

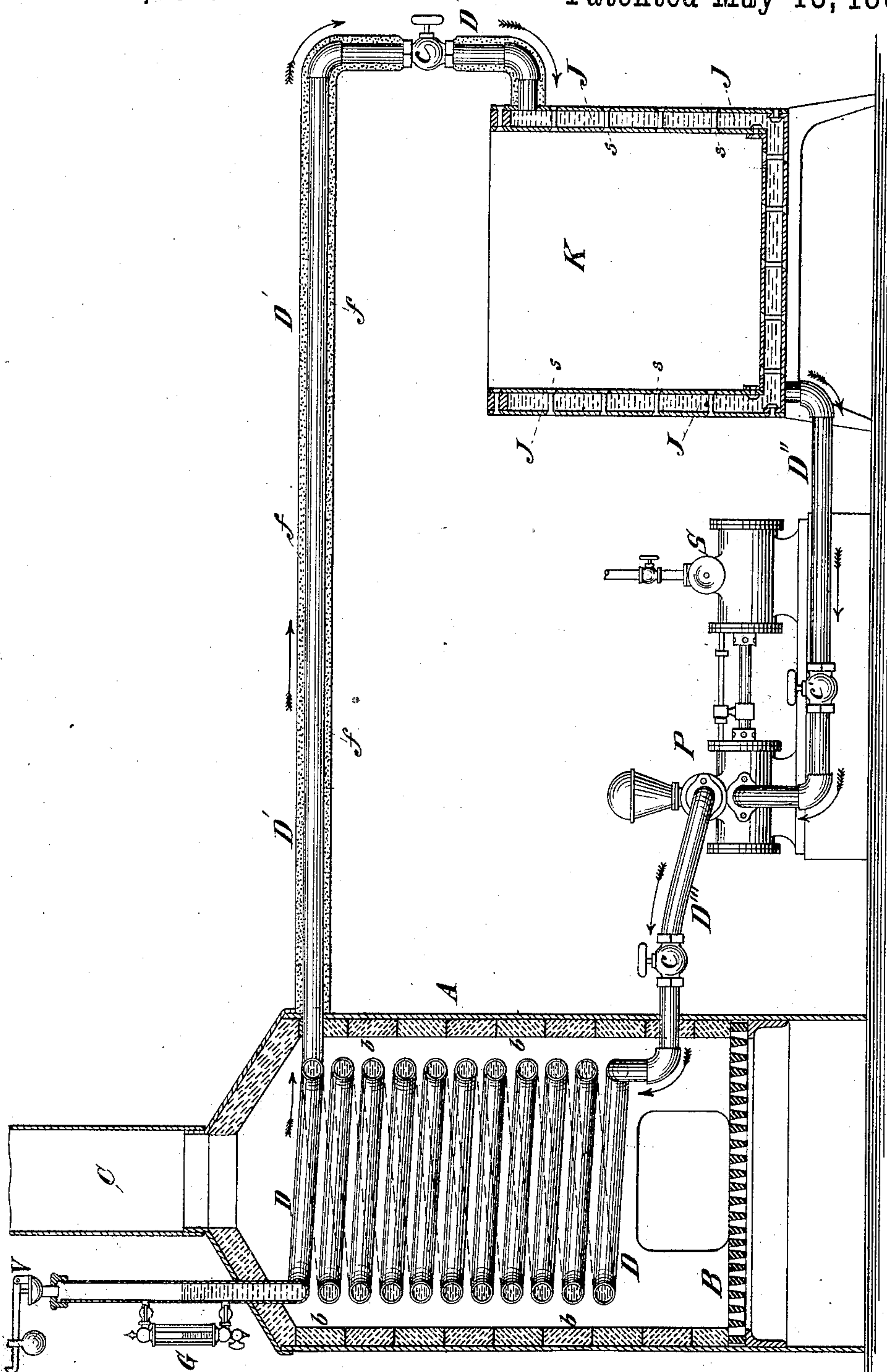
(No Model.)

W. M. BAILEY.

APPARATUS FOR MAKING VARNISH, &c.

No. 277,534.

Patented May 15, 1883.



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UNITED STATES PATENT OFFICE.

WALTER M. BAILEY, OF NEW YORK, N. Y.

APPARATUS FOR MAKING VARNISH, &c.

SPECIFICATION forming part of Letters Patent No. 277,534, dated May 15, 1883.

Application filed October 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, WALTER M. BAILEY, of New York, in the county and State of New York, have invented an Improvement in Apparatus for Making Varnish, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification.

As at present conducted, the operations of melting gums for the manufacture of varnish and the mixing therewith of various liquid ingredients is performed in kettles or vessels supported on wheels, so that they may be conveniently wheeled into or out of a fire-place under a large chimney and over a fire of coke or other fuel on the hearth of the fire-place. The liquid ingredients, after the gums are sufficiently fused, are or ought to be mixed with the melted gums at specific temperatures varying with the nature of the particular ingredient, or at as near such temperatures as is practicable. Above such temperatures the ingredients either evaporate or decompose, causing loss of material; or they may and sometimes do ignite, which also entails loss and danger. The operation of varnish-making under the present system therefore requires great care on account of the difficulty of regulating the heat of the open fire, and during the operation the kettle may be frequently wheeled on or off the fire, in order to control the heat of its contents, which is troublesome, and is liable to splash the contents out of the kettle. Besides this, the operation of heating over an open fire materials not only very inflammable, but, when their vapors are mixed with air, forming highly-explosive mixtures, is at best a hazardous one, frequently resulting in great damage to property, severe injuries to operatives, and even in loss of life.

It is therefore the object of my invention to provide an apparatus which in its use will obviate the hazard attending the present modes of manufacturing varnishes and japans, boiling linseed-oil, &c., and which will enable the manufacturer to secure and determine more exactly the proper temperatures at which the addition and admixture of different materials should be made, thus avoiding the loss and danger sustained by undue volatilization of

materials caused by too high a temperature, and also securing a more perfect admixture than can be obtained when the temperature is too low. By the use of this apparatus varnish can be made almost as safely as soap, and with a certainty of the best results.

The principal feature of my invention is a device for the use of water or other suitable liquid, under pressure, as a vehicle for heat and as a substitute for the open fire hitherto employed; and the invention principally consists in a furnace, a strong coil or chamber inclosed in said furnace for heating water, a tank, vessel, or kettle for melting, boiling, or mixing materials placed remote or isolated from said furnace, which tank, vessel, or kettle is provided with a strong water-jacket for the circulation of hot water, and means for circulating and controlling the circulation of hot water through said coil and jacket in such manner as to accurately supply the heat needed for the specified operations, yet keeping the kettle safely isolated from the fire. These features, together with certain details of construction, constitute my invention, as hereinafter fully set forth.

The drawing is a partial side view and a partial section of an apparatus constructed to carry out my invention.

A represents the furnace, preferably lined with fire-brick *b* or other refractory material. B is the grate, and C the uptake.

Supported in any suitable manner above the grate B is a strong coil of pipe D, the interior of which is, by means of the pipes D', D'', and D''', and a circulating-pump, P, made continuous with the interior of a hot-water jacket, J, of a tank, vessel, or kettle, K. This kettle K, as may be noted, is placed remote from the furnace, or at some safe distance therefrom, so that its contents will be entirely free from exposure to the furnace-fire, thus avoiding any chance of ignition, and, if desired, the kettle may be placed under a chimney or ventilating-shaft to carry off vapors which may rise therefrom. The coil is provided with a safety-valve at V and a water-gage at G, respectively, for limiting the pressure in the coil and indicating the height of water therein. The pipe D', leading from the coil to the hot-water jacket J, is preferably

felted, as shown at *f*, to prevent loss of heat by convection and radiation.

The pump is represented in the drawing as a direct-acting steam-pump, the steam-cylinder being at *S*, and its action is to circulate the water in the direction indicated by the arrow; but this is only a typical means for effecting the desired circulation, and I do not limit myself to any particular device for this purpose. Any circulator of whatever design or construction that can circulate hot water under high pressure may be used. Valves *c* and *c'* are placed in any convenient position in the system of pipes for regulating or stopping the circulation.

It is well known that, volume for volume, water under pressure will hold and convey more heat than any other medium—solid, liquid, or gaseous. When so confined under pressure water may be heated to a temperature ample to perform all the operations of making varnishes and japans, or boiling siccativ oils, the highest temperatures required for these purposes being not over 800° Fahrenheit. Water is therefore admirably adapted to the purpose of conveying heat in large quantity to considerable and safe distances from the source of heat, and when a pipe or tube containing hot water under pressure is brought into contact with a colder liquid the transfer of heat is very rapid and efficient.

It will be seen that by regulating the rapidity of the circulation of the heated water through the apparatus the amount and intensity of heat in the tank, vessel, or kettle *K* may be very nicely regulated; also, by adjusting the safety-valve *V* to open at specific pressures, the temperature of the confined water can never exceed that which is correlative with such specific pressure.

The jacket *J* is strengthened to any desired extent by stays *s*, after the usual manner of staying steam-boilers, &c. This jacket is represented in the drawing as extending over both the base and sides of the kettle, which in many cases will be preferable; but it will be sufficient for most purposes to have the jacket extend over the base of the kettle only.

In large factories, where a number of kettles are required for making different kinds of varnishes or other products, each kettle will always be provided with its own circulating-pump or other motor, so that the heat in each kettle may be controlled independent of the other kettles, and each kettle may connect to distinct heating-coils in a common furnace, or all may connect to one large and common coil in the furnace.

In the manufacture of varnish a temperature of about 700° Fahrenheit is necessary for melting the hardest gum, while about 500° is required for the boiling of linseed-oil, and the turpentine is usually introduced at about 200°. Therefore in the practical operation of the apparatus the temperature may be maintained at the maximum—say somewhat over 700°—

in the coil by the action of an automatic damper-regulator in the same manner as is employed in water-heating apparatus, so as to automatically regulate the fire and maintain the desired maximum temperature in the coil at the same time; hence by regulating the speed of the circulating-motor any desired temperature equal to or less than this maximum may be maintained in the varnish-kettle, as will be readily understood, thus rendering the management of the apparatus, both as regards the heat in the furnace and coil as well as the heat in the kettle, very simple and perfect.

The kettle may be provided with suitable thermometers or pyrometers to indicate the temperature therein, and it may be furnished with cocks on the base or sides, through which the varnish or other products may be drawn off when completed.

It will therefore be appreciated that by this improvement the varnish-kettle is kept entirely separate or remote from the fire, and at the same time the heat of the fire is conveyed thereto at a high temperature and in great quantity or volume, and equably diffused upon the kettle, and is applied thereto in a regular and easily-controllable manner, which enables any desired temperature to be maintained as long as desired, thus overcoming all danger of conflagration, greatly facilitating the work, and appreciably improving the quality of the product.

Several attempts or proposals have been heretofore made to provide a varnish-making apparatus which would obviate the direct exposure of the kettle to the fire, and to this end the heat of superheated steam has been applied to the kettle; but this is found to be impracticable for the reason that with the great heat demanded in the melting of the gums and in the boiling of the oils the superheated steam, which acts simply as a hot gas, has not the volume or quantity of heat required for the purpose, so that the application of this kind of heat to the kettle is found to be inadequate, irregular, and uncertain. By employing a superheated liquid under pressure, however, with a motive device for circulating the liquid, an effective means is provided for applying heat, both at a high temperature and in great quantity, and in regulating its amount by the rate of circulation, so that the heat is not only great in quantity as well as in intensity, but is equable and certain in its character, thereby accomplishing a most important improvement in apparatus for this purpose.

What I claim as my invention is as follows:

1. An apparatus for making varnish, boiling siccativ oils, manufacturing japans, and similar operations, consisting of a furnace, a coil or chamber placed within the furnace for heating water under pressure, a tank, vessel, or kettle for containing the materials to be operated upon, and provided with a hot-water jacket, a system of pipes for connecting

the interior of the coil with the interior of the jacket, and means for circulating and controlling the circulation of hot water under pressure through said coil, pipes, and jacket, substantially as and for the purposes specified.

5 2. The combination, with a heating-furnace containing a superheating coil or chamber, of an open kettle placed in an isolated or remote position from said furnace, a jacket or chamber arranged to heat said kettle, connections
10 between said jacket and said coil, forming a

circulating system, a charge of water or other liquid filling said coil-connections and jacket, and a motive device connected with said circulating system for insuring and regulating
15 the circulation of the liquid therein, substantially as and for the purpose set forth.

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