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GB 0853319
GB 0837642
EP A1 0022020
DE A1 3238558
US 4239186
US 4195816

(58) Field of search
F2V

(54) Device for dispensing liquids

(57) The device for dispensing both liquids which contain and also liquids which are free from gas, more especially drinks or beverages which contain carbon dioxide, from containers, comprises a housing 1 with a socket or nozzle 2, which can be fitted on to the container opening, a feed pipe duct 4 which opens into the socket and on to which is connected a rising feed pipe 5 projecting into the container, a dispensing duct 6 which extends laterally from the housing and is connected to the feed pipe duct 4, and a valve member 14, which is displaceable in a bore or tube 8 in the housing between a closed position and an open position. The bore or tube has rotatably arranged therein a cam carrier 9 which partially encloses the valve member 14 and of which the cams 18, 19, 54 cooperating with pins or studs 20 on the valve member have a pitch or incline region 18, 54. The pins are held by spring force 30 in abutment with the cams. Pin support bearings are provided in the pin position at the upper end of the incline region and the valve member, with support of its pins on the pin support bearings, is axially locked and, with release of its pins from the pin support bearings, is axially displaceable so as to open quickly. When a gas-containing liquid is dispensed by this device. The release of the dissolved gas and thus the evolution of foam or froth is minimised. The pin support bearing may comprise a non-sloping region 19, 34, Fig 4 of the carrier 9, or arcuate portions 55, Fig 10, of axial grooves 11 in the bore that guides the pins 20.

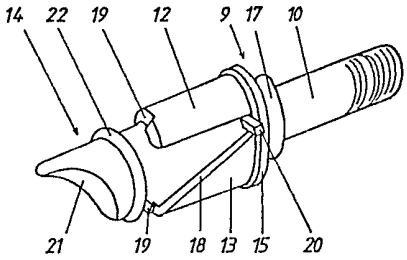

FIG. 4

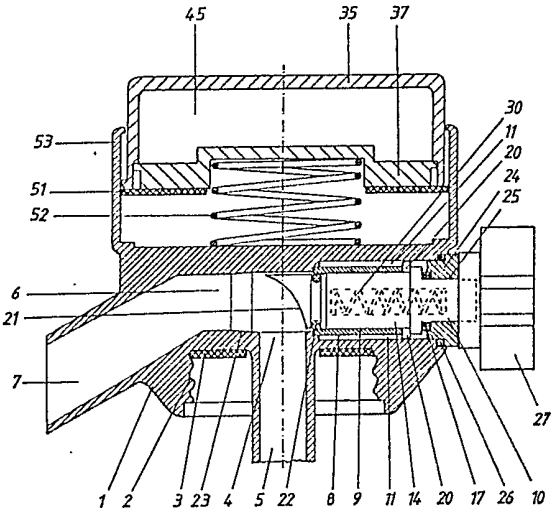

FIG. 8

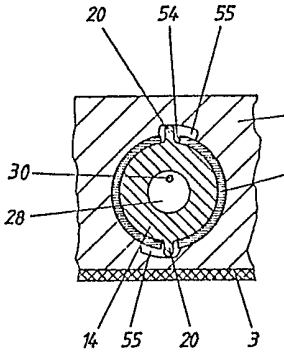

FIG. 10

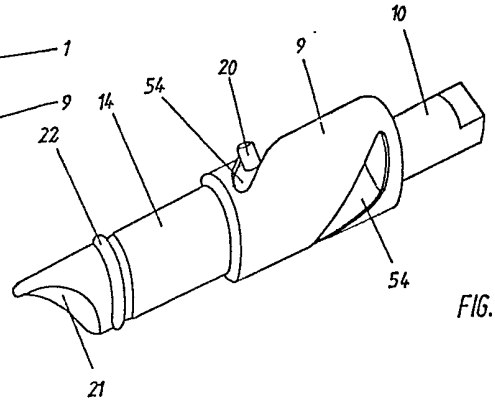

FIG. 11

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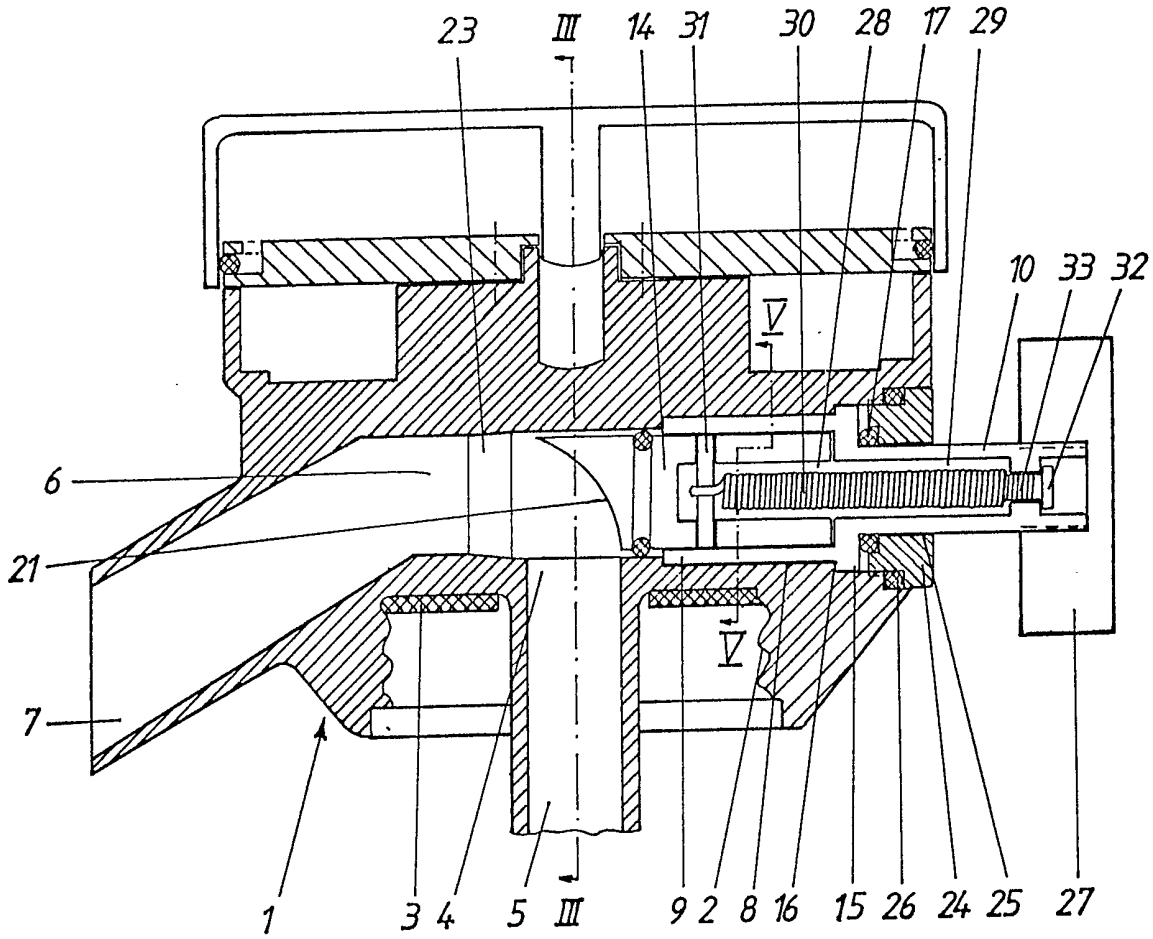

FIG. 1

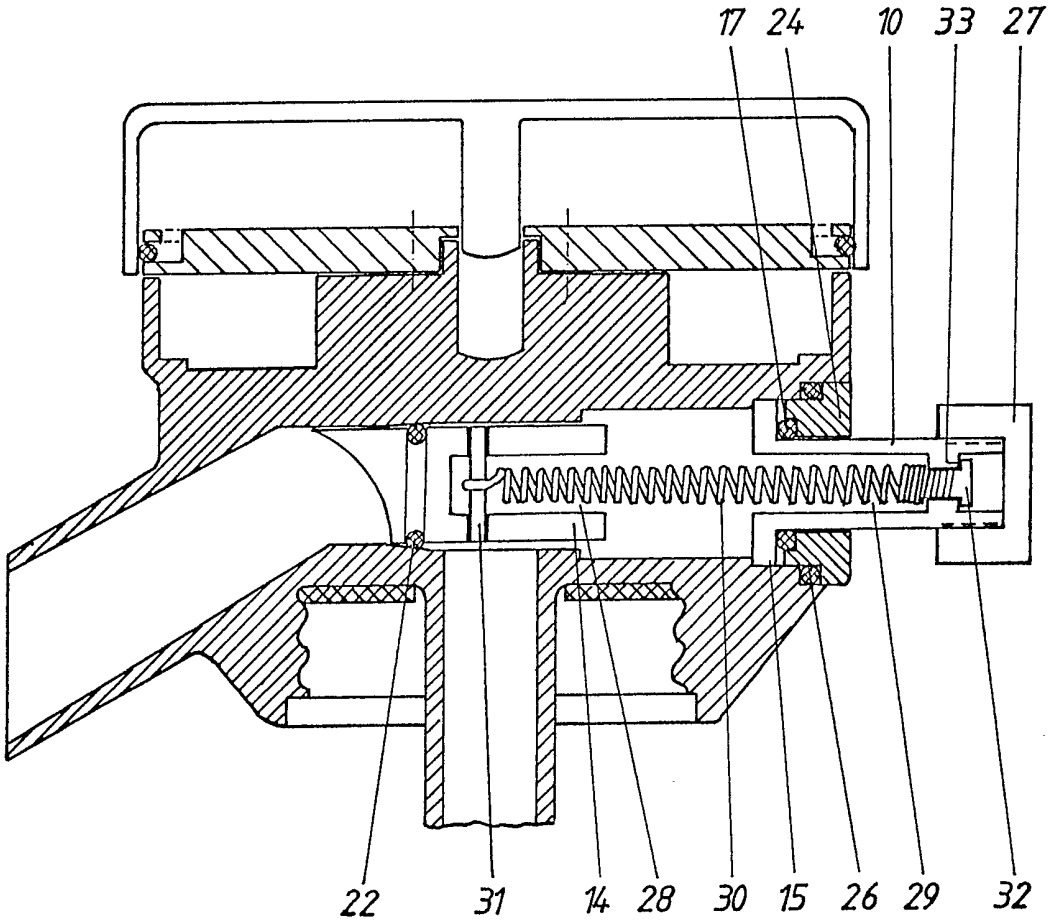

FIG. 2

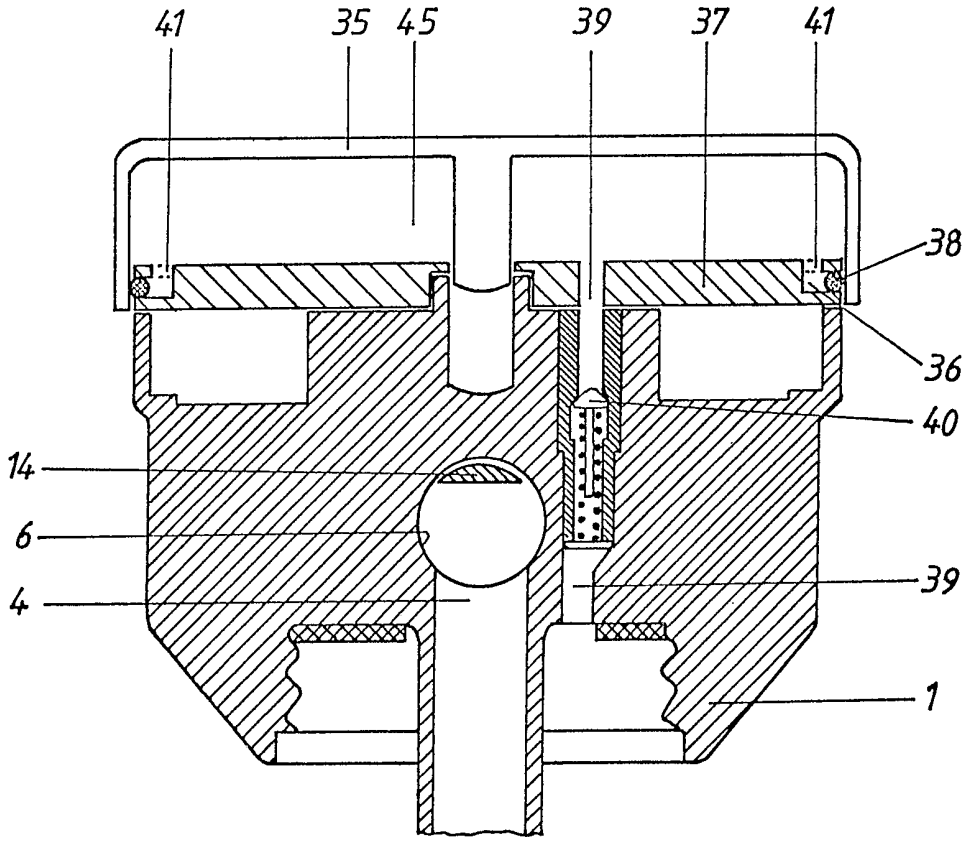

FIG. 3

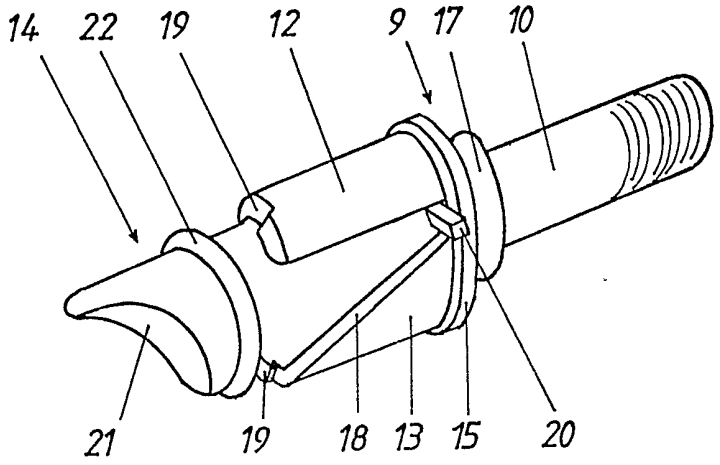

FIG. 4

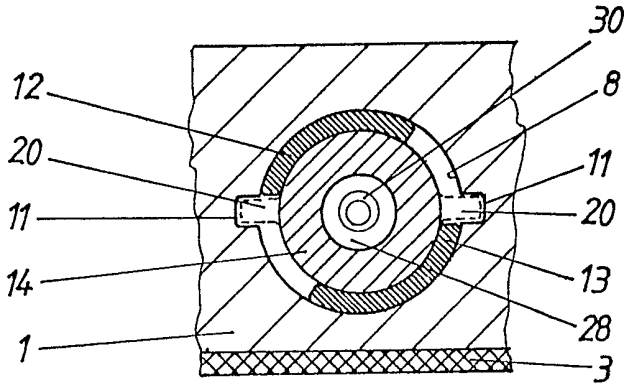

FIG. 5

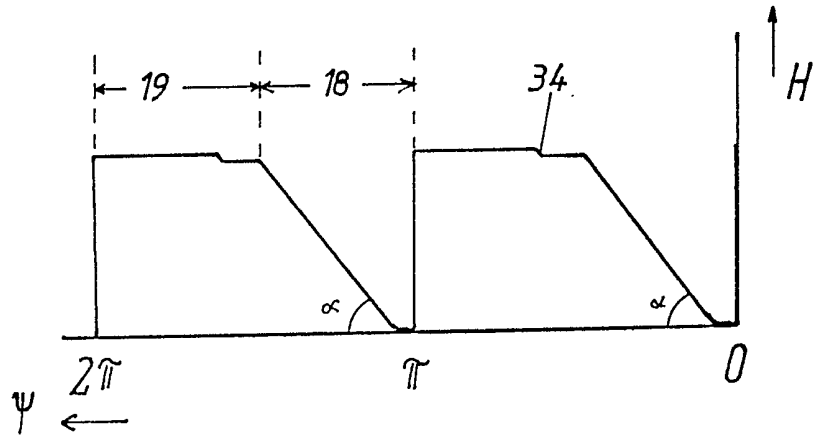

FIG. 6

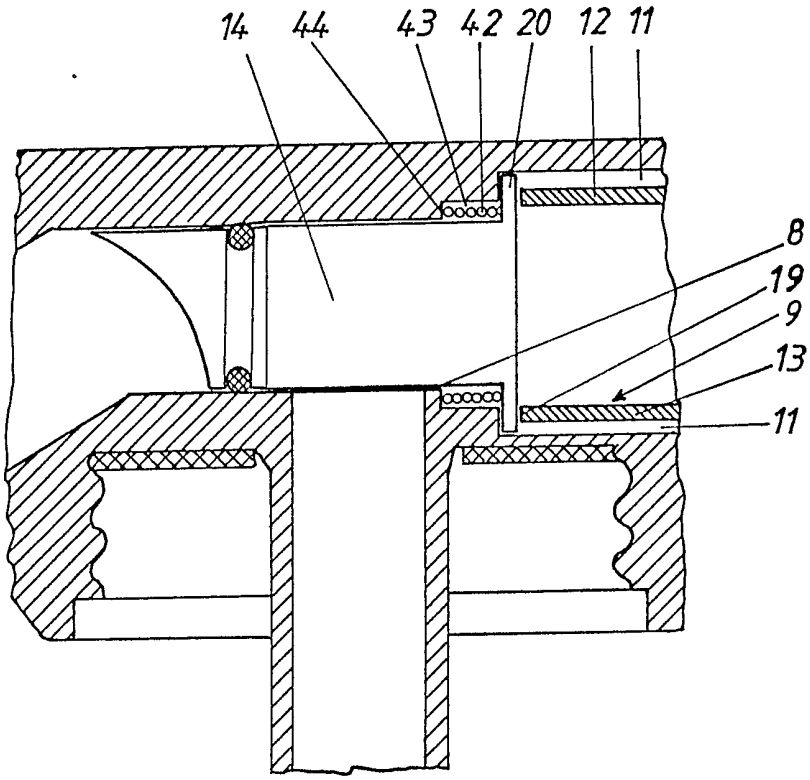

FIG. 7

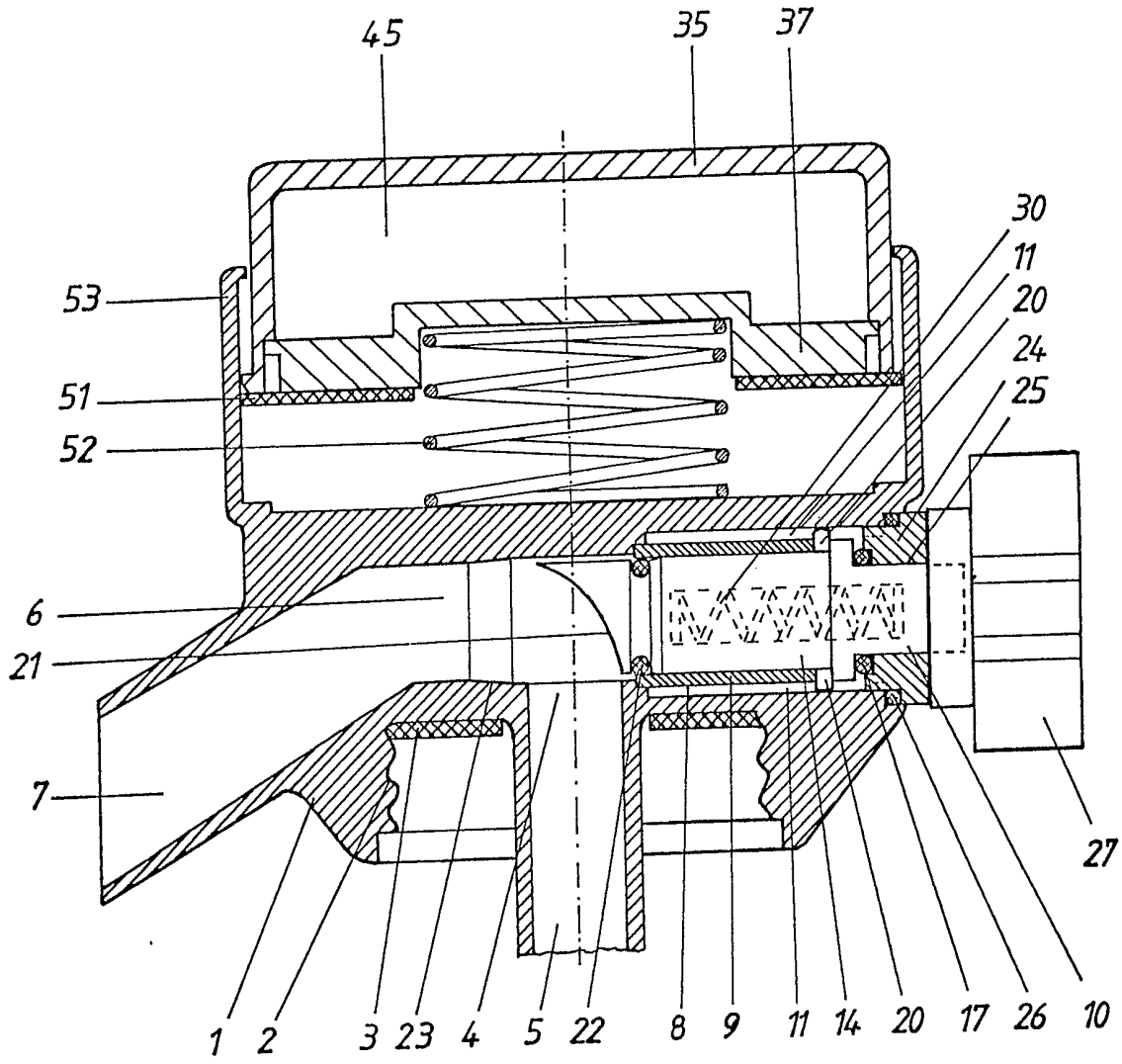
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FIG. 8

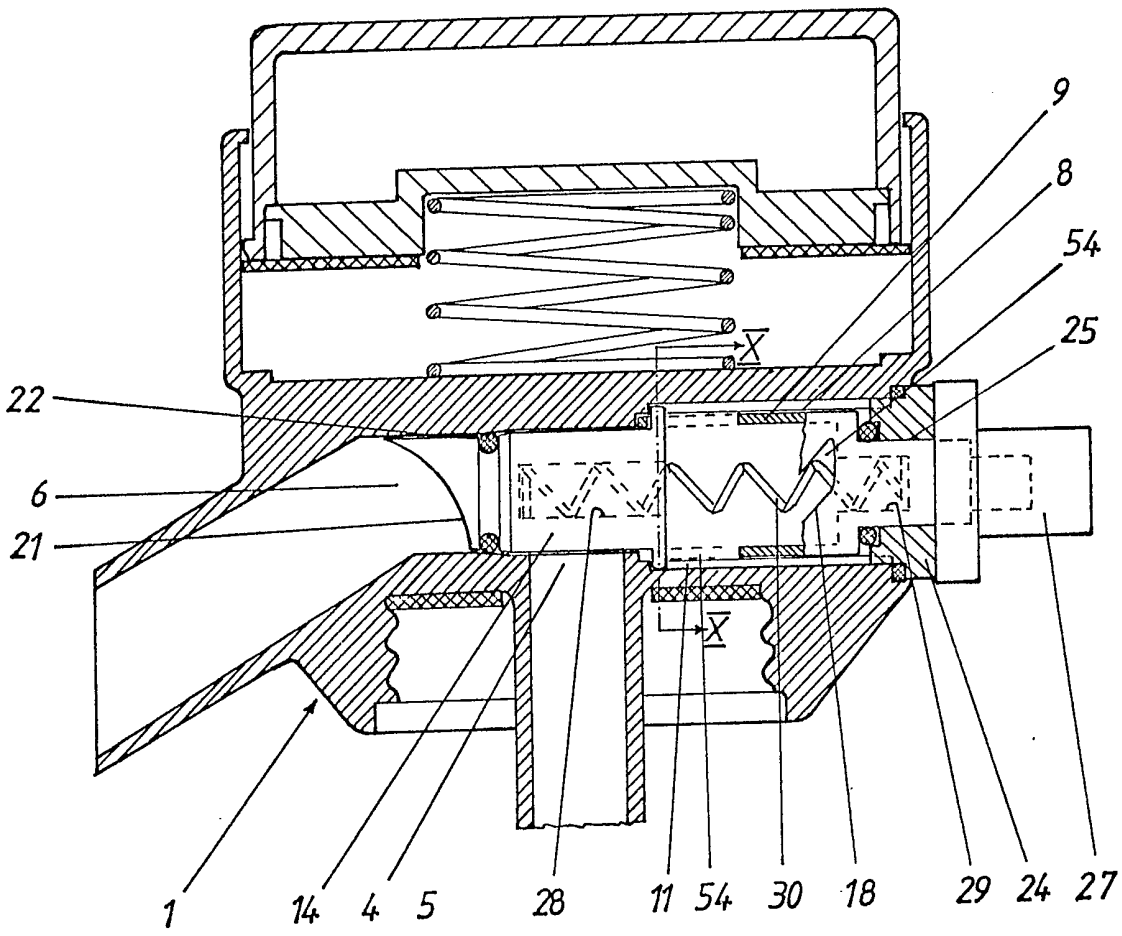

FIG. 9

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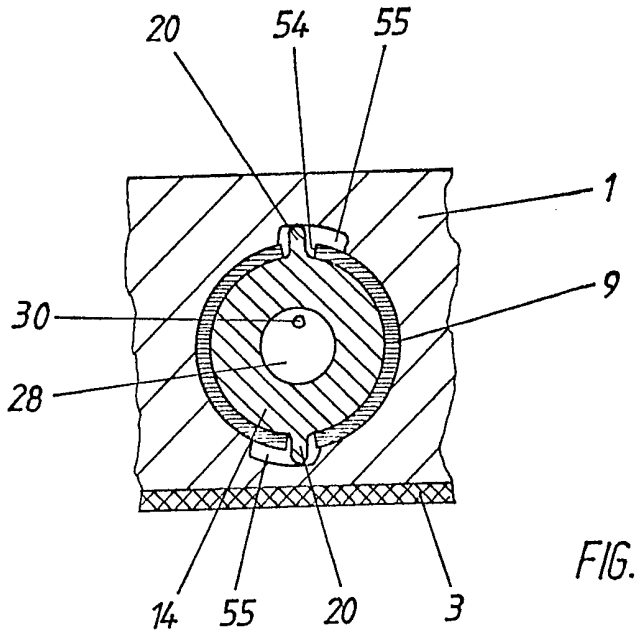

FIG. 10

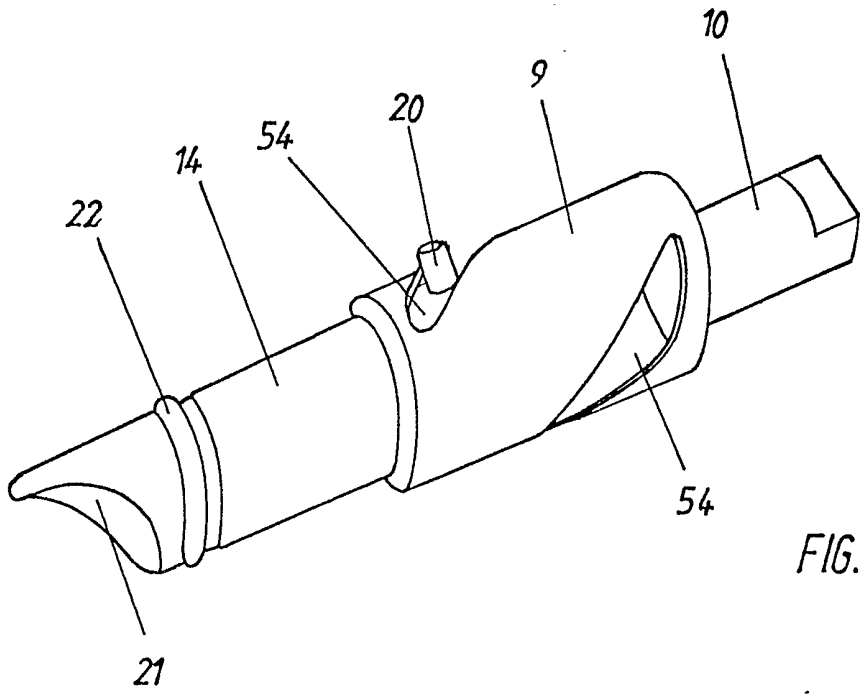

FIG. 11

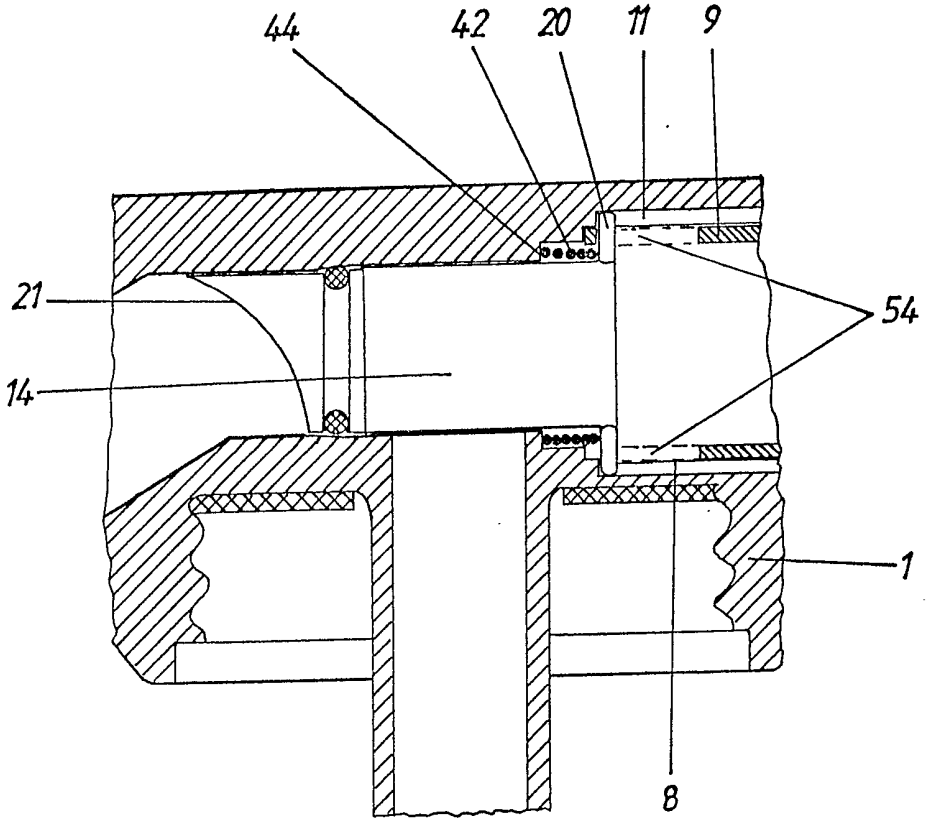

FIG. 12

SPECIFICATION

Device for dispensing liquids

The invention relates to a device for dispensing liquids which contain or are free from gas, especially drinks or beverages containing carbon dioxide, from containers, especially bottles.

The known dispensers for liquids are only suitable either for liquids containing gas or for liquids which are free from gas and are connected to the container which contains the liquid. Consequently, it is not possible for them to be transferred in a simple manner from one container, for example, a bottle with a screwthread on the bottle neck, to another container.

A dispensing device has been proposed in German Offenlegungsschrift No. 32 38 558.7, which is combined with an air pump and consequently is equally suitable for the dispensation of liquids which contain gas or are free from gas. More especially it is possible for gas-containing liquids, e.g. drinks containing carbon dioxide, to be drawn off substantially completely from relatively large containers, for example, 2-litre bottles, because it is possible, with an insufficient carbon dioxide pressure in the substantially emptied container, always to produce a sufficient propellant gas pressure for drawing off the liquid by pumping in air. On the other hand, it has been found in practice that, with the dispensing of beverages or drinks which contain carbon dioxide and/or sugar, the shut-off valve does not sufficiently conform to the requirements for froth-free tapping, high carbon dioxide content even in the last drink quantities tapped from the container and easy availability. The opening movement of the valve member is carried out manually and consequently is comparatively slow. The liquid, super-saturated with carbon dioxide, consequently flows with the initiation of the opening of the valve through a narrow valve gap, behind which occurs a relief of pressure. As long as the clearance of the shut-off valve is stil small, turbulence occurs in the clearance or gap and on the downstream side thereof, such turbulence leading to the formation of foam or froth and splashing or spilling of the liquid to be drawn off. It was additionally found that the surface seals on valve members have a tendency to sticking, as a result of which the functioning of such valves is impaired.

A tapping cock or vent having a sleeve which surrounds the valve member is known from Austrian Patent Specification No. 10925. The sleeve has a helical slot, through which the radial pin of the valve member projects outwardly into an axial groove of the valve housing. By rotating the sleeve, the valve member is moved from the closed position into the open position, and *vice versa*. In such an operation, the pin is guided without clearance in the slot, since the width of the slot is adapted to the diameter of the pin. The opening of the valve requires a manual rotation of the sleeve. It is not possible in this case for the valve to be opened so quickly that the formation of froth or foam of drinks containing CO_2 is avoided, on account of vorticity of the liquid at the small opening gap being initially established.

The present invention seeks to provide a device which is suitable for the dispensing of gas-containing or gas-free liquids, more especially CO_2-containing drinks or beverages. The dispensing of gas-containing drinks is to be effected without loss of gas, i.e. without gas escaping from the container holding the liquid during the dispensing operation. More especially, as regards CO_2-containing drinks, the escape of dissolved carbon dioxide from the drink during the dispensing operation and thus the formation of froth or foam during the passage through the dispenser, is to be avoided. In particular the invention seeks to provide a dispensing means of which the valve opens at a high speed which is independent of the speed with which the user of the dispenser operates the latter, i.e. rotates the withdrawal member, pivoted lever or the like. In addition, with liquids which contain sugar, the operability of the shut-off valve is not to be impaired, even after relatively long intervals between use, and the tightness or seal is to remain assured, even after a relatively long period of use. Finally, the dispenser is to be able to be easily transferred from one container to another container and to be easily operated in the home also by technically unskilled persons.

The device for the dispensing of gas-containing or gas-free liquids, more especially CO_2-containing drinks or beverages, from containers, accordingly comprises a housing with a socket or nozzle capable of being fitted on the opening of the container, a feed pipe duct which opens in the said nozzle or socket and to which is connected a feed pipe extending into the container, a dispensing duct which extends laterally from the housing and which is connected to the feed pipe duct, and a valve member which is displaceable in a bore or tube between a closed position and an open position and is provided with at least one pin which projects from its wall surface and which engages in at least one axially parallel guide groove which is formed in the bore or tube.

According to the invention a cam carrier partially enclosing the valve member is arranged to be rotatable in the tube, of which cam carrier the cam or cams cooperating with the at least one pin has or have a pitch incline or range, the pin or pins of the valve member are held by spring force in abutment with the cam or cams of the cam carrier, support bearings are provided in the pin position at the upper end of the pitch range and the valve member, with support of its pin on the pin-supporting bearing, is axially established and, with release of its pin from the pin-supporting bearing, is capable of axial displacement.

With the rotation of the cam carrier, the valve member bearing with its pins on the cams is lifted against spring action along the pitch range, i.e. from its open position, in which the liquid is able to flow through the passages, into its closed position, in which the passage of the liquid through the passages is blocked. This displacement is effected without any rotation, since the pins of the valve

member are guided in the guide grooves. When the pins, as a result of this displacement, reach the upper end of the pitch range, then as a result of further rotation of the cam carrier, they reach the pin-supporting bearing, by which the valve member is supported axially against the spring force. In this axial position, the valve member is located in the closure position, i.e. the valve member, despite the effect of spring action, remains in the closed position when its pins are supported in the pin-support bearing. If the cam carrier is now rotated in such manner that the valve member pins are freed from the pin-supporting bearing, the valve member, which is now displaceable axially, is moved immediately by the force of the spring in the direction towards its open position. Depending on the constructional form of the device, the valve is in this case able to be moved immediatley into the open position, or it is able to execute only a part of the opening movement. In the latter case, the valve is suddenly only partially opened. The rotation of the cam carrier which is necessary for the freeing of the pins from the pin-support bearing is able, depending on the constructional form, to be effected in the same direction of rotation as with the closure of the valve or in the direction of rotation which is opposite to that of the closing direction.

In accordance with the preferred constructional form of the device according to the invention, the cam carrier comprises at least one shell component and the pin-support bearing is a region of the cam or cams extending on the upper edge of the shell component, the said region having substantially no pitch and adjoining the pitch region. With this constructional form, the pins of the valve member, after leaving the pitch region, are supported on the following pitch-free region of the upper edge of the shell component, as a result of which the valve member is held against spring action in the closure position. At the end of the pitch-free region, the shell wall generally descends perpendicularly to the commencement of a following pitch region. With further rotation of the cam carrier, the consequence is that the valve member, at the end of the pitch-free region, is once again suddenly moved back by the spring force into its intial position, i.e. the open position. The stopping of the valve member in the closure position is then obtained if its pins, in the pitch-free region, are supported on the upper edge of the wall of the shell component or components. No reversal of the direction of rotation of the cam carrier is necessary for the opening of the valve, that is to say, the cam carrier can always be rotated in the same direction, for example, in a clockwise direction, open positions and closed positions following one another as often as desired. With this device, it is particularly advantageous for the valve member to be moved instantaneously from the closed position into the fully open position, i.e. the speed of opening of the valve member is independent of the speed of rotation of the cam carrier. With the opening of the valve, the inflowing liquid is instantaneously accessible to the full valve cross-section, this being an essential precondition for avoiding evolution of gas at the valve.

The cam carrier advantageously comprises two axially symmetrical shell sections carrying the cam or cams. The supporting of the valve member on the cam carrier is then effected, in this case, by two pins or studs which are arranged diagonally relatively to one another, thereby avoiding an angular position of the valve member in said carrier.

With this constructional form, a step rising in the direction of rotation of the cam carrier is advantageously formed in the substantially pitch-free region of the cam or cams. If the cam carrier is rotated still further, after the closed position of the valve member has been reached and the valve member pins or studs, in the pitch-free zone or region, are resting on the cams, the said studs come to a position before these steps or stages. A further rotation is only possible with the application of an increased torque, since the raising of the valve member on to the steps or stages is connected with a compression of the O-ring by which the cam carrier is sealed off with respect to the outer threaded ring. The resistance caused by the steps or stages with the rotation of the cam carrier consequently constitutes a certain arresting action, since it is only possible for the cam carrier to be rotated into the end position after this resistance has been overcome, in which position the valve member pins or studs leave the pitch-free regions of the cams and the valve member is suddenly moved by the spring or springs into its initial position, i.e. the open position.

With another constructional form of the device according to the invention, the cam carrier is of sleeve-like formation, the cam or cams is or are formed in the sleeve or casing by at least one helical slot, the width of which is at least equal to the diameter of the pin of the valve member, and the pin-supporting bearing is formed by guide groove sections which, at those ends of the guide grooves which are adjoining the feed pipe duct, are connected in the same circumferential direction of the bore to the guide grooves. In this constructional form, the pins or studs of the valve member engage through the helical slots in the guide grooves. By rotation of the sleeve-like cam carrier, the valve member is displaced axially without any rotation until the pins or studs have arrived at the upper ends of the slots. In this position, the said pins are disposed before the guide groove sections extending in the circumferential direction, so that it is now possible for a rotation of the valve member to take place, the pins or studs of the latter being able to enter into the guide grooves sections serving as support bearings for the said pins. With further rotation of the sleeve-like cam carrier, corresponding to the circumferential direction of the guide groove sections, the valve member is consequently carried along by the cam carrier, the pins or studs being supported axially in the guide groove sections and the valve member being thus held in the closed position against the force of the spring. By rotation of the sleeve-like cam carrier in the opposite direction of rotation, the valve mem-

ber is likewise carried along, as a result of which its pins are moved out from the guide groove sections extending in the circumferential direction. The valve member, which is under spring tension, is consequently moved backwards suddenly by the force of the spring, i.e. in the direction towards the open position, when the pins or studs have left the guide groove sections. The extent of this movement of the valve member is equal to the axial slot width. If it should be that, in a borderline case, the slot width is equal to the diameter of the pins or studs, the movement at the time of the valve member, caused byt the spring force is equal to zero, and the valve member has to be moved into the starting position, i.e. into the open position by rotating the sleeve-like cam carrier. It is advantageous for the axially parallel width of the slot or slots to amount to a multiple of the pin diameter. When the pins or studs are freed from the guide groove sections extending in the circumferential direction, the valve member is instantaneously moved back by the axially parallel slot width from the closed position and, as a result, an only slight opening gap causing the formation of froth or foam is overcome.

As regards this constructional form, the sleeve-like cam carrier is advantageously formed with two helical slots and the pins project through these slots into the guide grooves. As is the case with the aforementioned cam carrier having two axially symmetrical shell-like sections, it is possible, by the two slots arranged in opposition to one another, to achieve a constant force transmission between cam carrier and valve member and to avoid a tilting of the valve member.

With both constructional forms, the valve member expediently has two pins or studs arranged diagonally in relation to one another and the bored member has two guide grooves with are diagonally opposite one another. The guide grooves are advantageously arranged in the horizontal axial plane of the said member. The device may also be provided with more than two, more especially with three, peripherally disposed pins or studs, guide grooves and shell sections or sleeve slots.

A helical tension spring is advantageously arranged between the valve member and the cam carrier. The tension spring holds the valve member with its pins or studs in a bearing position against the curvilinear portions of the cam carrier, so that, in the rising region of the cams, each position of rotation of the cam carrier has associated therewith an advancing position of the valve member. A bore is expediently formed in the valve member and/or the axial journal of the cam carrier, in which is contained the tension spring, so that the insertion of the valve member into the shell-like or sleeve-like cam carrier is not impeded by the tension spring. At least one end of the tension spring, more especially that end of the spring projecting into the journal of the cam carrier, is rotatably suspended, so that with the rotation of the cam carrier in one direction, the spring is not able to develop any torque in the opposite direction of rotation.

With another constructional form of the device according to the invention, a helical compression spring is arranged between the pins of the valve member and an annular shoulder of the bore. This compression spring has the same effect as the previously explained tension spring. The valve member is constantly urged with its pins on to the cams of the cam carrier, and in the rotated position at the outlet end of the substantially pitch-free region of the cams or at the outlet end of the guide groove sections, the valve member is suddenly moved into the shell-like or sleeve-like cam carrier i.e. it is moved from the closed position in the direction towards the open position.

According to the preferred constructional form of the invention, the end face of the valve member is formed as a cylindrically or spherically curved concave surface for the deflection of liquid from the feed pipe passage into the dispensing passage. The liquid flowing upwardly through the feed pipe is deflected horizontally into the dispensing passage by the end face having a constant curvature without any substantial turbulence. The tendency to release of gas and development of foam in a liquid oversaturated with gas at the valve is hereby further reduced.

According to the preferred constructional form of the invention, the dispensing passage is conically constricted in a partial zone in the direction of flow and the wall surface of the cylindrical valve member is provided near its end face with an O-ring providing a seal against the conical region of the dispensing passage. In contrast to a valve member providing a surface seal against a conical seating, for example, a rubberised member, what is produced here is a linear seal, which is insensitive to agglutination by sugar-containing liquids. The term "linear seal" which is chosen here obviously also covers surface seals of small width, which are formed by pressure deformation of the O-ring consisting of elastic material in the conical region of the dispensing passage. Even with considerable sugar content of the liquid and repeated drying out of the valve, the adhesive forces are unable to become so strong that the spring force for the opening movement of the valve member is no longer sufficient.

A pivoted lever, rotatable knob of the like, projecting laterally from the housing, may be conveniently prominently arranged on the axial journal of the cam carrier. If the cam carrier in accordance with the preferred embodiment of the invention carries two axially symmetrical shell-like parts, each with a cam, the valve member, with turning of the pivoted lever through 180°, completes a full travel from the open position to the closed position and, at the end of this angle of rotation, springs back again into the open position.

The housing is expediently equipped with a pump, of which the pressure chamber is connected by a duct provided with a valve to the internal volume of the nozzle. By means of the dispensing head equipped with this air pump, it is also possible for liquids without a propellant gas pressure, as for example, drinks or beverages with a low content of or free from carbon dioxide, to be dis-

pensed from a container. For this purpose, with the aid of the pump in the gas chamber of the container, an air pressure is produced which is sufficient for conveying the liquid through the feed pipe and the dispensing head. This apparatus is consequently capable of more versatile use than a dispensing head without an air pump.

The invention is hereinafter more fully described by way of example with reference to the drawings, wherein:

Figure 1 shows a first constructional form of the dispenser with the shut-off valve open and in axial section;

Figure 2 is the same view as in Figure 1, but with the shut-off valve closed;

Figure 3 is a section on the line III-III of Figure 1;

Figure 4 is a perspective view of the cam carrier with the valve member pushed into the latter;

Figure 5 is a section on the line V-V of Figure 1;

Figure 6 shows the developed projection of the curves of the cam carrier which is shown in Figure 4;

Figure 7 is a partial view of a second constructional form of the dispenser in axial section;

Figure 8 is a third constructional form of the dispenser with the shut-off valve open and in axial section;

Figure 9 is the same view as in Figure 8, but with the shut-off valve closed;

Figure 10 is a section on the line X-X of Figure 9;

Figure 11 is a perspective view of the cam carrier with valve member, as used in the constructional form according to Figure 8; and

Figure 12 is a partial view of a fourth constructional form of the dispenser in axial section.

According to Figures 1 and 2, the dispenser consists of a housing 1 with an internally threaded socket 2, with which it is possible for the device to be screwed, for example, on to the threaded opening of a drink container, for example, a bottle, a packing disc 3 ensuring the seal. The device has a feed pipe passage 4 which opens into the threaded socket 2 and on which is formed a freed pipe 5 opening into the container (not shown). The housing 1 also contains a horizontal dispensing passage 6, which is terminated by a downwardly sloping socket or short feed pipe 7.

Also formed in the housing 1 is a cylindrical bore 8, the axis of which lies in one plane with the axes of the feed pipe passage 4 and of the dispensing passage 6 and which is extended laterally from the housing. Fitted so as to be rotatable into the bore 8 is a cam carrier 9, which carries, at the rearward end, a journal 10 (see also Figure 4) which projects from the housing 1. The cylindrical bore 8 is formed with two axially parallel guide grooves 11 which are arranged diametrically facing one another, said grooves extending substantially over the full length of the bore 8 and being disposed in the horizontal plane of the bore (see Figure 5).

As may be more particularly seen from Figure 4, the cam carrier 9 has two shell-like parts 12, 13 of hollow cylindrical segmental form which are arranged axially symmetrically of one another and into which is pushed the valve member 14 in the closure position as shown in Figure 4. The cam carrier 9 also comprises a collar 15, by which it bears on an annular shoulder 16 of the bore 8, and also a journal or trunnion 10, which carries an O-ring 17. The cams formed by the shell-like portions 12 and 13 comprise a rising portion 18 and a portion 19 having substantially no rise.

The valve member 14, which is displaceable axially in the shell-like parts 12, 13 of the cam carrier 9, carries at the rearward end and in a diagonal arrangement two radially projecting studs 20, which coact with the cams 18, 19, as will hereafter be more fully described. The studs 20 engage in the diametrically facing guide grooves 11 of the bore 8 (Figure 5), as a consequence of which it is ensured that the axial displacement of the valve member 14 is effected without any rotation. The end face of the valve member 14 is formed as a cylindrically curved guide surface 21, which, in the open position as shown in Figure 1, deflects the liquid flowing into the feed pipe 4 into the horizontal dispensing duct or passage 6 without any substantial turbulence. At a small distance from the end face 21, the valve member 14 carries an O-ring 22 which, in the closed position as shown in Figure 2, seals off the valve member 14 against the conical region 23 of the dispensing passage 6.

Screwed into the bore 8 is a threaded ring 24 having a bore 25, the journal 10 projecting outwardly through the bore 25. The threaded ring 24 is sealed off relatively to the housing 1 by an O-ring 26 and relatively to the cam carrier 9 by the O-ring 17. The outwardly projecting journal 10 has a screwthread at the outer end and has a torsion-resistant threaded connection with a rocking lever 27, so that, by rotation of this latter lever, the cam carrier 8 which is substantially immovable axially in the bore 8 is able to be rotated.

As can be seen from Figures 1, 2 and 5, the valve member 14 and the journal 10 of the cam carrier 9 contain axial bores 28 and 29, respectively. Secured in the bore 28, by means of a pin 31, is the one end of a helical tension spring 30. The other end of the spring 30 is suspended for rotatable movement on an annular shoulder 33 of the bore 29 by means of a screw 32. The spring 30 exerts a tensile force on the valve member 14, so that its pins or studs 20 are held so as to bear constantly on the cams 18, 19.

If the rocking lever 27 connected to the cam carrier 9 is rotated clockwise, the studs 20 are moved on the sloping curved or cam zones 18, the valve member 14 being moved forwardly from the open position into the closed position. At the forward end of the shell-like parts 12, 13, and with further rotation of the cam carrier 9, the studs come to the pitch-free cam region 19, as a result of which the valve member 14 remains in the closure position. As will be seen from Figure 4 and the developed form of the cam carrier shells as shown in Figure 6, the pitch-free zone 19 has a sloped step 34 (with a height of, for example, 0.2 mm.) which, with the rotation of the pivoted lever 27, makes apparent an increased resistance to the turning movement, since the consequence of overcoming the step is a

corresponding slight compression of the O-ring 17. The resistance caused by the step 34 results in a certain arresting effect, since it is only after the resistance has been overcome that the pivoted lever 27 is able to be rotated into the position at the end of the pitch-free zone 19, in which the valve member 14 is suddenly returned into the open position. Figure 6 shows the travel H of the valve member in dependence on the rotation Ψ of the cam carrier 9 in respect of the cam carrier with two axially symmetrical shell-like parts, such as that shown in Figure 4. As will be seen from Figure 6, a movement period of the valve member from open position to open position is obtained with a half rotation of the pivoted lever, i.e. after rotation through the arc π. The pitch angle α in the region 18 is, for example, 54°.

According to Figures 1 to 3, the housing 1 carries on its upper side an axially guided cylinder 35, the wall of which coacts with an O-ring 38 floatingly arranged in the annular groove 36 of the plate or disc 37. The disc 37 and the housing 1 have a bore 39 which opens into the socket 2 and in which is arranged a spring-loaded valve 40. The groove 36 is connected by way of a plurality of bores 41 to the pressure chamber 45 of the cylinder 35. The operation of this air pump, which is known *per se*, is that, with the pressing down of the cylinder 35, the air flowing into the annular groove 36 forces the O-ring 38 against the side wall of the cylinder and in this way produces the sealing of the compression chamber 45 between the cylinder wall and the disc 37. As a consequence, the air is forced through the bore 39 and the valve 40 into the container on which the dispenser is mounted. With the upward movement of the cylinder 35, the O-ring 38 is drawn inwardly in the annular groove 36 by the vacuum in the cylinder, so that the seal between the cylinder wall and the disc 37 is broken and air is able to flow into the compression chamber 45.

Figure 7 shows a constructional form in which the valve member 14 is surrounded by a helical compression spring 42, which is arranged in the annular space 43 between the studs 20 and an annular shoulder 44 of the bore 8. In the same manner as the tension spring 30 in the constructional form which is shown in Figures 1 to 3, the compression spring 42 holds the studs 20 in position against the cams 18, 19 of the cam carrier 9, so that the movement of the valve member 20 responds to the rotational angle-travel diagram which is prescribed by the cams. With a position of the valve member 14 differing from the closure position which is represented in Figure 7, and with the valve partially or completely opened, the helical compression spring 42 lies partially in the annular gap between the valve member 14 and the shell-like parts 12, 13. Apart from the fact that the guide grooves 11 for the valve member studs 20 are arranged one above the other in the vertical axial plane of the bore 8, there are no essential differences in comparison with the constructional form according to Figures 1 to 3.

The constructional form of the dispenser which is illustrated in Figures 8 and 9 consists of a housing 1 with an internally threaded socket 2, by which the dispenser can, for example, be screwed on to the threaded opening of a beverage container, for example, a bottle, a sealing disc or washer 3 guaranteeing the sealing action. The dispenser is provided centrally of the socket 2 with a feed pipe passage 4, on which is formed a feed pipe 5 projecting into the container. The housing 1 also contains a horizontal dispensing duct 6, which ends in a downwardly sloping dispensing pipe 7.

Provided in the housing 1 is a cylindrical bore 8, the axis of which lies in one plane with the axes of the feed pipe passage 4 and the dispensing pipe or nozzle 6 and which is extended laterally from the housing 1. Fitted for rotatable movement into the bore 8, which is provided at the outer end with a screwthread, is a sleeve 9, which is provided at the outer end with a journal 10 (see also Figure 11) projecting from the housing. In addition, the sleeve 9 is provided with two helical slots 54 running in the same direction. The cylindrical bore 8 is formed with diametrically facing, axially parallel guide grooves 11, which extend over substantially the full length of the bore 8. Displaceable in the sleeve-like cam carrier 9 is a cylindrical valve member 14, which carries at its rearward end two radially projecting studs or pins 20 which are diametrically opposite one another and which pass through the two slots 54 into the axially parallel guide grooves 11 and thereby assure that the valve member 14 is displaceable axially, but is not rotatable with the axial displacement, as long as the studs or pins 20 are guided in the guide grooves 11. The inner end face 21 of the valve member 14 is formed as a cylindrically curved guide surface which, in the open position as shown in Figure 8, deflects the liquid rising in the passage 4 without any substantial turbulence into the horizontal dispensing duct 6. At a small distance from the end face 21, the valve member 14 carries a packing ring 22 which, in the closed position as shown in Figure 9, seals off the valve member 14 in relation to the conical region 23 (Figure 8) of the dispensing passage 6.

The member 8 is held in position by a threaded ring 24 having a drilled hole 25, the journal 10 projecting outwardly through the bore 25. A packing ring 26 is provided for sealing off the threaded ring 24 relatively to the housing 1 and a packing ring 17 is provided for sealing it off relatively to the cam carrier 9. The outwardly projecting journal 10 has a screw-threaded connection with a rocking lever 27, so that is possible, by displacement of the said lever, to rotate the sleeve 9 which is fixed axially in the cylindrical member 8. Since the pins or studs 20 of the valve member 14 engage through the helical slots 54 into the axially parallel guide grooves 11, the pins or studs 20, by the rotation of the journal, are displaced in the slots 54 and thus also in the guide grooves 11, i.e. the valve member 14 can be moved axially between the open position which is shown in Figure 8 and the closed position which is shown in Figure 9.

At their inner ends, the guide grooves 11 have short guide groove sections 55 extending circum-

ferentially of the member 8, as can be seen from Figure 10. Consequently, the valve member 14, in the closed position (Figure 9), in which the pins or studs 20 have arrived at the inner end of the guide grooves 11, is able to be rotated by means of the lever 27 through an angle corresponding to the arcuate length of the guide groove sections 55, as a result of which the valve member 14 is stopped in the closed position. It is only after the sleeve 9 has been rotated back into the unlocked position which is shown in Figure 10 that the valve member 14 can be moved back into the open position from the closed position which is shown in Figure 9.

As will be apparent from Figures 8 to 10, the valve member 14 and the journal 10 of the sleeve 9 contain axial bores 28 and 29, respectively, into which a tension spring 30 is fitted. It can be seen from Figures 9 and 11 that the helical slots 54, in the axially parallel direction, have a width which is substantially larger than the diameter of the studs or pins 20. The consequence of this is that, after the freeing of the pins (Figure 10), the valve member 14 is instantaneously retracted by the axially parallel width of the slots 54 (Figure 9) from the closed position. The shut-off valve is consequently partially opened in a very short time, as a consequence of which it is avoided that a considerable quantity of liquid flows through an initially narrow valve gap and as a consequence froth is developed.

Figure 12 shows a constructional form with which the valve member 14 is displaceabel in the sleeve 9, leaving an annular gap, and a compression spring 42 is arranged in the said gap. In the closed position which is shown, the spring 42 is clamped between the two pins 20 at one end and an annular shoulder 44 of the member or sleeve 8 at the other end. As soon as the valve member 14 is freed by rotation of the sleeve 9, the spring 42 acting on the pins 20 throws back the valve member 14 by the axially parallel width of the slots 54, the valve opening suddenly. This instantaneous opening stroke or travel is in this case sufficient for opening a flow cross-section of the valve which avoids the escape of gas from the liquid.

According to Figures 8 and 9, the housing 1 carries on its upper side a cylinder 53 which, in conjunction with the piston 37, forms a piston pump. The piston 37 is sealed off relatively to the cylinder by the packing disc 51. As with the constructional form according to Figure 3, the housing 1 has a bore, into which a spring-loaded non-return valve (not shown) is fitted. By pressing down the housing cover 35 connected to the piston 37 and against the force of the spring 52, air is forced through the non-return valve into the interior of the threaded socket 2, i.e. into the gas chamber of the container, on to which the dispenser is screwed.

The dispenser which has been described is not only suitable for the dispensing of gas-containing liquids, more especially drinks containing carbon dioxide, which spontaneously generate an adequate propellant gas pressure in the container. With the aid of the arrangement 35—41 (Figure 3) or respectively 35,37,45,51-53 (Figure 8), also liquids which have a low gas content or are gas-free, e.g. drinks not containing carbon dioxide, are able to be placed under a sufficient air pressure, so that they can be dispensed by the apparatus according to the invention in a similar manner to liquids over-saturated with carbon dioxide. However, the invention is not limited to the constructional forms which have been illustrated; it is also extended to dispensing devices without the means for the production of a propellant air pressure in the container, which then are only suitable for the dispensing of liquids having an adequate natural gas pressure. Furthermore, the cam carrier can for example comprise more than two shell-like parts or slots and the curvilinear form can be modified.

CLAIMS

1. Device for dispensing liquids which contain or are free from gas, more especially drinks or beverages containing carbon dioxide, from a container, comprising a housing with a socket or nozzle which can be fitted on to the container opening, a feed pipe duct which opens into the socket or nozzle and to which is connected a rising feed pipe projecting into the container, a dispensing duct which extends laterally from the housing and which is connected to the feed pipe duct, and a valve member which is displaceable in a bore or tube between a closed position and an open position, wherein a cam carrier partially encloses the valve member and is arranged to be rotatable in the tube, the cam or cams of the cam carrier cooperate with at least one stud or pin of the valve member and have a pitch or incline region, the pin or pins are held by spring force in abutment with the cam or cams of the cam carrier, at least one pin support bearing is provided in the pin position at the upper end of the incline region and the valve member, with support of its pin or pins on the pin support bearing or bearings, is axially established and, with release of its pin or pins from the pin-support bearing or bearings, is capable of axial displacement.

2. Device according to claim 1, wherein the cam carrier comprises at least one shell component and the pin support bearing is a substantially incline-free region of the cam or cams extending along the upper edge of the shell component, said region bordering the incline region.

3. Device according to claim 1 or 2, wherein the cam carrier comprises two axially symmetrical shell components which carry the cam or cams.

4. Device according to any one of claims 1 to 3, wherein a step rising in the direction of rotation of the cam carrier is formed in a substantially incline-free region of the cam or cams.

5. Device according to claim 1, wherein the cam carrier is of sleeve-like formation, the cam or cams are formed by at least one helical slot in the sleeve, the width of the slot being at least equal to the diameter of the pin or pins, and the pin-support bearing or bearings are formed by guide groove sections which, at those ends of the guide

grooves which adjoin the feed pipe duct, are connected in the same peripheral direction of the bore to the guide grooves.

6. Device according to claim 5, wherein the axial parallel width of the slot or slots is a multiple of the diameter of the pin or pins.

7. Device according to claim 5 or 6, wherein the sleeve-like cam carrier is formed with two helical slots and the pins project through the slots into the guide grooves.

8. Device according to any one of claims 1 to 7, wherein the valve member comprises two pins arranged diagonally of one another and the bore has two guide grooves which are diagonally opposite one another.

9. Device according to any one of claims 1 to 8, wherein a helical tension spring is arranged between the valve member and the cam carrier.

10. Device according to claim 9, wherein a bore is formed in the valve member and/or the axial journal of the cam carrier, in which bore or bores is contained the tension spring.

11. Device according to any one of claims 1 to 8, wherein a helical compression spring is arranged between the pins of the valve member and an annular shoulder of the bore.

12. Device according to any one of claims 1 to 11, wherein the end face of the valve member is constructed as a surface with a cylindrical or spherical concave curvature for deflecting the liquid from the feed pipe duct into the dispensing duct.

13. Device according to any one of claims 1 to 12, wherein the dispensing duct is formed in one region in the direction of flow with a conical tapering and the wall surface of the cylindrical valve member is provided near its end face with an O-ring providing a seal against the conical region of the dispensing duct.

14. Device according to any one of claims 1 to 13, wherein a rocking lever projecting laterally from the housing is arranged on the axial journal of the cam carrier.

15. Device according to any one of claims 1 to 14, wherein the housing is fitted with a pump of which the pressure chamber is connected to the interior of the socket by way of a passage fitted with a valve.

16. Device for dispensing liquids substantially as shown in Figures 1 to 6, Figure 7, Figures 8 to 11, or Figure 12 of the accompanying drawings and described herein with reference thereto.

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