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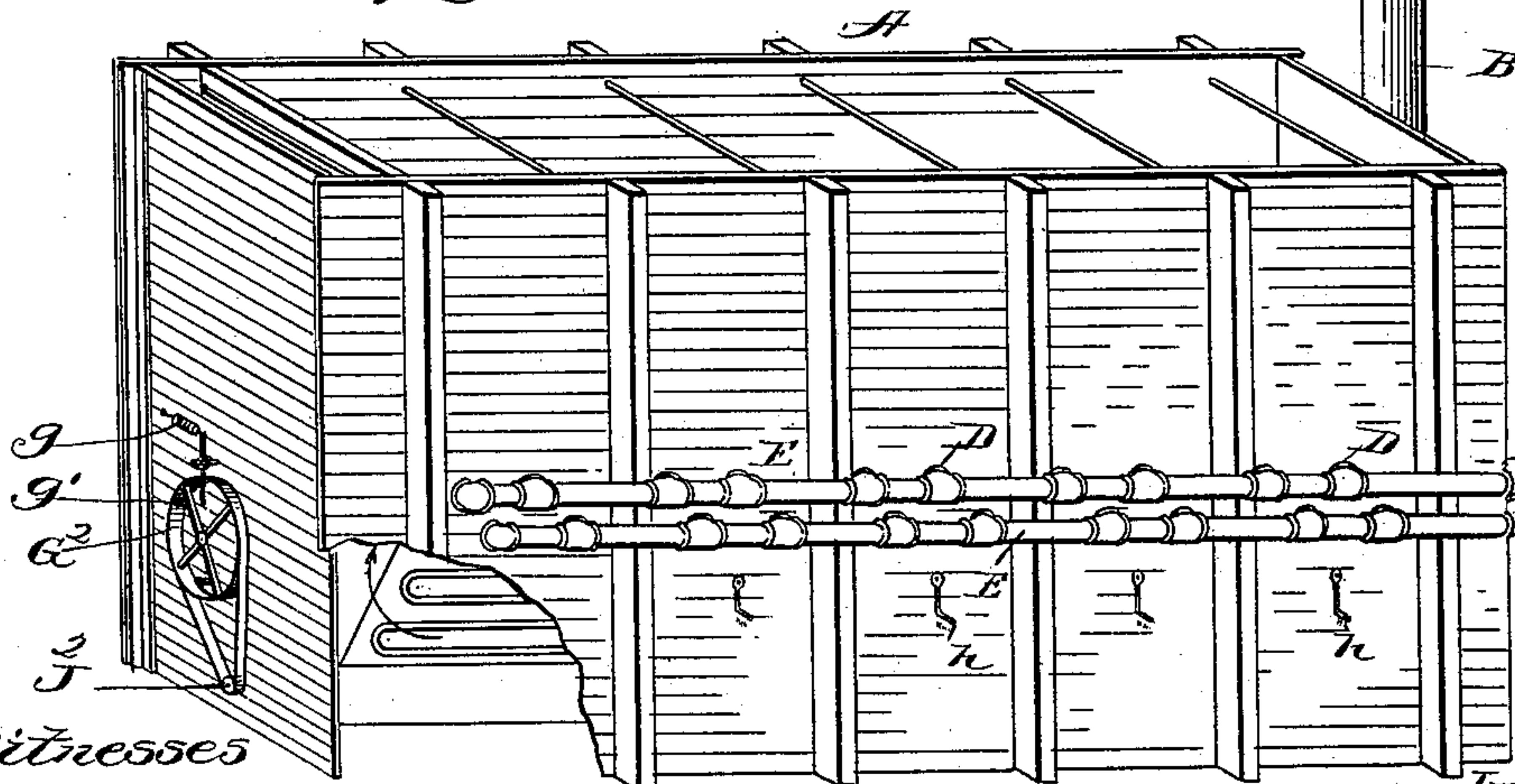
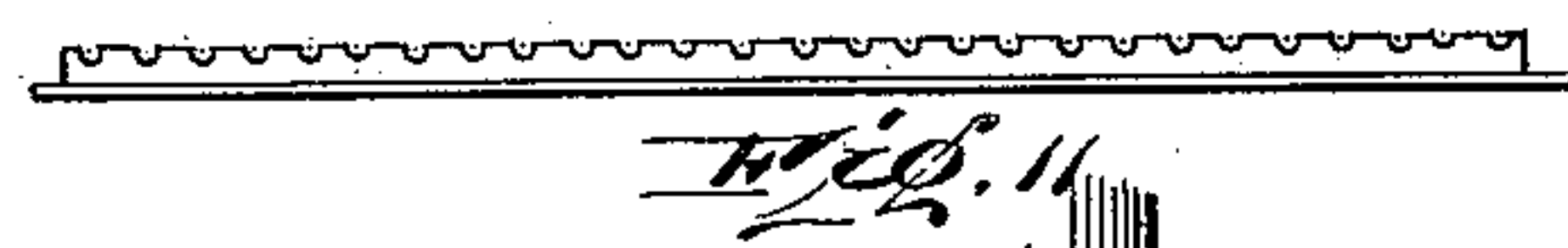
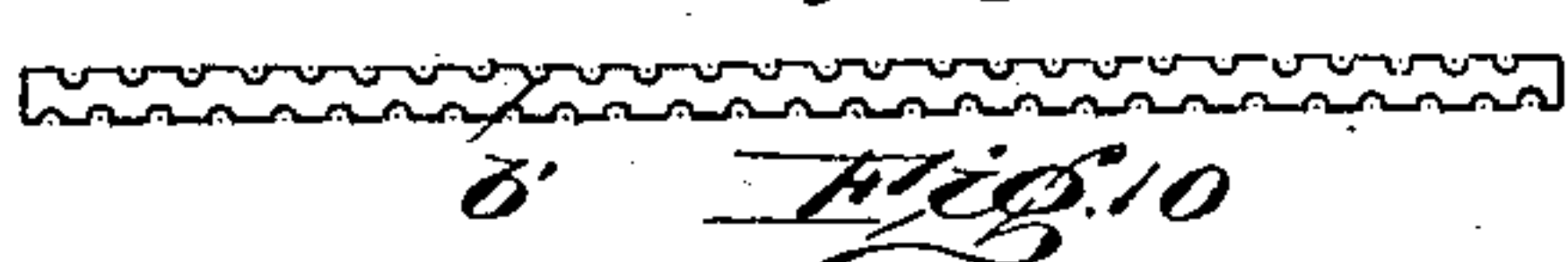
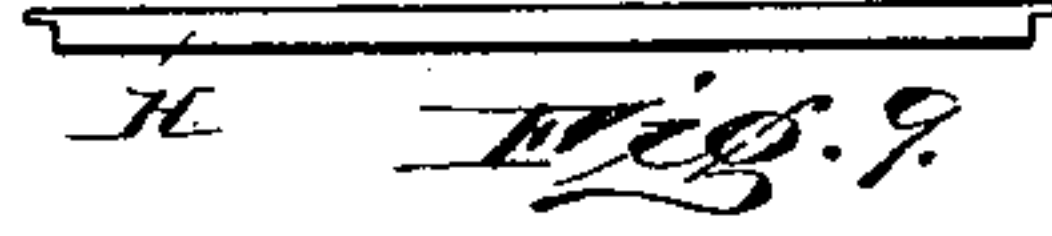
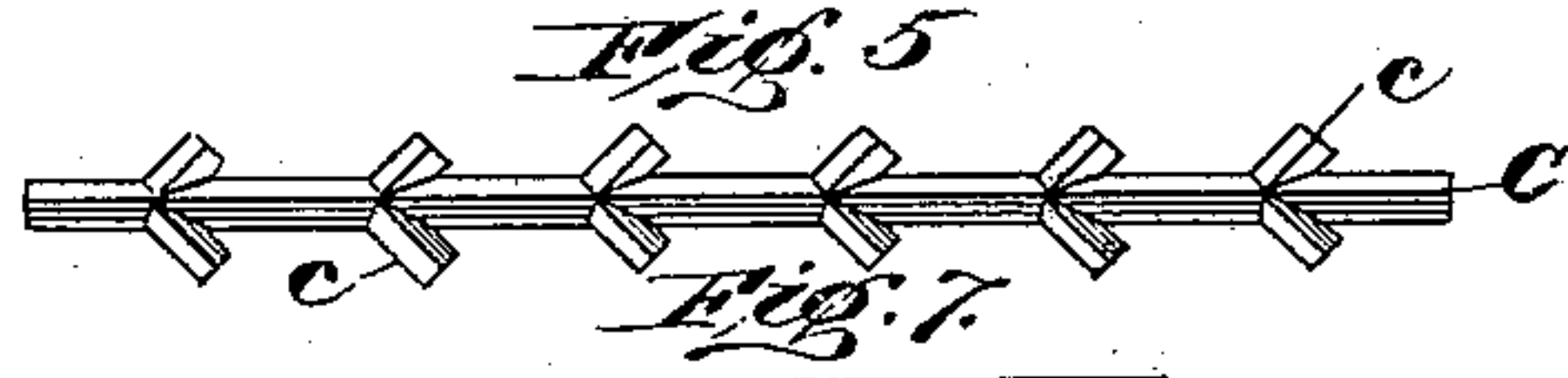
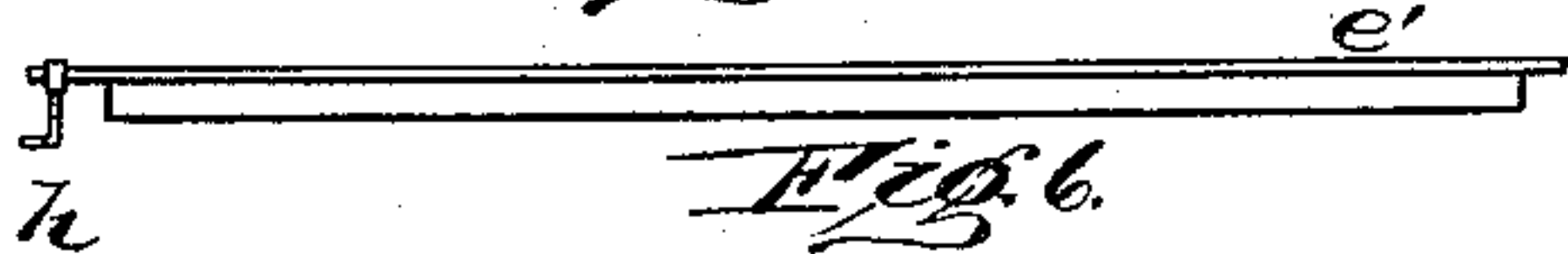
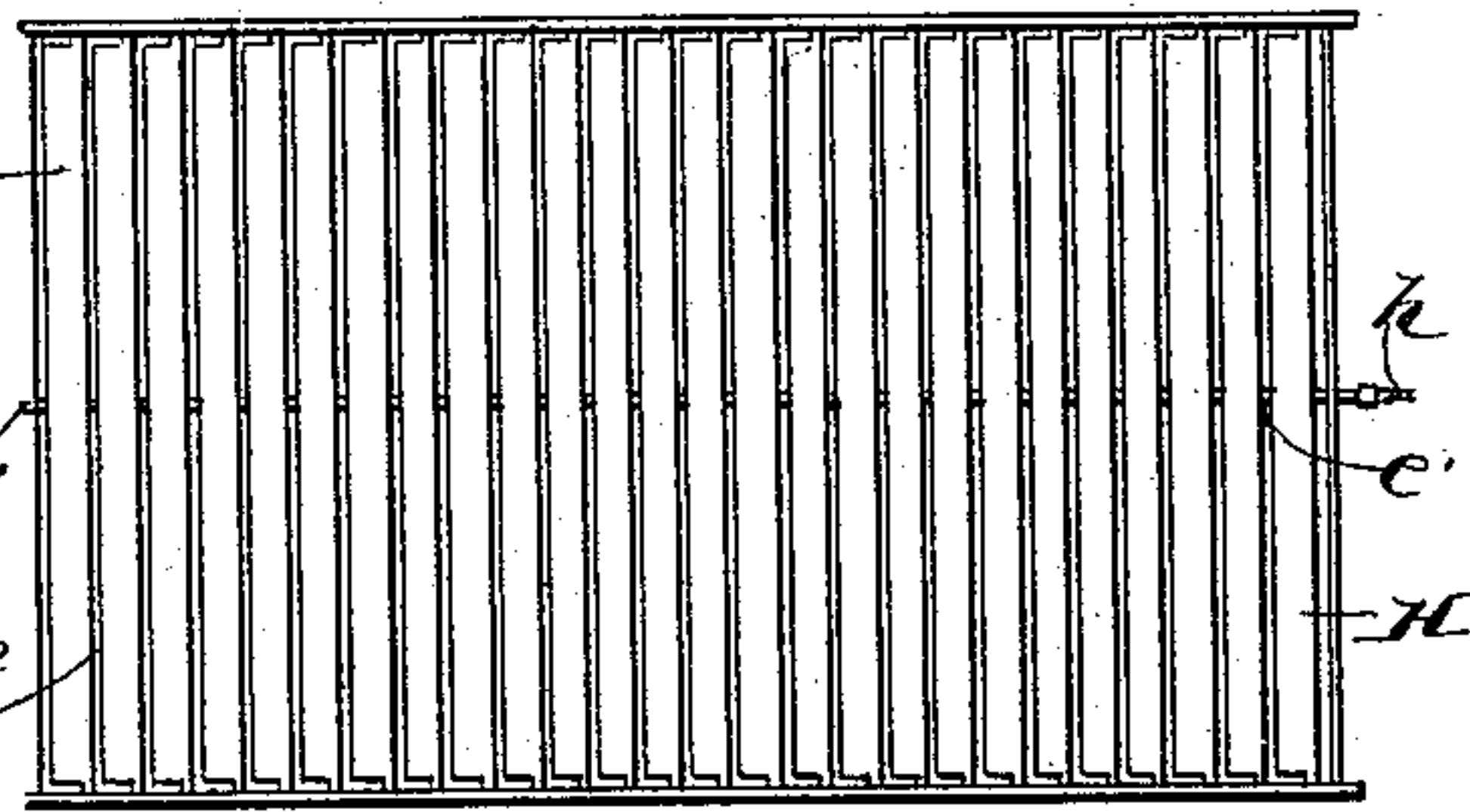
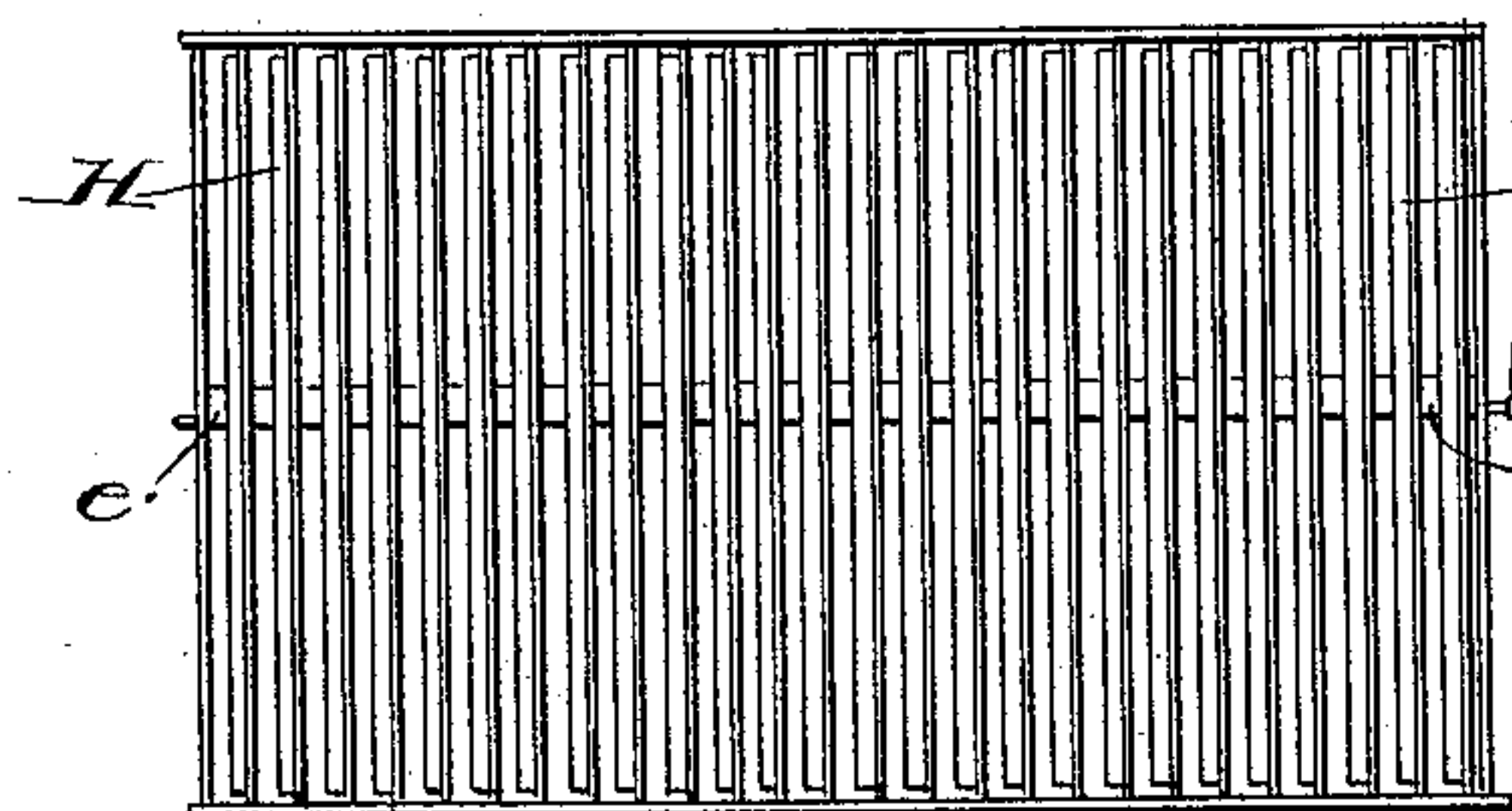
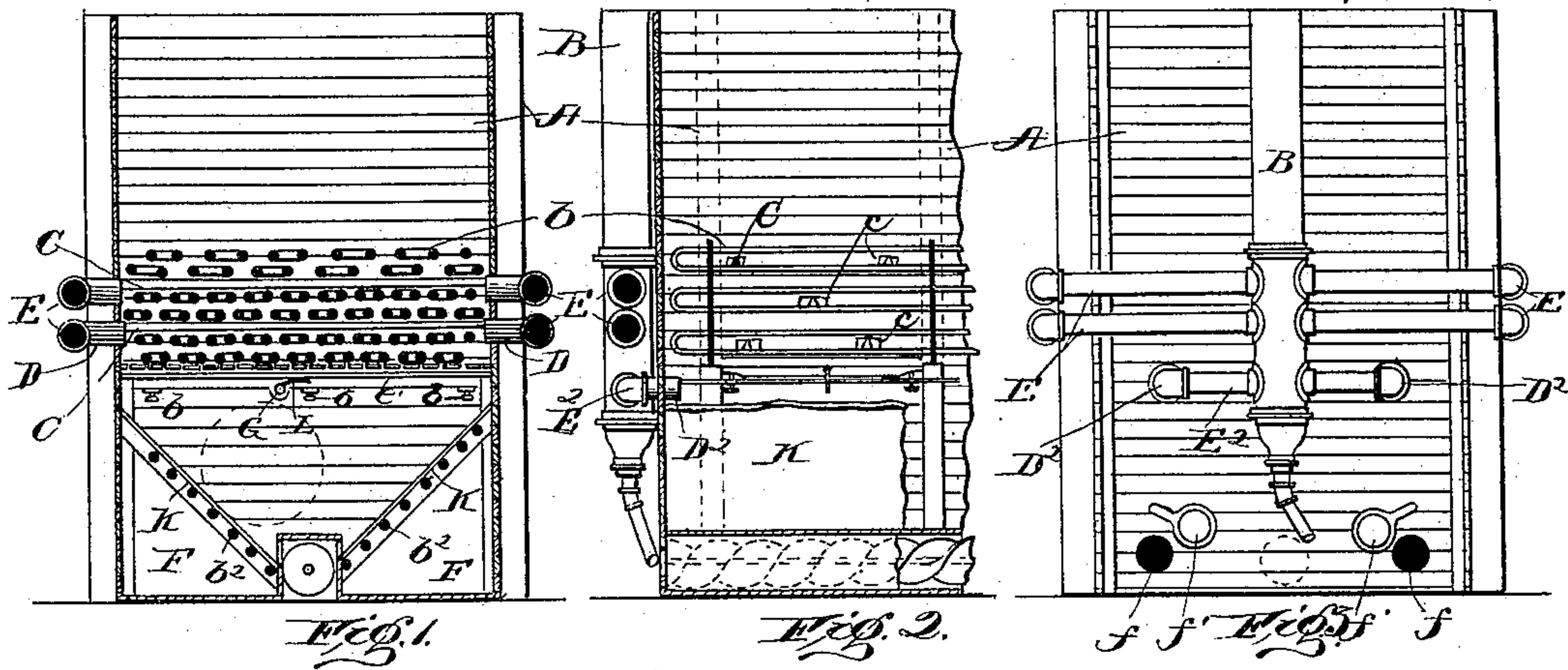
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E. L. MERRIMAN & J. W. VOUGHT.

SAND DRIER.

No. 591,413.

Patented Oct. 12, 1897.



Witnesses

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Alex. Stewart.

Fig. 12.

Inventors.

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by Charles H. Smith
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(No Model.)

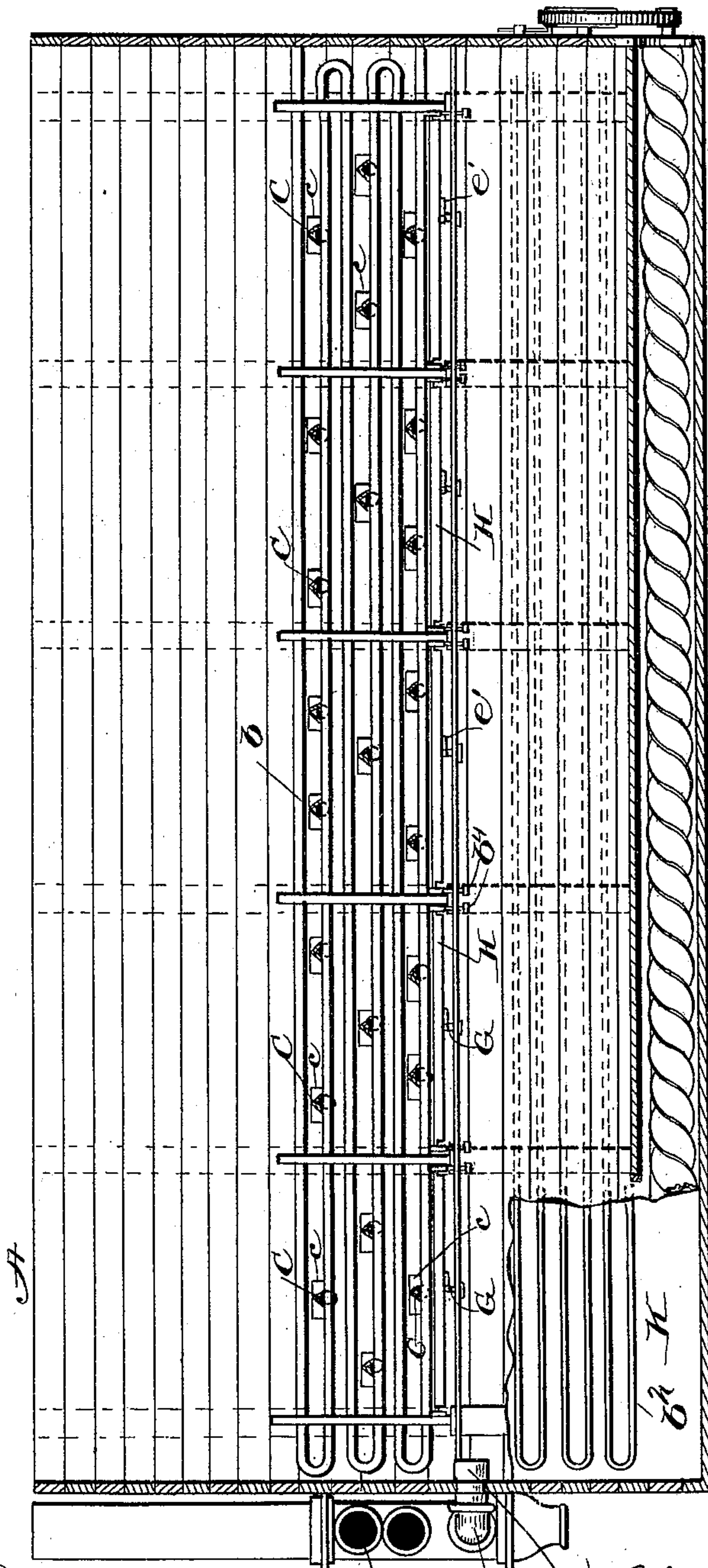
2 Sheets—Sheet 2.

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Patented Oct. 12, 1897.

Fig. 13.



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UNITED STATES PATENT OFFICE.

EURIE L. MERRIMAN AND JOSIAH W. VOUGHT, OF SCRANTON, PENNSYLVANIA.

SAND-DRIER.

SPECIFICATION forming part of Letters Patent No. 591,413, dated October 12, 1897.

Application filed February 3, 1897. Serial No. 621,846. (No model.)

To all whom it may concern:

Be it known that we, EURIE L. MERRIMAN and JOSIAH W. VOUGHT, of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Sand-Driers; and we do hereby declare the following to be a clear, full, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to improvements in driers for sand, &c., the objects being to provide an apparatus which will effectually remove the moisture from the sand by a continuous process and without heating the sand to such a degree as to destroy any of its qualities or to prevent its immediate utilization in the manufacture of plaster compounds, &c.

The invention consists in certain novel details of construction and combination and arrangements of parts, all as will be now described, and pointed out particularly in the appended claims.

Referring to the accompanying drawings, Figure 1 is a transverse section through a drier embodying our present invention. Fig. 2 is a section taken longitudinally through one end. Fig. 3 is an end elevation. Fig. 4 is a top plan view of the ventilator or grate with the slats open. Fig. 5 is a top plan view with the slats closed. Fig. 6 is an elevation of the slat for controlling the position of the grate or damper slats. Fig. 7 is a top plan view of one of the ventilators. Fig. 8 is a longitudinal section through the grate when the slats are opened to their fullest extent. Fig. 9 is a view of one of the ventilator-slats. Fig. 10 is an elevation of one of the supports for the heating-pipes. Fig. 11 is a similar view of another support. Fig. 12 is a perspective view, partly broken away, of the entire apparatus. Fig. 13 is a longitudinal section with portions in elevation and broken away to illustrate the construction more clearly.

Like letters of reference in the several figures denote the same parts.

In carrying this invention into practice we preferably make use of a bin or hopper into

which the sand is dumped in bulk and from which it is drawn through the drying mechanism by a continuous process, although provision is made for regulating the rapidity with which the sand travels through the drying mechanism, thereby adapting the apparatus for operation upon sand containing various amounts of moisture. As shown, the hopper is in the form of a rectangular casing, preferably open at the top and into which the sand may be dumped or shoveled and having at the bottom a discharging apparatus, preferably a screw conveyer, for discharging the sand at a single point, although an inclined chute or other means for accomplishing this end may be employed, if so desired.

Arranged within the casing A is a system of heating or steam pipes *b*, the arrangement of pipes being such that those near the top of the system are more widely separated than those near the bottom, in order that every particle of the sand may be duly heated by being brought into proximity to a heating-pipe, but at the same time there will be little or no tendency to clog up between the pipes, as would be the case if it were attempted to pass damp sand between closely-spaced pipes. The pipes themselves are supported by cross-pieces *b'*, Fig. 10, having notches in which the pipes rest and by which they are positioned, the arrangement of notches being such that the pipes in each succeeding row will be beneath the spaces in the next higher row.

Between the rows of pipes and arranged horizontally through the system of pipes is a system of separators or sand-breaks C, Figs. 1, 2, and 7, preferably each provided with branches *c* and hollowed out beneath or V shaped to form channels, through which moist air or steam from the moist sand may escape. The particular shape of the separators or breaks in cross-section is immaterial, it being preferable, however, that their upper surfaces should be inclined at such an angle that the sand will not find a lodgment thereon, but in falling over the edges of the separators it will form passage-ways through the sand itself, through which the air may circulate and from which the air may be withdrawn

by a system of ventilator-pipes E, running along each side of the casing and communicating with these passages by a short transverse pipe D, extending through the casing.

5 The ventilator-pipes E communicate with a stack or uptake B for carrying off the moist air or steam and creating a draft through the body of the sand, as it were. We preferably employ two systems of separators or breaks, 10 one above the other, and with those of the lower system arranged between those of the upper system or beneath the spaces in the upper system, as shown clearly in Fig. 2, by which arrangement all of the sand passing 15 through the apparatus is caused to pass by an "open" space, so to speak, and the moisture contained therein is free to evaporate and be carried off by the gentle current of air traversing such space.

20 For the purpose of regulating the rate at which the sand shall pass through the apparatus we provide a system of grates or dampers having relatively narrow spaces between the slats and capable of being opened or closed 25 to a greater or less degree to permit of an increased or diminished flow of sand. These grates (lettered H in the drawings) are preferably arranged in proximity to the lower row of heating-pipes and are adapted to be 30 raised or lowered by set-screws b^4 , Fig. 1. Each grate consists of a frame having pivoted therein a series of slats, the pivotal point of each slat being in proximity to one edge, as shown clearly in Fig. 8, whereby in opening 35 the slats it is not necessary to overcome the sand-pressure, as would be the case were the slats centrally pivoted. When the slats are in horizontal position, a space e^2 is left between them of sufficient width to allow a 40 minimum feed of sand, and in order to lower and raise or open and close the slats we provide a transverse slat e' , arranged centrally of each frame and adapted when turned down to the position indicated in Fig. 8 to permit 45 the slats H to open sufficiently to give a maximum feed of sand. The slats e' are each provided with a crank-handle h , projecting through the slide of the casing and by which they may be turned to raise or lower the slats 50 H, as will be readily understood.

With a view to supplying heated air to the sand to carry off the moisture therefrom through the separator-passages before mentioned, we preferably arrange heating-coils 55 b^2 in longitudinal passages F in the bottom of the casing, such passages, if desired, being formed of inclined sides K, constituting the bottom of the sand-receptacle. Openings f , adapted to be closed by dampers f' , are formed 60 in the end wall of the casing leading into the passages F at one end, and at the opposite end said passages open out into the space beneath the heating-pipes b , as shown in Fig. 12, whereby air traveling through the pas- 65 sages F is heated and dried, and passes thence through the sand as it drops through the system of heating-pipes and into the separator-

passages, from whence it is carried off, as before described.

In order to remove any excess of air and to 70 effect a more complete drying of the sand, pipes E^2 open into the casing at D^2 beneath the system of heating-pipes and grates and communicate with the stack. These pipes are 75 at the opposite end from that through which the air enters the sand-receptacle, and as a consequence a relatively large volume of air is caused to traverse the sand as it falls away from the system of heating-pipes, removing 80 the last vestige of moisture therefrom.

For removing the sand from the receptacle we preferably arrange a screw conveyer in the bottom portion thereof, although it will be understood that any means may be pro- 85 vided for this end, or the sand may be simply allowed to fall from the receptacle into the mixers or other appliances for handling the sand in its future treatment.

To further insure against any possible lodg- 90 ing or clogging of the sand, we preferably provide a system of knockers L, Fig. 1, mounted on a longitudinal shaft G and adapted when said shaft is oscillated to strike the under side of the grate or the slats e' and impart a sufficient shock thereto to dislodge any ac- 95 cumulation of sand. The shaft G extends through the end wall of the casing, as shown in Fig. 12, and is provided with an arm and spring g , adapted to be struck by projections g' on a wheel G^2 , rotated by a belt or other 100 gearing from a pulley J^2 on the conveyer-shaft, or it may be driven from any other suitable source of power.

Having thus described our invention, what we claim as new is— 105

1. A sand-drier comprising a receptacle for the sand having entrance and discharge openings at the top and bottom respectively, a system of heating-pipes arranged in said receptacle and constituting irregular passages 110 through which the sand passes to the discharge-openings, and grates having movable slats arranged immediately beneath the heating-pipes for regulating the discharge of sand and the length of time the sand shall be held 115 in contact with said pipes; substantially as described.

2. A sand-drier comprising a receptacle having entrance and discharge openings at top and bottom, an interposed system of heating- 120 pipes and ventilators interposed in said pipes for the purpose of drawing the moisture from the sand passing between the pipes and an adjustable grate located immediately beneath the pipes and above the discharge-opening 125 for regulating the discharge of sand and the length of time the sand shall be held in contact with the pipes; substantially as described.

3. A sand-drier comprising a receptacle for 130 the sand having entrance and discharge openings at top and bottom, an intermediate system of heating-pipes with ventilators for withdrawing the moisture vaporized from said pipes,

hot-air flues or passages arranged at the bottom of the receptacle to heat the sand which has already passed through between the heating-pipes and communicating with the receptacle at a higher point to supply heated air to the body of sand for carrying off the vaporized moisture; substantially as described.

4. A sand-drier comprising a receptacle having a discharge-opening at the bottom and an interposed system of heating-pipes between which the sand passes, and ventilators formed by inverted-V shape sand-separators, said separators being arranged at different levels and with those at the lower level opposite the spaces between the higher separators, and having transverse V-shaped branches

and ventilator-pipes communicating with the spaces beneath the separators; substantially as described.

5. A sand-drier comprising a receptacle, an interposed system of heating-pipes between which the sand passes and a grate for regulating the passage of sand through said pipes formed of slats hinged at one edge and a transverse slat adapted to close or open the same; substantially as described.

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