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INFUSION APPARATUS, PARTICULARLY FOR EXPRESS COFFEE MACHINES

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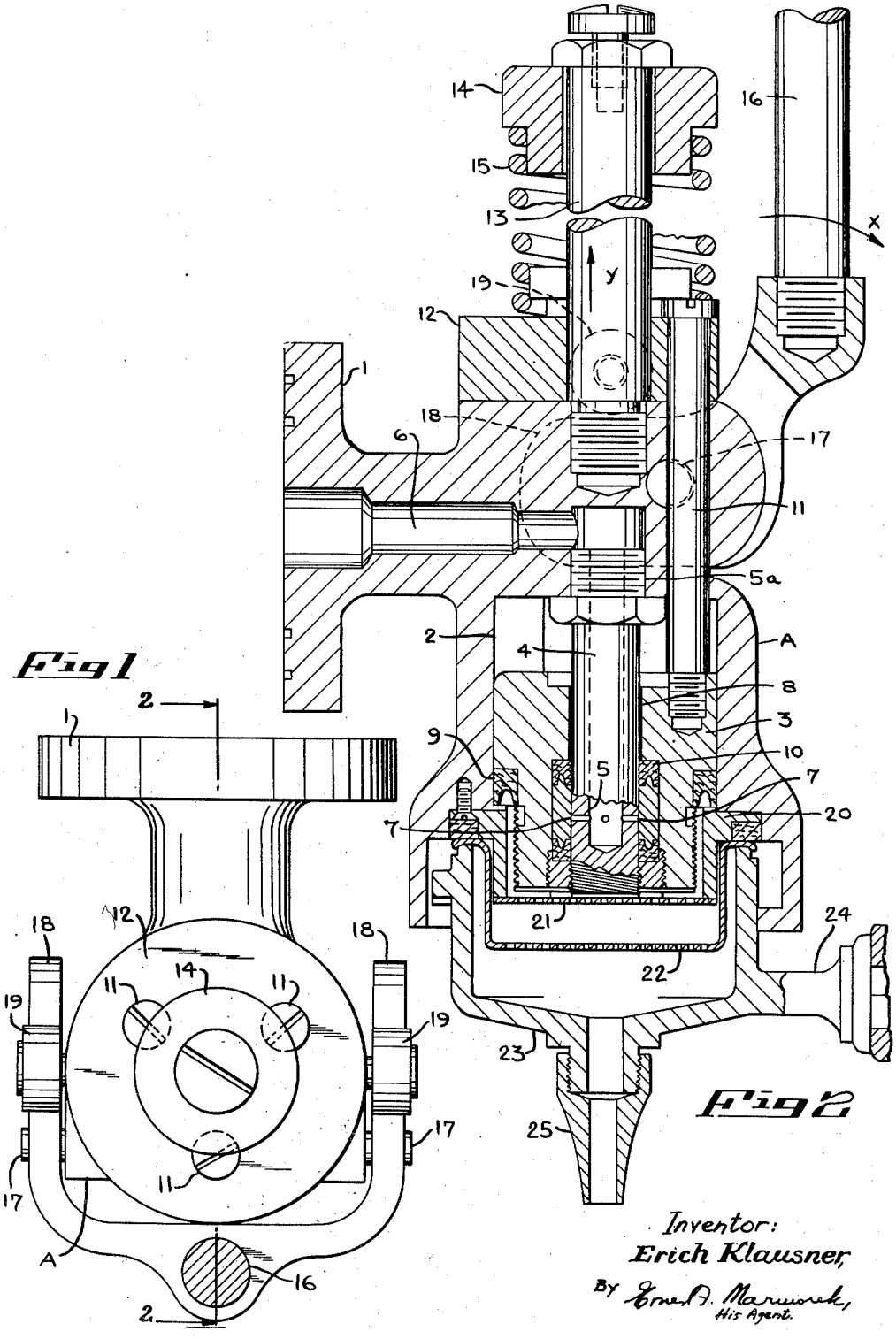


Fig 1

Fig 2

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INFUSION APPARATUS, PARTICULARLY FOR EXPRESS COFFEE MACHINES

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6 Claims. (Cl. 99—302)

The present invention relates to an infusion apparatus, particularly for express coffee machines.

Express coffee machine units are known wherein the water for the infusion of coffee or other substances is raised to a temperature near 212° F., in a special boiler to which the individual units for preparing the infusions are hydraulically connected.

Water from the boiler reaches the unit in a suitable quantity for the preparation of one or two cups of the drink.

The water is then put under pressure and caused to pass through the substance to be infused contained in powder form between perforated diaphragms, in such a way that the forced passage of the water through the powdered substance effects substraction of the aromas without, however, extracting any of the disagreeable substances, as is the case with steam apparatus.

Such hydrocompression apparatus present, as known, some failings of a mechanical order, and particularly the inconveniency of requiring the use of stuffing boxes or resilient bodies for the sealing of the water coming from the boiler, said means being of a delicate construction requiring a constant maintenance.

Another deficiency presented by the known apparatus is the constant capacity of the infusion water dosing chamber.

These failings are obviated by the apparatus according to the present invention substantially characterized by the fact that the piston pressing the water through the infusion powder carries an axial hole in which the water conduit from the boiler is fitted watertightly, in such a manner that the lifting of the piston uncovers the water passages thus making possible the filling of the dosing chamber, whereas the lowering of the piston closes said passages and generates the desired pressure upon the water contained in the dosing chamber itself.

The invention will now be described with reference to the annexed schematic drawing, description and drawing being given merely as an indicative example, not limiting the range of the invention.

In the drawing,

Fig. 1 is a plan view, partly in section, of a preferred embodiment of the invention; and

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

A indicates the body of the apparatus provided with a conduit with a flange 1 intended for connection with the boiler (not shown).

Body A has a cylinder that defines a cylindrical cavity 2 in which a piston 3 slides axially to press the water through the infusion powder.

Cavity 2 is axially traversed by a conduit 4 whose upper end is rigidly screwed at 5a to body A.

Conduit 4 is provided with a blind axial hole 5 communicating above with conduit 6 for the supply of water from the boiler. Hole 5 communicates with the outside through radial holes 7. Piston 3 carries an elastic annular packing 9 intended to make a seal with the surface of the cylindrical cavity 2 and two elastic annular packings 10 in correspondence with axial hole 8, intended to form a seal between said hole and the conduit 4.

To the piston 3 there are connected the ends of two or more rigid bars 11 traversing the cylinder at its upper part and reaching with the upper end an annular or ring element 12.

The latter is engaged over a cylindrical column 13 coaxial with the cavity 2 and rigidly fastened by its lower end to body A of the apparatus. Another annular element 14 is fastened to the upper end of column 13. Between the elements 13 and 14 there is interposed a helical spring 15, intended to supply the piston pressure onto the water contained in the dosing chamber. The apparatus is completed by an operating lever 16, pivoted to the body A by a horizontal pin 17, and whose cams 18 work upon two loose rollers 19 that are carried at diametrally opposite points, by ring element 12.

The water dosing chamber is confined not only by the end surface of piston 3 but also by a cylindrical cap 20 whose bottom is formed by a perforated diaphragm 21, and the inwardly projecting wall of the cavity 2. By 22 is indicated the filter or screen or perforated diaphragm containing the powder of the infusion realized in the known manner, while 23 represents the filter support provided with handle 24 and having an infusion delivery orifice 25 and connected in a known way by means of a bayonet coupling to the lower part of body A of the unit.

The operation of the apparatus is as follows:

In the position shown in Fig. 2, the piston 3 is at the end of its downward stroke. In that position the hot water delivery holes 7 are masked by the piston itself and positioned between annular packings 10 in such a way that the water cannot in any way leak into the cylindrical cavity 2 coming from the boiler through the conduit 6.

By operating the handle 16 in the direction of arrow X the surfaces of cam 18 work from below against the rollers 19 causing them to move axially, in the direction of arrow Y, with the ring element 12 against the pressure of the spring 15.

The ring element 12 in turn pulls by the bars 11 the piston 3 upwardly.

When the piston 3 moving upwards has reached such a position that holes 7 are outside of the lower end of seal packing 10 the water coming from conduit 6 discharges itself through said holes 7 toward the dosing chamber that has been vacated by the displacement of the piston itself.

By releasing the lever 16 the spring 15, put under charge during the preceding operation reacts upon annular element 12 in a direction opposite arrow Y and presses piston 3 downward by means of bars 11, interrupting the communication of the dosing chamber with the boiler at the instant when lower annular packing 10 covers the holes 7.

From this instant on the movement of the piston governs the water pressure and forces the water through the infusion powder, which is compressed between the two perforated diaphragms 21 and 22, until the piston 3 attains the position illustrated in Fig. 2 with the complete expulsion of the water from the dosing chamber.

It is therefore possible, by simply changing the conduit 4, to vary as desired the capacity of the infusion dosing chamber without disturbing any other part of the machine.

It will also be possible to provide a means for varying the location of holes 7 with the machine working, in order to adapt the apparatus to the preparation of one, two or three cups of infusion.

From the description of the apparatus the absence of any spring loaded stuffing box or sealing device or the like is evident.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. In an infusion apparatus, for use in connection with a source of hot pressurized liquid, in combination, a body defining a pumping chamber for taking in a quantity of said liquid and expelling it subsequently therefrom, a piston reciprocably movable in said chamber between inner and outer extreme positions and operable to vacate the outermost section of said chamber in the inner piston position for the filling of said chamber section with said liquid and to expel during the outward stroke substantially all of said liquid from said chamber section, said piston defining on its interior a straight passage extending in the direction of the movement of reciprocation, a conduit communicating with said source and extending into said chamber and fitting in and projecting into said passage of said piston and having an outlet disposed in said chamber section in such a manner that the piston will expose said outlet in the inner position and, respectively, the wall of said passage will cover said outlet in the outer position of said piston, whereby when said piston is in the inner position said chamber section will be filled with liquid conducted from said source by said circuit through said outlet into said chamber section and, respectively, the flow of said liquid will be cut off when the surface of the passage of said piston covers said outlet during the outward piston stroke and in the outer piston position, means operable for reciprocating said piston, and a receptacle for the infusable material positionable in intercommunication with said chamber section for pumping said liquid into said receptacle from said chamber section during the outward stroke of said piston.

2. In an infusion apparatus, as claimed in claim 1, together with, oppositely disposed annular sealing means recessed in the surface of said passage, positioned on both sides of said outlet in the outermost piston position, for sealing said outlet in said outermost piston position against leakage of liquid from said passage into said chamber.

3. In an infusion apparatus, as claimed in claim 1, said outlet including a series of holes transversely to the longitudinal extension of said passage, whereby the orifices of said holes will be covered by the surface of said passage in the outer position of said piston.

4. In an infusion apparatus, as claimed in claim 1, together with, said passage being cylindrical, and said conduit having a cylindrical surface fitting in and projecting through said cylindrical passage, said outlet including a series of radially extending holes.

5. In an infusion apparatus, as claimed in claim 1, said reciprocating means comprising a two-armed lever journalled on said body and tiltable in opposite directions for opposite piston strokes, a cam formed on one of said arms and a handle on the other, a reciprocable element disposed externally of said chamber, means interconnecting said element with said piston for tied reciprocation, a cam follower connected to said element and reciprocable therewith and in operative driving connection with said cam, and resilient means urging said element into one extreme position, whereby upon actuation of said lever said cam will move said cam follower and thereby said element and piston towards the opposite extreme position against the power of said resilient means.

6. In an infusion apparatus, as claimed in claim 5, said resilient means urging said element and said piston to complete the outward piston stroke, whereby during manual lever actuation the piston will be retracted for filling of said chamber section with liquid, and upon manual release of said lever said resilient means will cause expulsion of the liquid from said chamber section.

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