

## COMMONWEALTH OF AUSTRALIA

## PATENTS ACT 1952

## APPLICATION FOR A STANDARD PATENT

Bosch-Siemens Hausgerate GMBH, of Hochstrasse 17, D-8000 Munchen 80, FEDERAL REPUBLIC OF GERMANY; Coca-Cola Company, incorporated in Delaware, of Atlanta, Georgia, 30301, UNITED STATES OF AMERICA, hereby apply for the grant of a standard patent for an invention entitled:

A Device for Mixing Two Liquids at any Given Time

which is described in the accompanying complete specification.

Details of basic application(s):-

<u>Basic Applic. No:</u>	<u>Country:</u>	<u>Application Date:</u>
P 39 40 879.5	DE	11 December 1989

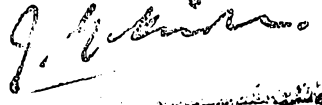
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DATED this TENTH day of DECEMBER 1990

Bosch-Siemens Hausgerate GMBH, Coca-Cola Company

By:



Registered Patent Attorney

TO: THE COMMISSIONER OF PATENTS  
OUR REF: 148790  
S&F CODE: 51732

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P/00/008

SPRUSON & FERGUSON

Australia

Patents Act 1990

NOTICE OF ENTITLEMENT

We, Josef Kessl and Franz Rode, both care of Bosch-Siemens Hausgerate GMBH, of Hochstrasse 17, D-8000 Munich 80, Germany, being authorised by one of the Applicants/Nominated Persons in respect of Application No 67962/90 state the following:-

The Applicants/Nominated Persons have entitlement from the actual inventors, Karlheinz Farber, Walter Eichler, Anton Deininger, Heinz-Werner Giefer and Alfred Raab as follows:-.

Bosch-Siemens Hausgerate GMBH is entitled to make the basic application by Contract of Employment between the inventors as employees and Bosch-Siemens Hausgerate GMBH as employer, as a person who would be entitled to have the patent assigned to it if a patent were granted upon an application made by the inventors and Coca-Cola Company is entitled to make the basic application as assignee of a part interest in the invention from Bosch-Siemens Hausgerate GMBH.

The Applicants/Nominated Persons are the applicants of the basic application listed on the Patent Request.

The basic application listed on the Patent Request is the application first made in a Convention Country in respect of the invention.

DATED this 12th day of August 1993

*Josef Kessl*  
.....  
Josef Kessl

DATED this 17th day of August 1993

*Franz Rode*  
.....  
Franz Rode



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**(12) PATENT ABRIDGMENT (11) Document No. AU-B-67962/90**  
**(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 644391**

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- (54) Title  
**A DEVICE FOR MIXING TWO LIQUIDS AT ANY GIVEN TIME**
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- (71) Applicant(s)  
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- (72) Inventor(s)  
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- (74) Attorney or Agent  
**SPRUSON & FERGUSON , GPO Box 3898, SYDNEY NSW 2001**
- (56) Prior Art Documents  
**US 4955509**  
**US 4144650**
- (57) Claim

1. A device for mixing of two liquids at any given time in a fixed proportion, where one of the liquids is added to a mixing area in consecutive individual portions by a volume-dosaging device and the other liquid over a timed delivery valve which is flow-regulated as to volume, wherein the timed delivery valve which controls the flow-through of the liquid delivered via a flow-through regulator, is made rhythmic to work in concert with the volume-dosaging device.

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FORM 10

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COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE:

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Complete Specification Lodged:  
Accepted:  
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Related Art:

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Complete Specification for the invention entitled:

A Device for Mixing Two Liquids at any Given Time

The following statement is a full description of this invention, including the best method of performing it known to me/us

#### ABSTRACT

In a device for mixing two liquids at any given time in fixed predetermined mix proportions, where one of the liquids, particularly the liquid constituting the smaller mix proportion, can be added in successive individual portions by a volume dosaging device, and the other liquid added through a timed dispensing valve and while regulating the flow-through volume conducted into a mixing area, the timed delivery valve can be made to work in concert with the volume dosaging device.

The present invention relates to a device for mixing two liquids in a predetermined ratio, wherein one of the liquids, in particular the liquid for the smaller fraction of the mix, can be conveyed, in individual successive portions, to a region of mixing through a volume-metering device and the other liquid can be conveyed via a timed dispensing valve with volume flow control.

Such a device is adapted preferably for making available, for the mixing process in automatic beverage dispensers with which carbonated water is mixed with beverage concentrates to a refreshment, the beverage concentrates as the one of the two liquids, and the carbonated water as the other liquid from a storage vessel in a volume-metered fashion for the mixing operation.

The mixing ratio, obtained with such automatic beverage dispensers, of beverage concentrate to carbonated water in the refreshment to be prepared should as precise as possible so that, if possible, the drink prepared in the automatic beverage dispenser will be up to the standards of comparable ready-to-use bottled beverages. In order to be able to obtain the precision of the mixing ratio and, hence, the high quality of the beverage, it is necessary to be able to dispense both the beverage concentrates and the carbonated water with an accordingly high precision as far as volume is concerned.

For installing in automatic beverage dispensers for the dispensing of beverage concentrates, dosage chamber dispensers have been introduced (DE-OS 25 44 671, DE-OS 34 09 124, DE-OS 36 22 745). With this type of metered chamber dispensers that can deliver relatively precise individual amounts, the beverage concentrate can be dispensed with sufficient precision.

For making available carbonated water for mixing with beverage concentrates portioned out that way, a device has been introduced (DE-OS 34 30 953), in which, in a so-called carboniser, water prepared and stored under high pressure can be dispensed in a flow-through regulated way by a flow-volume regulator and also by a volume-regulating timed valve.

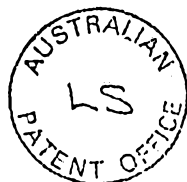
It is also possible to deliver beverage concentrates from the storage container to the mixing area for mixing and preparation of beverage, by using a piston pump system. Piston pump systems for this purpose require, to be sure, compared to the known metered chamber  
5 dispensers, a higher drive output, but they offer the possibility to portion out the beverage concentrates in essentially smaller individual amounts and with higher dispensing frequency, so that drinks can be mixed in individual, fixed amounts - on a practically continuous basis.

The measures required to dispense beverage concentrates, on the  
10 one hand, and carbonated water, on the other, for the purpose of making them available for mixing a drink have been chosen and optimised according to the particular requirements and conditions. But since these measures necessarily vary and present peculiar characteristics, care must be taken that these varying characteristics do not have any  
15 disadvantageous consequences for the intended mixing ratio of the prepared drink, and indeed are independent of the amount of beverage to be mixed and prepared in some number of individual steps.

Considering these facts, the present invention intends to create such a device which, with the least effort, will ensure that the  
20 particular mixing ratio of two combining liquids, where one liquid is added by a volume metering device and the other liquid by a timed, controlled dispensing valve with regulation of the flow volume, will all the time be as precise as possible, irrespective of the particular dispensed volume.

25 In accordance with the invention there is disclosed a device for mixing of two liquids at any given time in a fixed proportion, where one of the liquids is added to a mixing area in consecutive individual portions by a volume-dosaging device and the other liquid over a timed delivery valve which is flow-regulated as to volume, wherein the timed  
30 delivery valve which controls the flow-through of the liquid delivered via a flow-through regulator, is made rhythmic to work in concert with the volume-dosaging device.

The according to the activity of the volume-dosaging device timed action of the delivery valve for the addition of the flow-through  
35 regulated liquid leads, according to the characteristics of this invention, to the fact that of the two liquids that are to be mixed, whichever is the smallest can be determined by the volume-dosaging device on a continuous



basis, and that by juxtaposing the dispensing quantities for practically continuous dispensing and mixing of these two liquids, the mix proportions will continue to stay precise. Viz. it has turned out that when liquids are dispensed by regulating the flow-through, during the opening and closing of the timed delivery valve as opposed to the continuous flow-through regulated delivery, different conditions crop up. These may contribute to rendering the desired mix proportions imprecise. To be sure, it seems not a good idea to multiply these influences by making the delivery flow rhythmic. But since these influences appear to have almost the same effect at each input and output occasion, these influences are then also controllable, if they are multiple. The invention however fixes it so that these in themselves irregular but controllable influences have a fixed connection with the dispensed total volumes and hence are to the same degree controllable, independent of the particular dispensed volumes.

According to a preferred embodiment of the device of the invention, the volume-metering device is a piston pump system which can deliver the one liquid, e.g. in automatic beverage dispensers the beverage concentrate, in any consecutive individual least amounts. In this connection, it is a good idea that the rhythmic timed delivery valve is activated by the drive mechanism for the volume-dosaging device. This activation can be purely mechanical. But it is also possible to make this device in such a way that a control contact that can be influenced by the drive mechanism of the volume-dosaging device runs the electromagnet that activates the rhythmic timed delivery valve.

An example of how the invention might be implemented is illustrated in closer detail in the drawings. They show schematically:  
Fig.1: An arrangement in a beverage dispenser with a carboniser for making available carbonated water and a storage tank with a beverage concentrate for mixing into a drink;  
Fig.2: A side view of a piston pump system with eccentric drive inserted in a casing for the delivery of beverage concentrate; and  
Fig.3: An eccentric drive system for two side by side arranged piston pump systems and for working the delivery valve for the carbonated water stored in the carboniser, and



Fig. 4 and Fig. 5, circuit diagrams.

In the simplified and largely diagrammatic representation of Fig. 1, we see that in a device casing 1 of an automatic beverage dispenser, there is a carboniser 2 which is heat-isolated by an isolation shell. Over an inlet pipe 4 this carboniser 2 is in the usual way provided with water, as needed, from a water source, and by way of a feed line 5, CO<sub>2</sub> in the form of gas. Inside this carboniser 2, the provided water is mixed with the provided CO<sub>2</sub> into carbonated water. The carboniser is cooled by cooling pipes 6, which together with a compressor 7, a condenser line 8, and a throttle 9, form a compressor-cooling machine. In the lower part of the carboniser 2 there is an outlet 10 for the carboniser water. According to the regulating activity of a flow-through volume regulator 11 connected electromagnetic outlet valve 12, this carbonated water will be delivered, to a mixing area, to which also beverage concentrate 13 is brought, for producing and preparing a soft drink.

The beverage concentrate 13 is stored in a container 14, which is inserted inside a storage space 15 in the device casing 1. Via a drive system the beverage concentrate 13 is dispensed through a dispensing system 16, which is a fixed component of the container 14, and is mixed with the carbonated water to produce a soft drink.

In the lower container partition of the carboniser 2--in the area of the outlet 10 for the carbonated water--there is a heat-conducting element 17 flanged onto its surface, and as partitions 18 and 19 of the storage space 15, leads to where the container 14 for the beverage concentrate 13 is to cool it.

The structure and the working of the dispensing system 16 will be explained with reference to Figure 2, and the drive system, in conjunction with Figure 3. The delivery system 16 is a piston pump system and consists of a casing 23, which can be inserted and fixed inside an automatic beverage dispenser in its casing 1 from the front. For this purpose the casing 23 has a groove 24, into which an insert 25 of the device casing 1 fits in horse-shoe fashion. Inside this casing 23, there is an accelerator piston 26 axially between impact limitations so it can move. These impacts

fix the stroke height that determines the output volume of the beverage concentrate 13 to be dispensed each work cycle. An inlet opening 27 in the casing 23, which reaches only to the intended storage container 14, and a central passage 28 in the conveying piston 26, come concentrically together, so that inside, a shaft of a drive piston 29 can be inserted to move axially. The axial movement between control piston 29 and output piston 26 is again limited by impacts 36 and 37. The control piston 29 is driven by a lever 30, which with its one lever end 31 catches like a fork [sic] in a groove 32 of the control piston 29. The lever 30 is fixed permanently onto a shaft 33 in the device casing and is run by an eccentric drive 34, which is encircled like a fork by the second lever arm 35 of the lever 30 and run by turning in the direction of the arrow. When the eccentric 34 rotates in the direction of the arrow beyond the position shown in Fig. 1, the working piston 23 is moved downward beyond the impact area 36 so that the beverage concentrate 13 is sucked from the storage container 14 in to the piston pump system 16 via the inlet opening 27 of the same. If the eccentric 34 is turned further, first the upper shaft of the control piston 29 gets into the area of the inlet opening 27 and closes it off. As the control piston 29 continues up, the impact areas 37 between control piston 29 and accelerator piston 29 close up, so that the accelerator piston 26 is now moved up with control piston 29. Thereby the originally sucked in beverage concentrate amount is transported by side channels 28 in the control piston 29 to a central delivery channel 39 in the control piston 29. From this central delivery channel 39 the beverage concentrate 13 gets out into the area where it will be mixed into a drink with the through the flow-through volume regulator 11 and delivery valve 12 volume-controlled carbonated water that has been brought in. At will, many work cycles can take place one after the other, so that a very precise determination and delivery of the delivered amounts can be effected for individual work cycles as well as the total amount of work cycles. The drive system for running the two piston pump systems 16 and 16', i.e. also for the delivery of two beverage concentrates which have been placed each in its own container inside the storage space 15 of the device casing, is illustrated by the simplified and schematic depiction in Fig. 2. An electric motor 40, indeed a reversible electric motor, stands over a cog

wheel drive 42 with the drive shaft 43 in drive contact. Through corresponding electrical wiring, the electric motor 40 can pull in both directions and hence also work the drive shaft 43 in both directions. This drive shaft 43 can be turned by two hollow shafts 44 and 45, which are also stored in the device casing 1 in such a way that they can be turned, and each carries an eccentric 34 or 34'. The shaft 43 carries on a flange area 46 a twisting spring band 47, which catches on the hollow shafts 44 and 45. This twisting spring band 47 works between the flange area 46 and the drive shaft 43 and the two hollow shafts 44 and 45 as a free-run connection, where the connection between the flange area 46 and one of the two hollow shafts 44 or 45 and the disconnection of the one or the other hollow shaft from the flange area is independent of the turning direction of the twisting band connection 47. Depending on the pull direction of the reversing electric motor 40, either the hollow shaft 44 with eccentric 34 and via them the drive lever 30 is driven, while hollow shaft 45 is disconnected, or the hollow shaft 45 with eccentric 34' is driven, while the hollow shaft 44 is disconnected. By the electronically or electrically activated pull direction of the reversing electric motor 40, the selection of the piston pump system for the delivery of one of the two stored beverage concentrates can be effected.

On the hollow shaft 44 as also on hollow shaft 45, two drive cams 48, 49, and 50, 51 have been arranged. The drive cams 48 and 50 are activated by switch contact devices 52 and 54 on the drive circuit for the reversing electric motor 40, so that this always pulls on, after a drive phase, until the particular activated hollow shaft 44 or 45 with its eccentric 34 or 34' is returned to a definite resting position. This assures that the particular piston pump system 16 completes entire work cycles.

The drive cams 49 and 51 are technically driven by the to them attached switch contact devices 53 and 55 on the electro magnetic system which activates the delivery valve 12 for the carbonated water to be mixed with the beverage concentrates. In carboniser 2 the carbonated water is stored under pressure and cooled, and, with the opening of the outlet valve--flow-through regulated by the flow-through volume regulator 11--is delivered by the over-pressure in carboniser 2 and conducted to the mixing

area, and indeed works rhythmically, starting from the drive cam 49 or 51, corresponding to the work cycles of the piston pump system.

Alternatively it is also possible to let the drive cams 49 or 51 work purely mechanically on the delivery valve for the carbonated water.

Figure 4 shows in symbolic form the drive means according to Figure 3 in conjunction with a circuit scheme suitable for the device. The circuit diagram shows the leads from the power supply via switching contacts 52 and 54 to the drive motor 40 and via switching contacts 53 and 55 to the solenoid of dispensing valve 12. As drive motor 40 is a reversible synchronous motor with in known fashion two windings and three terminals of which a centre terminal is connected to the one lead of the power supply and one of the two other terminals, which are shunted by a phase-shifting capacitor, can be selectively connected to the other lead of the power supply via switching contacts 52 and 54 [sic]. If, for example, switching contact 54 is activated in the direction of the arrow to prepare a beverage, drive motor's 40 connection facing this switch contact is directly connected and the opposite motor connection is connected via the capacitor, and drive motor 40 therefore is driven so that, via wrap-around coupling 45, shaft 43 with cams 50 and 51 and the eccentric 34' are driven.

As soon as there is no longer an actuation of this switching contact 54 in the direction of the arrow, this switching contact 54 is kept by cam 50 in the adjustment position until cam 50 has reached again its initial position. Controlled by cam 51, the dispensing valve 12 for the carbonated water is opened via switching contact 55 for a time span which, per rotation of the cam, is determined by the shape of the cam. Driven by eccentric 34', the drive lever for dispensing the beverage concentrate at the same time performs a driving motion for dispensing an appropriate volume of beverage concentrate per rotation of shaft 43.

When the switching contact 52 is actuated in the direction of the arrow to prepare an other beverage, the drive motor 40 is connected in the reversed direction with its external connections to the power supply voltage so that the motor now rotates in the opposite direction and, as described above, drives the opposite shaft 43.

When a d.c. motor 40' is used, a modified circuit scheme as per Fig. 5 is recommended, because in this case also the current flow must be reversed.

In place of the one valve 12 there can be mounted two valves which are associated with the beverage types and, separately, with the contact switches 53, 55.

The claims defining the invention are as follows:

1. A device for mixing of two liquids at any given time in a fixed proportion, where one of the liquids is added to a mixing area in consecutive individual portions by a volume-dosaging device and the  
5 other liquid over a timed delivery valve which is flow-regulated as to volume, wherein the timed delivery valve which controls the flow-through of the liquid delivered via a flow-through regulator, is made rhythmic to word in concert with the volume-dosaging device.
2. A device according to claim 1, wherein the volume-dosaging  
10 device is a piston pump system.
3. A device according to claim 2, wherein the rhythmic timed delivery valve is activated by the drive mechanism of the volume-dosaging device.
4. A device according to claim 3, wherein the rhythmic timed  
15 delivery valve is worked mechanically by the drive mechanism of the volume-dosaging device.
5. A device according to claim 3, wherein switch contact is influenced by the drive mechanism of the volume-dosaging device via a control cam runs an electromagnet which works the rhythmic timed  
20 delivery valve.
6. A device according to any one of the preceding claims said one liquid comprises a smaller proportion of the mix.
7. A device for mixing of two liquids at any given time in a fixed proportion substantially as described herein with reference to the  
25 drawings.

DATED this FIFTEENTH day of SEPTEMBER 1993

Bosch-Siemens Hausgerate GmbH

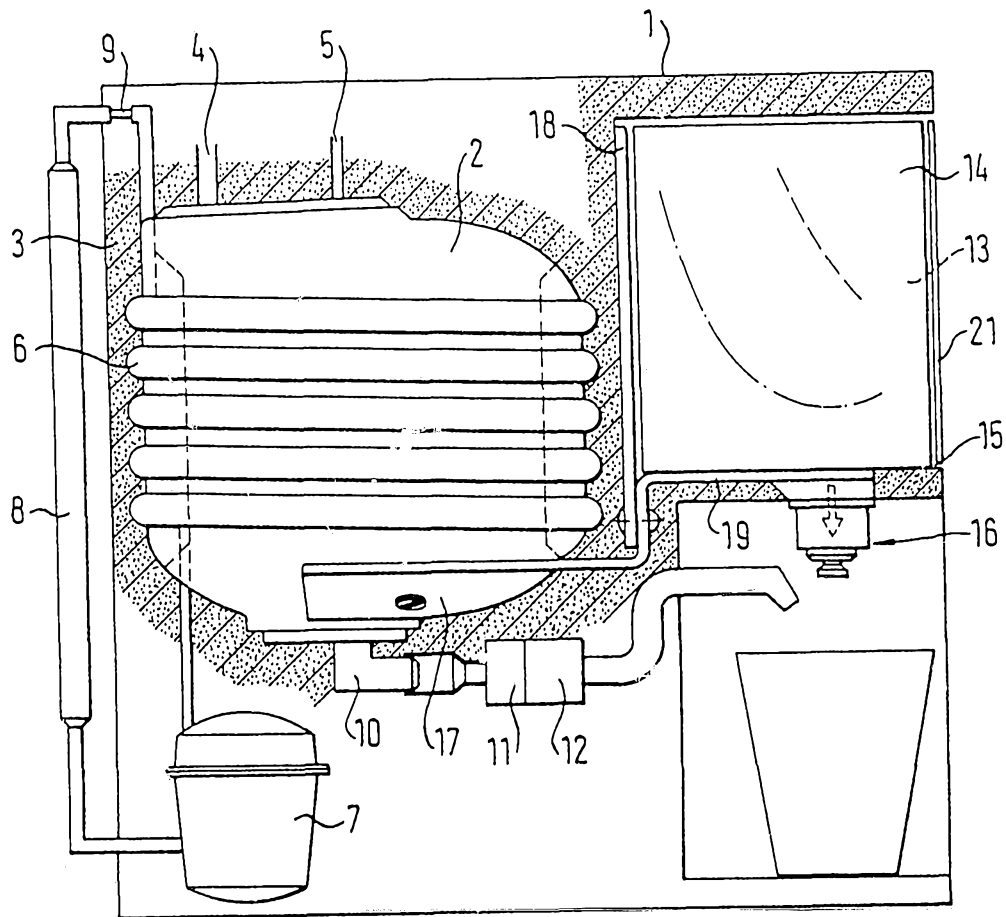
Coca-Cola Company

Patent Attorneys for the Applicants

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Fig. 1



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Fig. 2

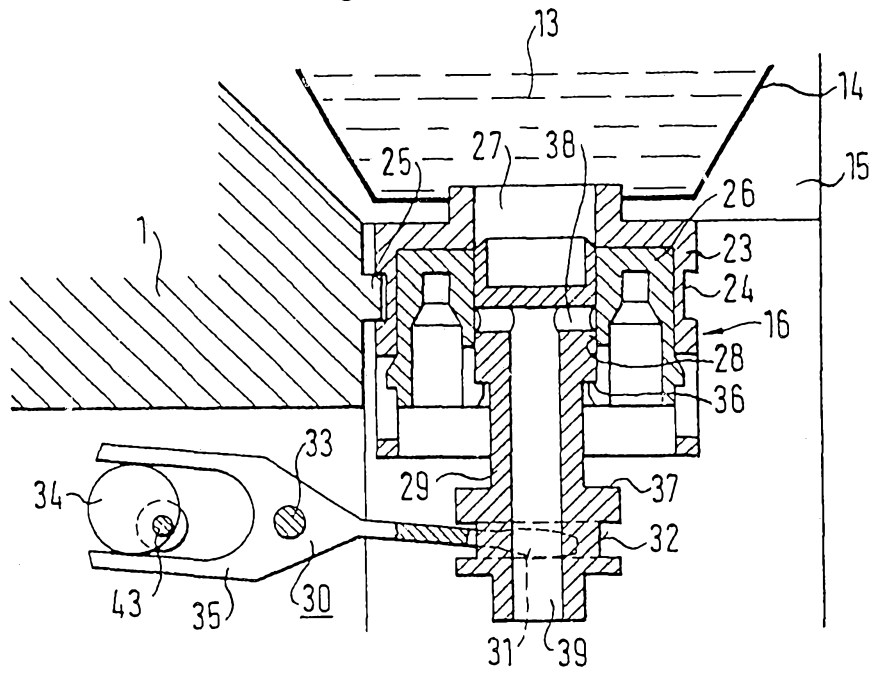


Fig. 3

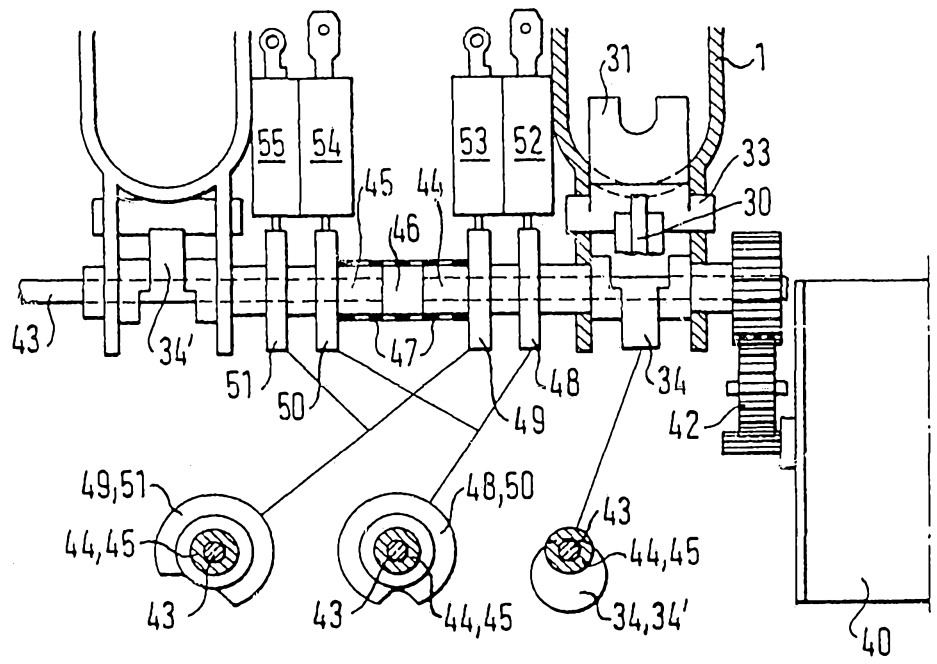




Fig. 4

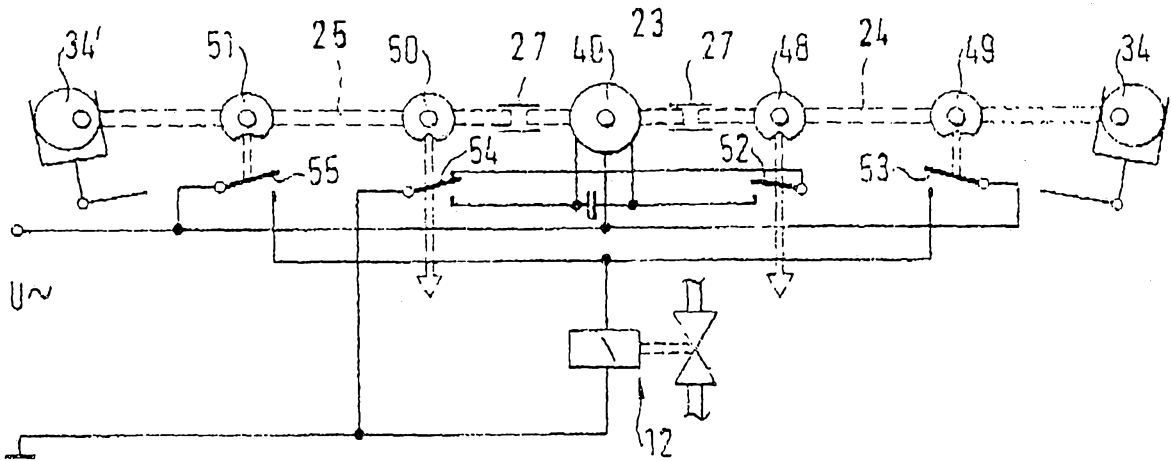


Fig. 5

