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C. BLAGBURN.

APPARATUS FOR PRESERVING PERISHABLE SUBSTANCES.

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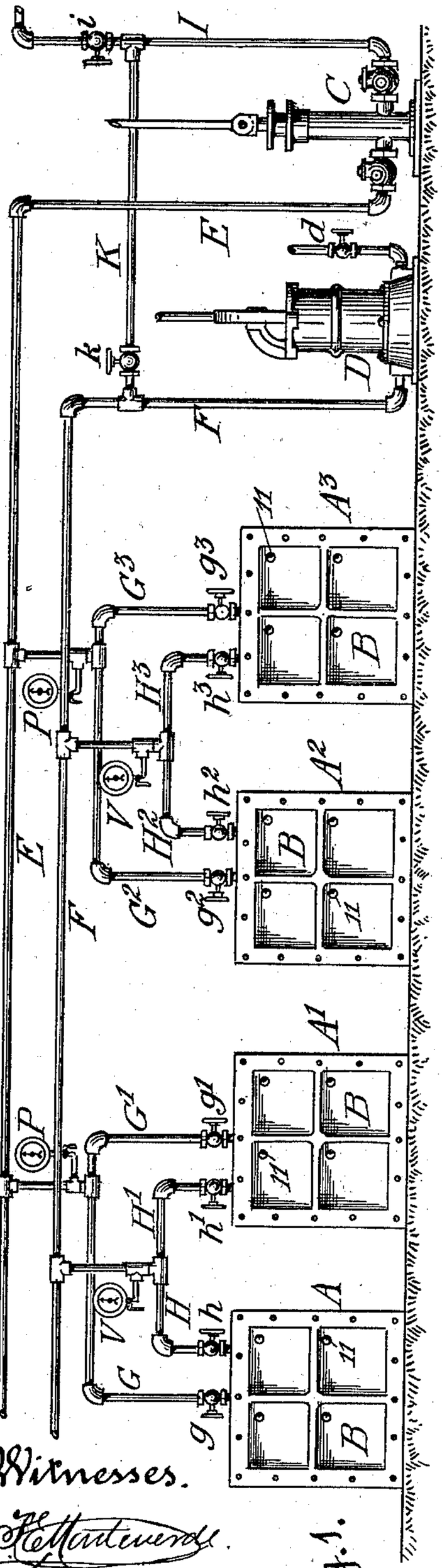
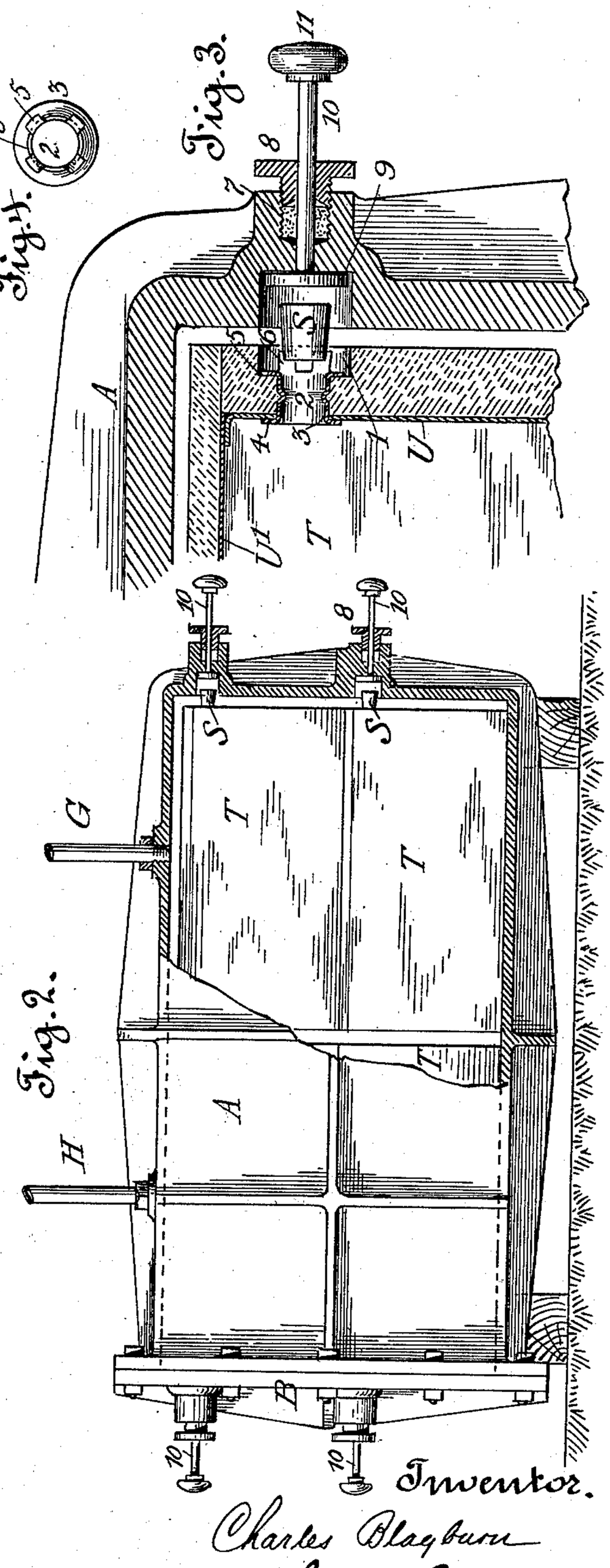
NO MODEL.





Witnesses.

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No. 750,518. Patented January 26, 1904.

UNITED STATES PATENT OFFICE.

CHARLES BLAGBURN, OF SAN FRANCISCO, CALIFORNIA.

APPARATUS FOR PRESERVING PERISHABLE SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 750,518, dated January 26, 1904.

Application filed May 3, 1899. Renewed June 29, 1903. Serial No. 163,660. (No model.)

To all whom it may concern:

Be it known that I, CHARLES BLAGBURN, a subject of the Queen of Great Britain, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Apparatus for Preserving Perishable Substances, of which the following is a specification.

My invention relates to apparatus for preserving perishable substances.

Heretofore attempts to preserve fresh fruit, meat, and other substances have not been practically successful, either from the gases used or the mechanical arrangement of the apparatus employed or the want of a proper package to keep and convey the substances.

The object of my invention is to thoroughly exhaust the air from the substances treated, not only the air outside but the air inside of the fruit or other substances being treated. After the air has been exhausted I pump in the preserving gas or gases at a considerable pressure, so that it enters into the interior of the fruit or other substance being treated. After the pressure has remained on for a time it is relieved and is lowered within a pound or two of atmospheric pressure, so that the substance may be under a slight pressure when being shipped and so that if any leakage should take place through damage to the case it will be outward. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front view of a preserving plant. Fig. 2 is a side elevation of a pressure-chamber, partly broken away to show interior packing-cases. Fig. 3 is a detail section of a corner of the pressure-chamber, showing the closing apparatus for an interior packing-case. Fig. 4 is a detail end view of a part of the closure.

Similar letters refer to similar parts throughout the several views.

The exhaust and pressure chambers (represented in the drawings by A A' A^2 A^3) are preferably although not necessarily rectangular in shape and are adapted to receive packing-cases T, which are the actual transportation-cases. I have shown in the drawings chambers of a capacity to receive eight of such cases; but I do not limit myself to any particular size either for the chambers or the cases. The cases are easily insertible and removable. The chambers are adapted to be closed by tightly-fitting doors B. All the chambers are connected to the pressure-pump C by a pipe E, having branch pipes G G' G^2 G^3, and to the vacuum-pump D by a pipe F, having branch pipes H H' H^2 H^3. These branches are respectively provided with controlling-valves g g' g^2 g^3 and h h' h^2 h^3 and with pressure and vacuum gages P and V.

I is a suction-pipe leading to the pressure-pump from any suitable receptacle or gas-supply, and d is the discharge-pipe of the vacuum-pump D.

K is a pipe connecting the suction-pipe F to the supply-pipe I. The latter pipe has a valve i above the connection K. By closing valve i and properly manipulating the other controlling-valves the pump C will draw surplus gas from any chamber through pipe K and pump it into any other chamber which is ready to be charged.

In Figs. 2, 3, and 4 are shown means by which the exhaust and pressure are applied to all the packing-cases in any chamber and all the contents of such packing-cases, and, further, they show means by which the packing-cases can be tightly closed while still held within the chambers A, such means being operable from outside of the chambers A. One of these means is supplied for each packing-case. Referring to Fig. 3, it will be seen that a recess 1 is formed in each packing-case T, which communicates by a passage 2 with its interior. In this passage is a metal ferrule or thimble 3, having an inner flange 4 turned over and secured to a sheet-metal or other suitable air-tight lining U inside the case T. The other end of the ferrule is split to form projections 5 and 6, the projections 5 being turned down and secured to the bottom of recess 1 to aid in holding the ferrule in place. The projections 6 are straight and receive the cork S, which is the closure. Either pressure or suction applied through the respective pipes G and H affect the contents of all the packing-cases, since the corks S, Fig. 3, are simply

held by the projections 6 and do not close the passages 2 until later. The chamber A adjacent to each passage is shown as fitted with a closing apparatus comprising a stuffing-box 7, gland 8, and a piston 9, provided with an operating-spindle 10 and handle 11. After the exhaust of air has been followed by the forcing of preservative material the spindle and piston are used to force the cork S into the ferrule, making a tight closure. The packing-case can then be removed and the closure further secured by sealing with wax which fills the recess 2. The projections 6 can be turned down upon the cork or can be left projecting, in which case they assist in holding the sealing-wax.

In operating my apparatus I take an ordinary packing-case and fit it with a sheet-metal or other suitable air-tight lining U, (such as paper or cloth made air-tight,) which is provided with the ferrule 3 or other suitable valve arrangement, as already described. The fruit or other substance is packed in the above case, after which a cover U′ is soldered to lining U and the lid T′ of case T is nailed down. These cases containing the fruit or other substances are placed in the pressure-chamber A with the ferrule 3 opposite to the closing apparatus, the cork S having been previously fixed in the outer end of ferrule 3. The door or cover B is then made tight with any suitable air-tight joint and bolted up. The vacuum-pump D is then connected with the chambers A by the pipes F and H H′ H^2 H^3, and all the air and gases are exhausted from the chambers, the cases, and their contents. The vacuum-pump D is now shut off by closing the valves *h* *h′* h^2 h^3, and one of the chambers—A, for instance—is connected to the pressure-pump C through the pipes E and G and valve *g*, the pump C being connected to the pipe I, which leads to the receiver containing the preserving-gases. These may be nitrogen, carbonic, or other gases, depending on the nature of the substances to be treated. As soon as the pressure in A has reached a suitable point—for instance, about one hundred pounds—valve *g* is closed and the gas is allowed to remain until the substance to be preserved is thoroughly permeated. The valves *g* and *g′* on chambers A and A′ are then opened. This allows the gas to pass from chamber A into the vacuum in chamber in A′, and when the chambers are in equilibrium valve *g* is closed and valve *h* on chamber A opened to the suction-pipe F, which is now connected to the suction-pipe I through the valve *k* and pipe K. Valve *i* to gas-reservoir is of course closed. The pressure-pump C now pumps the surplus out of chamber A into chamber A′ through valve *g′* until the pressure in chamber A is reduced to about one or two pounds, when valve *h* is closed. The inside packages are then closed, as before described, and ready to be taken out of A. The valve *k* is now closed and valve *i* opened in the pipe I, leading to gas-reservoir, so that the gas now in chamber A′ may be raised to the pressure of one hundred pounds, or to whatever pressure may be determined upon as proper to secure the best results. The same operation is continued from chamber A′ to chamber A^2, and so on progressively through the series of chambers, whatever their number may be.

After the interior packing-cases in any chamber have been closed and before they have been removed the small amount of pressure in the space around the packing-cases can be pumped out and utilized in order to observe strict economy in the use of the preservative gas, and in this connection it will be noted that by employing a plant comprising a number of chambers I am enabled to transfer pressure from one chamber to another, and thus draw upon my gas-reservoir only during a portion of the time, resulting in the highest economy in the use of the preservative agent.

A clear distinction must be observed between the invention herein set forth and two classes of preservative processes and apparatus heretofore used or attempted to be used. In one class attempts have been made to exhaust air from a large transportation-chamber, such as a car, and to fill the vacuum with a preservative gas. In such a chamber it is practically impossible to procure the requisite vacuum without going to undue expense in making an air-tight construction, and it is also impracticable to effectively use such a vacuum without increasing the capacity of the receptacle to withstand external air-pressure in a way which also unduly increases the expense of construction.

The other class of inventions and devices involves the attempt to produce the vacuum in the packing case, jar, vessel, or receptacle which contains the perishable substance and in which the latter is transported while such vessel is exposed. Such operations are necessarily upon a small scale, since they require expensive and carefully-constructed vessels for the purpose. They are not adapted, for instance, to the transportation of large quantities of fruit across the continent. By my invention I can use simple and inexpensive packing-cases, the exhaust and pressure chambers being a permanent plant and capable of adaptation to operations upon a large scale.

Instead of a metal lid U a glass cover may be substituted, so that the fruit, flowers, or other substance can be exhibited without the substance being exposed to the air until wanted.

I do not limit myself to the construction and arrangement of apparatus shown and described, as I desire to avail myself of such modifications and equivalents as fall properly within the spirit of my invention as set forth in the following claims.

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

1. An apparatus for preserving perishable substances, having a series of exhaust and pressure chambers connected together by separate exhaust and pressure pipes having controlling-valves, means for exhausting the chambers, means for supplying preservative gas under pressure, and connections from the said exhaust and pressure pipes respectively to the exhausting means and to the supplying means; all constructed and arranged so that the preservative gas can be caused to pass from chamber to chamber in order to secure economy in the use of the main gas-supply.

2. An apparatus for preserving perishable substances, having an exhaust-pump, a pressure-pump, a series of exhaust and pressure chambers, adapted to receive transportable receptacles and connected together by separate valved exhaust-pipes and pressure-pipes, which pipes are themselves connected with the exhaust and pressure pumps, a gas-supply connected to the pressure-pump, and means for closing the transportable receptacles while in the said chambers; all constructed and arranged so that preservative gas can be caused to pass from chamber to chamber and used in the series in order to secure economy in the use of such gas.

3. In an apparatus for preserving perishable substances, the combination with a series of air-tight chambers adapted to contain removable packing-cases, of a pressure-pump C having a gas-supply pipe I and pressure-pipe E, an exhaust-pump D, having an air-exhaust pipe F, pressure and exhaust connections from said pipes to each chamber, and between the chambers valves in said connections whereby communication between said chambers can be controlled, a pipe K connecting the exhaust-pipe F to the supply-pipe I and a valve *i* for cutting off the main supply; whereby the pump C can draw gas from any of said chambers through said pipes F and K and force it into any other chamber through said pipe E.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 22d day of April, 1899.

CHARLES BLAGBURN.

Witnesses:
L. W. SEELY,
FRANCES M. BURT.