

No. 696,989.

Patented Apr. 8, 1902.

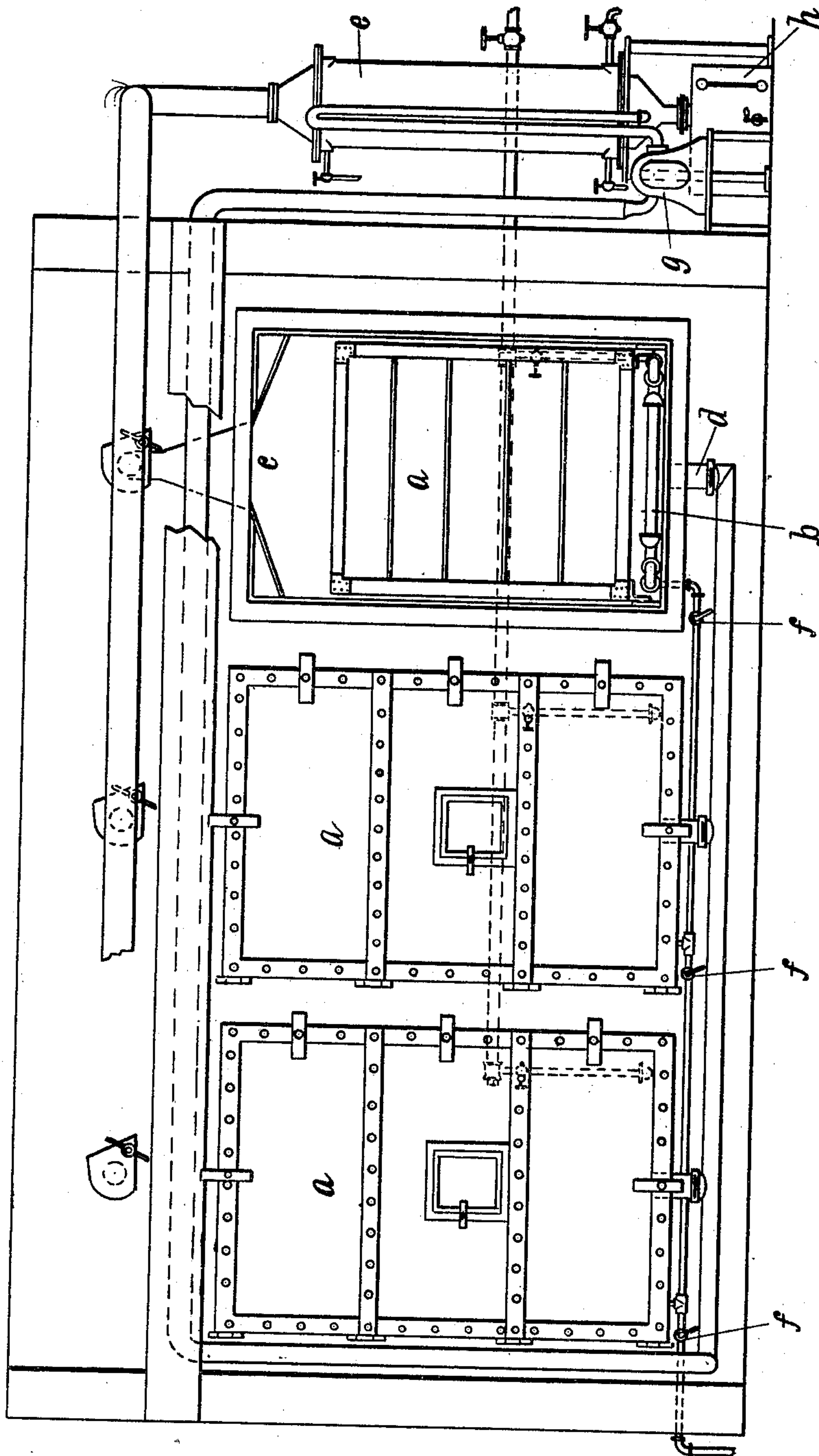
J. MARSHALL.
METHOD OF DRYING HATS.

(Application filed Apr. 4, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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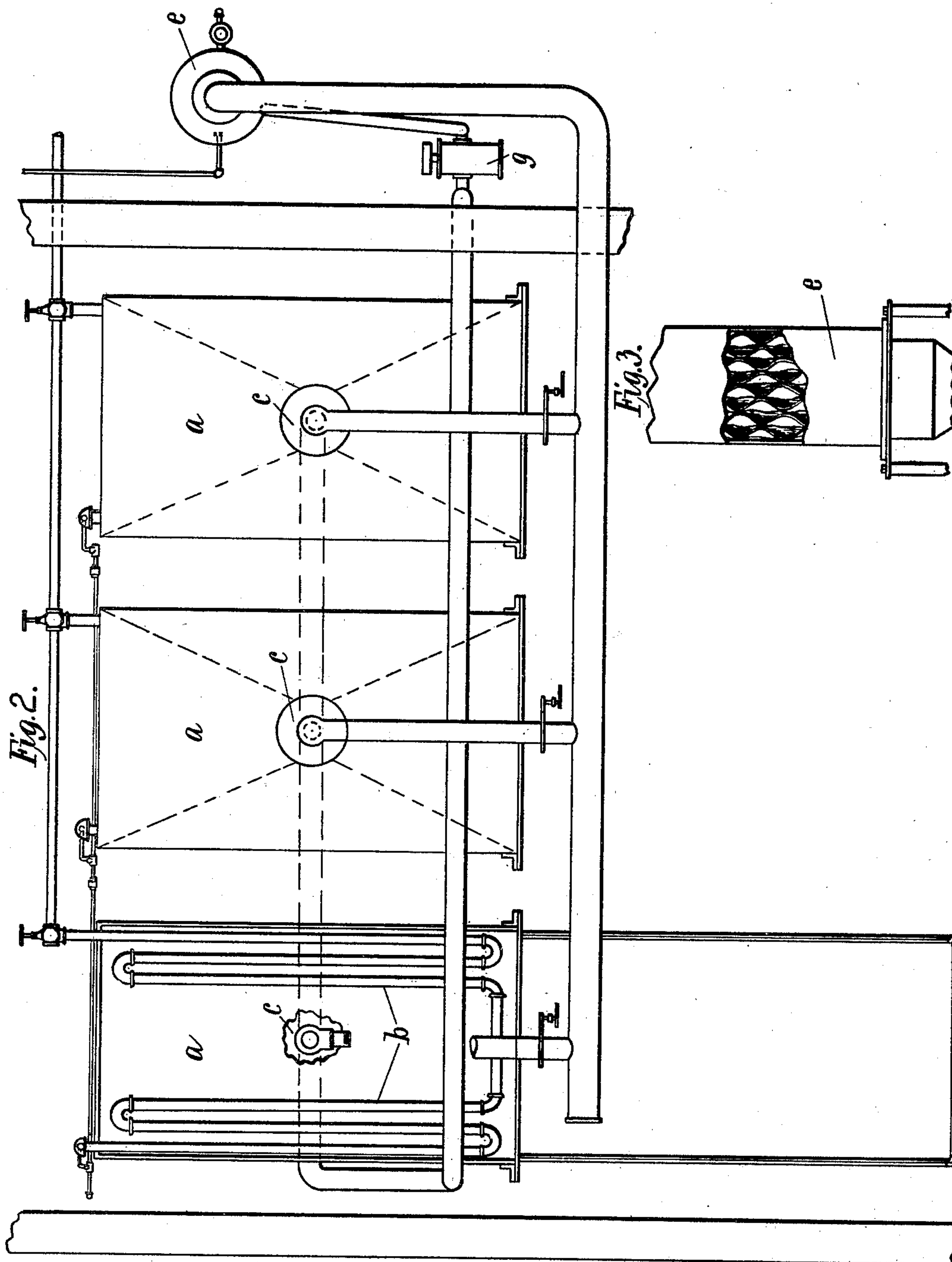
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

JAMES MARSHALL, OF FALL RIVER, MASSACHUSETTS.

METHOD OF DRYING HATS.

SPECIFICATION forming part of Letters Patent No. 696,989, dated April 8, 1902.

Application filed April 4, 1901. Serial No. 54,231. (No specimens.)

To all whom it may concern:

Be it known that I, JAMES MARSHALL, a citizen of the United States, residing in the city of Fall River, in the county of Bristol and State of Massachusetts, have invented a new and Improved Method of Drying Hats, of which the following is a specification.

My invention relates to the art of hat-making, wherein the hat-body is stiffened by the addition of shellac or other substances in solution and the solvent afterward evaporated, and is directed specifically to the method of removing the solvent.

The object of my invention is to provide a method for drying the hats which shall improve the quality of the hat, shorten the operation of drying, rendering it more thorough, and produce a more uniform product, and as an additional object the recovering of the evaporated solvent.

It is the common practice in hat manufacturing first to stiffen the hats with shellac or other substance previously cut with a solvent and then to dry these hats in rooms made warm by artificial means, or even in some cases to dry them by a slow process of drying without any artificial means, simply and solely by permitting evaporation of the solvent such as would occur when exposed to the open air. The open-air method is slow and expensive, the latter objection arising partly from the unavoidable loss of solvent. The use of artificial heat is desirable, as it hastens the operation and permits of the recovery of the solvent. The methods heretofore in use to attain these ends have employed a high degree of artificial heat at the commencement of the operation, whereby it has resulted that the shellac forms a hard outside skin, which hinders and at times altogether prevents the hardening of the interior portion of the hat, thus leaving the brim flexible and in all cases failing to obtain the full benefit of the shellac, in some instances spoiling the hats completely. The frequent occurrence of blistering is another disadvantage resulting from the exposure of the hat to too high a temperature at the start.

By my method of drying hats in a gradually-increasing temperature, passing in dry air, and removing the solvent the shellac hardens clear to the center of the hat, and the

objectionable features incident to the earlier methods, as above noted, are thereby avoided. In my invention I employ a closed practically air-tight chamber in which to dry my stiffened hats, and from this chamber I remove and condense the vaporized solvent evolved from the hats, whereby it may be again employed. A considerable saving is thus effected.

My method may be carried out by means of the apparatus shown in the accompanying drawings, in which—

Figure 1 is a vertical elevation, partly in section, of my complete apparatus. Fig. 2 is a plan view of the same, partly in section. Fig. 3 is a detail of the condenser.

Similar letters indicate similar parts throughout the several views.

An oven or closed practically air-tight chamber *a* is constructed to receive hats or hat-bodies and is supplied with means for artificially heating the air within it, such as the steam-pipes *b*. In the oven is an opening *c* in the top, and another, *d*, in the bottom or at the side near the bottom, (preferably in the bottom,) the opening in the top permitting escape of the air to the condenser apparatus *e*, the opening in the bottom admitting of the return of the air from the condenser. The condenser is preferably supplied with indented pipes, as seen in Fig. 3.

Regulating means *f* are provided on the steam-pipes, whereby the temperature within the oven may be readily controlled, diminished, or increased. In order to obtain a circulation of air through the condenser and oven, I may employ a pump or fan *g* at any desired point in the circuit, preferably between the outlet of the condenser and the inlet of the oven. This fan is not absolutely necessary, as the natural tendency of hot air to rise may be relied on to cause the circulation; but I prefer to employ positive actuating means.

A receptacle *h* is provided below the condenser to receive the liquefied solvent.

It will of course be understood that the necessary pipe connections, valves, &c., are to be employed.

In detail my method of procedure is as follows: After the hats have been moistened in the shellac solution they are placed on sup-

ports in the oven, the door of which is thereupon closed. The air-pump is now started to cause a circulation upwardly through the oven and downwardly through the condenser.

5 Heat is supplied to the current of air entering the oven by means of the steam-pipes *b*. At first this temperature is very moderate, preferably at or about 100° Fahrenheit. After a definite period of time, varying with the

10 kind of hat to be dried, the proportion of solvent to solid matter, and on the conditions under which the drying is to be done, I manipulate my steam-regulating means *f* so as gradually to increase the temperature of the

15 air in the oven. This is most conveniently done by successive uniform stages, as once every hour. This continues for a period of time, (three hours, more or less,) whereupon the maximum temperature to which the hats

20 are to be subjected has been reached. I find the most advantageous maximum temperature to be at or about 130° Fahrenheit, and if, as is sometimes desirable, for a fourth hour it may reach 140° Fahrenheit. These are ap-

25 proximate figures. The door of the oven is then opened, the hats removed, and the temperature of the oven lowered to the original moderate temperature at or about 100° Fahrenheit preparatory to receiving another

30 batch of hats, whereupon these are inserted, the door closed, and the operation repeated.

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

35 1. The method of drying hats, consisting in subjecting the moist hats to a moderate temperature in a confined space, gradually raising the said temperature to a maximum, and simultaneously withdrawing the vapors

evolved from the moist hats, substantially as 40 described.

2. The method of drying hats, consisting in subjecting the moist hats to a moderate temperature in a confined space, passing a current 45 of air through the confined space and about the hats therein, increasing the temperature in the confined space by successive uniform stages to a maximum, and removing the hats from the confined space, substantially as described. 50

3. The method of drying hats, consisting in subjecting the moist hats to a temperature at or about 100° Fahrenheit, withdrawing the vapors evolved from the hats by a current of 55 air, condensing the vapors from the current of air, and simultaneously increasing the temperature in the confined space by successive uniform stages to a maximum of 130° or 140° Fahrenheit, substantially as described.

4. The method of drying hats, consisting in 60 surrounding the moist hats by a body of air at a moderate temperature in a confined space, withdrawing this air and the vapors evolved from the hats, condensing the vapors from the air so withdrawn, replacing with dry air 65 the portions of air withdrawn, and gradually raising the temperature of the body of air surrounding the hats by successive uniform stages to a maximum, substantially as described. 70

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES MARSHALL.

Witnesses:

ARNOLD TURNER,
THEODORE T. DORMAN.