

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### Coffee making Machine

We, FELICE AROSIO and ERNESTO VALENTE, both of Italian nationality, of respectively Viale Majno 34, Milan, Italy, and Via Caracciolo 65, Milan, Italy, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a coffee making machine having a plunger unit which may be readily raised by hand, and to such a machine which may be used for domestic purposes. In most coffee making machines the plunger units are normally spring loaded so that following manual raising thereof against the loading, the latter will cause the plunger unit to descend and thereby force water through a panel or cake of coffee powder contained in a filter. It will be apparent that the raising action requires repeated effort and labour which is fatiguing for the operator if repeated often.

One object of the invention is to obviate this disadvantage.

Broadly in accordance with the invention a coffee making machine includes a cylinder having a spring influenced plunger displaceable therein towards and away from a coffee filter tray, a reservoir for liquid under pressure located in the cylinder behind said plunger, manual control means for withdrawing the plunger into said reservoir and a valve controlled passage through the plunger which is arranged to open against said spring influence at the commencement of the plunger withdrawal to permit liquid from the reservoir to flow into the space between the plunger and tray, and to close under the spring reaction when the withdrawing force is relieved, whereby the liquid pressure in said reservoir serves to urge the plunger forward on its return stroke towards the tray.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made to the

accompanying drawings, in which:—

Figure 1 is a section through the coffee making machine constructed in accordance with the present invention, and

Figure 2 is an enlarged detail of Figure 1.

As illustrated in Figure 1 which shows the machine with the operating lever at rest, there is provided a base plate 1, mounted on four supports. The plate is also provided with a boss or projection 4, to which is fixed a hollow column 5 carrying an overhanging container 6. In one piece with the container is a cylinder 7 housing the plunger unit. Two ports or ducts 8 join the cylinder 7 with the container 6 in such manner that water in the container, can be used in the cylinder until it has fallen to the level where it uncovers electrical resistances 9 arranged on the container bottom. Above the cylinder, at a point 10, is articulated a handle 11; one extremity of the handle has a fork member which engages over a cross pin 12 rigid with the free end of a stem or rod 13.

The container 6 can be closed in fluid-tight manner by means of a cover 14. A screw 15, provided with a conical portion 16 adapted to co-operate with a corresponding seat on the cover passes through the latter and engages a threaded hole 17 formed in a stem or post 18 anchored to the bottom of the container 6 in the manner shown. A packing 19 fitted into a small channel in the edge of the container is pressed by the projection 20 of the cover 14 to form a fluid-tight joint; a hand-grip or knob 21 is fixed to the screw 15. On the cover there is provided a safety valve 22, which can be calibrated by means of a screw; there is also provided a safety valve 23 including a diaphragm 24 resistant to the maximum pressure permissible in the container 6. In the wall of the cylinder 7 there is arranged an inspection glass or window 25 in order that the operator may ascertain the water level.

The electrical resistances 9 are connected to a cable 26 which is housed in the column 5 and which is fitted with a switch 27. Below

[Price 2s. 8d.]

the container 6 there is fitted a cover 31 adapted to mask and protect the clamps or clips of the resistances 9; the cover together with its accompanying block 30 is retained by means of the threaded pin illustrated. The block 30 may be used to press the coffee powder placed in the box filter 28 before the latter is fitted together with the filter carrier 29 within the part 32 of the cylinder 7.

The machine described provides a stable assembly without the necessity for additional fixing means, even during operation of the lever 11; the assembly is also readily accessible at all parts for the purpose of maintenance or the like.

It will be seen that the possibility of slackening the cover fixing screw 15 by the amount necessary for terminating the fluid-tightness between the cover 14 and the container 6 without fully disengaging the said screw from the female screw 17, excludes the danger of said cover from being violently repelled by residual pressure existing in the container.

Referring in particular to Figure 2, numeral 7 indicates the body of the container in which is formed a cylindrical cavity or reservoir 2 closed at the top by means of a cover 3. As shown the stem or rod 13 is provided with a rear plunger part 47 screwed thereon and the container is closed at its lower end by a gauze or mesh 33 carried by a ring 34 secured to said container in a liquid tight manner by means of a screw thread. The said ring 34 comprises a cylindrical internal portion 35 in which slides, also in liquid-tight manner, owing to the packing 37, a front plunger part 36.

The said front plunger part 36 is provided toward the gauze or mesh 33, with an extension 38 of decreased diameter adapted to slide in the narrower part of the aperture in the ring 34, which latter projects into the said cylindrical cavity 2 and forms an abutment 39 against which may bear a corresponding shoulder formed on the front plunger part due to a variation in its diameter. On one face, the front plunger part has an annular surface 40 disposed about a central aperture 41 into which is introduced a cylindrical finger or protuberance 42 with which the rear plunger part 47 is provided. The said finger 42 is of greater length than the aperture 41 and terminates in a threaded portion on to which is screwed a nut 43. The axial connection between the rear plunger part and the front plunger part is, therefore, provided with axial and also radial play, since the finger or protuberance 42 has a diameter smaller than the aperture 41. The rear plunger part 47 is provided with an annular surface 44 disposed about the finger 42 which surface faces the annular surface 40 of the front plunger part and is adapted to co-operate with the latter surface when relative axial displacement is produced between the front plunger part, and the rear plunger part. A packing 45 is fixed to the rear plunger part 47 and covers the said annular surface 40 in the manner shown. The rear plunger part 47 is also provided with a peripheral flange 46 adapted to support one end of a cylindrical helical spring 48, the opposite extremity of which bears against the cover 3. Below the gauze or mesh 33 is fitted a filter 49. In addition to the clearances provided between the finger 42 and the aperture 41 there is also a clearance between the extension 38 of the front plunger part 36 and the inner circumference in the ring 34; ducts 54 are provided to interconnect these clearances in the manner shown. The machine operates as follows:—

In the reservoir of the cylinder 2 it will be appreciated that there prevails a pressure equal to that in the container 6. In addition the surface 44 of the rear plunger part 47 is pressed in contact with the surface 40 of the front plunger part under the pressure of the spring 48, plus the difference between the total pressure of water on the surface area A and the pressure on the under surface area B, of the rear plunger part. However, it will be seen that the front plunger part 36 is pressed in contact with the bevelled surface 39 of the ring 34 under the pressure of the spring 48, plus only the pressure of water on the surface area A. Thus the total pressure in this latter case will be higher than in the previous instance.

When sufficient downward pressure is applied to the handle 11 of the machine, the rod 13 and rear plunger part 47 will be raised to overcome the lower of the two pressures mentioned above. The front plunger part 36, will, however, remain stationary since it is under the influence of the higher pressure. Thus following this initial raising movement, water will be allowed to flow from the reservoir of the cylinder 2 and into the space between the front plunger part and the coffee tray to equalize the pressures on both sides of the plunger unit. Further displacement of the handle will obviously cause the front plunger part 36 to be raised but in this instance the only pressure to be overcome will be that of the spring acting in a downward direction. If, at any moment during the ascent of the plunger unit, the handle is released, the force of which the spring is capable will be unloaded on the rod 13, causing the approach of the facing surfaces 40 and 44 and liquid tightness between them. The space below the plunger will then no longer be in communication with the container 6. On the other hand, the plunger unit is under the pressure of the water contained in the reservoir of the cylinder 2 plus the pressure of the spring. The resultant pressure causes the plunger to descend gradually as the water present below said plunger unit is expelled through the panel or

cake of coffee powder. It is obvious that the spring assists the descent of the plunger unit, together with the water pressure. However, in the plunger units heretofore in use the descent is entrusted exclusively to the force of which a spring is capable of producing on expanding. The work which must be stored by the spring in the course of its compression is smaller and thus the mean force and the maximum force exerted by whomsoever employs the machine is smaller.

The features above mentioned pre-suppose that the pressure in the container 6 is low and insufficient to produce in the reservoir of the cylinder 2, the pressure necessary for making coffee, and it is for this reason that co-operation of the spring which is loaded during the ascent of the plunger unit is necessary.

On the opposite and extreme assumption that the pressure in the container is such as to produce in the reservoir of the cylinder, the pressure necessary for making the coffee, the spring, if it does not become superfluous, certainly no longer fulfils the function of co-operating with the hydraulic pressure. In this case the spring merely produces the super-pressure on the rod, which pressure is directed downwardly to bring the surface 44 of the rear plunger part into contact with the facing surface 40 of the front plunger part 36 at the moment when, after raising the latter, the handle is released. That is to say when, in view of the fact that the lower chamber and the reservoir into which the plunger unit divides the cylinder 2 are intercommunicating the hydraulic pressure is the same.

Contact having been made and liquid-tightness having been effected for an instant, the said liquid-tightness is then ensured by the difference in pressure which is established between the reservoir (pressure in the container 6) and the lower chamber, which difference causes the descent of the plunger unit and the distribution or dispensing of the beverage.

It appears obvious that the force for raising the front plunger part 36 is initially equal to the pressure which keeps the surfaces 40 and 44 pressed together, which force is less than the total hydraulic pressure bearing on the rear plunger part during the descent thereof which is used for making coffee. Finally and for the whole of the duration of the raising action, omitting the friction, the force required is almost nil having regard to the fact that the lower chamber and the reservoir are in communication with one another. A further advantage common to the embodiment described is that any quantity of coffee may be dispensed. The water remaining in the cavity 2 cannot become cold again during the intervals of time in which coffee is not made since the wall of the cylinder forms part of

the wall of the container 6 and since heat passes through the ports 8.

It may yet be observed that at the end of dispensing coffee even if, as is usual, the plunger unit has descended until it is against the gauze or mesh and the latter is in contact with the panel or cake of coffee powder, the latter remains wet. But this is not so, since on the assumption which has just been made that the small quantity of water permeating the coffee is at a high temperature round about or above 100° C., when the pressure generated by the plunger is removed, the water evaporates rapidly.

What we claim is:—

1. A coffee making machine including a cylinder having a spring influenced plunger displaceable therein towards and away from a coffee filter tray, a reservoir for liquid under pressure located in the cylinder behind said plunger, manual control means for withdrawing the plunger into said reservoir, and a valve controlled passage through the plunger which is arranged to open against said spring influence at the commencement of the plunger withdrawal to permit liquid from the reservoir to flow into the space between the plunger and tray, and to close under the spring reaction when the withdrawing force is relieved, whereby the liquid pressure in said reservoir serves to urge the plunger forward on its return stroke towards the tray.

2. A coffee making machine as claimed in claim 1, in which the plunger includes rear and front parts having fluid-tight facing surfaces which are axially separable to a limited extent against the spring influence to open said passage, the manual control means being connected with said rear part so that separation of said surfaces is effected on initial application of the withdrawing force.

3. A coffee making machine as claimed in claim 2, in which the rear plunger part is in the form of a cylindrical member having one end thereof connected to the manual control means through the intermediary of an axially directed rod passing through said reservoir, and the opposite end thereof arranged radially loosely within a circular recess formed in the front plunger part, and in which said cylindrical member is provided with a peripheral flange to locate one extremity of a coil spring providing the said spring influence, and in which said rear plunger part is formed with a central protuberance or finger which extends radially loosely through a circular duct passing through the front plunger part to provide said valve controlled passage.

4. A coffee making machine as claimed in claim 3, in which at least one of said fluid tight facing surfaces is provided with a water-tight packing or seal.

5. A coffee making machine as claimed in any one of claims 1 to 4, in which means are provided so that liquid filling the reservoir

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may be kept at the optimum temperature for making coffee.

5 6. A coffee making machine as claimed in any one of claims 1 to 5, in which a water container integral with the cylinder is inter-connected through the intermediary of one or more ports with said reservoir, and in which electrical resistances are arranged in the bottom of said container.

10 7. A machine as claimed in claim 6, in which a base plate is provided with an upwardly directed boss or projection carrying one extremity of a hollow column, and in which said column is arranged to support said water container and house an electric cable for feeding the electrical resistances.

15 8. A machine as claimed in claim 6 or claim 7, in which said container is provided with a cover which may be fastened thereto with a fluid tight joint by means of a screw engaging an associated screw threaded aperture formed in part of the container bottom, and in which the screw may be partially unscrewed from the threaded aperture to release

said fluid tight joint.

25 9. A machine as claimed in claim 8, in which a safety valve communicating with the interior of the container is fitted to the cover of the latter by means of a screw thread, said valve being provided with means for calibration.

30 10. A machine as claimed in claim 9, in which said safety valve has a calibrated diaphragm.

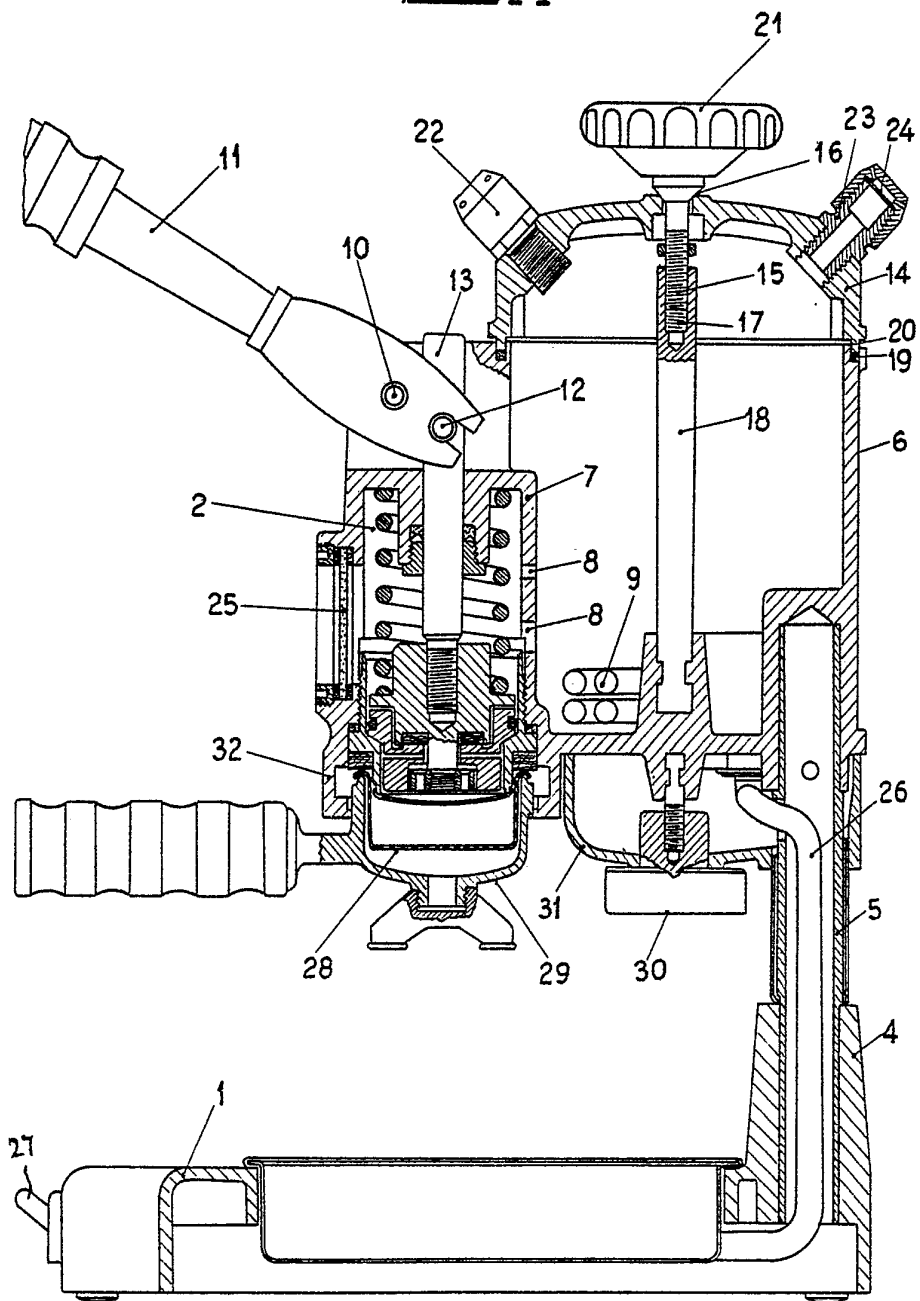
35 11. A machine as claimed in any one of claims 6 to 10, in which the wall of the cylindrical member is provided with an inspection glass for inspecting the level of the water within the container.

40 12. A coffee making machine substantially as hereinbefore described and illustrated with reference to Figures 1 and 2 of the accompanying drawings.

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copies may be obtained.

FIG. 1



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2 SHEETS

This drawing is a reproduction of the Original on a reduced scale.

SHEETS 1 & 2

FIG. 2

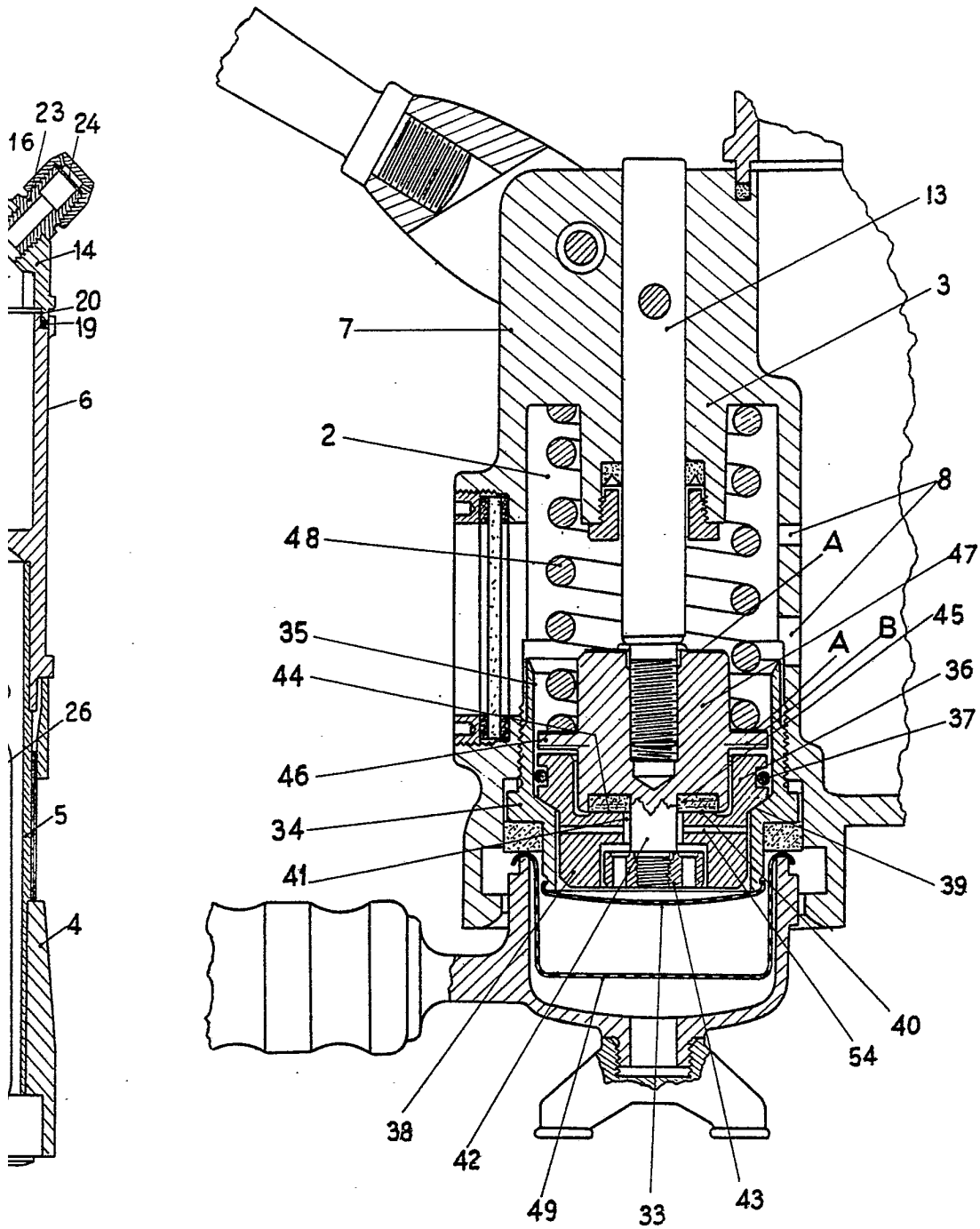


FIG. 1

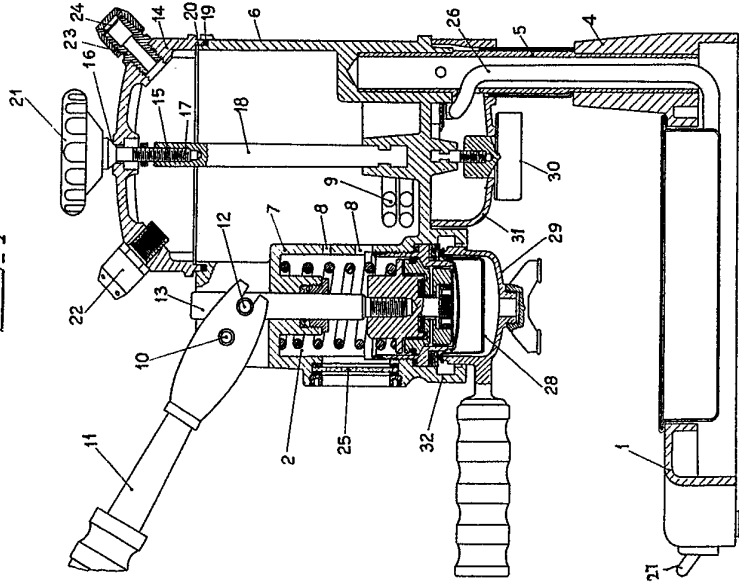


FIG. 2

