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(71) Applicant: **GENERAL DETERGENTS S.p.A.**
I-20020 Solaro (Milano) (IT)

(72) Inventor: **Fuger, Fernand,**
c/o General Detergents S.p.A.
20020 Solaro (Milano) (IT)

(74) Representative: **Cicogna, Franco**
Ufficio Internazionale Brevetti
Dott.Prof. Franco Cicogna
Via Visconti di Modrone, 14/A
20122 Milano (IT)

(54) Automatic filling machine for filling bottles and the like

(57) The present invention relates to an automatic filling machine (1) for filling bottles and the like, characterized in that said machine comprises, on a bearing framework (2), a bottle supporting element (3) for supporting a bottle to be filled, which includes a load cell (10) for detecting the weight, coupled to a display (12) for displaying the tare, delivered amount, unitary price of the product and the total cost thereof.

A control microprocessor (20) is moreover provided, for controlling the operation of the machine, which, in particular, controls the locating of the filling nozzle, a product delivery pump (31) as well as a printer (40) for providing a ticket bearing the law data, the delivered product amount and the cost thereof.

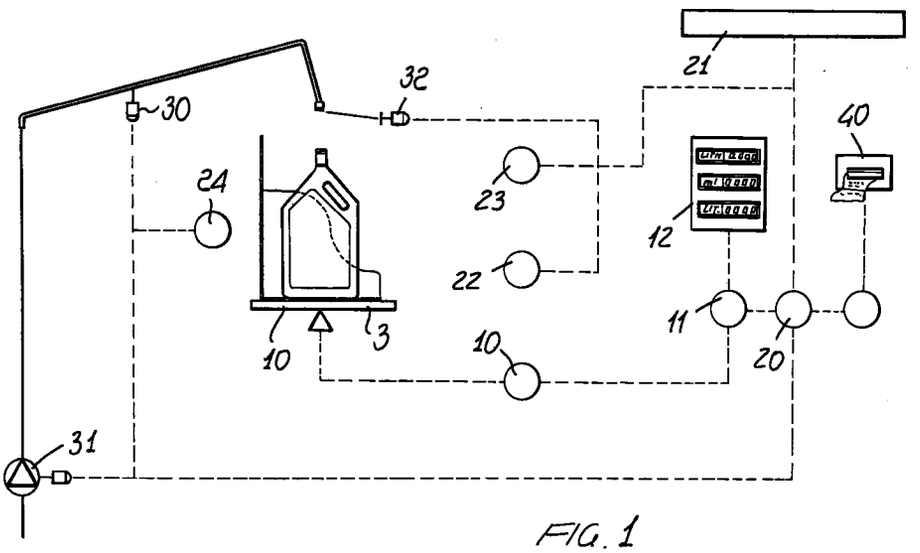

FIG. 1

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Description

BACKGROUND OF THE INVENTION

The present invention relates to an automatic filling machine for filling bottles and the like.

As is known, a very important problem is that of properly eliminating the waste, in particular of plastic materials used for making containers for cleaning agents or materials and the like.

These containers, in particular, are discarded as the cleaning product has been exhausted, with the consequent problem of the disposal thereof and with an increase of the costs for the user who, as buys again the cleaning material, must pay for a new container.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing an automatic filling machine, for filling bottles and the like, which allows an user to fill again an exhausted container thereby providing two advantages: the first of greatly reducing the plastic material waste to be disposed of, and the second of reducing the cost of the product, since the container therefor is used again.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a filling machine allowing an user to perform all of the filling operations in a very simple and automatic manner, without any operation errors.

Another object of the present invention is to provide such an automatic filling machine including means for providing an user with information related to the machine operating condition and specifically designed for providing, at the end of the filling operation, a ticket bearing data related to the net amount of delivered product, as well as to the price and other data required by law.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by an automatic filling machine, for filling bottles and the like, characterized in that said machine comprises, on a bearing framework, a support element for supporting a bottle to be filled, including a load cell for detecting the weight, connected to a display for displaying the tare, the delivered product amount, the unitary price of the product and the cost thereof, a control microprocessor being moreover provided for controlling the operation of said machine, said microprocessor controlling, in particular, the operation of a filling nozzle, a product supply pump and a printer for providing a ticket bearing legal data as well as the delivered product amount and cost thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of an automatic filling machine for filling bottles and the like, which is illustrated, by way of an indicative, but not limitative, example, in the figures of the accompanying drawings, where:

Figure 1 illustrates a logic diagram related to the operation of the subject machine;

Figure 2 is a front elevation view illustrating the filling machine according to the invention;

Figures 3 and 4 are respectively a side view and a top plan view illustrating the filling machine according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the number references of the above mentioned figures, the automatic filling machine, for filling bottles and the like, according to the present invention, which has been generally indicated by the reference number 1, comprises, on a bearing framework 2, a supporting element 3 for a bottle or the like to be filled.

Under the supporting element, it is provided a load cell 10, constituting a conventional measurement element.

The load cell, in particular, is connected, through a weight calibrated sensor or transmitter 11, to a display 12 for displaying the unitary price of the product, the empty bottle tare, as well as the delivered product amount and the cost thereof.

The transmitter or sensor 11 will indicate, in real time, the weight on the panel of the supporting element 3.

Moreover, it is provided a control microprocessor 20, for controlling the operation of the filling machine, which is connected to a signal emitter, for emitting signal to the user, indicated at the reference number 21.

The microprocessor 20 will detect the bottle type by means of a bar-code reading device, or a like element 22, and, in the case of a detection failure, it will send a message of not suitable bottle.

The microprocessor, in particular, will detect a minimum and maximum tare of the empty bottle and, outside of such a range, it will stop the operation of the machine, by transmitting a not suitable tare message.

Moreover, said microprocessor will detect the location of the bottle by means of a position detector 23 and, if the bottle position is not suitable for the filling operation, the microprocessor will stop the operation of the machine by sending a message in order to properly relocate the bottle.

The microprocessor, moreover, will detect, through a detector 24, the presence of the bottle plug, before the

filling-in operation and, in the case in which the bottle is plugged, it will stop the operation of the machine and will send a message for causing the plug to be removed.

At the start of the filling operation, the microprocessor will drive the delivery nozzle 30 to a proper filling operation, and will start the product delivering or supplying pump 31.

As a preset weight is reached, and after few seconds, the microprocessor will cause the delivering nozzle 30 to be driven again to its home position and it will moreover stop the product delivery pump and, moreover, will located, between the bottle and the delivery nozzle a drop retaining channel element 32.

At the end of the filling operation, the microprocessor will detect from the display control assembly, the net weight of the delivered product, and will transform the grams into ml's, and then will send the related data to a printer 40 and will drive said printer for emitting a ticket, and will signal to the user to screw-on the plug on the bottle and then, to take the filled bottle and ticket.

The automatic filling machine according to the present invention is moreover provided for performing auxiliary functions, such as a storing of the number of the delivery operation, on a permanent store, for statistical purposes, as well as on a resettable store, for indicating a minimum amount of available product.

Moreover, it is also adapted to perform autodiagnosis and alarm functions, and to modify the values of set conditions, such as tare, specific weight, unitary price, time and the like, by means of an input keyboard.

Another function of the subject machine is that of stopping its operation as the product has been exhausted as well as in the case in which the delivered amount does not correspond to a preset amount, or in the case in which the used bottle is broken so as to allow product to be ejected therefrom.

The subject machine, moreover, has been specifically designed for delivering several different products, by associating with each product, for example, a related type of bottle, and controlling several delivering pumps and nozzles.

The printer 40, in turn, has been provided for printing a ticket or label bearing all of the data required by law, such as, for example, the composition of the product and the use data therefor, as provided by law, as well as the date, product code, the net delivered amount and the price thereof.

Thus, it should be apparent that the disclosed machine is adapted to automatically perform the following operations: detection of the bottle type, calculation of the tare, detection of the plug presence, detection of a not suitable bottle, filling of the suitable bottles, delivery of a preset and constant amount of product, preventing drops from dropping, signalling an user to screw-on the plug of the bottle, and printing a ticket while alerting the user to remove the filled bottle.

The user, in turn, must simply screw-on the plug on the bottle and remove the filled-in bottle and related ticket.

From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

In particular, it should be apparent that a very functional and simple filling machine has been provided which can be easily used at selling places, providing an user to perform a self-service type of operation for taking-up the desired products, with savings of labour and costs.

The invention, as disclosed, is susceptible to several variations and modifications, all of which will come within the inventive idea scope.

Moreover, all of the details can be replaced by other technically equivalent elements.

In practicing the invention, the used materials, provided that they are compatible to the intended use, as well as the contingent size and shapes, can be any, depending on requirements.

Claims

1. An automatic filling machine, for filling bottles and the like, characterized in that said machine comprises, on a bearing framework, a support element for supporting a bottle to be filled, including a load cell for detecting the weight, connected to a display for displaying the tare, the delivered product amount the unitary price of the product and the cost thereof, a control microprocessor being moreover provided for controlling the operation of said machine, said microprocessor controlling, in particular, the operation of a filling nozzle, a product supply pump and a printer for providing a ticket bearing legal data as well as the delivered product amount and cost thereof.

2. An automatic filling machine, according to Claim 1, characterized in that said machine comprises a barcoded detector, read-out device or the like, for detecting the type of said bottle.

3. An automatic filling machine, according to Claims 1 and 2, characterized in that said microprocessor is programmed for detecting a minimum and maximum tare of the empty bottle, and stopping the operation of the machine if the tare is not included in such a range.

4. An automatic filling machine, according to one or more of the preceding claims, characterized in that said machine further comprises a detector for detecting the position of said bottle on said supporting element, and being adapted to stop the operation of said machine as the position of said bottle is not a set position.

5. An automatic filling machine, according to one or more of the preceding claims, characterized in that said machine further comprises detecting means

for detecting the presence of a plug on said bottle, said detecting means being connected to said microprocessor.

6. An automatic filling machine, according to one or more of the preceding claims, characterized in that said machine further comprises a dropping channel element to be arranged between the product delivery nozzle and said bottle, at the end of a filling-in operation.

7. An automatic filling machine, according to one or more of the preceding claims, characterized in that said machine further comprises an user message emitter driven by said microprocessor.

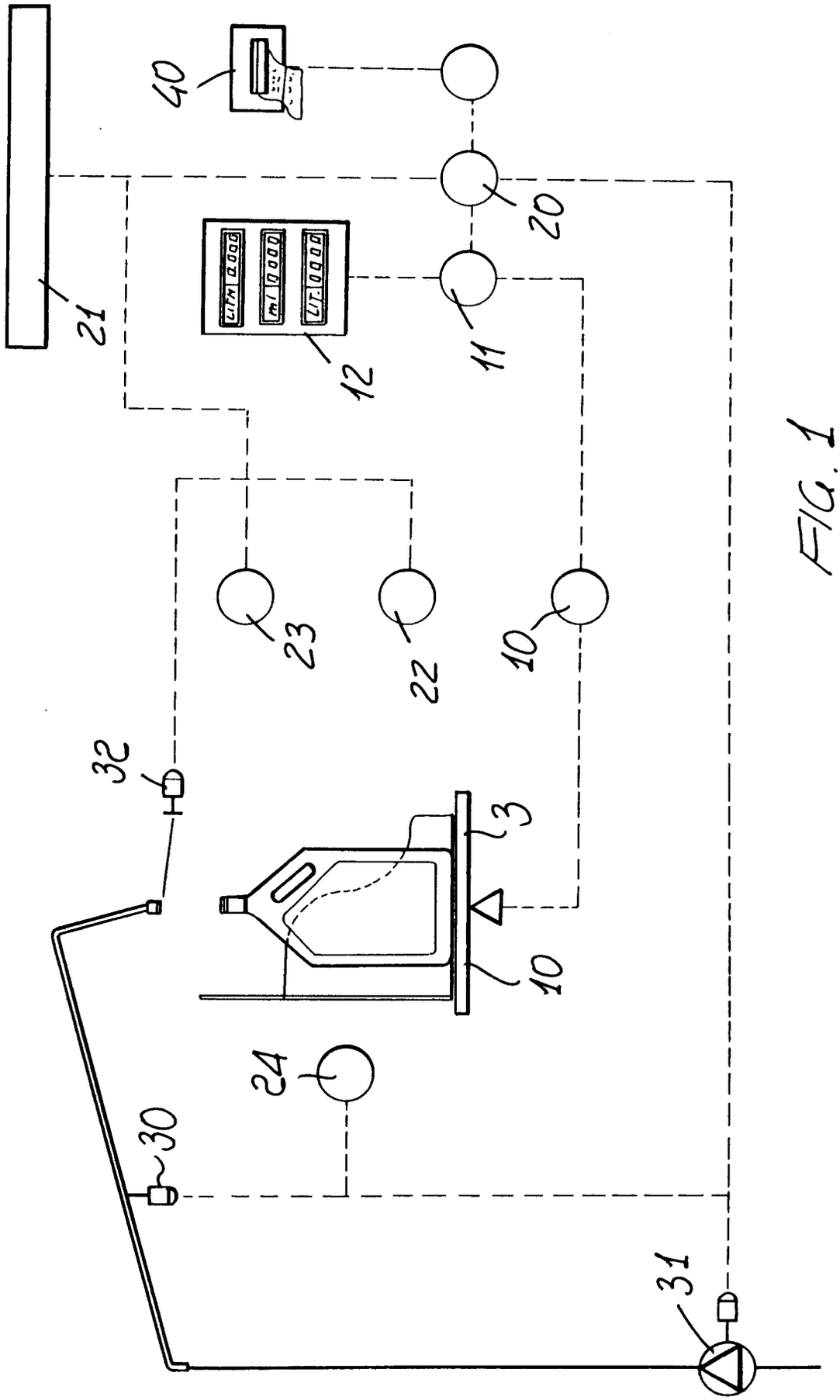

FIG. 1

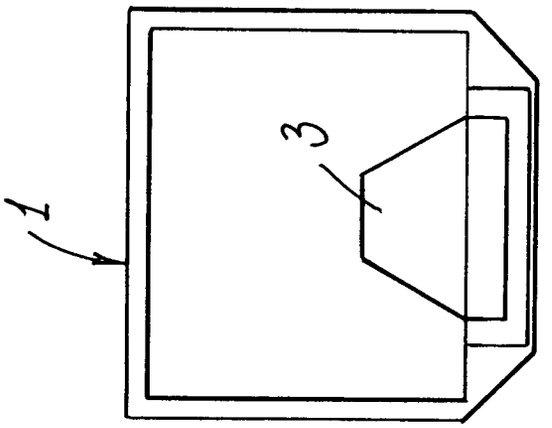

FIG. 4

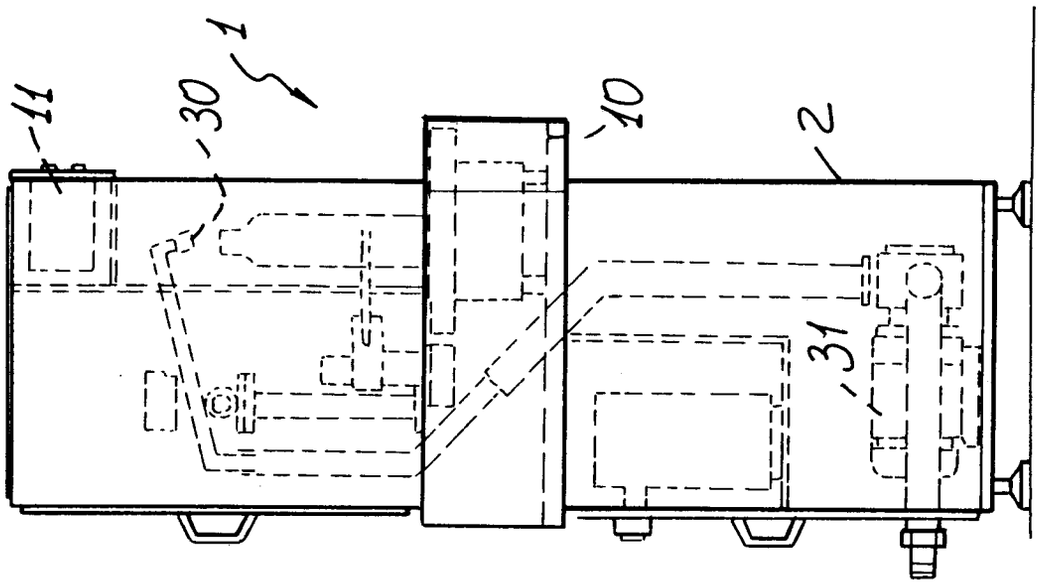

FIG. 3

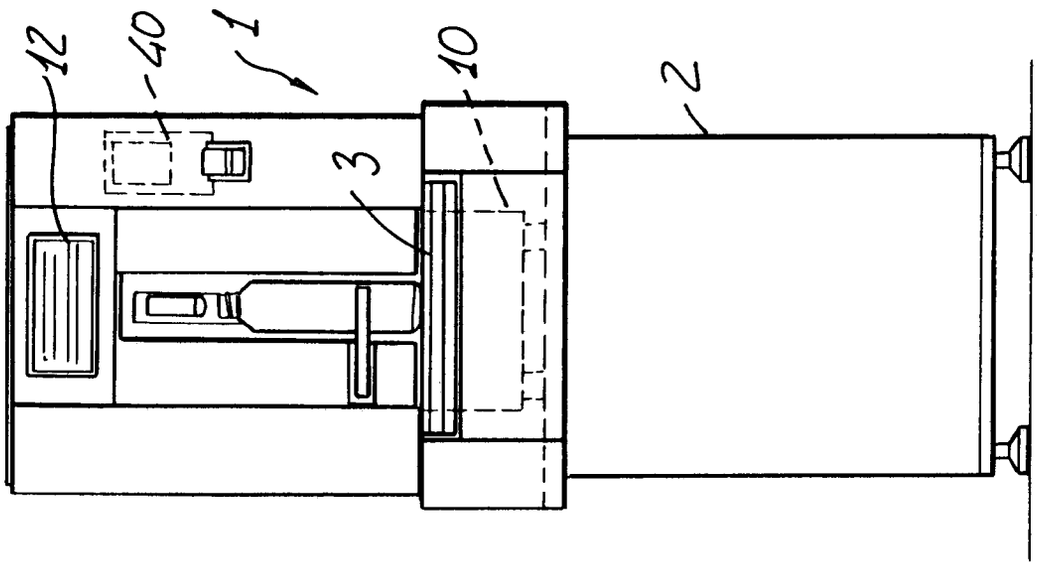

FIG. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 83 0246

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE-U-91 08 409 (CONTRAVES GMBH) * page 8, paragraph 2 * * page 9, paragraph 3 - page 11, paragraph 2 * ---	1,2,4,7	B67D5/02 B67D5/33
A	EP-A-0 564 303 (DIVERSEY CORP.) ---		
A	US-A-4 337 802 (KENNEDY ET AL.) ---		
A	DE-U-91 12 312 (DEUTSCHE TECALEMIT) ---		
A	DE-U-91 07 528 (ARMATURENFABRIK E. HORN) -----		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
B67D B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 May 1996	J.-P. Deutsch

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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& : member of the same patent family, corresponding document

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