

W. S. PLUMMER.

COMBINED HEATER AND BASE FOR DRIERS.

No. 261,035.

Patented July 11, 1882.

Fig. 1.

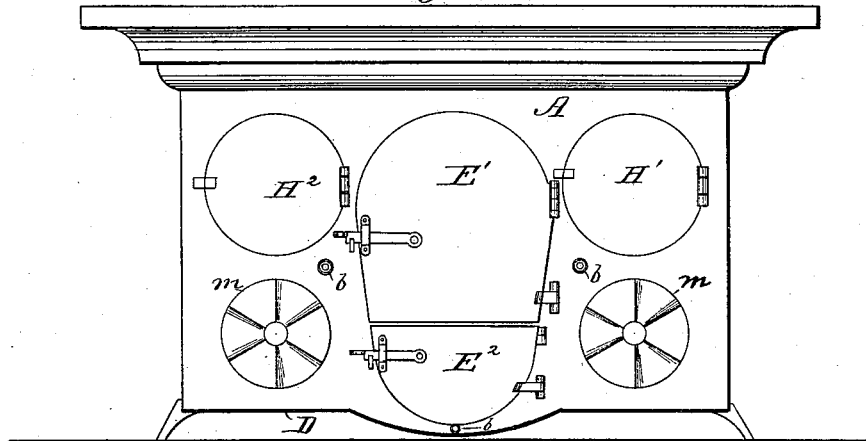


Fig. 3.

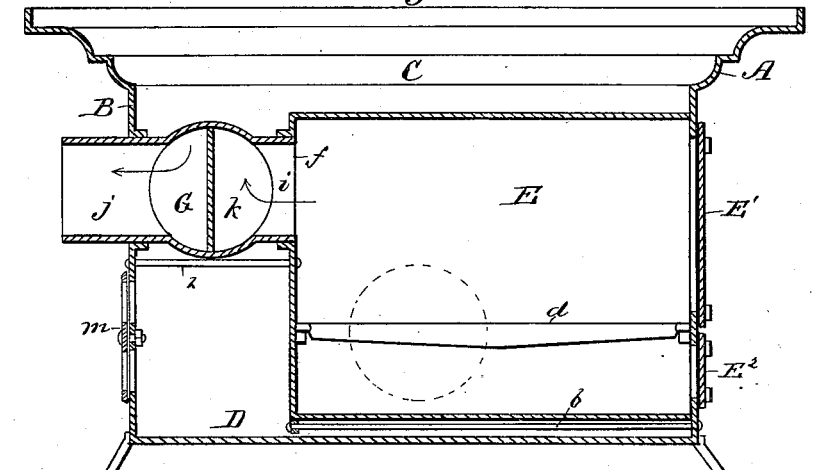
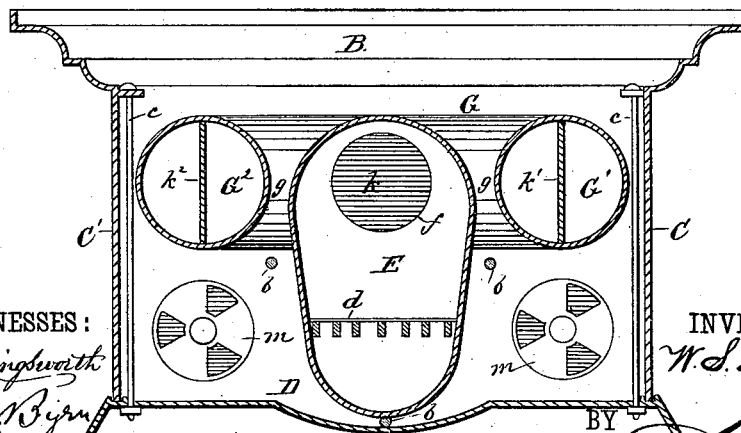


Fig. 4.



WITNESSES:

*W. W. Hollingsworth*  
*Edw. W. Bignall*

INVENTOR:

*W. S. Plummer*  
BY *Wm. L. Plummer*

ATTORNEYS.

(No Model.)

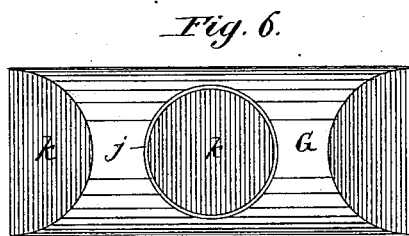
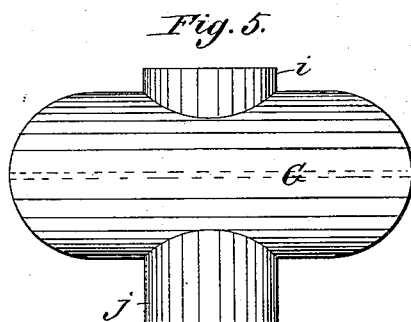
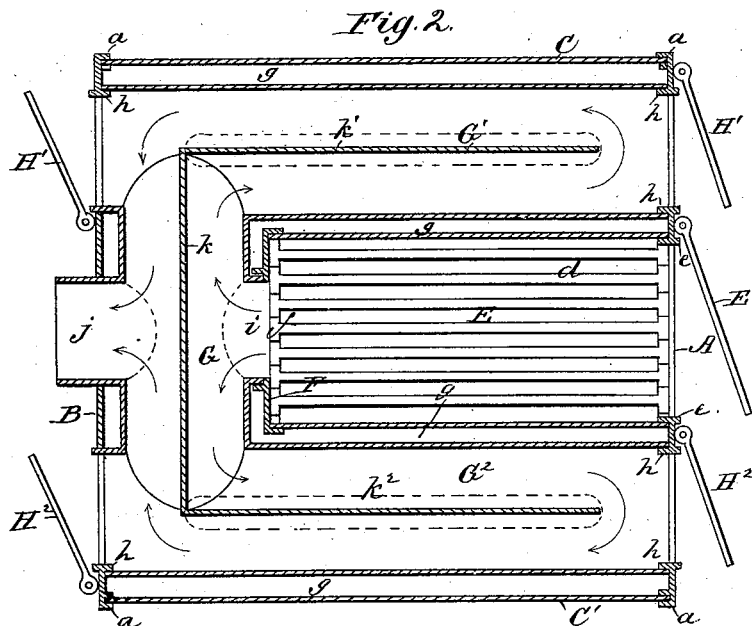
2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

WILLIAM S. PLUMMER, OF SAN JOSÉ, CALIFORNIA.

## COMBINED HEATER AND BASE FOR DRIERS.

SPECIFICATION forming part of Letters Patent No. 261,035, dated July 11, 1882.

Application filed April 12, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM S. PLUMMER, of San José, in the county of Santa Clara and State of California, have invented a new and Improved Combined Heater and Base for Driers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation. Fig. 2 is a horizontal section through Figs. 3 and 4; Fig. 3, a vertical longitudinal section through Figs. 2 and 4; Fig. 4, a vertical transverse section through Fig. 2; and Figs. 5 and 6 are top and side views in detail of the section G<sup>2</sup> of the cast pipe.

My invention is in the nature of a combined heater and base for use in connection with the drying-chamber of a fruit-evaporator; and it is designed to provide the greatest heating qualities in the most simple, compact, and easily-managed structure, as will be hereinafter fully described.

In the drawings, A represents the front wall, B the back wall, and C C' the two side walls, which together constitute the outer casing or shell of the heater and the base of the drying-chamber, which latter is not shown. These walls are preferably cast like stove-plates, and the end walls are provided with grooves or flanges *a*, into which the ends of the side walls are seated, and the parts held together by tie-rods *b*, running parallel with the side walls and holding the end walls tightly thereagainst. The upper edges of the side and end walls are flared outwardly to form a seat which supports the drying-chamber, while the lower edges of the said walls are seated in a groove in a bottom plate, D, which latter is fastened to the side and end walls and held up tightly thereagainst by vertical tie-rods *c*.

Occupying nearly a central position within the casing is the furnace-chamber E, which in vertical cross-section is of a somewhat pear shape, as shown in Fig. 4, and which is divided into two horizontal chambers by the grate-bars *d*, the upper one of which constitutes the fire-chamber, to which access is had through a door, E', and the lower one of which constitutes the ash-pit, to which access is had through

a door, E<sup>2</sup>. This furnace-chamber is made preferably of wrought-iron, and it is held in place by the tension of the tie-rods *b* between the flange or groove *e* of the front wall and the flange or groove of a back plate, F. This back plate has an opening, *f*, in it, through which the smoke and products of combustion escape from the furnace into the three-part U-shaped pipes G G' G<sup>2</sup>, which are put together at right angles to each other and nearly fill the U-shaped space existing between the upper portion of the furnace and the walls of the heater. These pipes, however, do not entirely fill said space, but leave open spaces *g*, through which the fresh pure air from below may rise and pass into the drying-chamber above. The parts G' G<sup>2</sup> of this three-part pipe are preferably made of wrought metal, and their ends are seated about the flanges *h*, or in grooves in the front and back walls, being held in place against said walls by the same tie-rods, *b*, that hold the front and back walls together. These two pipes or tubes G' G<sup>2</sup> open at both ends through corresponding holes in the end plates, and are provided with doors H' H<sup>2</sup>, which give access to the interior of said tubes for easily cleaning them from the accumulation of soot and ashes when necessary. Near the back ends of the pipes G' G<sup>2</sup> they have holes cut in their sides to connect with the intermediate cross-pipe, G, which latter is cast in one piece with its two thimbles or collars *i* and *j* and vertical partition *k*, as shown in detail in Figs. 5 and 6. The thimble *i* of the cross-pipe connects with the opening *f* in the back of the furnace-chamber, while the thimble *j* passes through an opening in the back wall and connects with the smoke-pipe of the heater. This cross-pipe G, it will be seen, by reason of its connection with pipes G' G<sup>2</sup> and its thimbles *i* and *j*, serves to hold up the back end of the furnace-chamber from the bottom plate, as shown in Figs. 2 and 3, without any other means being provided for this purpose. Connecting with the ends of partition *k* in the cross-pipe G are two longer partition-plates, *k'* *k''*, which run vertically and centrally down the pipes G' G<sup>2</sup>, to nearly the front ends of the same. Below the level of the pipes G G' G<sup>2</sup> dampers or registers *m* are formed in the front, back, and side walls, through which a regu-

lated quantity of fresh air is admitted to become heated.

Now, the doors all being closed, the operation of the heater is as follows: The fire being kindled in the furnace, the smoke and products of combustion pass out at the back end through the opening *f*, at which point they strike the partition *k* in the cross-pipe *G*, and the currents divide, one portion passing into the pipe *G'* and around the partition *k'* in the same, and the other portion passing into the pipe *G<sup>2</sup>*, and around the partition *k<sup>2</sup>*. These two currents thus pass, after entering the pipes *G'* and *G<sup>2</sup>*, first to the front, and then turning the partition pass to the rear again, and, uniting on the opposite side of partition *k*, pass out the nipple *j* into the smoke-pipe. It will thus be seen that the currents are made to traverse a tortuous or winding course before escaping, and thus hold for a long time their heat in a position favorable for its absorption by the rising currents of fresh air, which enter from the register *m* below and pass into the drying-chamber above.

In modifying my invention, instead of using a single partition-plate, *k'* and *k<sup>2</sup>*, in the center of each pipe *G'* and *G<sup>2</sup>*, I may make said partition of two plates, as shown in dotted lines, the space between said plates being arranged in open communication with the space above and below the pipe, so that it will act as a fresh-air conduit and co-operate with the air-passages *g* in giving additional passage-way to the fresh air as it rises. This modification, however, I propose only to employ in the larger styles of heaters.

In defining my invention more clearly, I would state that I am aware of the patent to Billings, No. 50,414, granted October 10, 1865, in which the furnace connects at the rear with a cross-pipe, which then turns and extends on each side of the furnace to the front, where it connects with the smoke-pipe. My invention is distinctive, first, in the mode of fastening and sustaining the parts in place, thereby avoiding all rivets and permitting easy detachability and removal of any one part; secondly, in the arrangement of the doors, which permit easy cleaning; thirdly, in the partitions as combined with the three-part pipe *G G' G<sup>2</sup>*; fourthly, in the particular construction and arrangement of the back cross-pipe, which is cast in one piece with its partition and thim-

bles; and, fifthly, in the peculiar arrangement of the middle cross-pipe, *G*, the side pipes, and the back wall of the furnace, whereby the back end of the furnace is supported by said cross-pipe.

I am of course aware that stove-plates have been held together by tie-rods, and do not claim this broadly.

Having thus described my invention, what I claim as new is—

1. The combination, with the furnace, the side walls, and the three-part U-shaped tube, having its side section of equal length to the side walls and its middle section opening into the furnace, of the two end walls having grooves or flanges to receive the ends of the side walls and the ends of the side sections of the tube, and the tie-rods *b* for the double purpose of holding the end walls against the side walls to complete the case and sustaining and holding the tube in place around the furnace, as described.

2. The combination, with the furnace and the side walls, of the perforated end walls, the three-part U-shaped tube, having its side sections of equal length to the side walls and opening through the perforation in the walls at both ends, and doors for closing said ends of the tube, substantially as shown and described.

3. The combination, with the side and end walls and the furnace, of the U-shaped tube surrounding the three sides of the furnace and opening into the furnace at its middle, and a partition extending through the three sections of the U-shaped tube and nearly to the front end, as and for the purpose described.

4. The combination, with the furnace and the outside casing, of the U-shaped pipe composed of side sections, *G' G<sup>2</sup>*, and a middle or cross section, *G*, cast in one piece with its partition *k* and its two thimbles *i* and *j*, substantially as and for the purpose described.

5. The combination, with the outer casing, of the U-shaped pipe and the furnace, the middle section of said U-shaped pipe and the back wall of the furnace being connected together, as described, whereby the back end of the furnace is supported by said pipe, as set forth.

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Witnesses:

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 SOLON C. KEMON.