Feb. 27, 1962 A. CHIANTELASSA 3,022,919

APPARATUS FOR DETERMINING COMPOSITION AND PRICE OF A DISPENSED MIXTURE

Filed June 17, 1958

4 Sheets-Sheet 1

FIG. 1

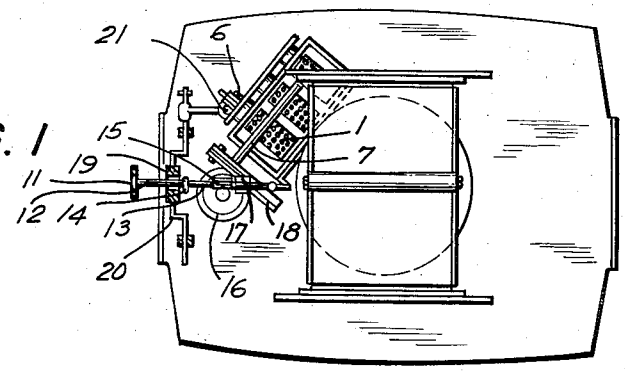


FIG. 2

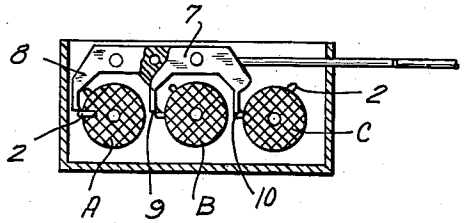


FIG. 3

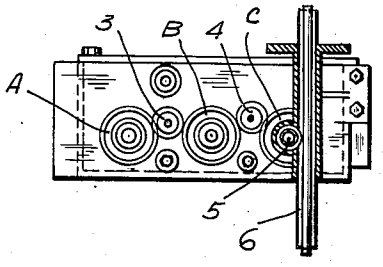
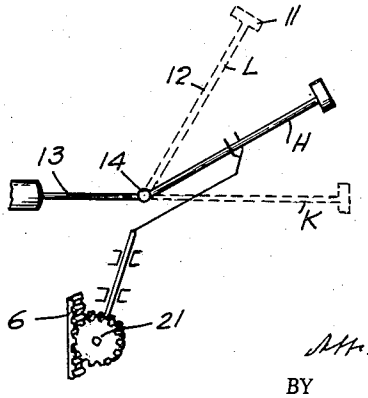


FIG. 4



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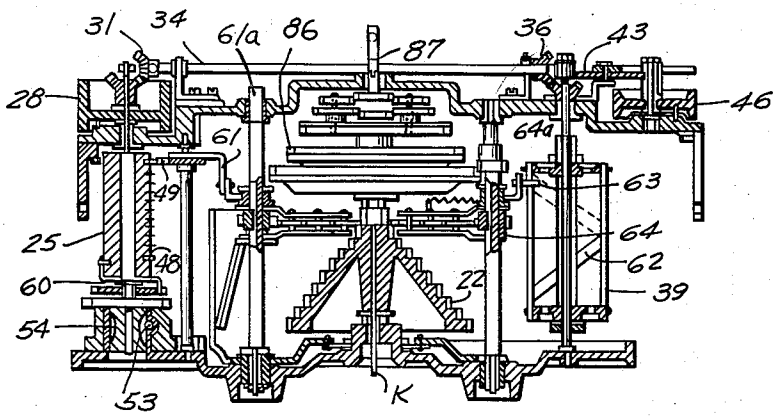


FIG. 5

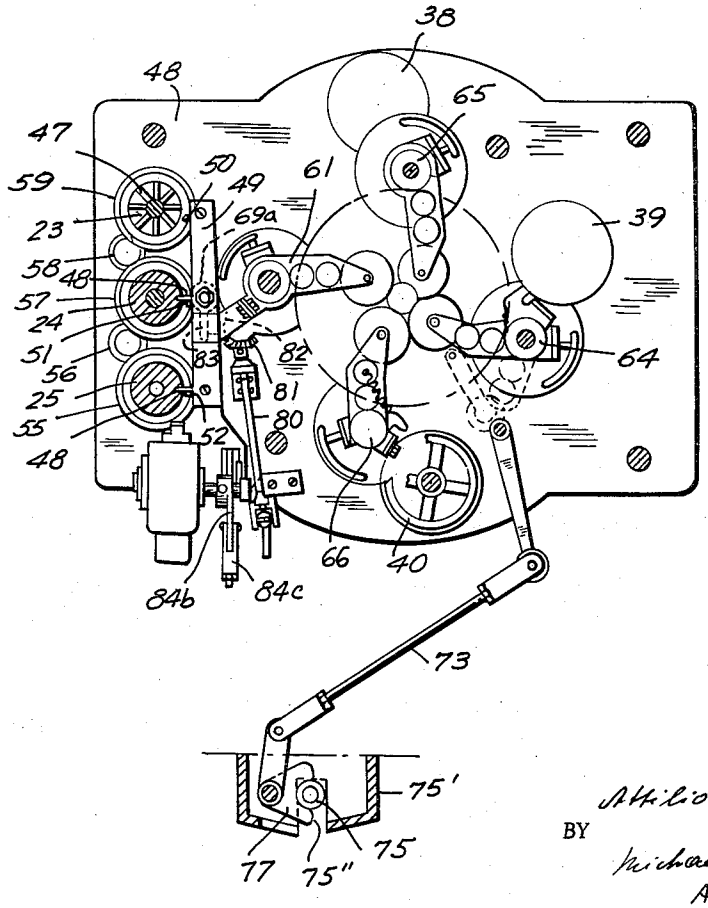


FIG. 6

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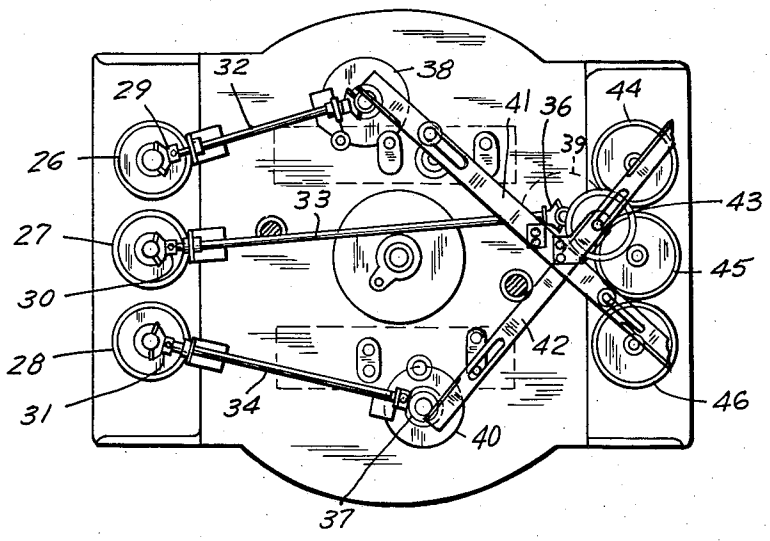
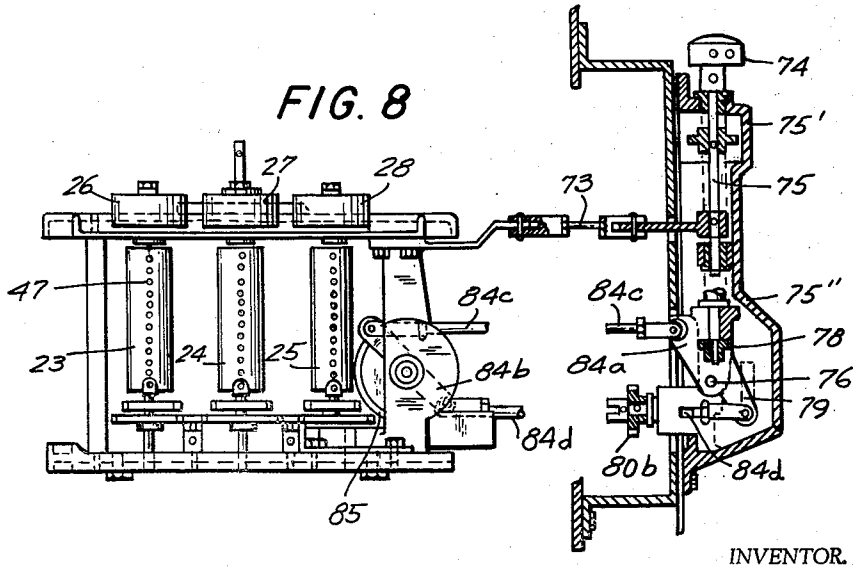


FIG. 7

FIG. 8



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FIG. 9

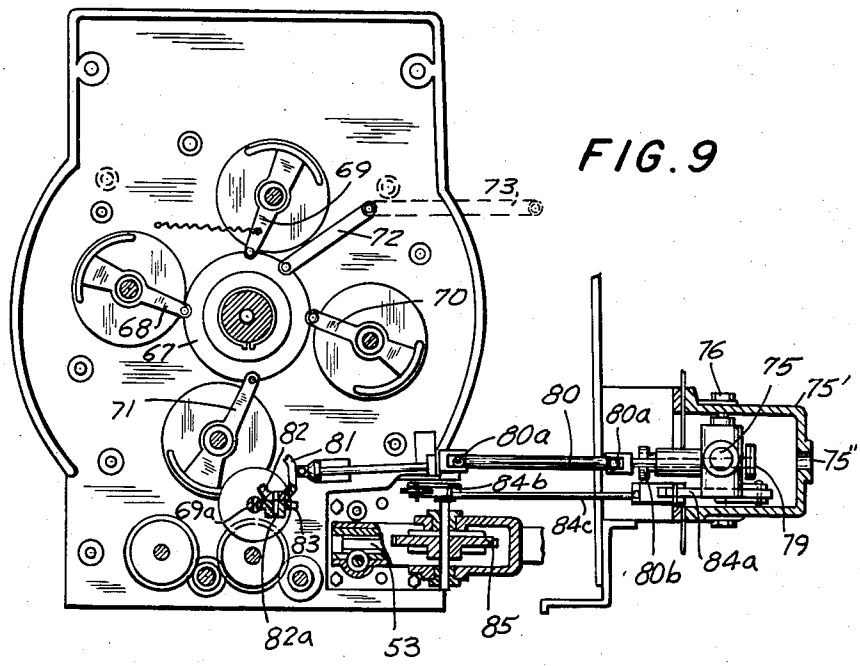
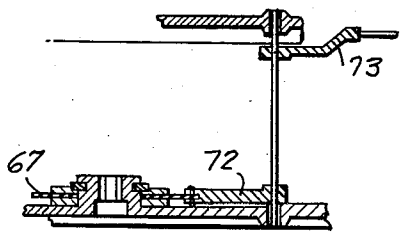


FIG. 10



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APPARATUS FOR DETERMINING COMPOSITION AND PRICE OF A DISPENSED MIXTURE

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Claims priority, application Italy Oct. 12, 1957
5 Claims. (Cl. 222—26)

The present invention relates to a device for effecting simultaneous changing of the price and the composition of the mixture for use in pumps delivering a mixture of two liquids.

The problem of effecting simultaneous changing of the price when the proportions of a mixture of two liquids are varied has become very topical with the ever greater growth of the number of pumps delivering a mixture of oil and petrol for motor scooters. It is well known that these vehicles require the most dissimilar mixtures, and that a pump must therefore be capable of delivering those mixtures. While the variation in the composition of a mixture is readily achieved in the pumps, so that any desired mixture can be produced, it is diffifficult to provide an indication of relevant prices corresponding to the mixture delivered. The user does not therefore know with certainty how much mixture he is getting and the exact proportions of the two constituents, nor does he know the correct amount he must pay without performing difficult calculations or relying on the calculations rapidly made by the staff operating the pump.

Devices have already been produced which enable this problem to be solved, but they are very complicated and costly, so that with a certain difficulty and uncertainty of operation there is coupled a cost for the apparatus which makers are sometimes unable to bear.

The present invention aims to provide a device of simple construction which is reliable in operation, and which is relatively cheap to manufacture.

According to the invention a device for simultaneously changing the price composition of mixtures of two liquids comprises a connected system of drums having parallel axes, each of which is mechanically coupled with members permitting the actuation of gear wheels in engagement with a driving cone, the drums being provided with a series of rows of holes evenly distributed over generatrices and directrices of the drums and into which a peg is inserted in a predetermined position of each row of each drum and a rake-like member adapted to be displaced along the axes of the drums and fixed from time to time in the desired position and carrying stops against which the individual pegs strike during the simultaneous rotation of the drums, so that the latter can perform rotatary movements which are alike or are different one from each other and in each case such as to cause the displacement of the pairs of gears in engagement until they are brought to the required position.

The invention will be better understood from the following description of a preferred form of construction of the arrangement in question given by way of non-limitative example, which description is given with reference to the accompanying drawings, in which:

FIG. 1 is a diagram showing the installation of the arrangement according to the invention;

FIGS. 2 and 3 are two sections of the arrangement;

FIG. 4 is a diagram of the operation of the actuating knob;

FIG. 5 is a vertical section of a practical embodiment of the device of the invention;

FIG. 6 is a cross section along the line D—D of FIG. 3;

FIG. 7 is a top plan view of embodiment of the FIG. 5;

FIG. 8 is a side view of the concerned assembly;

FIG. 9 is a cross section along the line F—F of FIG. 8, and

FIG. 10 is a cross section along the line C—C of FIG. 9.

Referring now to the schematic embodiment of the device, and, more particularly, to FIGS. 1–4, A, B and C are three drums, each of which is connected to members which cause the displacement of pairs of gears in engagement with a stepped cone, the movement of which is transmitted to a small drum adding up the amount to be paid.

In the said drums are formed a number of parallel series of ten holes 1, each series being evenly spaced around the circumference thereof. In these holes pegs 2 can be arranged in predetermined positions, one to each circumferential row of the various drums, as will be explained hereinafter.

Through interposed gears 3 and 4, the drums A, B and C are rotated by a single pinion 5 which receives the motion from a rack 6, with the interposition of a friction clutch (not shown).

A stop member 7 in the form of a rake is adapted to be displaced along the axes of the drums and is provided with extensions 8, 9 and 10 against which the individual pegs 2 strike, thus stopping the rotation of the corresponding drum.

A knob 11 arranged at the end of a shaft 12 is connected to a shaft 13 through a universal joint 14, which shaft 13 is coupled to a screw controlling the variation of the percentage of oil.

On the shaft 13 there is arranged a worm 15 which is in engagement with a toothed disc 16 coupled to a pinion 17 meshing with a rack 18 controlling the translations of the rake member 7.

On the shaft 12 there is also arranged a sleeve 19 connected to a crankshaft 20 which causes a pinion 21 in mesh with the rack 6 to rotate.

The operation of this arrangement will now be described on the assumption that a mixture consisting of n parts of petrol and m parts of oil is to be delivered which costs 125 lire per litre.

It will then be sufficient to place one peg in the hole numbered 1 in the drum A, one peg in the hole numbered 2 in the drum B and one peg in the hole numbered 5 in the drum C, this distribution corresponding to the row which represents the mixture in question.

The knob 11 is first moved from position L (FIG. 4) to position H so as to separate the gears from the drive means as will be described hereinafter with reference to FIGS. 5 to 9. The knob is then moved into position K (FIG. 4) which movement effects the zeroing of the price indication and the return of all the gears to the original zero position as will be described hereafter.

Then in the position K the knob 11 is turned, whereby both the variation of the relative positions of the members controlling the delivery of the different components of a mixture in the desired proportions and the displacement of the rake-member 7 into the position proper located opposite the circumferential series of holes 1 in the drums associated with the aforesaid mixture are effected.

Return of the knob to the position H is now effected causing rotation of the drums A, B and C until the individual pegs 2 strike against the extensions 8, 9 and 10 of the rack member so that the drums are stopped.

Finally, the knob is returned to the initial position L, thus locking the parts in engagement in the new position which will give the desired mixture and indicate the cost of the quantity delivered at the unit price of 125 lire per litre as will be explained hereinafter.

From what has been stated above, it is obvious that the essential characteristic of the arrangement is that a series

of manoeuvres, complex, as they may be, are effected by a single control member whose extreme positions are determined and set as desired and therefore are capable of forming locating points for any transmission (kinematic, electrical, etc.) adapted to start or stop the operation of the metering assembly.

Referring now to FIGS. 5–10, which represent a practical embodiment of the device, the stepped Norton cone **22** of a comptometer head group of a known type and provided, in the case represented, with nine gear wheels having teeth numbers which are in arithmetical progression (the step of this progression being normally 8), and whose rotation is proportioned to the total flow of the delivered liquid (this liquid being, for instance, a mixture of oil and gasoline, or a mixture of two different gasoline types, for instance conventional gasoline and gasoline of the "special" type). Said stepped cone **22** is directly connected to the metering device for the dispensed liquid through the shaft K so that the number of revolutions of shaft K is proportional to the volume of the delivered liquid.

23—**24** and **25** indicate three turnable members shown to be drums, each of which is connected at upper end with the small indicator drums **26**—**27** and **28** on which the set up price is indicated.

Each of said drums is connected, through bevel gears **29**—**30**—**31**, rods **32**—**33**—**34** and other bevel gears **35**—**36**—**37** to axial cams **38**—**39**—**40**.

As shown in FIGS. 5–7, the axial cams **38** and **40** drive through rack bars **41** and **42** and pinions, and cam **39** drives in a direct way through a cylindrical train **43**, the small secondary drums **44**—**45** and **46** to rotate at the speed of the small drums **26**—**27** and **28**. The secondary small drums provide another indication which can be read on the opposite side of the pump, so that a two-front head is obtained.

The drums **23**, **24** and **25** are provided with a number of parallel groups of ten holes **47**, each group being evenly spaced around the circumference thereof and associated with a specific mixture whose discharge effects rotation of shaft K. Sets of three groups of holes on the three drums **23**, **24**, **25** are located on the same level. Each hole is located on a circumferential portion of a circumferential part of the respective turnable member **23**, **24**, **25**, said circumferential parts being axially spaced and located in parallel planes transverse to the axes of the turnable members.

In these holes, stops or pegs **48** can be arranged in predetermined positions, one to each circumferential group of holes of the various drums to represent a price in three monetary orders. The ten holes in each circumferential series represent the digits or units in the respective monetary order.

A stop member in the form of a rake **49** is adapted to be displaced along the axes of the drums, and is provided with stops **50**—**51**—**52** against which the individual three pegs **48** in the holes of a set of groups of holes **47** strike, when the drums are rotated, thus stopping the rotation of the said drums **23**, **24**, **25**.

Drums **23**, **24** and **25** can be rotated by a rack **53** driven by a cylindrical gear **54**. Rack **53** causes the rotation of the three drums through gear train **55**—**56**—**57**—**58** and **59**.

Each gear **55**, **57** and **59** and the respective drum **23**, **24** and **25**, are connected by a friction clutch **60** (FIG. 5), the clutch allowing the slipping of the corresponding drum, when the pegs **48** have striken the corresponding stops **50**, **51**, **52** on the rake **49**, without blocking the rotation of the wheels **55**, **56**, **57**, **58** and **59**.

The rake **49** is supported on an adjustment plate **61** which is displaced with rake **49** in axial direction of drums **23**, **24**, **25** on a guide shaft **61***a* and indicates by its position the mixture, gears on plate **61** mesh with corresponding gear portions of Norton Cone **22**.

Cams **38**, **39**, **40** are formed with a continuous or stepped cam groove **62**, within which slides a follower element **63** guided by a guide shaft **64***a* and is part of an adjustment plate **64**, which carrier gears adapted to engage with the stepped cone **22**, while two other adjustment plates **65** and **66** are axially shifted by cam drums **38**, **40** and have the same purposes and operate as indicated for the adjustment plate **64**. The gear of each adjustment plate engages with a gear of the stepped cone **22** at the predetermined height corresponding to the angular displacement of the corresponding preselecting cam drum since the position of the adjustment plates corresponds to the position of the respective cam followers in a cam groove **62**.

Adjustment plates **61**, **64**, **65** and **66** can be simultaneously released from the engagement with the stepped cone **22**, since said adjustment plates are connected to a single lobed cam disc **67** through the levers **68**, **69**, **70** and **71** as best seen in FIG. 9.

The angular deviation of lobed cam disc **67** is imparted by a single control **72** which is connected, through a tie rod **73**, to the actuating knob **74**.

Knob **74**, whose turning axis is vertical when the device is in operating position, is located at the end of a lever **75** housed in a casing **75'**. At the beginning of pivotal motion through slot **75''** about the axis **76**, lever **75** causes, by its engagement with the fork **77** (FIG. 6), the displacement of the tie rod **73** and therefore the retraction of the gears of the four adjustment plates from cone **22**.

After the releasing, the operating means **74**, **75** is turned with the pinion **78** thereon about its fulcrum **76** together with a double-armed lever **84***a* which forms with lever **84***b*, and linking rods **84***c* and **84***d* a parallelogram linkage, see FIGS. 8 and 9. When lever **75** arrives in its horizontal end position, the axis of pinion **78** is horizontal, and pinion **78** meshes with a pinion **79** which is connected to a card on shaft **80** having universal joints **80***a* and carrying a bevel gear **81**, meshing with a bevel gear **82**. A spur gear **83** is secured to bevel gear **82** and mounted in a fixed bearing **82***a*. Gear **82** meshes with a cylindrical rack bar **69***a* which is secured to rake **49** and moves the same when the stationary gear **82** is turned. Consequently, turning of knob **74** in the horizontal position of lever **75**, effects movement of rake **49** through the control means **80**, **81**, **82**, **83**, **69***a*, until the predetermined level of adjustment plates **61**, **64**, **65**, **66** relative to Norton cone **22** and corresponding to the ratio of the desired mixture is reached. The control means for controlling the discharge of the components by lever **74** is not shown in the drawings with the exception of gear **80***b* on shaft **80**.

Once the desired position of stop means or rake **49** has been reached, lever **75** is pivoted in the opposite direction, by pushing it up to the end of its return stroke, so that the lever will be again located within its casing **75'**.

Before the return stroke, and during the down-stroke, the articulated parallelogram **84***a*–**84***d* causes, through spur gear **85**, to which lever **84***b* is connected by shaft **85***a*, shifting of the rack **53**, see FIGS. 5 and 9, which causes in turn the rotation of the three drums **23**, **24**, **25**, since rack **53** meshes with gear **54** which turns gear **55**, so that when gears **78**—**79** are placed in meshing engagement at the end of the down-stroke all of the indicating small drums **26**, **27**, **28** will indicate zero.

During the upward return stroke, through the mentioned parallelogram **80***a*–**80***d*, the rack **53** is displaced in the opposite direction and causes the rotation of drums **23**—**24**—**25** until the pegs **48** abut against the teeth **50**, **51**, **52** of the rake **49**.

Under said conditions, on the main small drums **26**—**27**—**28** and on the secondary small drums **44**—**45**—**46** the set-up price of the mixture will appear (since the small drum **26** indicates the hundreds, the small drums **27** indicates the tens, and small drum **28** indicates the units of the price).

Due to the friction clutches, whatever the amount of

drum rotation will be, the rack and therefore lever **75**, are free to perform the same displacements.

The shaft **61***a* carrying the adjustment plate **61** is turned through an angle proportional to the amount of one of the two component liquids delivered (that one which is delivered in lower amount) and controls a common totalizer (not represented) from which one can derive both the delivered quantity for each single utilisation (by difference) and the total amount delivered during the operation).

The gears of the remaining three adjustment plates **64**, **65** and **66**, through a differential totalizer **86**, impart to the shaft **87** rotations which are proportional to the amount to be paid, since the initial rotation of the shaft K, which is proportional to the delivered quantity, is multiplied by a transmission ratio which corresponds to the price and depends on the gear on the Norton cone **22** with which the gears on plates **64**, **65**, **66** were placed in meshing engagement.

Another small shaft, not represented, is connected through gears to the small shaft K and controls the total amount of liquid delivered at each distribution.

Of course, many modifications of detail may be made in the invention without thereby departing from the scope of the invention itself. For example, with a separate control of the type normally provided in comptometer heads, it is possible to obtain automatically, during manipulation, an indication of the price to be paid per unit before commencing delivery.

Likewise, the stepped cone can be provided with ten or more wheels in order to enlarge the arithmetical progression and thus insert some gears having teeth numbers which are not in arithmetical progression.

Furthermore, the movement of the knob may be transmitted to the various members in a different way to be described and illustrated, for example, it may be transmitted by hydraulic means or through the intermediary of an automatically-controlled assembly which will bring about the succession of the various operation through a single starting control. Similarly, the drums need not be mounted in a single housing, but separately, and the drums may be replaced by a single drum which can be solid but is preferably hollow, and which forms or completes the outer cylindrical casing.

Finally, the functions of the drums carrying the pegs and those of the rake carrying the stops for the aforesaid pegs may be reversed, the drums assuming different angular positions according to the composition of the desired mixture and the stops on the rake undergoing different axial translation according to the prices.

Furthermore, it will be observed that one of the main advantages of the arrangement of the invention consists in that everything controlled is separated, from the indication of the set-up of the price, the whole being brought outside in order to facilitate the adjustment, the control and the eventual maintenance.

What I claim is:

1. In a device of the type described, in combination, a plurality of turnable members having parallel axes of rotation and being respectively associated with monetary orders, each turnable member having a plurality of axially spaced circumferential parts, each circumferential part having a group of portions uniformly spaced from each other in circumferential direction, sets of said circumferential parts being located in parallel planes perpendicular to said axes of said turnable members; friction coupling means connected to said turnable members; variable transmission means including an element driven at a speed proportional to the volume of a liquid mixture discharged by a pump, said transmission means connecting said element to said turnable members for rotating the latter; a set of first stops respectively attached to selected portions of said circumferential parts of a set of

circumferential parts, and respectively representing digits in the respective monetary order; a stop means mounted for movement in axial direction of said turnable members between a plurality of positions, and having a set of second stops located in said parallel planes in said positions of said stop means, each second stop being located in the path of movement of one of said first stops to stop rotation of the respective turnable member in a position associated with the price of a liquid mixture to be dispensed by the pump; control means for varying the ratio of the liquids of the mixtures dispensed by the pump, and for moving said stop means between said positions so that each set of circumferential parts can be associated with a different mixture; operating means for operating said control means, and connected to said friction coupling means for turning said turnable members through said friction coupling means until said first stops abut said second stops; and means actuated by said turnable members to indicate the price of a dispensed volume of the mixture of liquids.

2. In a device of the type described, in combination, a plurality of turnable drums having parallel axes and being respectively associated with monetary orders, each drum having a plurality of holes arranged in axially spaced groups, the holes of each group being uniformly spaced from each other along the circumference of the respective drum and respectively representing digits of the respective monetary order, sets of groups of holes on said drums being located in parallel planes perpendicular to the axes of said drums; drive means; friction coupling means connecting each drum with said drive means; a set of pegs respectively located in selected holes of a selected group of holes of a set to represent a monetary value; a stop rake mounted for movement in axial direction of said drums and having a set of stops, each stop being located in the path of movement of one of said pegs to stop rotation of the respective drum in a position associated with the price of the respective mixture associated with the respective set of groups of holes; variable transmission means including a shaft driven at a speed proportioned to the volume of discharges of liquid mixture, and connecting said shaft to said drums; control means for varying the ratio of a dispensed mixture of liquids and the position of said stop bar so that each group of holes can be associated with a different mixture of liquids; operating means for operating said control means, said operating means being operatively connected to said drive means for turning said drums until said pegs abut said stops, said operating means including a lever pivotable to an operative position for actuating said drive means, and turnable in said operative position for actuating said control means; and means driven from said drums at a speed corresponding to the price of the dispensed volume of the mixture.

3. The combination as set forth in claim 2 wherein said operating means includes a turnable member, and gear means connecting said member with said drive means, said drive means including at least one gear.

4. The combination as set forth in claim 2 and said transmission means including a stepped driving cone adapted to be connected to a metering device for measuring the volumes of pumped mixtures, drive gears connected to said drums, and intermediate gears meshing with said cone, said cone having an axis parallel to the axes of said drums; said control means including a plurality of adjusting means supporting said intermediate gears and connected to said stop bar for movement therewith and shiftable between axially displaced positions in which said intermediate gears mesh with different stepped sections of said cone.

5. The combination as set forth in claim 4 and including a set of cam cylinders respectively associated with said drums and connected to the same for rotation therewith, each of said cam cylinders having a helical groove;

and a cam follower member in each of said grooves connected to said adjusting means for shifting the same.

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