

(No Model.)

C. H. HERSEY.

## STEAM DRIER.

No. 360,525.

Patented Apr. 5, 1887.

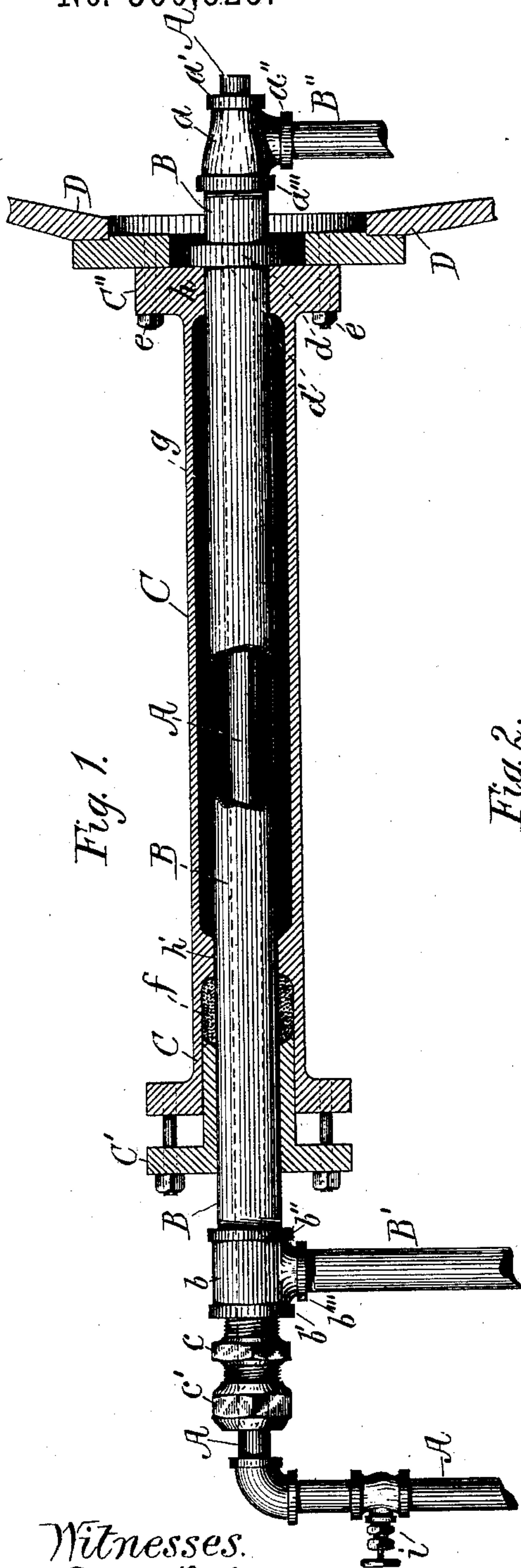


Fig. 1.

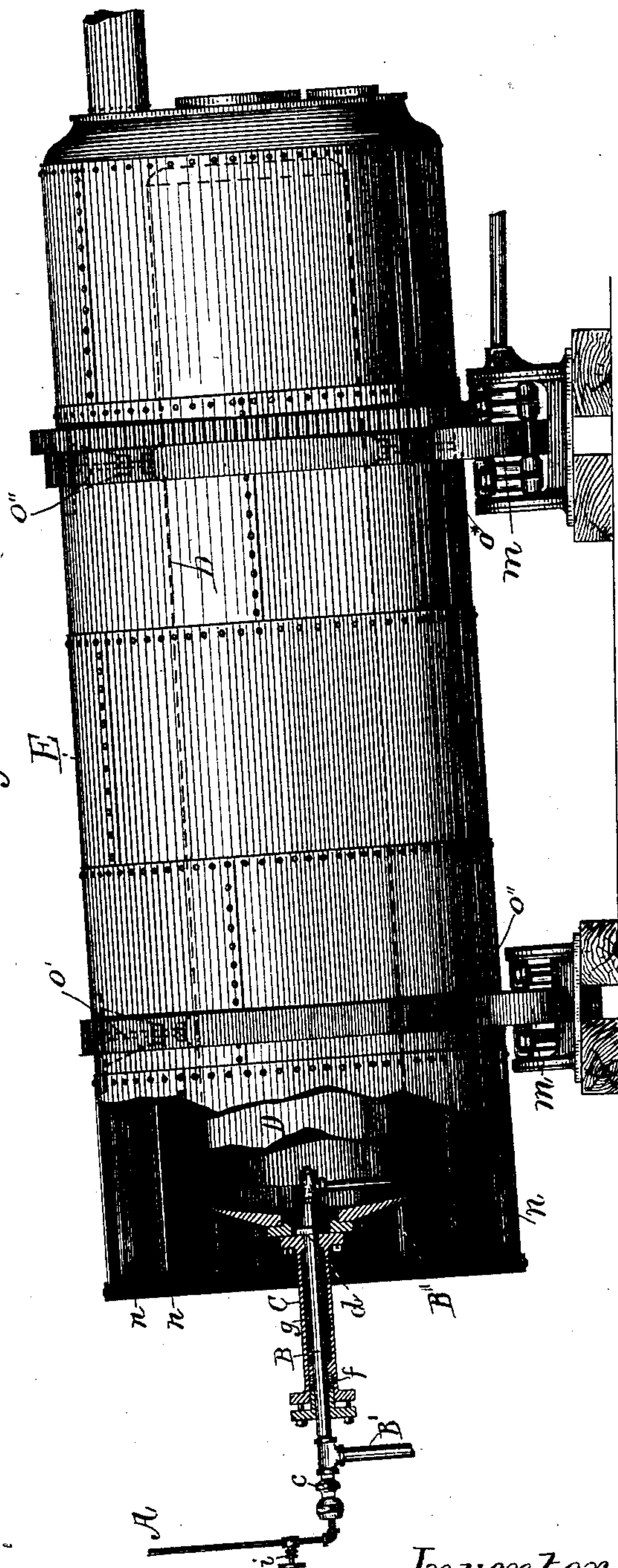


Fig. 2.

Witnesses.  
Francis C. Kusey,  
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Inventor.  
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by his Attorney  
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# UNITED STATES PATENT OFFICE.

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## STEAM-DRIER.

SPECIFICATION forming part of Letters Patent No. 360,525, dated April 5, 1887.

Application filed September 6, 1886. Serial No. 212,849. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES H. HERSEY, a citizen of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Combination Supply and Exhaust Pipes for Steam-Driers, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is to combine an inlet-pipe for the admission of superheated steam to the heater-cylinder of tubular rotary drying apparatus and an outlet-pipe for conducting exhaust or condensed steam therefrom with an outer case capable of rotation about said combined inlet and exhaust pipes, and in such relation to each other that the packing interposed between said rotary case and steam-pipes may not be destroyed by overheating from direct contact with the superheated steam-pipe, and that the steam contained in the heater-cylinder cannot back into said rotary case and come into contact with the said packing to destroy it; also, to make provision for the expansion and contraction taking place between the supply and exhaust pipes. The construction and details whereby this is accomplished will be fully understood by reference to the accompanying drawings, filed herewith, and forming part of this specification.

Similar letters refer to similar parts in the drawings.

Figure 1 represents a longitudinal view of my device, partially in section. Fig. 2 represents an application of the device to a rotary drier of a construction similar to that patented to me April 25, 1871, and numbered 114,137.

Referring to Fig. 1, A represents an inlet-pipe, held in position at one end by means of a T-coupling, *a*, having one of its angles, *a'*, of a dimension to fit tightly over the pipe A, while the two remaining angles, *a''* and *a'''*, connect, respectively, with a main exhaust-pipe, B, and its right-angle extension B'', said extension being of sufficient length to reach the bottom of the heater-cylinder, within which it is suspended. The other end is held in position by means of the T-coupling *b*, having a stuffing-box, *c*, fitted over the pipe A and connecting with the angle *b'*, the cap *c'* being

filled with suitable packing to make a close joint over the pipe A, the other two angles, *b''* and *b'''*, connecting, respectively, with the main exhaust-pipe B and the extension B', for conducting the exhaust to any suitable place of outlet. Thus the pipe B is secured axially upon pipe A in such a manner that provision is made for longitudinal play between the two pipes, and at the same time no escape of exhaust can take place when one pipe is secured to the other. C is a case surrounding the outlet-pipe B, having a flange, C'', by means of which it is secured to the head of the heater-cylinder D, the case being sufficiently large to leave a space, *g*, surrounding the pipe B. The inner portion of the flange C'' fits closely over the pipe B, making a running fit at *h*, and also a perfectly-fitted running joint at *d'* of the collar *d*, which is fastened to the pipe B. At the other end of the case C a running joint is made over the pipe B at *h'*. A perfectly-tight joint is then secured by means of the packing *f*, which is forced tightly around the pipe B by means of the cap C'. It will be seen that when the combined pipes A and B are held stationary, the case and cylinder are free to rotate about the pipes. It will also be seen that by this construction the steam contained in the cylinder is prevented from entering the space *g* by collar *d*, and the exhaust in pipe B acts as a protection to the packing *f* from the direct heat of the superheated steam in pipe A.

Referring to Fig. 2, a thorough understanding will be had of the application and novel features of my device. E represents a hollow cylinder or tube mounted in a somewhat inclined position upon friction-rollers *m m*, so as to be capable of rotation, and upon the inner side of which the material is to be received, and through which it is to pass to be dried. Centrally located within this is placed a heater-cylinder, D, held concentrically to the outer cylinder by spokes, so that both are free to rotate as one. To this heater-cylinder D is secured the case C, by means of bolts *e e*, the combined inlet and exhaust pipes being embraced within the case, as heretofore described in Fig. 1.

Steam being admitted through the pipe A, the heater-cylinder is thereby charged with



hot steam, causing the air circulating through the outer cylinder to be heated. The material to be dried is carried round by means of the buckets *n n*, and falls upon the heater-cylinder D. The water of condensation, which settles to the bottom of the cylinder, is expelled by the pressure of steam through the pipe B.

It will be fully understood by the above description that the superheated steam cannot back into the space *g* surrounding the pipe B, to come in contact with the packing *f*; neither can the superheated steam-pipe come in contact with the packing, it being prevented from so doing by the space surrounding the pipe A and the condensed steam contained therein.

It will be further understood that the difference in heat between the supply and exhaust pipe, causing a difference on contraction and expansion between them, is provided for in the stuffing-box *e*, which allows longitudinal freedom of the pipes one from the other.

It is the construction and novel organization of the pipes by which these conditions are brought about that constitute my invention.

I do not confine myself in the application of my invention to any particular form or construction of rotary steam-drying apparatus, as the same may be applied to various forms.

I am aware that prior to my invention combined inlet and outlet steam-passages for driers have been used. I do not therefore claim, broadly, a device for this purpose; but

What I do claim, and desire to secure by Letters Patent, is—

1. In a combined supply and exhaust pipe for rotary steam-driers, the combination, with a supply-pipe provided with a controlling-valve, of an exhaust-pipe surrounding and secured axially thereon, having a right-angle extension and a collar at one end and a right-angle extension and stuffing-box at the other, and a casing capable of rotation about said supply and exhaust pipes, provided with means for connecting with cylinder-head at one end and a packed joint at the other, substantially as and for the purpose herein set forth.

2. The combination, with a supply-pipe, A, of an exhaust-pipe, B, secured axially thereon, forming an annular space between it and the supply-pipe, and a collar, *d*, secured thereto, whereby a closely-fitted running joint is secured with case C, capable of rotation about said combined supply and exhaust pipe, in the manner and for the purpose herein set forth.

3. The combination, with a supply-pipe, A, of an exhaust-pipe, B, secured axially thereon, forming an annular space between it and the supply-pipe, and a stuffing-box, *e*, whereby a closely-fitted joint is secured with the pipe A, and capable of longitudinal movement upon said supply-pipe, and an outer case, C, secured axially thereon, having an annular space between it and said exhaust-pipe B, in the manner and for the purpose herein set forth.

4. The combination, with a supply-pipe, A, of an exhaust-pipe, B, secured axially thereon and having a right-angle extension, B', surrounded by casing C, capable of rotation about said combined supply and exhaust pipes, in the manner and for the purpose herein set forth.

5. The combination, with a supply-pipe, A, of an exhaust-pipe, B, secured axially thereon and having a right-angle extension, B'', surrounded by a casing, C, capable of rotation about said combined supply and exhaust pipes, in the manner and for the purpose herein set forth.

6. The combination, with a supply-pipe, A, having a controlling-valve, *i*, of an exhaust-pipe, B, secured axially thereon and having an annular space between it and the supply-pipe, and a casing, C, having an annular space, *g*, between it and the exhaust-pipe and provided with steam-tight running joints at its extremities, in the manner and for the purpose herein set forth.

7. The combination, with a rotary steam-drying apparatus, of a supply-pipe provided with a controlling-valve and an exhaust-pipe secured axially thereon, provided with a stuffing-box at one end, whereby longitudinal movement can take place between said supply and exhaust pipes, and an outer case having means of securing the same to said rotary drying apparatus, provided with closely-fitted running joints, substantially as and for the purpose herein set forth and described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 30th day of August, A. D. 1886.

CHARLES H. HERSEY.

Witnesses:

FRANER C. HERSEY,  
WM. J. SMITH.