

No. 785,544.

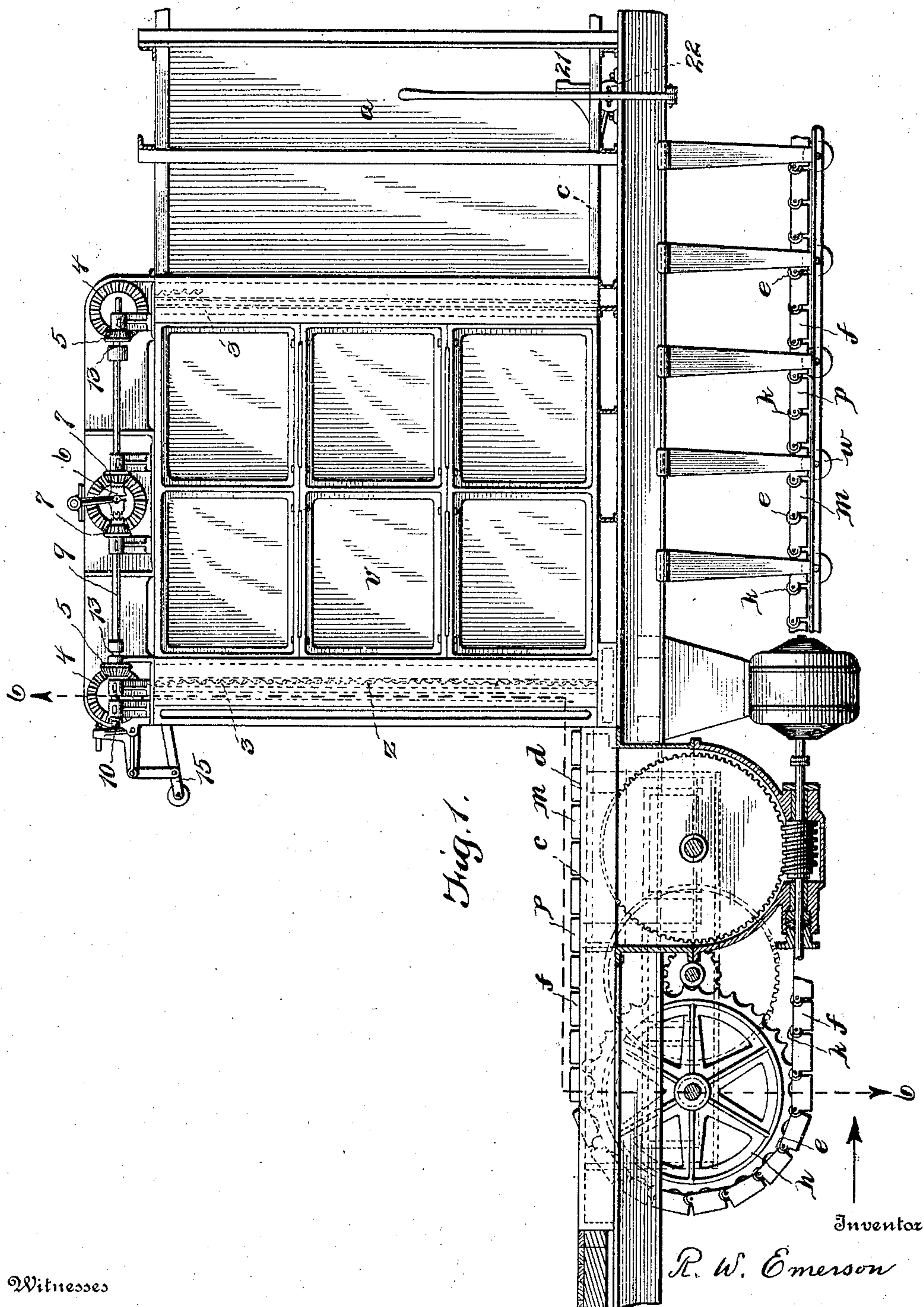
PATENTED MAR. 21, 1905.

R. W. EMERSON.

## HEATING AND EVAPORATING APPARATUS.

APPLICATION FILED JAN. 26, 1904.

8 SHEETS—SHEET 1.



Witnesses

R. A. Boswell.  
A. G. Leane

၁၆၂

E. W. Anderson

his

Attorney

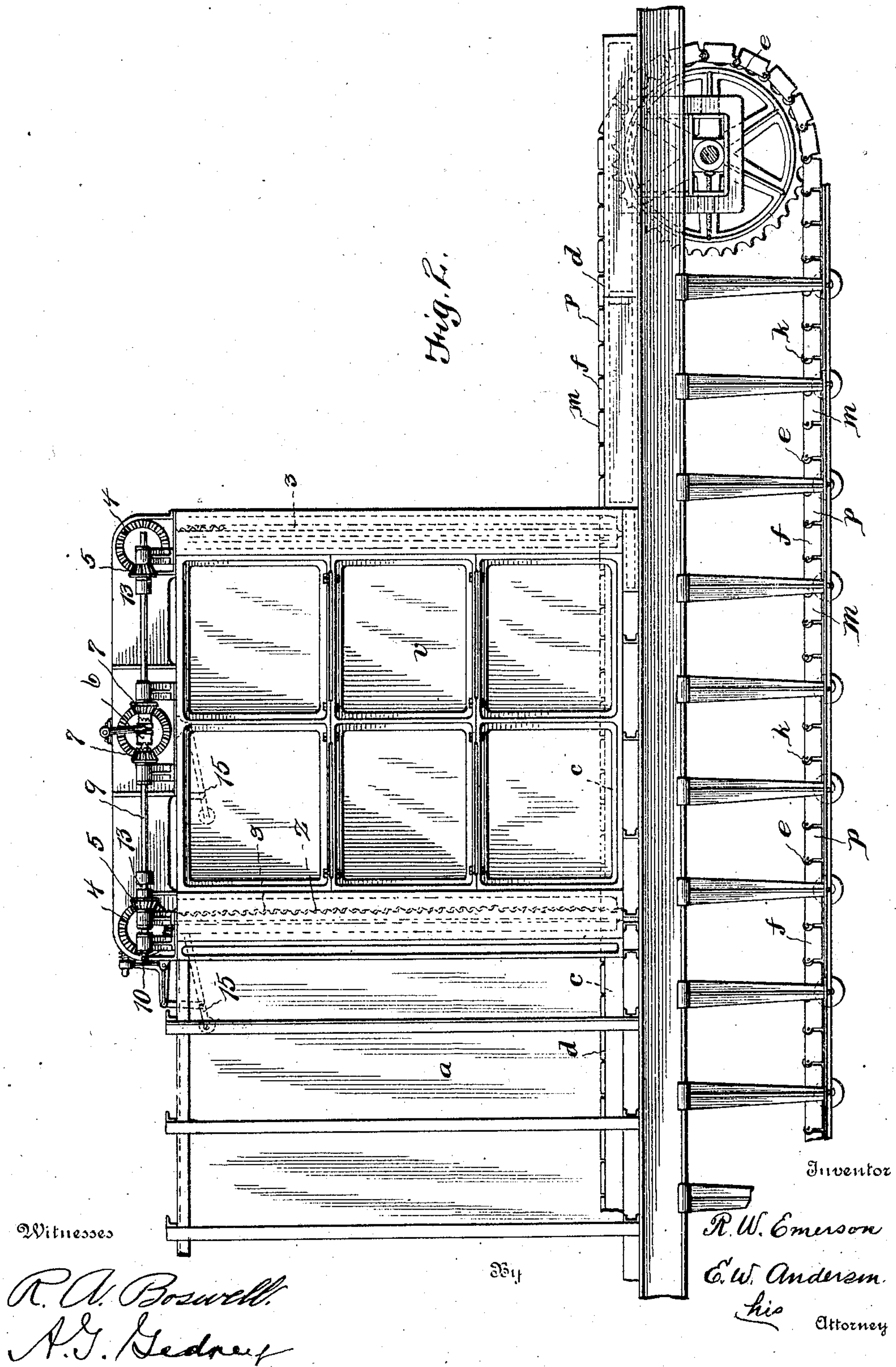
No. 785,544.

PATENTED MAR. 21, 1905.

R. W. EMERSON.  
HEATING AND EVAPORATING APPARATUS.

APPLICATION FILED JAN. 26, 1904.

8 SHEETS—SHEET 2.





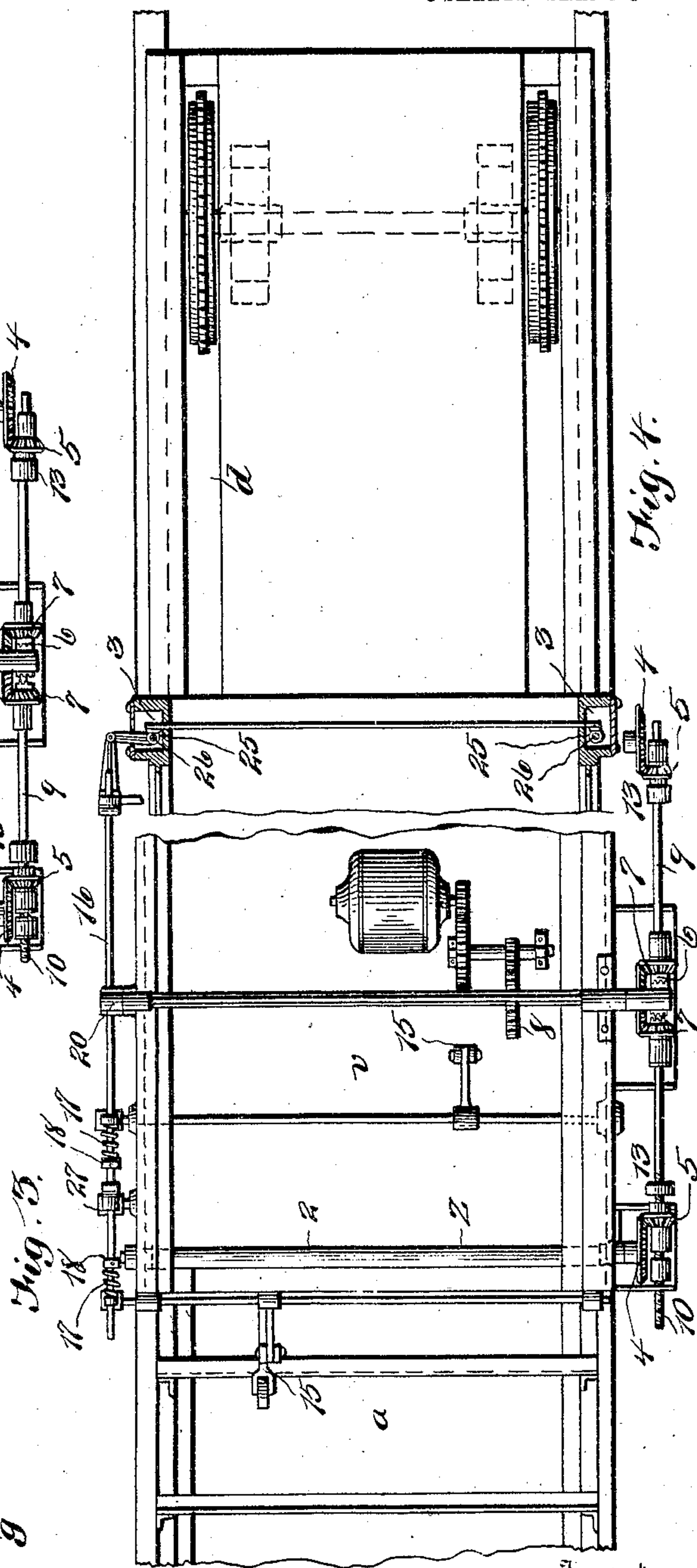
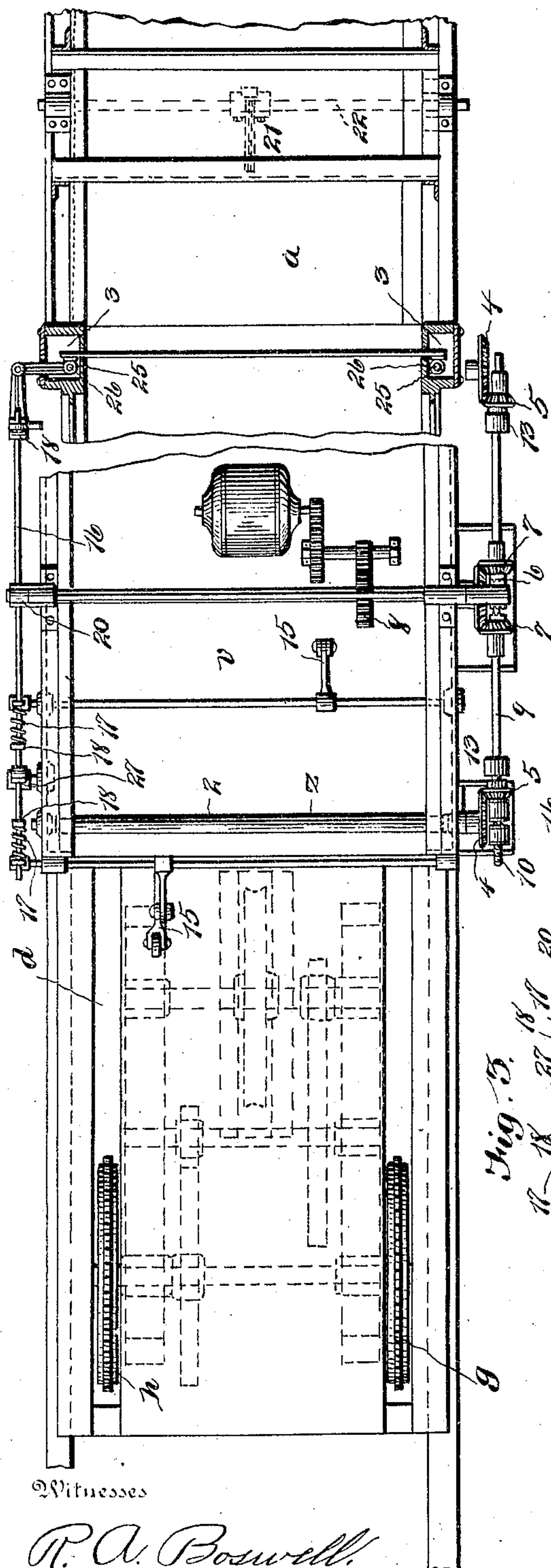
No. 785,544.

PATENTED MAR. 21, 1905.

R. W. EMERSON.  
HEATING AND EVAPORATING APPARATUS.

APPLICATION FILED JAN. 26, 1904.

8 SHEETS—SHEET 3.



Witnesses

R. A. Boswell.  
A. J. Gedney

Inventor

Ralph W. Emerson

By

E. W. Anderson  
his

Attorney

No. 785,544.

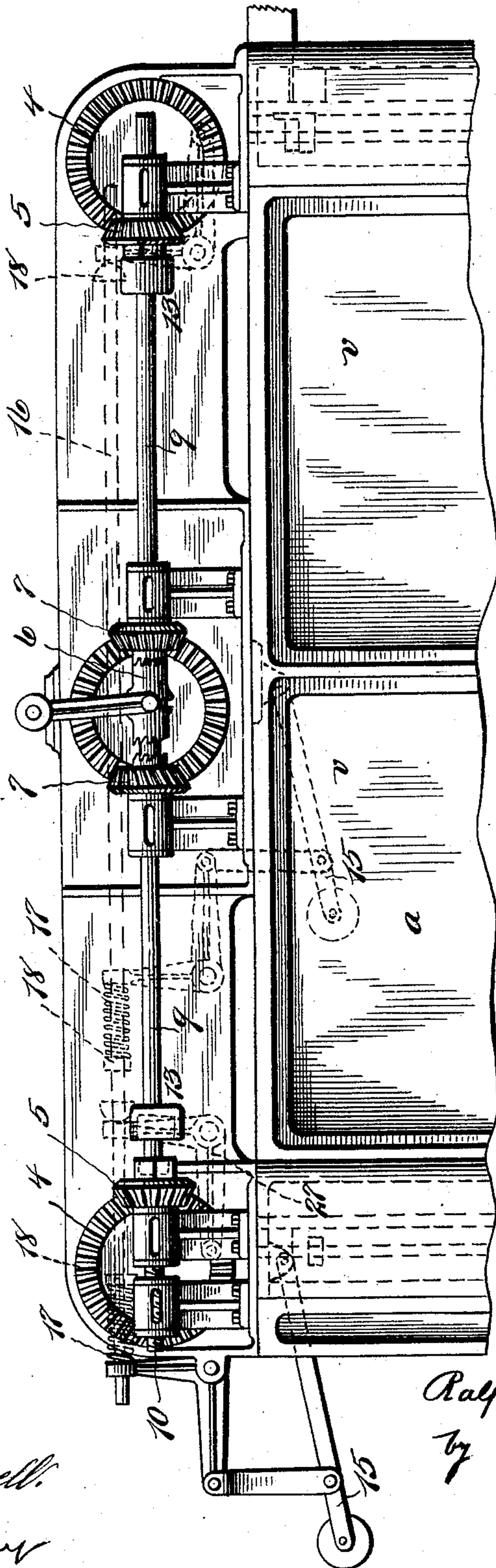
PATENTED MAR. 21, 1905.

R. W. EMERSON.  
HEATING AND EVAPORATING APPARATUS.

APPLICATION FILED JAN. 26, 1904.

8 SHEETS—SHEET 4.

Fig. 5.



Witnesses

R. A. Boswell.  
A. J. Geaney

Inventor

Ralph W. Emerson

by E. W. Anderson

his Attorney



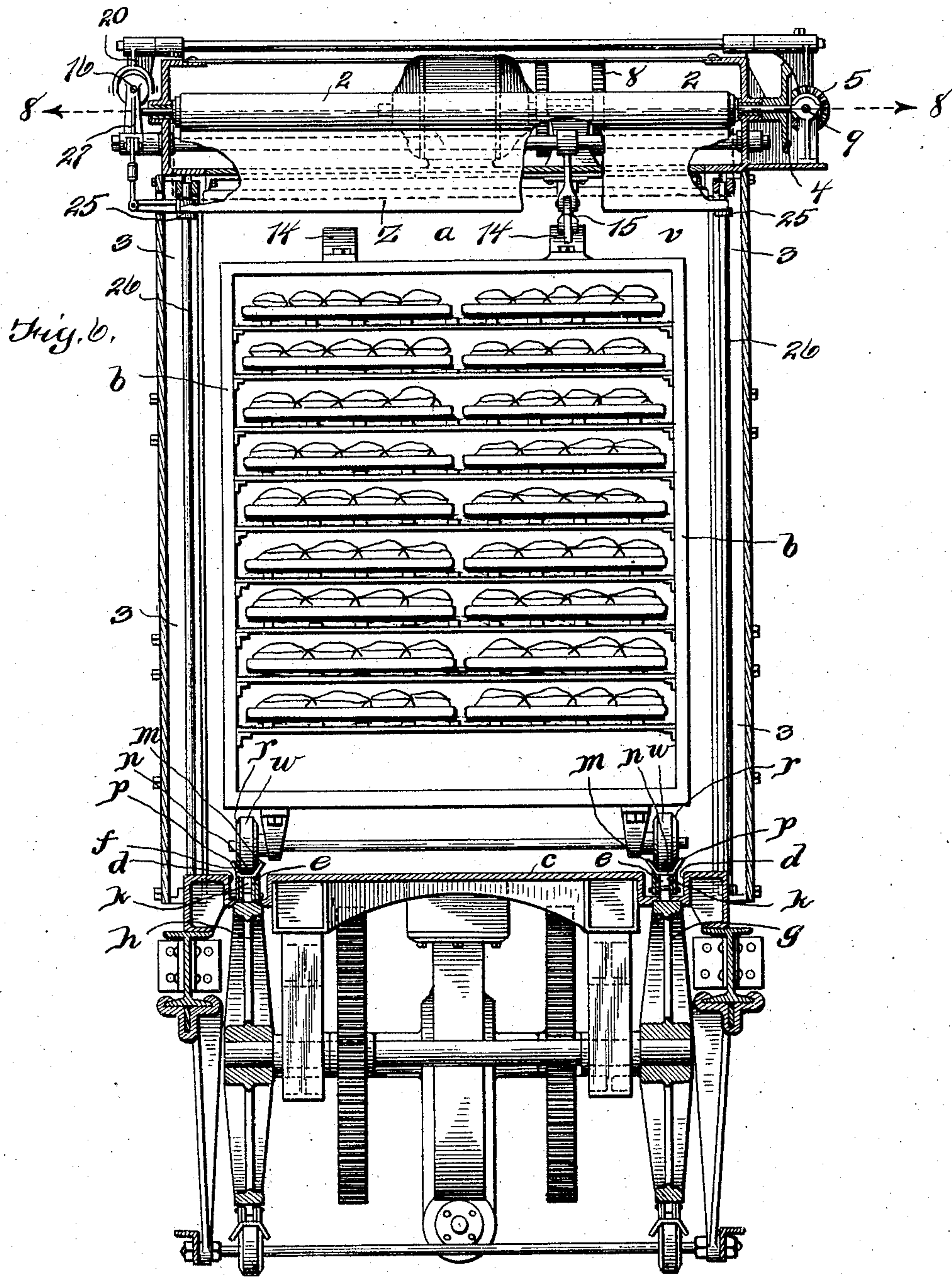
No. 785,544.

PATENTED MAR. 21, 1905.

R. W. EMERSON.  
HEATING AND EVAPORATING APPARATUS.

APPLICATION FILED JAN. 26, 1904.

8 SHEETS—SHEET 5.



Inventor

Ralph W. Emerson

Witnesses

R. A. Bowell.  
A. G. Sedney.

By

E. W. Anderson

Attorney

No. 785,544.

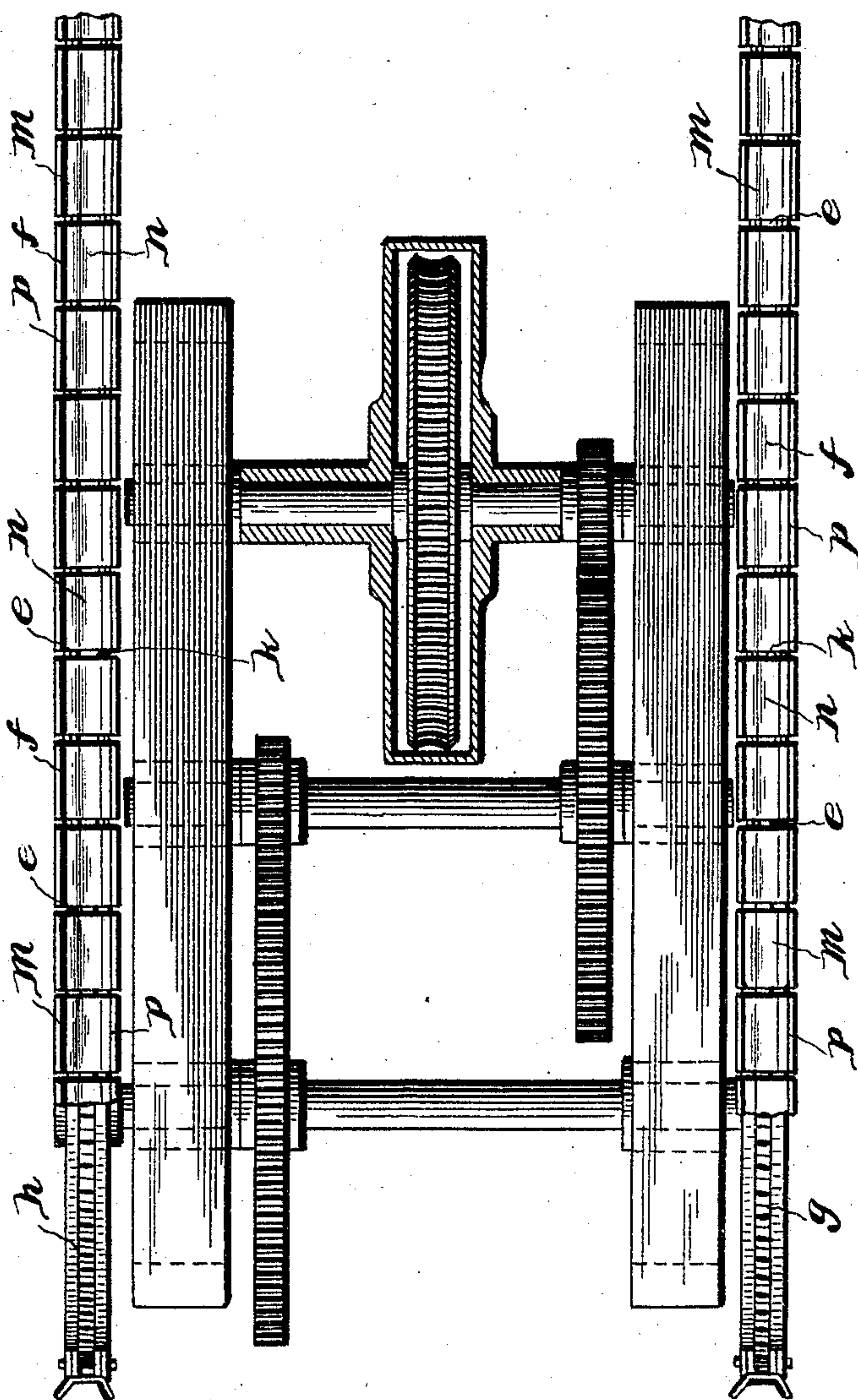
PATENTED MAR. 21, 1905.

R. W. EMERSON.  
HEATING AND EVAPORATING APPARATUS.

APPLICATION FILED JAN. 26, 1904.

8 SHEETS—SHEET 6.

Fig. 7.



Witnesses

R. A. Boswell.  
A. G. Sedney

Inventor

Ralph W. Emerson

By

E. W. Anderson

His Attorney



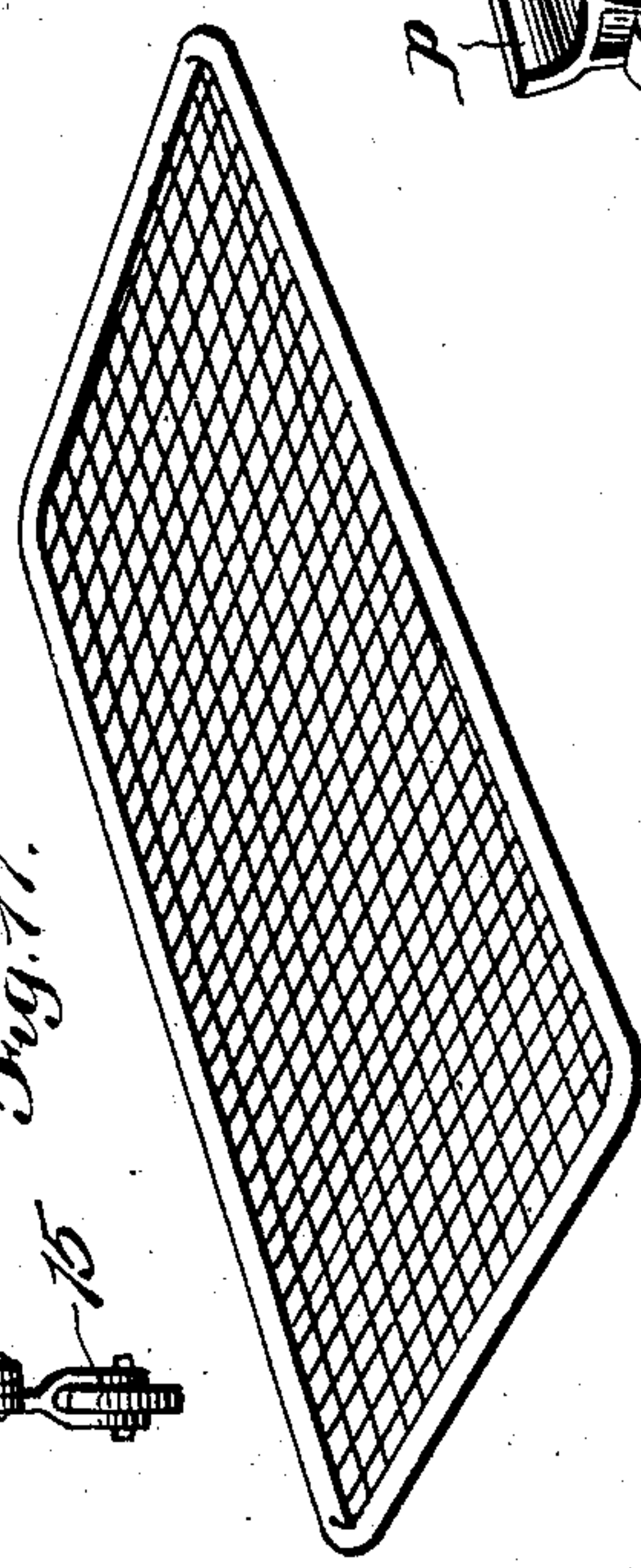
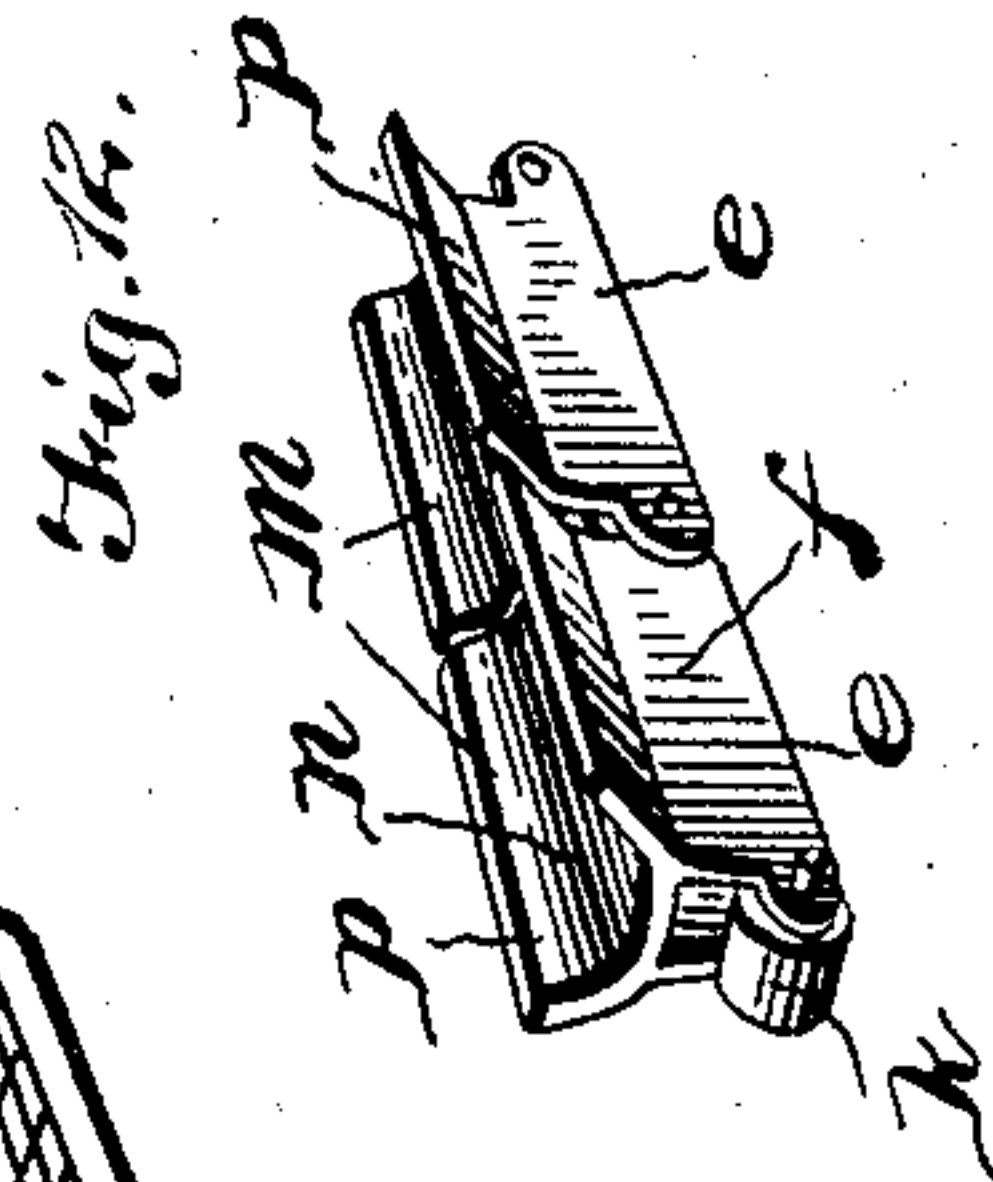
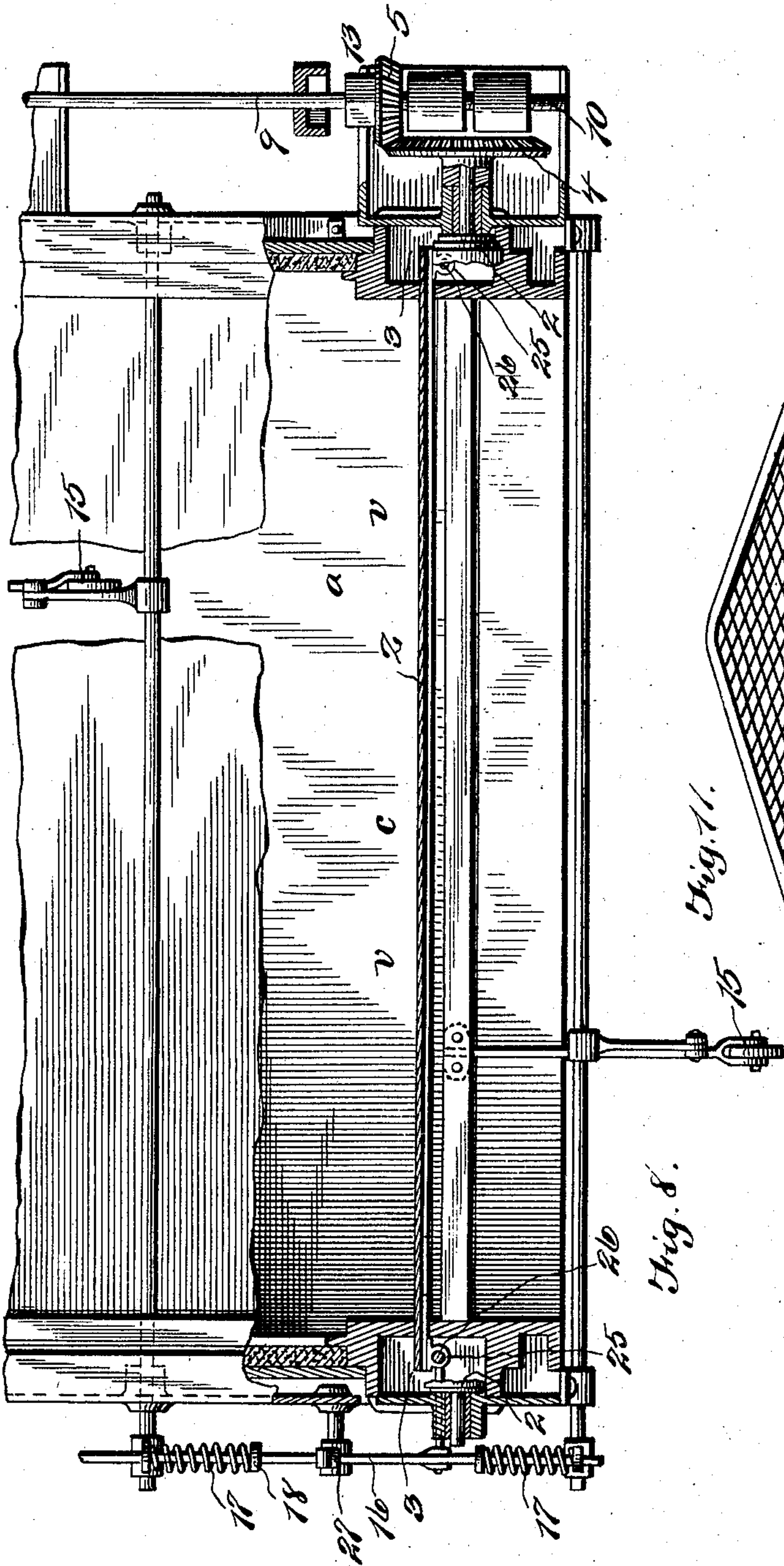
No. 785,544.

PATENTED MAR. 21, 1905.

R. W. EMERSON.  
HEATING AND EVAPORATING APPARATUS.

APPLICATION FILED JAN. 26, 1904.

8 SHEETS—SHEET 7.



Witnesses

R. A. Boswell  
A. J. Geaney

By

Inventor  
Ralph W. Emerson,

E. W. Anderson  
his Attorney

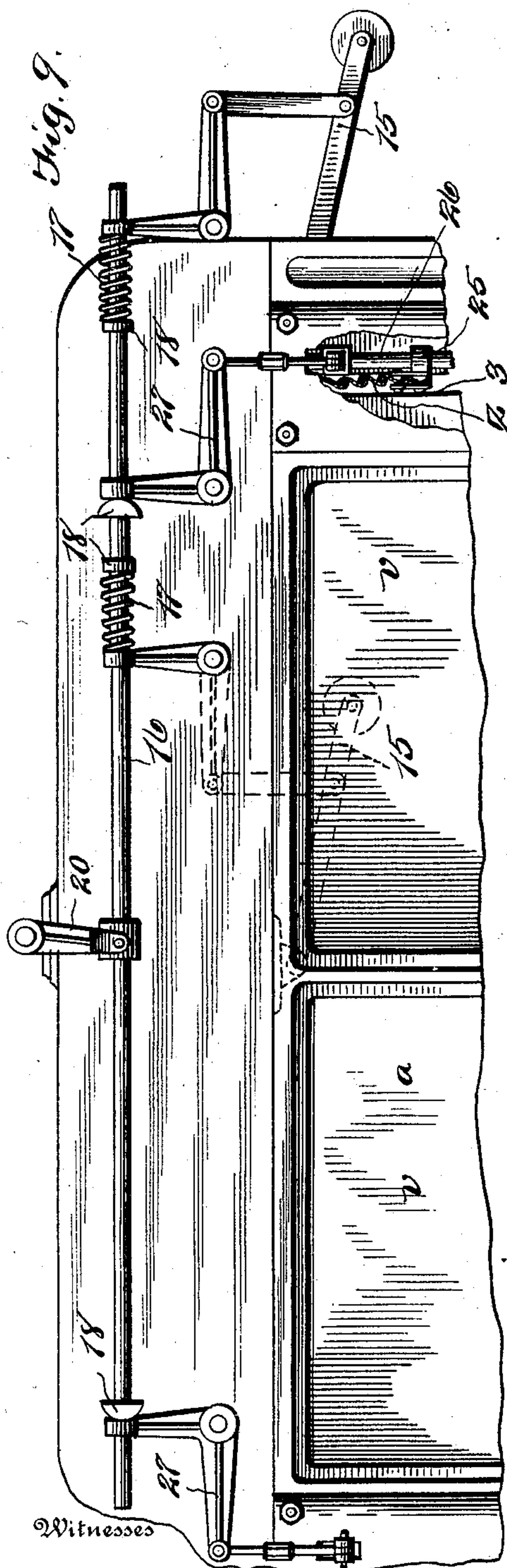
No. 785,544.

PATENTED MAR. 21, 1905.

R. W. EMERSON.  
HEATING AND EVAPORATING APPARATUS.

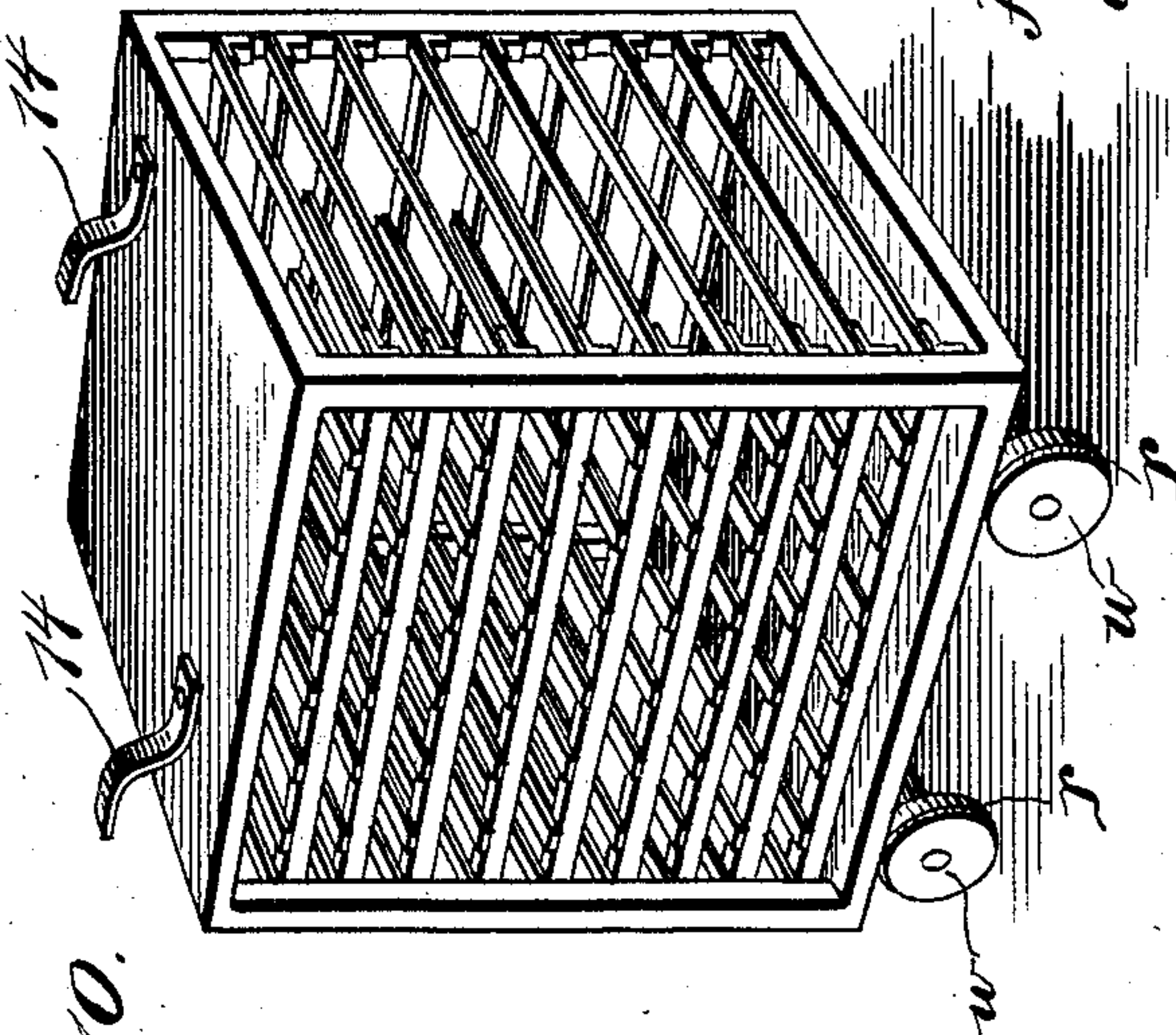
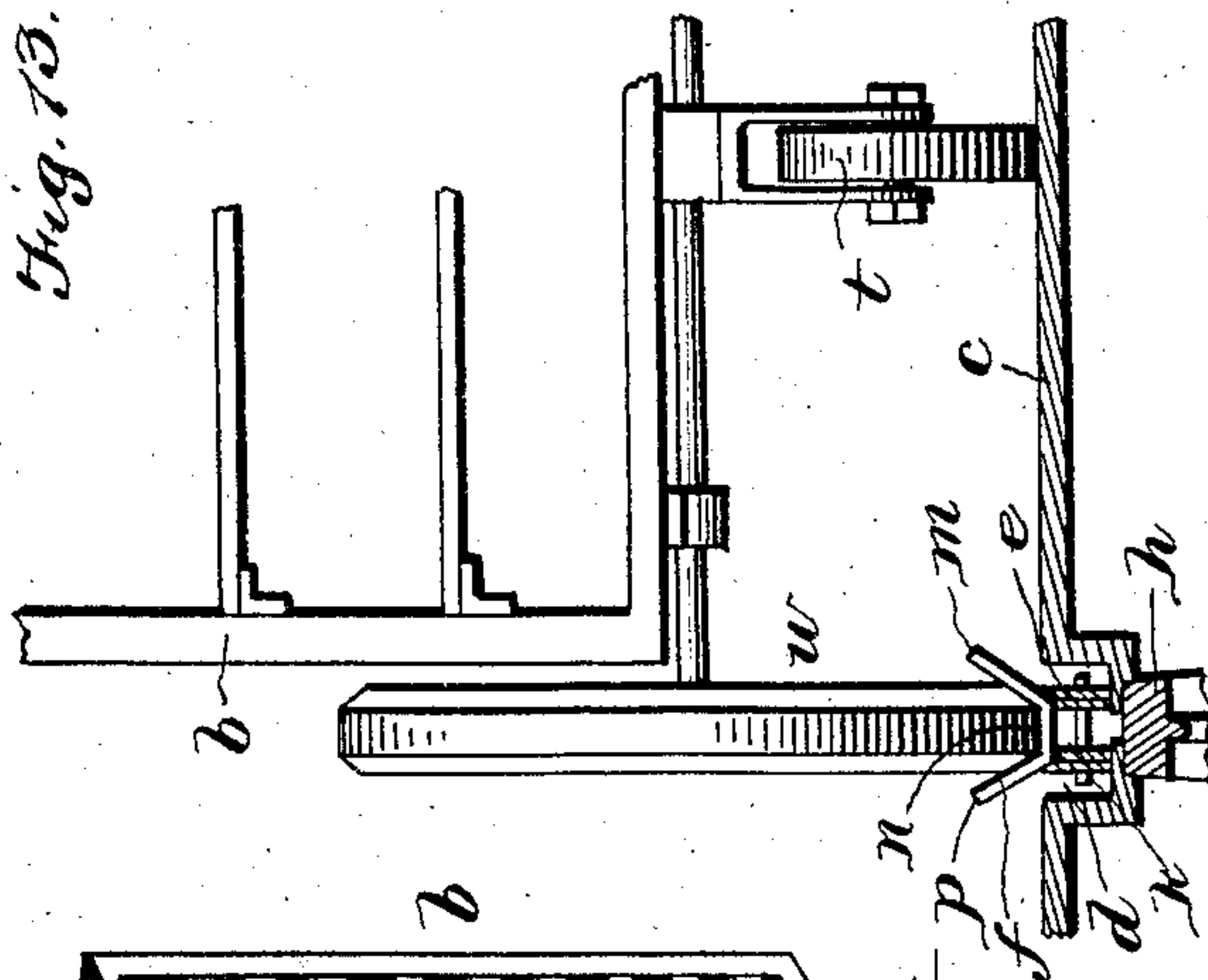
APPLICATION FILED JAN. 26, 1904.

8 SHEETS—SHEET 8.



Witnesses

R. A. Boswell.  
A. G. Geaney



Inventor

Ralph W. Emerson,

By *E. W. Anderson.*  
his Attorney



# UNITED STATES PATENT OFFICE.

RALPH W. EMERSON, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO THE  
NATURAL FOOD COMPANY, OF NIAGARA FALLS, NEW YORK.

## HEATING AND EVAPORATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 785,544, dated March 21, 1905.

Application filed January 26, 1904. Serial No. 190,757.

*To all whom it may concern:*

Be it known that I, RALPH W. EMERSON, a citizen of the United States, and a resident of Niagara Falls, in the county of Niagara and State of New York, have made a certain new and useful Invention in Heating and Evaporating Apparatus; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side view of one end of the oven. Fig. 2 is a side view of the other end. Fig. 3 is a plan view of the end shown in Fig. 1. Fig. 4 is a plan view of the end shown in Fig. 2. Fig. 5 is a side view of the upper part of vestibule. Fig. 6 is a section on line 6 6, Fig. 1. Fig. 7 is a plan view of gearing. Fig. 8 is a section on line 8 8, Fig. 6. Fig. 9 is a side view of the upper part of vestibule opposite to that shown in Fig. 5. Fig. 10 is a perspective view of the carrier. Figs. 11, 12, and 13 are detail views.

The object of the invention is to facilitate the application of heat to articles in large quantities, and it is designed for use chiefly in evaporating operations upon articles of food.

In the accompanying drawings, illustrating the invention, the letter *a* designates the long evaporating chamber or oven, and *b* the cage or carrier, which is designed to pass through said oven from end to end in a slow and regular manner. To serve purposes of economy in floor-space and in heat, the carrier occupies very much of the cross-sectional area of the oven, and the entrance and exit ends of the latter are vestibuled and protected by shifting gates in order to avoid undue loss of heat at the time of admission of a carrier or of its exit.

The oven or evaporating-chamber *a* is of elongated form, having its lateral walls and top made with double sheathing and either hollow or packed with suitable non-conducting material. The bottom *c* of the oven is

provided with trackways *d*, which are usually slightly depressed to receive the rolling links *e* of the operating chain-tracks *f*, which move longitudinally in the trackways from a point in front of the entrance end of the oven to a point beyond the exit end of the same. These operating chain-tracks are of endless character and are carried by sprocket-wheels *g* and *h*, which are connected in pairs by suitable shafting. The shaft of the sprocket-wheels *g* is geared to a motor-shaft or other power device in such a manner as to provide a powerful but slow movement of the chains along the trackways in the floor of the oven. The chain is composed of track-links *e*, each of which is provided with a roller *k*, the bearing of which connects it with the next link, and each link is made in its upper portion *m* in channel form, its lateral flanges *p* being, however, divergent from each other from the bottom *n* between said flanges in order to adapt it to receive the tapered or wedge form peripheral portion *r* of the lateral supporting-wheel *w* of the carrier *b*. The carrier may be provided with caster-wheels *t*, fore and aft, which are of smaller size than the lateral wheels and are designed to run on the floor of the oven. The flare of the track-links of the chain is designed not only to facilitate the reception of the lateral wheels of the carrier, but also to effect a slight frictional engagement tending to hold the carrier in position on the chains as they move through the oven.

At each end of the oven a vestibule *v* is provided by means of metallic roller curtains or gates *z*. This vestibule is large enough to hold a carrier, and the curtains or falling gates are so arranged in connection with appropriate mechanism that when one curtain of a vestibule is in raised position or open the other curtain thereof will be closed, whereby the undue escape of the heated air in the oven is prevented. To this end each curtain of a vestibule is provided with a roller *2* at its upper end, to which it is attached and whereby it is raised when the roller is turned in one direction and lowered or pushed down by the roller when turned in the opposite direction, the edges of each curtain moving in ways 3 of



the lateral walls of the oven to insure a closure which will prevent the undue escape of the heated air by its lateral edges. Each curtain-roller is provided with a bevel-wheel 4 in engagement with a driving-pinion 5, which is loose on the drive-shaft 9, which extends along the top of the vestibule and is provided in its middle portion with a reversing-clutch 6, adapted to engage the reversing-pinions 7, which are loose on the shaft and in engagement with the motor-wheel or drive-wheel 8. The reversing-clutch 6 has a sliding engagement with the drive-shaft 9. This shaft is provided with a thread 10 at its end to engage a reversing-nut 12, which is secured in seat of the framing. When this shaft is turned by means of the motor, clutch, and gearing in one direction, it will have a slow movement of reciprocation, serving to engage the pinion-driving clutch 13 at one end of the shaft with the driving-pinion 5 at this end just after disengagement has been effected between the driving-clutch 13 and pinion 5 at the opposite end. Movement of the shaft in the opposite direction by means of the reversing-clutch will reverse the engagement and disengagement, the driving-clutch 13 leaving the driving-pinion 5 at one end of the shaft a little before the driving-clutch 13 at the other end of the shaft engages its driving-pinion. When the driving-clutch disengages from the driving-pinion, the action on the curtain ceases.

The curtain-operating mechanism is put in action automatically as required by the carriers, each carrier being provided with trip projections 14, designed to engage lever devices 15 in connection with a sliding reversing-bar 16, which is provided with buffer or take-up springs 17 and engagement-collars 18. These springs are also designed to keep the reversing-bar in intermediate position when it is not being operated by the carriers.

To the slide-bar 16 is connected the reversing-arm 20, which is pivoted to the framing and engages the reversing-clutch 6.

In order to control the carriers within the oven and prevent them from being too rapidly discharged at the exit end, a stop device is provided within the oven and a little in front of the inner gate or curtain of the exit-vestibule. By means of this device the carriers can be massed within the oven between the vestibules, thereby curtailing the length of oven-space required and economizing in regard to heat. The stop device consists of the knees or stops 21, which are connected to a transverse reciprocating bar 22, adapted to be operated by a lever 23 in such wise as to move the stops sidewise to engage buffers 24 of the carriers or to release the same, allowing the carriers to move forward under the action of the moving chain-tracks.

The curtain-operating mechanism is caused to cease action automatically by means of trips in connection with the curtains and their

guide-rods 26. When one of the curtains is raised by the rotation of its roller, it is designed toward the end of its movement by means of its trip to engage and operate a bell-crank lever 27, which by its engagement with a collar of the reversing-bar moves the latter back, disengaging the reversing-clutch from the reversing-pinion.

The oven may be heated in any desirable manner. The charged carriers are moved up in front of the entrance-vestibule, where their supporting-wheels are run on to the operating chain-tracks, which being constantly in motion cause the carriers to move through the oven. As each carrier approaches the entrance-vestibule it finds the outer gate or curtain open and the inner one closed. Being carried within the vestibule, it operates the first system of levers to first lower the outer curtain of this vestibule and then raise the inner curtain thereof, the latter operation being effected in time to admit the carrier into the oven-chamber or heated compartment between the vestibules. After the carrier has passed out of the entrance-vestibule into the heated compartment it engages the second system of levers, reversing the action of the clutch mechanism, so as to lower the inside curtain and then raise the outer curtain of this vestibule in readiness for the next carrier. The carriers are borne by the operating chain-tracks slowly along the oven to the exit-vestibule and through the latter without stoppage, provided there be no necessity for massing them. Usually, however, it is necessary to crowd them together to save room and heat, and the stop device is employed to hold the line of carriers back until the heating action upon their contents is concluded. Although these stopped carriers rest on the links of the operating chain-tracks, the latter continue in motion, so that they are ready at any moment when the carrier in engagement with the stop is released therefrom to move the carrier through the exit-vestibule and out of the oven. In the exit-vestibule the inner curtain is normally raised or open, the outer one being closed. When the carrier is moved within this vestibule, it operates devices similar to those described in connection with the entrance-vestibule to close the inner curtain and then open the outer one. So, also, after the carrier has moved out of this vestibule it operates, through its trip-lever device and the reversing mechanism, to close the outer curtain and raise the inner one, the latter action automatically disengaging the reversing-clutch and stopping the curtain in raised position.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. The long oven-closure provided at each end with a vestibule having at each end a vertically-shifting gate and carrier-operative



means for raising and lowering the same, substantially as specified.

2. The long oven-closure provided at each end with a vestibule, and having endless moving chain-tracks extending through the oven, the vestibules, and beyond the latter, substantially as specified.

3. The combination with the long oven-closure, and its endless moving trackways, of the shifting gates, the carrier, and automatic devices for operating the gates, substantially as specified.

4. The combination with the long oven-closure and the trackways in its floor, of the parallel endless chains of channeled links forming a continuous channel-trackway, substantially as specified.

5. The combination with a long oven-closure, and its end gates, of endless moving chain-tracks, the trackways in the floor of said closure, the rolling carriers, and a carrier-stop device, substantially as specified.

6. The combination with the oven-floor, and the sprockets below the floor, of the depressed trackways in the floor and the parallel endless chains of track-links having upward and outward lateral flanges forming a continuous moving channeled trackway, substantially as specified.

7. The combination with the oven-closure, and the end curtain-gates, of the rollers there-

of, third-bevel wheels, the reciprocating drive-shaft, the loose clutch-pinions thereon, the reversing-clutch, the reversing-pinions of said clutch, the drive-wheel, the driving-clutch, the reversing-nuts, the sliding reversing-bar engaging the reversing-clutch, and its springs, substantially as specified.

8. The combination with the oven-closure, its vestibules and trackway, and the carrier, of the traveling chain-tracks, the front and rear curtain-gates of each vestibule, and means for automatically opening and closing said gates, substantially as specified.

9. The combination with a long oven-closure, its trackways, and end vestibules, of the front and rear gates of each vestibule, the carrier, the operating-gear of each gate, and the reversing-clutch devices, substantially as specified.

10. The combination with a long oven-closure, its endless channel link trackway, the end gates, their operating-gearing and reversing devices, the trip-carrier, and means for moving the link trackway, substantially as specified.

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

RALPH W. EMERSON.

Witnesses:

HECTOR W. MACBEAN,  
ALEXANDER J. PORTER.