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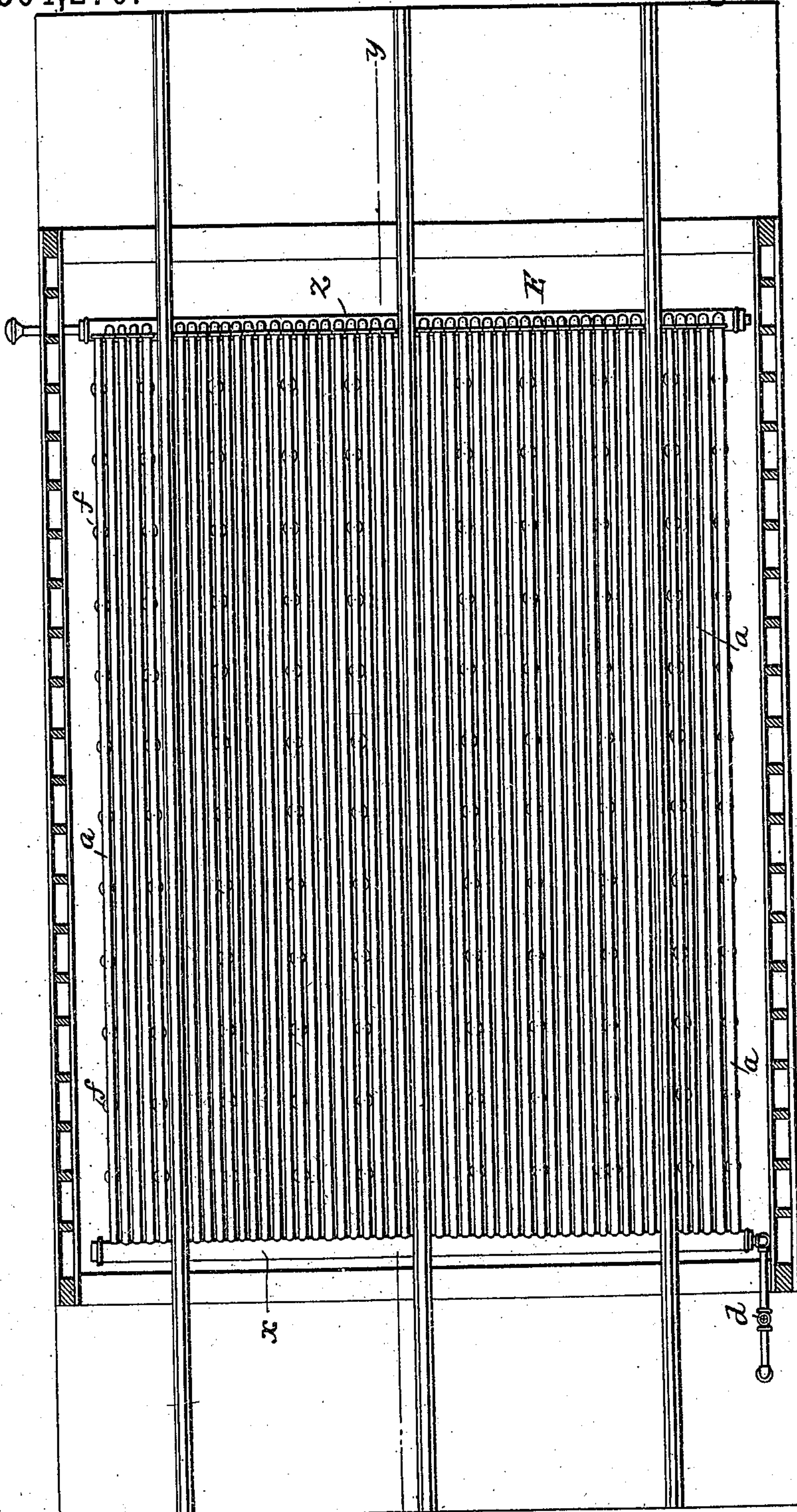
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D. L. HUMASON.  
DRIER.

No. 504,270.

Patented Aug. 29, 1893.

Fig. 2.



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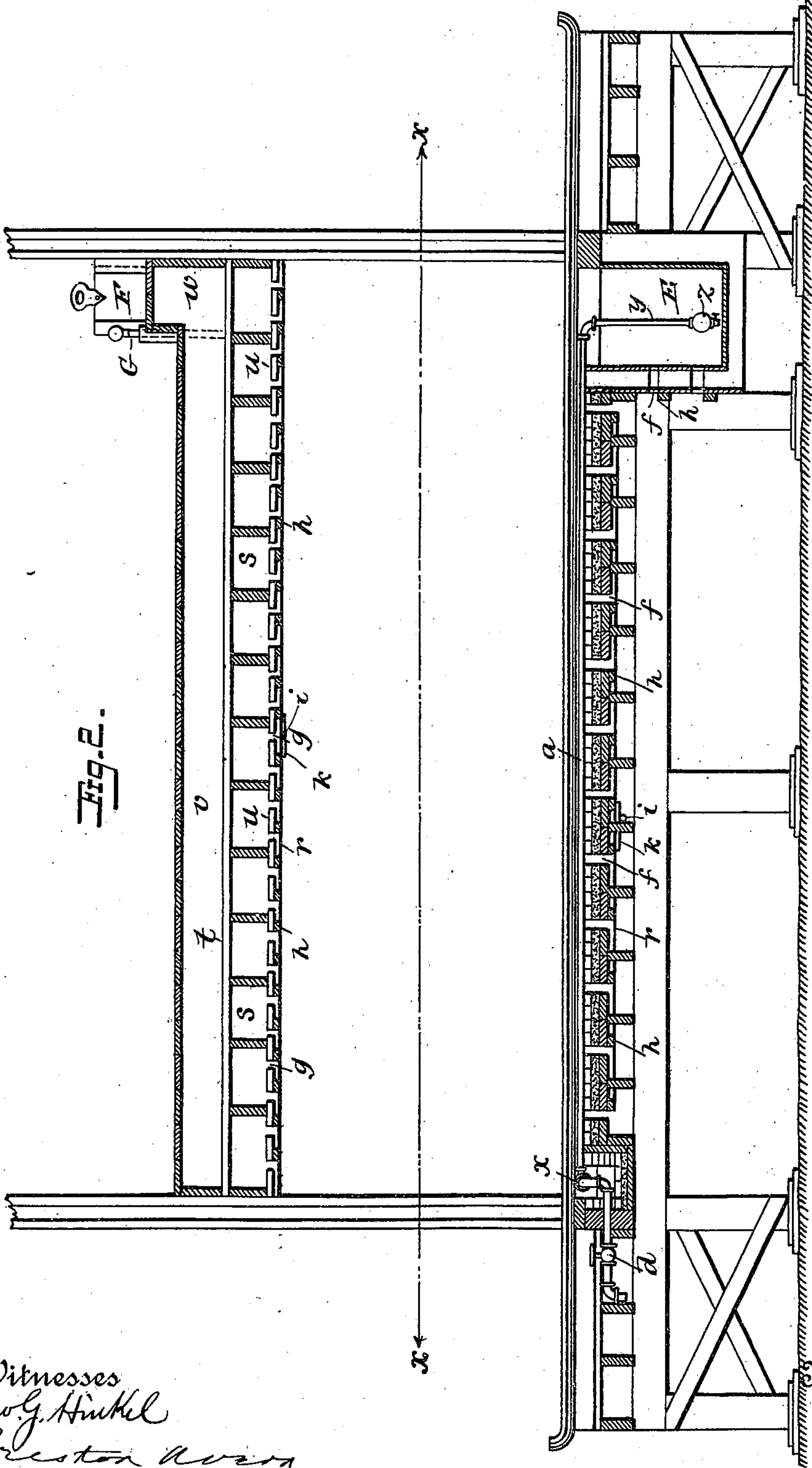


Fig. 2.

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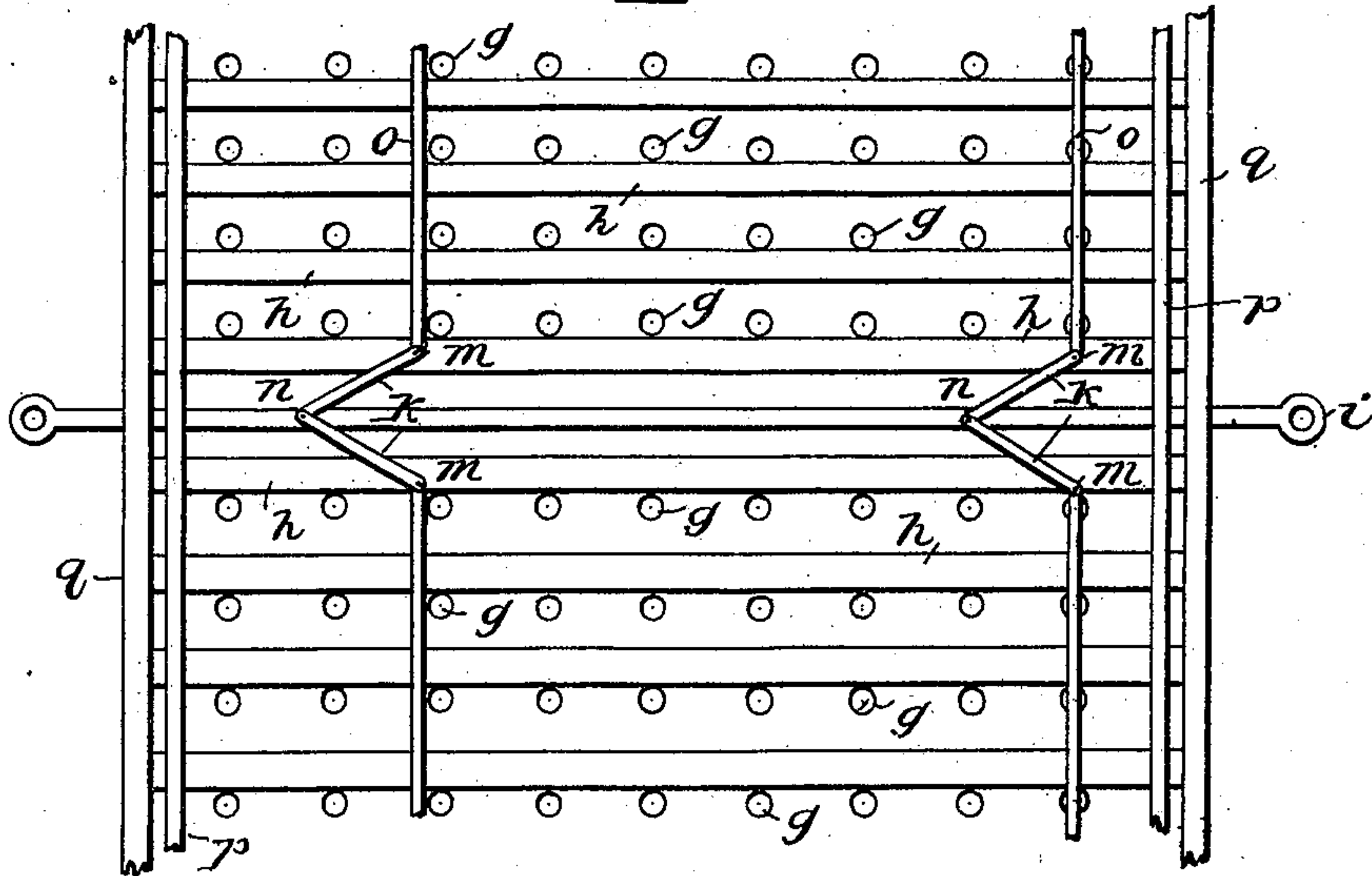
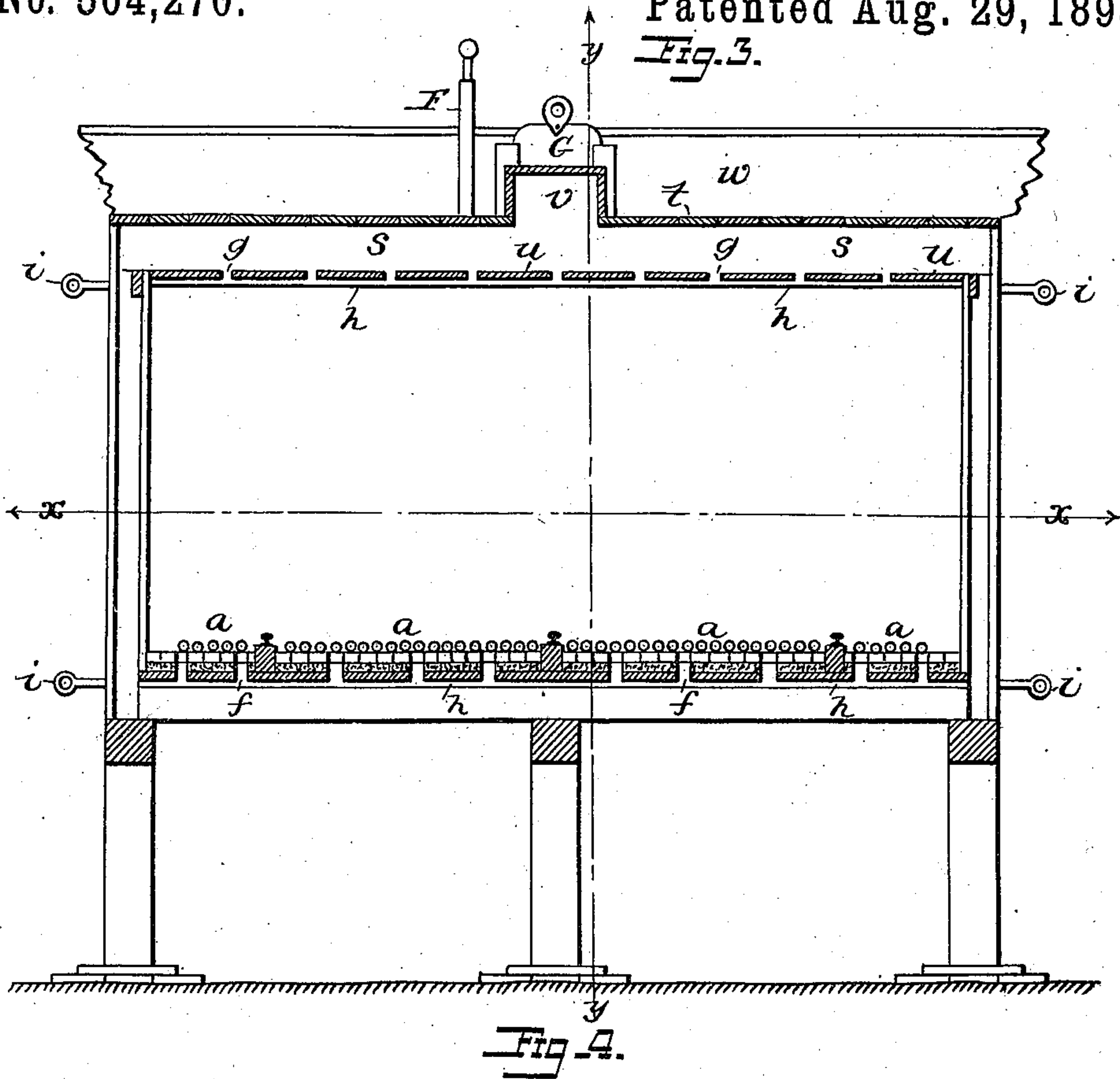
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# UNITED STATES PATENT OFFICE.

DANIEL L. HUMASON, OF CAMDEN, ARKANSAS, ASSIGNOR OF ONE-FOURTH TO  
J. B. FRIEDHEIM, OF SAME PLACE.

## DRIER.

SPECIFICATION forming part of Letters Patent No. 504,270, dated August 29, 1893.

Application filed December 19, 1892. Serial No. 455,632. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL L. HUMASON, a citizen of the United States, residing at Camden, in the county of Ouachita and State of Arkansas, have invented certain new and useful Improvements in Driers, of which the following is a description in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it pertains or with which it is most nearly connected to make, construct, compound, and use the same.

My invention relates to improvements in driers or kilns for drying lumber, bricks, til- ing, clays, terra cotta, fruit, wool, and in fact any kind of article subjected to a drying process, and the object of my invention is to so construct a drier or kiln that the article to be dried is subjected to the combined effect of heat and evaporation.

A further object of my invention is to so regulate and manipulate the drafts through the drier or kiln that each and every part of the article or substance to be dried is equally subjected to the drying and evaporating influences.

A further object is the production of a drier or kiln, simple in construction, cheap, easily operated, efficient, novel and useful.

My invention consists in the novel constructions and combinations all as more fully hereinafter set forth and then specified in the annexed claims.

Reference is had to the accompanying drawings forming a part hereof, wherein—

Figure 1 is a horizontal sectional view of my improved drier, taken on the line  $x-x$  of Figs. 2 and 3. Fig. 2 is a vertical longitudinal sectional view of the same, taken on the line  $y-y$  of Figs. 1 and 3. Fig. 3 is a vertical transverse sectional view of the same. Fig. 4 is an inverted plan view of a portion of the movable slats, showing the mechanism for moving the same, and the draft apertures regulated thereby.

Similar letters of reference indicate corresponding parts throughout the drawings.

A represents the heating box or chamber, which is of rectangular shape, having doors or openings in its ends by which the articles to be dried may be introduced to the interior thereof, where they are subjected to the dry-

ing and evaporating influences. This may be accomplished by first loading the articles upon a suitable skeleton car or frame, mounted upon wheels.

Suitable tracks, B, are provided in the floor of the heating box or chamber, upon which the skeleton car or frame loaded with the articles to be dried, are run into the heating box or chamber, and after the completion of the drying process the car or frame bearing the now dried articles can be withdrawn, and a new or fresh charge of articles can be run in. Instead of the car or frame, the articles can be introduced to the heating chamber by hand if desired, and piled upon the tracks, B, or any other suitable supports placed on the floor of said chamber, care being taken in any case to leave sufficient space between the articles to be dried to insure a draft therebetween, as will be readily understood.

In the floor of the heating chamber longitudinally thereof, is arranged a series of steam pipes,  $a$ . These pipes are arranged beneath the tracks, B, so as not to touch the articles to be dried, in cases where articles are piled directly upon tracks B, and so as not to serve as supports therefor, and at one end each pipe  $a$ , communicates with a manifold, " $x$ " which is a pipe of large cross sectional area, and receives steam, hot water, or other heating medium, from any suitable source, the supply being regulated by a valve " $d$ " of any ordinary and suitable construction. At their opposite ends, pipes " $a$ " connect by ordinary elbow joints, with short vertically depending pipes " $y$ " which communicate with a manifold, " $z$ " similarly arranged with respect to manifold " $x$ " except that it is in a lower horizontal plane, said manifold being ranged in pit "E." The pipes " $a$ " are arranged on a slight incline from manifold " $x$ " to the point of connection with the short vertical pipes " $y$ " so that the condensed moisture will drain down them from manifold " $x$ " to manifold " $y$ ."

The operation of the heating system is as follows: The heating medium, which may be hot air, hot water, steam, &c., is admitted to manifold " $x$ " whence it divides and passes through pipes " $a$ ," and short connecting pipes " $y$ ," to manifold " $z$ " and thence to exit " $t$ ,"



to a suitable receiver or condenser, or to the atmosphere. Any suitable means may be employed to create a flow of the heating medium through the pipes, but as any ordinary and well known means for this purpose may be employed, none are specifically described herein.

The floor of heating chamber "A" is provided with circular perforations, "f," of uniform size arranged in parallel rows longitudinal of said chamber. These perforations are directly beneath the heating pipes "a" and they serve to open direct communication between the outer air and the interior of the heating chamber. The ceiling of chamber "A" is also provided with perforations "g" similar in all respects to perforations "f" in the floor, and similarly arranged. Two or more of these rows of perforations in the ceiling of the heating chamber communicate with each of the series of transverse flues S, presently to be described, thus opening direct communication between the interior of the heating chamber and the flues. A series of movable slats, "h," with suitable operating mechanism therefor, is provided for regulating the amount of opening of perforations, "f" and "g." As this mechanism is exactly the same in construction, whether for the floor or the ceiling, I have only specifically shown and described it in connection with the ceiling. Fig. 4 is an inverted plan view of this mechanism.

Slats "h" are arranged in sets, one set on each side of a line central, transversely, of the ceiling. Instead of two sets, four or six sets may be used, according to the size of the drier, as will be readily understood. Every slat of each set is rigidly secured at or near each end, to a strip "o." The inner end of each strip "o" is pivotally connected at "m" to one end of a link "k" the other end of which is pivotally connected to a rod "i" having its ends projecting through suitable holes in the side walls of chamber "A." This arrangement constitutes in effect a toggle-joint, and upon movement of rod "i" longitudinally, each set of slats is moved toward or from each other. Since each slat is rigidly secured to strip "o" the distance between the individual slats composing the set remains the same. Each slat "h," corresponds in length to a line of perforations. It will be readily understood, therefore, that by a longitudinal movement of rod "i" the area of opening of perforations "f" and "g" can be readily and easily regulated and it will also be seen that all the perforations will be equally opened or closed.

Heating chamber or box "A" is air tight, except as to perforations, "f," and "g" and hence the amount of air admitted to the interior of the chamber, and hence the draft, can be manipulated and regulated at will by a movement of the rods "i." It will be readily understood that if more than two sets of

slats "h" are employed, each pair of sets will have its own operating rod "i."

The roof or ceiling of heating chamber or box "A" is sealed air tight on both the upper and lower sides of the ceiling joists. Perforations "g" are provided only in the ceiling on the under sides of the joists. A system of independent flumes "s" is thus formed by the two ceilings and the joists. The joists extend transversely of the chamber, and hence these flumes "s" are also transverse, and there are as many flumes as ceiling joists. In the upper ceiling is arranged an air-tight flume "v" transverse to and communicating centrally with flumes "s." Flume "v" extends longitudinally of the chamber "A" and at one end communicates with another air-tight flume "w" arranged transversely of the said chamber, on the upper roof thereof. A damper or gate "G" is arranged in flume "v" and a similar damper or gate "F" is arranged in flume "w." It will thus be seen that the draft through the heating chamber can be regulated at will to suit any condition required. The air is admitted equally through all parts of the floor and coming in contact with pipes "a" becomes heated and ascends through the articles, stacks or piles of articles to be dried, thereby effecting the dehydrating or evaporation of the said articles. From the arrangement of the holes or perforations in the ceiling and floor, an equal amount of air is admitted to every part of the chamber, and is drawn off through apertures "g" into flumes "s" thence into flume "v" and thence out through flume "w." Thus every part of the articles subjected to the process is equally acted upon and the serious difficulty is avoided, of subjecting that portion of the charge only which is nearest the points of ingress and egress of the air, to the drying or evaporating process. Any suitable exhaust fan, siphon or stack chimney may be employed in connection with the flume "w" to assist in creating and maintaining a steady draft through the chamber.

It will be readily understood that each set of movable slats "h" can have its own operating rod "i." I have shown two sets operated from one rod, which is a convenient and simple arrangement.

I desire it to be understood that I do not limit myself to the exact details of construction, nor to the exact size and proportions shown and described, as many variations therefrom can be made by any mechanic skilled in the art, without departing from the scope and spirit of my invention; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a drier or chamber provided with circular perforations in the ceiling and floor thereof, said perforations being arranged in rows transverse to the length of said chamber, two sets of slats also arranged transverse to the length of said chamber located beneath



the floor, adapted to control the opening of the perforations in the floor and two sets located within the chamber and immediately beneath the ceiling adapted to control the opening of the perforations in the ceiling, each slat adapted to regulate the area of opening of a row of perforations, strips rigidly connecting the slats in each set at both ends thereof, sliding rods having their ends projecting through the walls of said chamber, each rod being arranged between sets of slats, links pivotally connected to said rod and the strips of each set of slats whereby a longitudinal movement of said rod will move said sets of slats and simultaneously regulate the opening of said perforations, substantially as described.

2. In a drier, a drying chamber provided with rows of perforations in the floor and ceiling thereof, those in the floor communicating directly with the outer air and those in the ceiling communicating with flues; slats arranged in sets, the slats in each set rigidly

fixed with respect to each other a distance apart corresponding to the distance between two contiguous rows of perforations, each slat adapted to cover a row of perforations; a longitudinally movable rod, links pivotally connecting the rod and the sets of slats, whereby, when the rod is moved longitudinally, the sets of slats are moved bodily to simultaneously regulate the area of opening of the perforations; in combination with heating pipes arranged within the chamber immediately above the floor thereof, flues in the ceiling of said chamber, and flue dampers, all arranged as and for the purpose set forth.

In testimony whereof I have hereunto set my hand, in the presence of two attesting witnesses, this the 13th day of December, 1892.

DANIEL L. HUMASON.

Witnesses:

PRESTON AVERA,  
W. W. PACE.