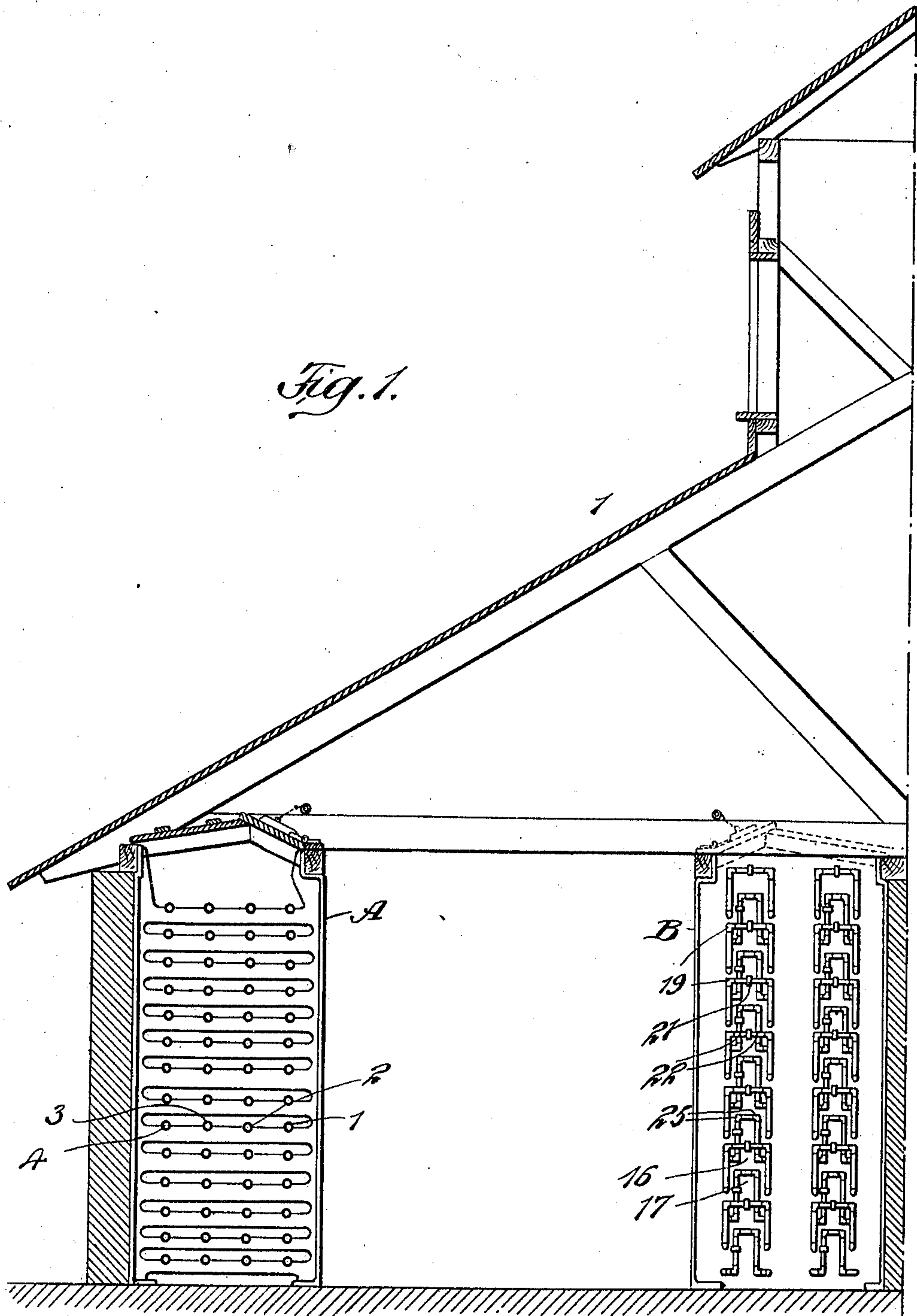


E. H. CALLAWAY.  
STEAM DISTRIBUTING APPARATUS FOR BRICK DRIERS.  
APPLICATION FILED MAR. 20, 1908.

945,219.

Patented Jan. 4, 1910.

3 SHEETS—SHEET 1.



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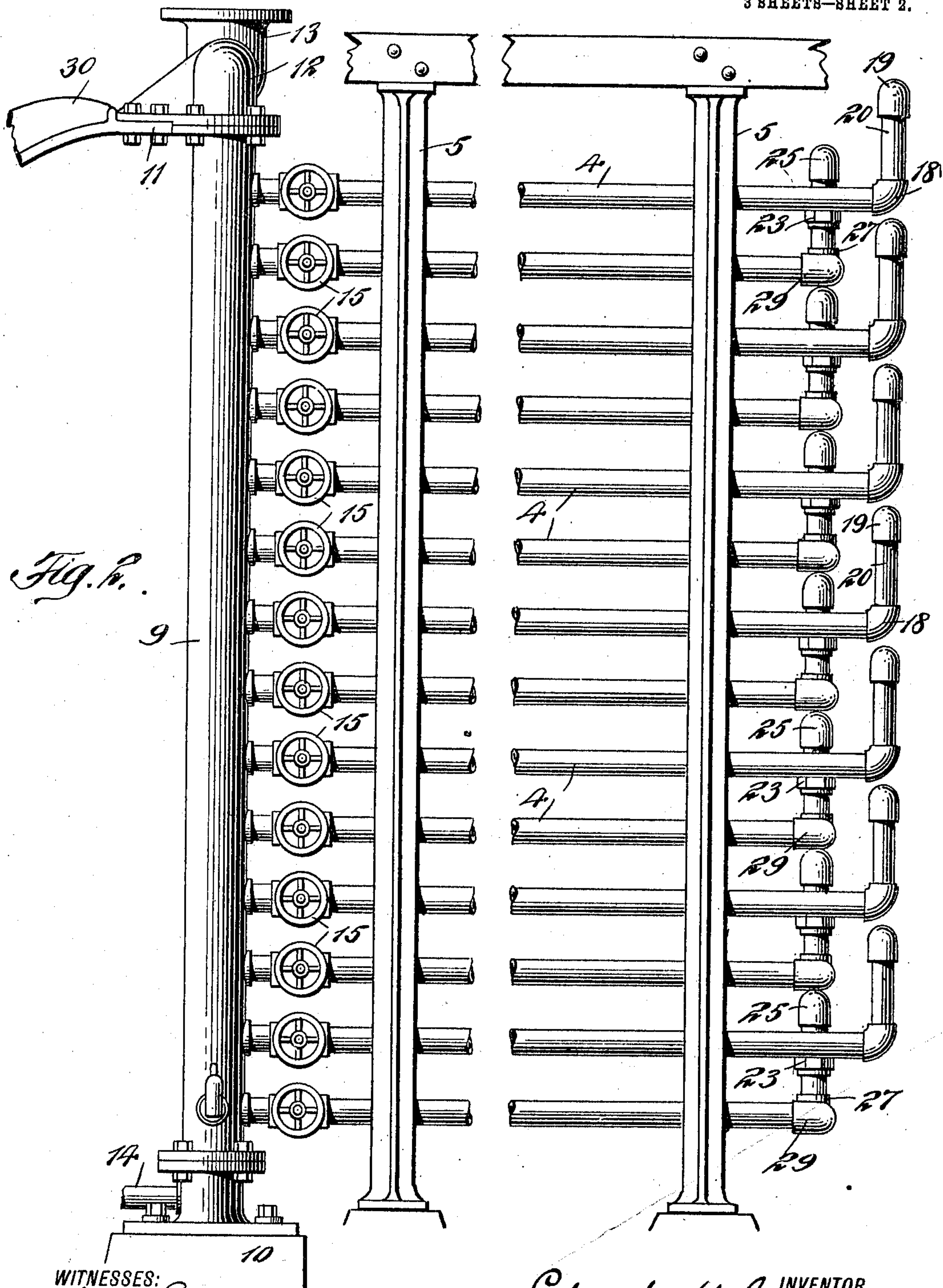


Fig. 2.

WITNESSES:

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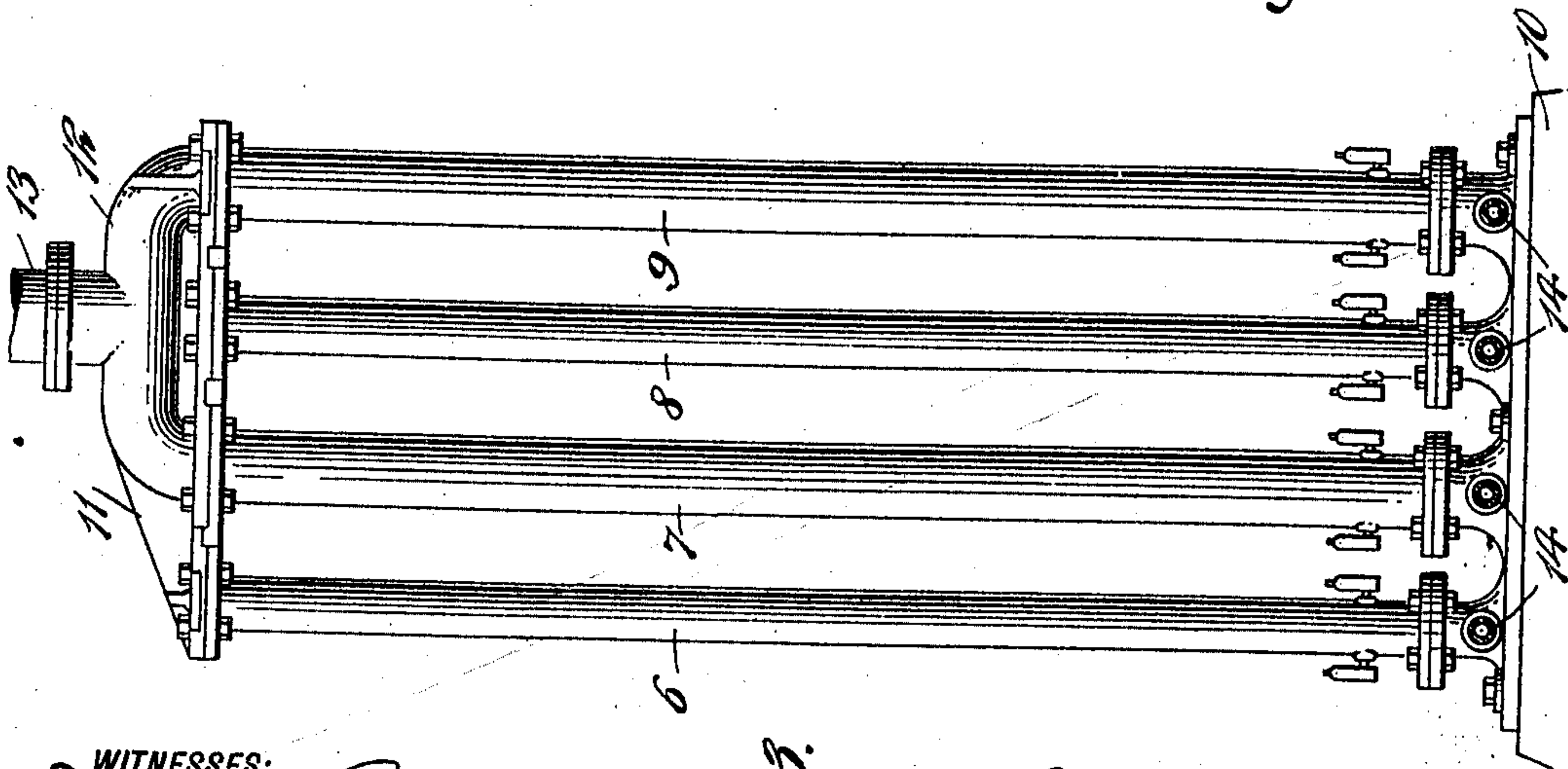
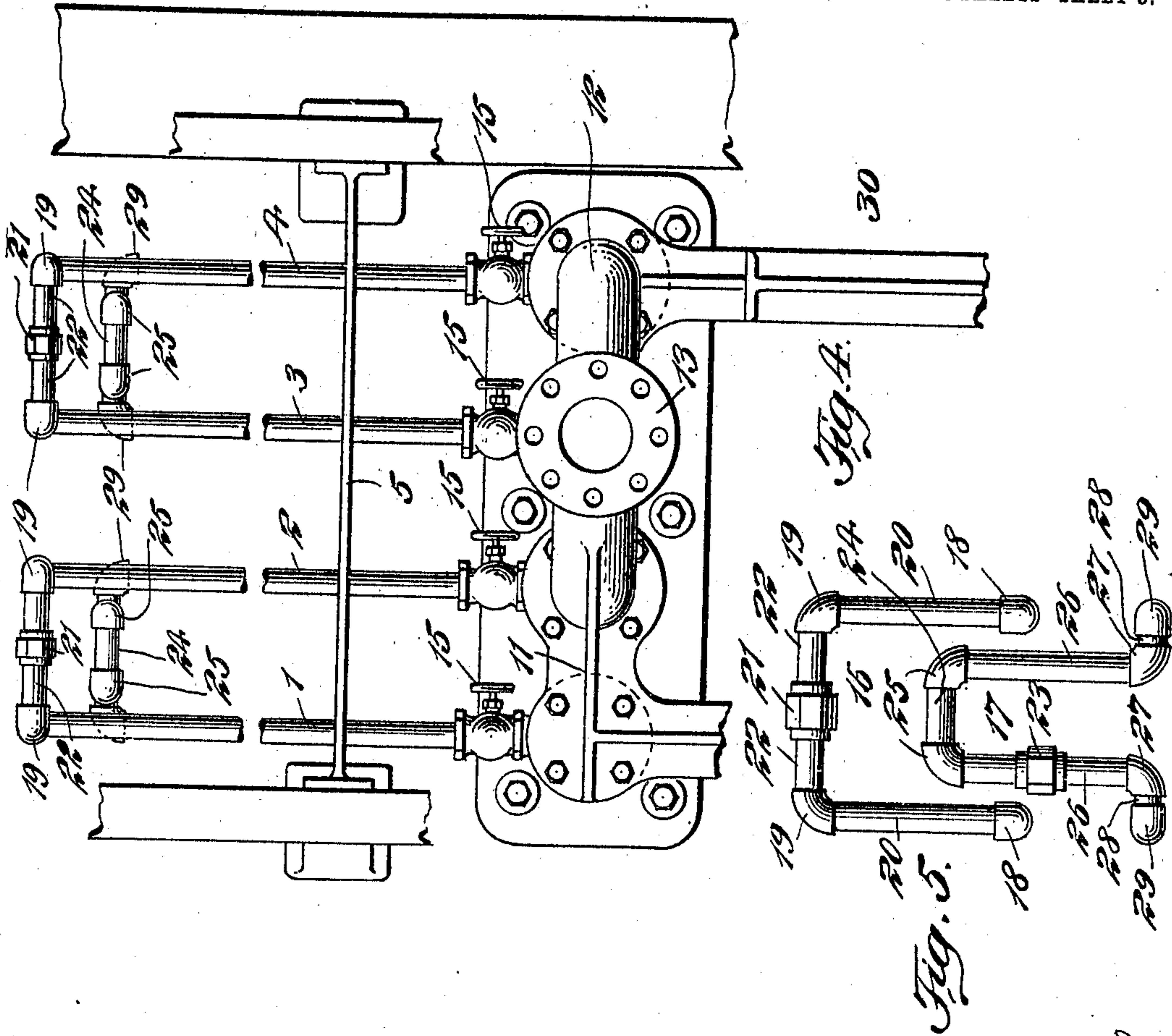
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 3 SHEETS—SHEET 3.



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*Fig. 3.*

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# UNITED STATES PATENT OFFICE.

EDWARD H. CALLAWAY, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO THE AMERICAN CLAY MACHINERY COMPANY, OF BUCYRUS, OHIO, AND NEW YORK, N. Y., A CORPORATION OF OHIO.

## STEAM-DISTRIBUTING APPARATUS FOR BRICK-DRIERS.

945,219.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed March 20, 1908. Serial No. 422,356.

*To all whom it may concern:*

Be it known that I, EDWARD H. CALLAWAY, a citizen of the United States of America, and a resident of Westfield, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Steam-Distributing Apparatus for Brick-Driers, of which the following is a specification.

10 This invention relates to certain novel and useful improvements in drying racks for bricks, tiles, and the like.

One of the objects is to simplify and perfect the arrangement of piping, so that the most efficient drying action may be produced with a minimum of mechanical construction.

Another object is to circulate and distribute the steam throughout the rack, and also remove the water of condensation in such a way that the highest efficiency may be gained, and a very economical contrivance as to steam consumption be provided. The use of manifolds at only one end of the rack, one manifold being a supply manifold and receiving the ingoing steam, and the other being a discharge manifold and carrying away the discharging steam, the pipes of both manifolds being grouped together in a single combination, and each pipe functioning in connection with the water of condensation as well as the steam, is a novel and useful feature, and promotes greatly the simplicity of the apparatus, for said manifolds combined with shelves made up of pipes extending to the other end of the rack provide for the circulation and distribution of the steam and the removal of the water of condensation in a way to secure very great efficiency.

Various other objects will be evident during the consideration of the combination of the mechanical parts and the operation of the apparatus.

45 The invention therefore may be said to consist essentially in the construction, arrangement and combination of the various mechanical elements, substantially as will be hereinafter described and claimed.

50 In the accompanying drawing illustrating my invention, Figure 1 is a sectional view of a shed with my improved drying racks arranged therein, the latter being shown partly in elevation. Fig. 2 is an en-

larged detail side elevation of my improved brick-drying rack, certain parts being broken away. Fig. 3 is an end elevation to represent more particularly the arrangement of the manifold. Fig. 4 is a top plan view. Fig. 5 is an enlarged detail representing the rectangular terminals of two contiguous pipe shelves.

Similar characters of reference designate corresponding parts throughout the different figures of the drawing.

The construction of the shed, as 1, which houses the drying mechanism forms no part of the present invention, and is only represented in Fig. 1 in order to indicate the relative application of the invention practically to the building wherein it is situated, and hence it will be understood that I am not restricted to any special form of shed or building within which to place the drier, but can give to such shed or building any desired detailed construction to enable it to best perform its proper office in connection with the operation of the drier. There may be any number of the drying racks located under a single roof, and the different racks will be connected together by any necessary and convenient pipes or conduits for carrying the steam thereto and for taking away the condensed water; and I therefore reserve the liberty of multiplying the racks as often as desired, connecting them together in any suitable way, conducting the steam thereto in whatever may be deemed the most practicable and preferable way, and removing the condensed steam also by any desirable method.

In Fig. 1 I have represented a couple of driers, one at A and one at B. I have also indicated in Fig. 1 means for inclosing the driers so that the degree of heat generated and applied by each of them may be controlled and regulated, and the air draft in connection therewith likewise regulated.

The drier consists essentially of a series of horizontal shelves for the brick-carrying plates, said shelves being each composed of a plurality of horizontal pipes of proper size and capacity that receive the steam and allow it to circulate therethrough and that likewise discharge the condensed steam in such a manner as to permit the easy removal of the latter. There may be any number of these shelves of piping. Referring to Fig. 2,



which shows the drier in side elevation, it will be observed that there is quite a large number of these horizontal shelves placed as close together as possible and composed of rows of pipes, said shelves being superposed one above the other with sufficient space between them to allow of the insertion of the required number of bricks which are delivered easily thereto by means of the ordinary brick-carrying plates, and are consequently easily capable of removal from the shelves after the drying process has been completed.

In the present example of my invention, each shelf consists of four pipes 1, 2, 3 and 4, which are arranged in two pairs, one pair consisting of pipes 1 and 2 and the other pair consisting of pipes 3 and 4. A four-pipe shelf, however, is simply offered by way of example, and I am not to be restricted to this number. But it is desirable, however, in carrying the present invention into practical operation that the pipes should be provided in pairs. These pipes are of considerable length according to the size of the shed and brick-making plant, and hence it is desirable that they should be supported at intervals throughout their length in order to preserve their horizontality and enable them to properly sustain the weight of bricks placed upon them. In supporting them, however, care must be had that they are allowed the necessary expansion and contraction which is incidental to their heating and cooling. Accordingly at intervals throughout the length of these horizontal shelves I place vertical uprights or standards 5, the detail construction of which may vary within very wide limits, but which are metallic supports provided with openings through which the pipes pass and wherein they rest, thus giving the necessary sustaining power with the required opportunity for expansion and contraction.

At one end of the rack is a manifold, see Fig. 3, consisting of four vertical pipes 6, 7, 8 and 9. These pipes are bolted to and supported upon the base 10, and at their upper ends are securely bolted to the connecting plate or frame 11. Two of the pipes, as 7 and 9, are larger than the other two, 6 and 8, and said pipes 7 and 9 are connected together preferably at their upper ends by means of the coupling 12 having the inlet pipe 13 connected therewith through which steam is introduced to the pipes 7 and 9. The pipes 6 and 8 are not connected together. Pipes 7 and 9 together constitute a supply manifold, and pipes 6 and 8 a discharge manifold, and all these pipes are together in a single group at one end of the apparatus. Water outlet pipes 14 are connected with the pipes near their lower ends.

The pipes belonging to the brick-carrying shelves are connected to the vertical pipes constituting the supply and discharge manifold at one end of the drier. This is

clearly shown in Figs. 2 and 4. The pipes of one pair of pipes, as 3 and 4, connect, the one, as 4, with one of the steam supply pipes, as 9, and the other, as 3, with one of the discharge pipes, as 8; while the pipes 1 and 2 of the other pair connect similarly to the other steam supply and the other discharge pipe. Thus pipe 1 leads into the discharge pipe 6, and pipe 2 leads from the steam supply pipe 7. Every pipe of each shelf is provided with a globe valve 15 to control the passage of the steam and water. In order to make the manifold more rigid and firm in its position upon its base 10, I preferably employ a brace 30 which is bolted to the top place or head 11 and reaches therefrom down to the ground at some suitable point.

There is a manifold or group of pipes for delivering the steam to the shelves and for taking care of the water of condensation, at only one end of the drier, and at the other end I provide a novel and improved construction for taking care of the expansion in the pipes 1, 2, 3 and 4 belonging to the horizontal shelves during the process of heating and cooling. I will now explain this construction. Each pair of pipes, one of which leads from a steam supply pipe, and the other of which leads to a discharge pipe, as, for instance, the pair of pipes 1 and 2, or the pair of pipes 3 and 4, is provided at the free end thereof with a rectangular or substantially U-shaped terminal 16. This terminal is slightly different for alternate shelves, as I shall presently specify. One form of terminal consists of vertical pipes 20 connected to the pipes of the horizontal pair by means of the elbows 18. The upper ends of the pipes 20 are connected by a horizontal pipe 22 and elbows 19 between said pipe 22 and the pipes 20, there being at the center of the pipe 22 a union 21 which is useful when the parts are being assembled. These pipes and elbows all have screw-threaded connections with each other which are susceptible of a slight turning or twisting on their threads whenever an expansion or contraction of the horizontal pipes takes place, and accordingly the movement of said horizontal pipes is taken up and fully provided for.

Another form of rectangular terminal or free end 17 differs from that just described principally in having a horizontal pipe 24, which connects by means of elbows 25 with the vertical pipes 26, shorter than the pipe 22 of the other form. In this case also the vertical pipes 26 connect by elbows 27 with short horizontal pipes 28 that connect by means of elbows 29 with the horizontal pipes of the shelf. On one of the pipes 26 is a union 23. The object of having this form is to enable the shelves to be placed closer together than would be possible if all the terminals were of the kind previously



described, and this is accomplished by having the vertical pipes 26 closer together than are the pipes 20 and allowing said vertical pipes 26 to pass between the horizontal pipes 1 and 2, or 3 and 4, as the case may be, which connect through the elbows 18 with said pipes 20; and the short connection 24 is sufficiently shorter than the connection 22 to cooperate in this matter and properly hold together this other form of terminal between the horizontal pipes; and furthermore the short pipes 28 and the additional elbows 29 are availed of in order that horizontal pipes of the shelves may lie vertically below each other, and the terminals of the alternate shelves allowed to project upwardly between the pipes of the next shelf above, in the manner I have just described. With this form of narrower terminal, the same effect is produced as with the other of allowing, through a slight movement of the screw-threaded couplings or elbows upon the connecting pipes, provision to be made for the expansion and contraction that occurs in the pipes of the shelves.

All the pipes belonging to the shelves are slightly inclined toward the manifold pipes, in order that the water of condensation may easily flow back into the latter. Steam from the supply pipes 7 and 9 enters those pipes of the shelves connected with said pipes 7 and 9, and passes through the latter to the remote ends thereof where it passes upwardly through the vertical pipes 20 or 26, as the case may be, thence through the horizontal pipes 22 or 24, as the case may be, then downwardly through the vertical pipes 20 or 26, as the case may be, and thence back through those pipes of the shelves which connect with the discharge pipes 6 and 8. While the steam is coursing from the pipes 7 and 9 toward the rectangular terminals, it will become more or less condensed and the water of condensation will run back into the pipes 7 and 9 and be carried away from them through the lower pipes 14. Most of the steam, however, will pass over through the rectangular terminals into the other pipes which connect with the discharge pipes 6 and 8, and more of the steam will be condensed in said pipes and will flow down into the discharge pipes 6 and 8 and be taken thence through the lower pipes 14. Hence the condensation of the steam will be removed as fast as it occurs, and the pipes will never fill with water, and therefore the heating effect will be greater and there will be a great economy in the use of the steam. It is important that the vertical pipes 20 and 26, which constitute parts of the shelf terminals, should be of considerable height. In the first place they should be high enough so that the water of condensation in the pipes leading to said terminals will not be carried over through the terminals into the

other pipes, but so that the steam can be easily carried over. But the chief reason for making the pipes 20 and 26 of considerable height is in order that there may be a substantial leverage exerted upon the elbows 19 when expansion of the pipes takes place. Each of the vertical pipes with its elbow at the top may be treated as and called a swing joint. When the steam courses through the pipes, as 2 and 4, to the terminal devices, expansion will take place therein on account of the heating of the same, and the result will be that the vertical pipes 20 and 26 will move the elbows 19 and 25 on their screw-threaded connections, the movement being of a substantial amount and varying with the degree of heat; and in this movement, if the vertical pipes 20 and 26 are of considerable length, there will be the right amount of leverage exerted upon the elbows, and the proper amount of movement of said elbows on their screw-threaded joints, so that there will be no leakage, though there will be enough movement to compensate for the expansion of the metal. There will be a twisting movement of this kind until the steam passes over and enters the return pipes, as 1 and 3, and when the latter have been heated to a proper pitch the action of the vertical pipes 20 and 26 on both sides of their horizontal connection will be substantially the same, a similar leverage being utilized and the whole terminal partaking of the expansive movement of the metal. Thus at first, only one set of pipes being heated, there will be a twisting on the one side, and after the pipes on the other side have been similarly heated there will be a corresponding and not an uneven movement on the two sides of the rectangular terminals. By this arrangement, therefore, I achieve very useful results with a simple mechanism, and there is a substantial economy in the use of steam with the attainment of a high efficiency.

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

1. In a brick-drying rack, the combination with supply and discharge manifolds, of brick-supporting shelves each consisting of a series of pipes secured to the manifolds and arranged in pairs, one pipe receiving the steam and the other carrying it back, and both inclined to return the water of condensation to said manifolds, means for providing for expansion and contraction at the free ends of said pipes, means consisting of a swing-joint connection between the free ends of the contiguous pipes, said connection comprising vertical pipes, a connecting pipe and screw-threaded elbows, and racks for supporting each shelf.

2. In a drying-rack for bricks, the combination with steam supply and discharge



manifolds, of a series of shelves each consisting of pairs of pipes rigidly connected at one end with said manifolds and having outer and relatively free ends provided with substantially upright U-shaped terminal connections, said connections including swing-joints that allow for unequal expansion and contraction between the two members of each pair of pipes.

3. In a drying-rack for bricks, the combination with a series of shelves each consisting of a pair of heating pipes, of angular terminals connecting the free ends of said pipes, said terminals consisting of vertical pipes, horizontal connections between them and screw-threaded elbows connecting the two, the terminals for every adjacent shelf rising between the pipes of the next shelf above, so as to allow the shelves to be placed closer together.

4. The combination in a drying rack for bricks, of a manifold including supply pipes and return pipes situated together in a group, and a series of shelves comprising rows of pipes connected with the manifold, together with connections between the ends of the pipes, which connections include movable joints, the connections for each alternate shelf rising between the pipes of the next shelf so as to allow the shelves to be placed closely together.

5. In a drying-rack for bricks the combination of a series of shelves each consisting of heating pipes, a supply manifold and a discharge manifold, the members of both of which are grouped together at one end of the apparatus, means for connecting the end of each supply pipe of the shelf with the adjacent end of a discharge pipe of the shelf, said means consisting of vertical pipes, el-

bows between them and the pipes of the shelf, a connection between the upper ends of the vertical pipes, elbows between said connection and the vertical pipes, all arranged to allow expansion and contraction.

6. In a drying-rack for bricks the combination with a series of shelves each consisting of heating pipes, of means for delivering the steam to said pipes at one end of the apparatus, means for connecting the free ends of adjoining pipes with each other at the opposite end of the apparatus, said means consisting of an elevated pipe connection through which the steam passes from one pipe to an adjacent pipe.

7. In a drying-rack for bricks the combination of a series of shelves each consisting of heating pipes, means for supplying steam to said pipes, and connections for connecting the pipes together at one end of the apparatus, said latter means being elevated above the level of the shelf and including a movable joint.

8. In a drying-rack for bricks, the combination of a series of shelves each consisting of heating pipes, means for supplying steam to said pipes, movable terminal joints connecting the free end of each supply pipe of the shelves with the adjacent free end of a discharge pipe, said means consisting of vertical pipes rising above the horizontal plane of the shelf, and including a movable joint, the connecting means for each alternate shelf rising above the level of the next shelf.

Signed at New York city, this 3rd day of March, 1908.

EDWARD H. CALLAWAY.

Witnesses:

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