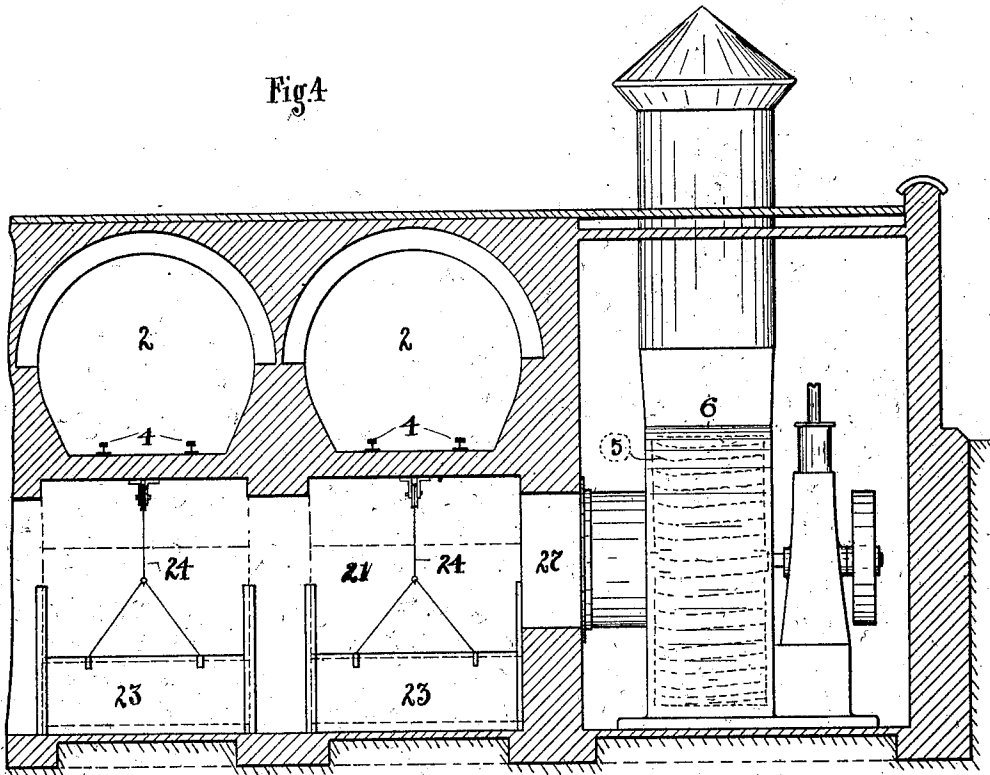
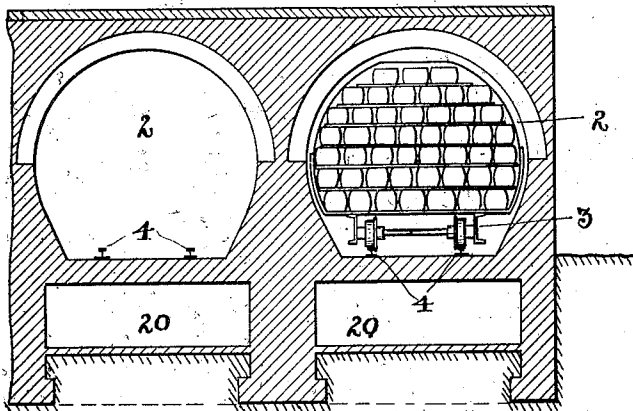


Fig 5.



Attest.
 Geo. Fisher
 F.C. Mason

Inventor
 W. F. GOLTRA
 By Fisher & Mason Attys

W. F. GOLTRA.
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6 SHEETS—SHEET 4.

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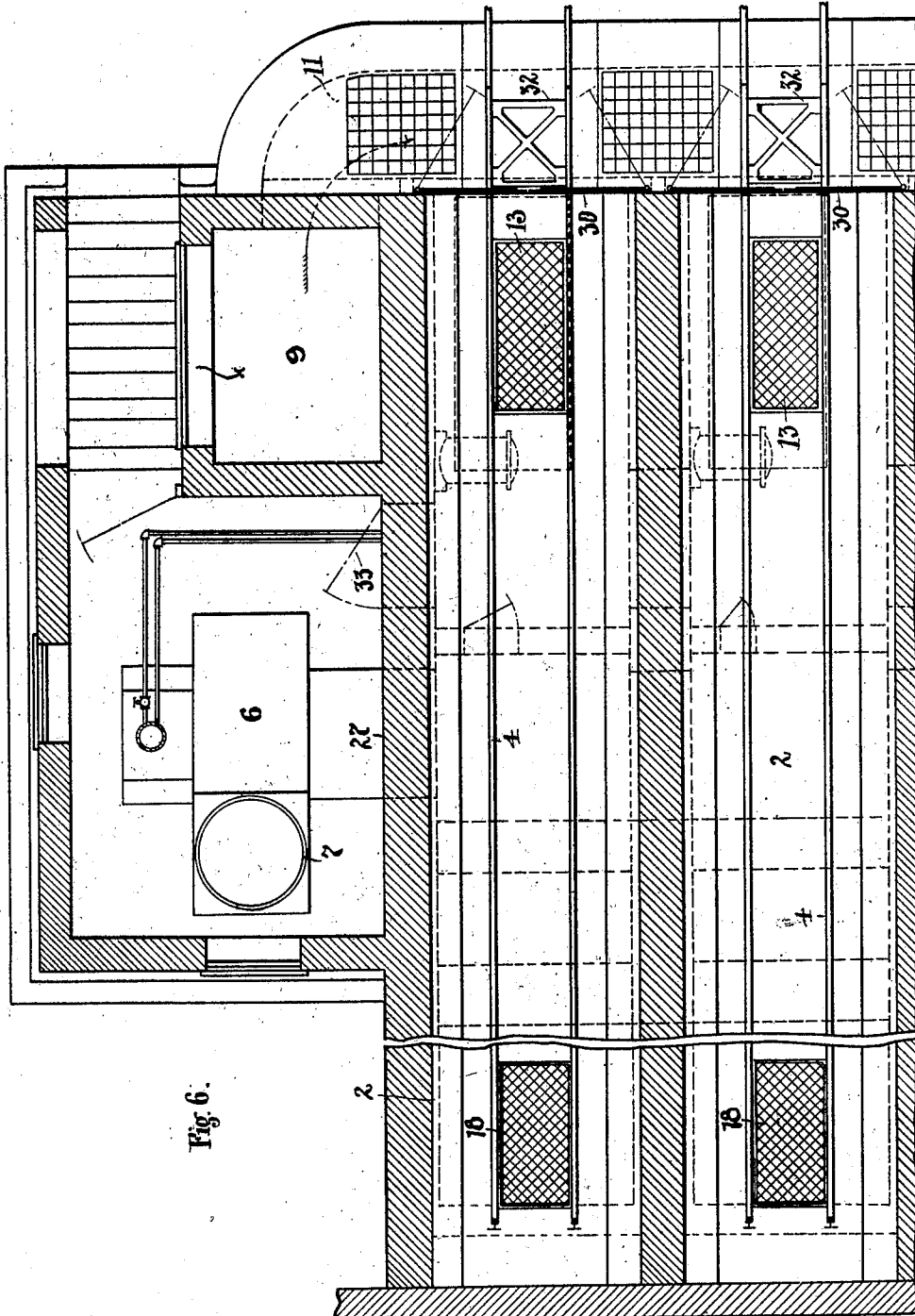


Fig. 6.

Attest
Emtisher
 S. D. Museum

Inventor.
 W. F. GOLTRA
 By Fisher & Ulster Attys.

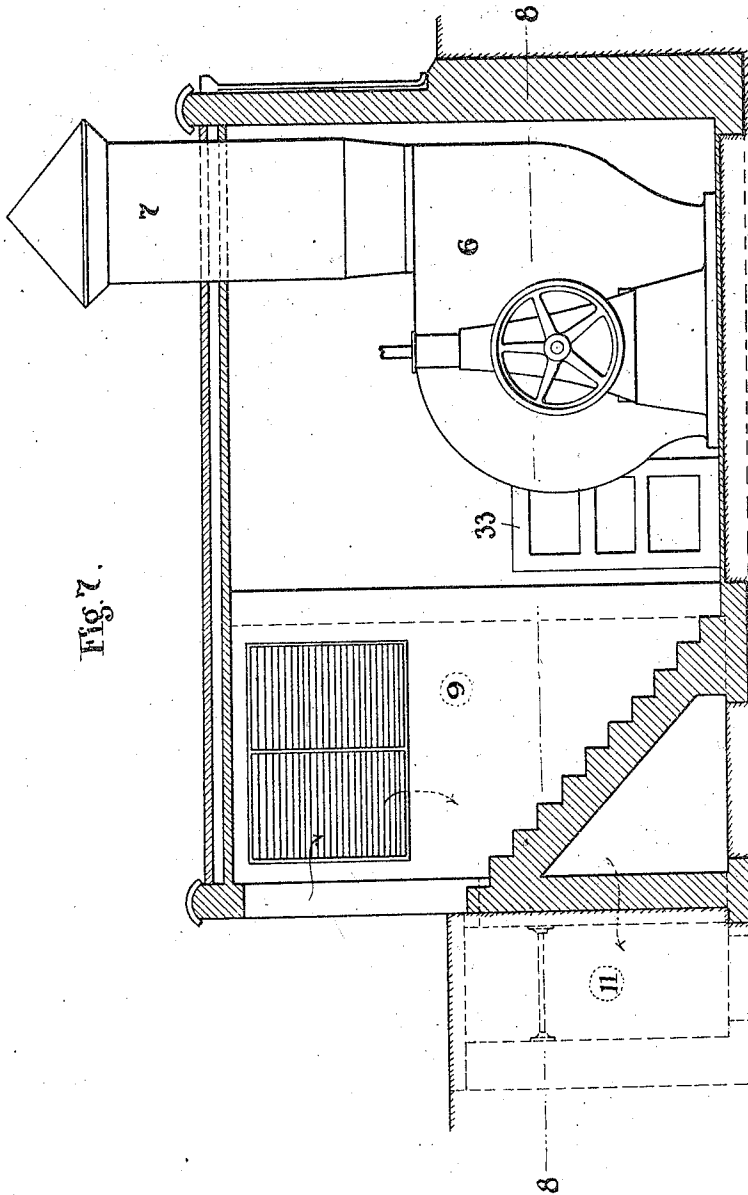
W. F. GOLTRA.
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6 SHEETS—SHEET 5.

1,047,406.

FIG. 7.



Attest.
 E. M. Fisher
 F. C. Museum.

Inventor.
 W. F. GOLTRA.
 By Fisher & Moser Attys.

W. F. GOLTRA.
 DRYING APPARATUS FOR RAILWAY TIES.
 APPLICATION FILED JAN. 2, 1912.

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 6 SHEETS—SHEET 6.

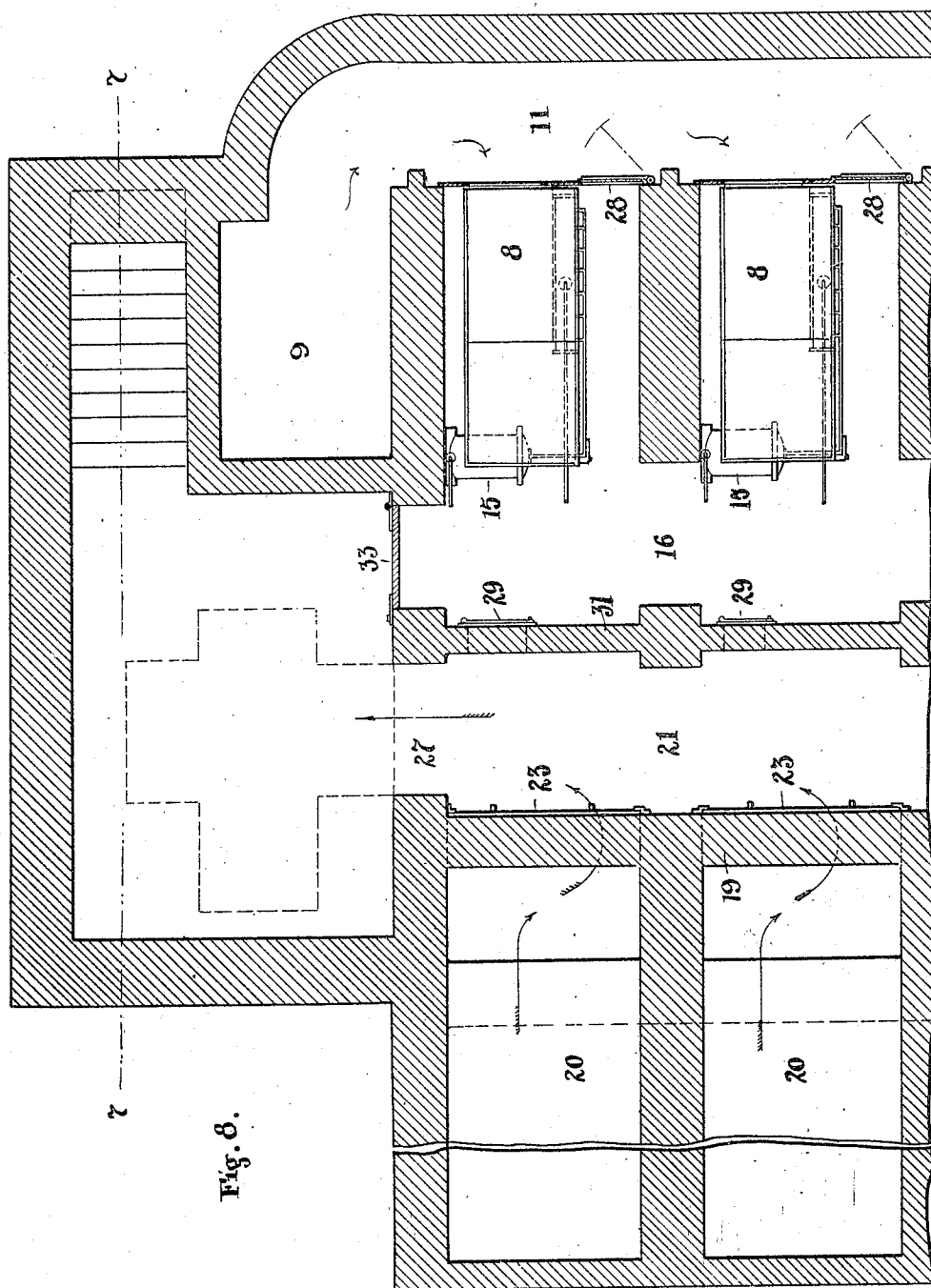


Fig. 8.

Attest
 E. C. Fisher
 U. S. Museum.

Inventor.
 W. F. GOLTRA
 By Fisher & Vetter Atty's

UNITED STATES PATENT OFFICE.

WILLIAM FRANCIS GOLTRA, OF CLEVELAND, OHIO.

DRYING APPARATUS FOR RAILWAY-TIES.

1,047,406.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed January 2, 1912. Serial No. 668,916.

To all whom it may concern:

Be it known that I, WILLIAM FRANCIS GOLTRA, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Drying Apparatus for Railway-Ties, of which the following is a specification.

This invention has reference to a drying apparatus for railway ties and other timbers, and the invention consists more especially in a drying oven of original construction and associated means adapted to circulate air at a drying temperature through the oven, all as hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of the apparatus, and Fig. 2 is a cross section on line 2—2, Fig. 1, and showing two ovens arranged side by side. There may be one or several ovens, according to the size or capacity of the plant, but all are alike and have their own complete equipments and adapted to be operated separately or simultaneously according to the amount of work to be done. Fig. 3 is a cross section corresponding substantially to line 3—3, Fig. 1, looking to the left. Fig. 4 is a cross section corresponding substantially to line 4—4, Fig. 1, but omitting the tram shown in Fig. 1 as carrying a load of timbers. Fig. 5 is a cross section substantially on the line 5—5, Fig. 1, looking to the left. Fig. 6 is a horizontal sectional plan on a line corresponding substantially to 6—6, Fig. 1, and which runs through the immediate bottom of the drying cylinders directly over the tracks therein. Fig. 7 is a cross section corresponding substantially to 7—7, Fig. 8, looking inward. Fig. 8 is a horizontal sectional view corresponding substantially to line 8—8, Fig. 7, but omitting the blower and drum shown in Fig. 7.

The drying apparatus as thus shown is a portion of a plant or system which I have developed for treating timber and particularly railway ties, and which constitutes the subject matter of two companion applications, bearing Ser. Nos. 668,914 and 668,915, respectively.

The present application appertains exclusively to that portion of the said system which receives the ties or timber after they have been previously steamed and dried

and otherwise made ready for ultimate drying and treatment as hereinafter set forth.

As to the importance of this particular apparatus and step in the treatment of the timber by my method it is to be observed that the moisture content in timber has a very appreciable effect upon the way in which it lends itself to filling with the preservative, and any method which places the wood in such condition that it will be in approximately the same state of dryness throughout is bound to result in a much more uniform penetration and dissemination of the antiseptic than can be obtained where such favorable conditions do not exist. The uniformity with which the preservative is distributed through the wood is one of the cardinal principles of proper wood preserving work, and since open air-seasoning is not in itself found sufficient to insure a satisfactory preparation of the wood for chemical treatment the drying must necessarily be artificially completed.

It is to be further observed that the placing of the timber in drying ovens is not only for the purpose of completing the drying but has two other important objects; first, because it permits a perfect regularity of operations at the plant in all seasons of the year and in all kinds of weather; and, secondly, because the timber thus dried is prepared to go to the impregnating retort in a heated state and thus is also given the temperature of the impregnating fluid as it is run into the retorts. Consequently the penetration of said fluid is deeper and more perfect than it could otherwise be, especially if the wood were cold when impregnation begins. During the winter season in northern latitudes it is frequently necessary to close down impregnating works on account of ties being covered with ice and snow. When such ties are placed in the impregnating retort for treatment the warm impregnating fluid is chilled and congealed and, in consequence, the penetration is very slight. Again, ties exposed to the weather immediately prior to treatment are often drenched by heavy rains and absorb considerable water. This offsets, in a great measure, the open air seasoning and makes it quite impossible to obtain good results from such seasoning alone. But with drying ovens it is possible to get uniform conditions preparatory to antiseptic treatment and also

to hurry the seasoning of any timber which might be urgently needed.

Furthermore, in drying wood in the oven, whether in the form of railroad ties, standard stock or finished product, the application of the requisite heat and circulation must be carefully regulated throughout the entire process or warping and checking are almost certain to result. Also wood of different shapes and thicknesses is very differently affected by the same treatment. Finally, the tissues composing the wood differing in form and physical properties as they do, and crossing each other in various directions, exert their own peculiar influence upon the behavior of wood during the drying. For instance, with our native woods, summerwood and springwood, show distinct tendencies in drying, and the same is true, in a less degree, of heartwood and sapwood. Or, again, pronounced medullary rays further complicate the drying problem. Thus, some woods yield their moisture more readily than others, so that the time for drying differs widely with the species as well as with the intended use.

The rapidity with which the drying can be carried on after the material has received a preliminary steaming therefore depends upon several factors, such as species of the wood, its softness and porosity, proportion of heartwood and sapwood, its hardness or density, size, mass, intended use and the manner in which it is presented to the air in the ovens. No positive rule can therefore be given as to the duration of the drying period and the temperature for the various kinds of woods, under all conditions, but experience soon teaches the operator how rapidly the ties or lumber can be dried in the ovens without injuring it by splitting, checking, warping or honeycombing. It should not, however, be inferred from the above that it is necessary to separate the timbers into groups for drying in ovens beyond the natural separation at shipping points as the time required to obtain sufficient dryness varies on account of the factors above mentioned, and such ties or timbers as have first reached totality of dryness should wait in the ovens for the more refractory timbers. The time required in the oven to complete the drying of railroad ties which have undergone the several preparatory steps of my process is between eighteen and thirty hours, or an average of twenty-four hours.

Now, having reference again to the drawings herewith, the combined drying and heating ovens are indicated by 2 and are preferably built of cement and masonry and of a size and length adapted to receive a line of trams 3 on tracks 4 in the bottom of the ovens. I prefer to make the ovens substantially in the form of cylinders and of a length corresponding to the length of the

impregnating retorts, not shown, so that the trams can be transferred from oven to retort to continue the treatment without materially disturbing the preparation of the timber for chemical impregnation.

The ovens and their rails or tracks are preferably on the yard grade, and this brings the means for heating and controlling the air circulated through the ovens underground or in subterranean spaces or compartments beneath the ovens substantially as seen in Fig. 1. The said means may be briefly summarized as comprising devices for heating a volume of air to the desired temperature for each oven and for drawing the moisture laden air down and out through sub-ducts and chambers by means of a suitable fan or blower 5 Fig. 4. Said blower is confined in drum or casing 6 and discharges through stack 7 to the open air. This, however, does not take account of the various details and features of construction *en route* which make the apparatus practical as well as economical and distinguishes it in the art from other drying apparatus, at least, so far as they have come within my knowledge. Thus, the air enters at the front of the apparatus through a fresh air space 9 and passes thence to the space 11 from which it is drawn into the heating chamber 8 containing the steam radiating coils 10 and to which the steam is supplied from a boiler belonging to the system, not shown. The space or passage 11 is common to all the heating chambers 8, and valves are of course provided for governing the flow of steam through the coils 10 and which also control the volume of heat imparted to the inflowing air. The air being heated by said coils flows thence to the open space 12 in the top and rear of the coil chamber and thence into the oven through the grated opening or register 13 in the bottom and front thereof. Suitable steam headers 14 and a trap 15 are shown in Fig. 1, and also a cross section of a working space or gallery 16, extending across the series of heating chambers so that one man can attend to all of them.

The heated air having entered an oven or gallery, it travels thence under suction or draft at the rear through the loads or charges of ties or timbers on the trams. Fig. 5, to the exit opening 18 in the rear and bottom thereof and down through the moist air or exhaust duct 20 into the space 21 from which it is withdrawn by the fan or blower 5 through the opening 27 in the intervening wall. An opening 22 is also formed in the wall 19 which separates the duct 20 from the space or chamber 21, and a sliding damper 23 for said opening is suspended by cable 24 running over sheaves and which is controlled by a counterweight 25 in the working gallery 16, while a damper 26 is provided at the entrance 12 to the

open space in the top of each heating chamber 8 to regulate the inflow of air to its respective oven 2. Thus, by means of said dampers and the speed of the blower the temperature and velocity of the air is regulated. The compartment or space 21 extends transversely beneath all the ovens and is open alike to all the ducts 20 in the series through the separate openings 22.

The free air space between the loads and the walls of the ovens is only sufficient for clearance, say about two or three inches, so that the air will be compelled to pass through the loads and come in contact with all surfaces of the material instead of passing around it and drying and warming the exterior more than the interior. At the beginning the temperature of the ovens should be about 95° and gradually raised to 150° to 175° F. A maximum temperature of 236° F. may be attained with one hundred pounds steam boiler pressure.

The length of the drying ovens may of course vary but the standard size is such as to accommodate twelve tram loads of eight foot ties, or say a total length of approximately one hundred feet, each tram carrying 45 to 50 ties or about 560 per charge.

Suitably heavy steel doors 30 are provided at the entrance of each oven, and sections 32 of the tram tracks 4 are removable to enable said doors to swing on their hinges to open and closed positions. This is necessary because the doors close the ends of the ovens on a plane beneath said tracks.

A door 33 is shown between the fan room and the space 16 across the front of the several heating chambers.

In Fig. 1 damper 26 which is adapted to close the passage 12 at the rear of each heating chamber 8, has a handle 27' and segment therefor serve to fix the adjustments of said damper.

In the basement of each oven between passage 11 and gallery 16, I employ a steel front with a series of swinging doors 28, one for each oven and its heater 8, and there are also small cast iron doors 29 in the wall 31 between the working gallery and the moist air gallery. These doors are for the purpose of ventilating the cross galleries and one of the doors 31 may be large enough to permit entrance to either gallery. By opening two or more doors a current of fresh air can be made to pass through the working gallery 16 into the moist air collection gallery 21.

The operation herein involves the final drying of railroad ties and other timbers preparatory to their being impregnated with a preservative, and the object is to get uniform and complete drying. To this end the timbers are placed suitably upon trams and run into the cylinders in which they are exposed to drying means involving the circu-

lation of heated air through the said cylinders and the said timbers, which are placed upon the trams in such way as to expose each timber or tie on all sides to the heated air and passage. Air is admitted through the various channels as herein clearly described and traced and flows thence under pressure into the said cylinders and is exhausted with such load of moisture as may become omitted in the process of drying, suitable fans or blowers being used for this purpose. A number of trams with their loads are placed in each cylinder according to the length of the cylinders, and the operation continues as long as there is any evidence of moisture being absorbed. When this ceases the drying operation is regarded as finished and the timbers are ready for the next step which is not within this application.

What I claim is:

1. In a system of drying and treating timbers with antiseptic solutions, an apparatus adapted to prepare the timbers for the solution consisting of a substantially cylindrical oven provided with draft openings in the bottom and ends thereof and tracks for trams in its bottom, in combination with sub-compartments beneath said oven comprising an air heating chamber having its discharge through the front opening into said oven, an air supply space in advance of said heating chamber and a damper to control the flow of air through said chamber, an exhaust duct leading downward from the rear opening in the oven, a draft compartment next to said duct and a draft damper controlling the passage of the air from said duct to said compartment, and a rotary exhaust fan arranged in a sub-compartment relatively at one side of said oven and communicating with said draft compartment and adapted to carry the moisture laden atmosphere away from the apparatus.

2. In timber drying apparatus, a series of parallel cylindrical ovens, each having tracks therein and air exhaust lengthwise thereof front to rear and jointly provided with a transverse fresh-air inlet passage at their front and a transverse working gallery behind said ovens, a transverse moist air gallery for all said ovens walled apart behind said working gallery, and an exhaust fan communicating with said exhaust gallery.

3. In a timber drying and treating system, a drying and heating apparatus comprising a plurality of drying ovens of substantially cylindrical shape and arranged side by side on the yard grade, tracks in said cylinders and front and rear bottom openings in each cylinder, a compartment beneath the front of each oven to heat air and arranged to discharge through said opening 13, a duct 20 for each cylinder communicating with each rear opening 18, a chamber

21 common to all said ducts and separated therefrom by a wall having openings 22 in its bottom, a slide damper 23 for each opening and means to adjust said damper, a
5 blower space outside of said chamber 21 and a blower in said space in suction relations with said chamber, a working compartment 16 extending across the rear of said heat-

ing compartments, and means to control the flow of air to said compartments. 10

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM FRANCIS GOLTRA.

Witnesses:

F. C. MUSSUN,
E. M. FISHER.