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(54) **Carousel filling machine comprising a pneumatic apparatus**

Drehtischfüllmaschine mit einer pneumatischen Vorrichtung

Machine remplisseuse à carrousel avec un dispositif pneumatique

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Description

[0001] The invention relates to vertical axis carousel machines for filling bottles or other containers with liquid products. The peripheries of the carousels of these machines are fitted with equidistant heads, connected to the reservoir of liquid product with the interposition of a valve means the opening and closing of which is actuated by controls governed by a cam and which is oriented downwards with its own discharge mouth fitted with an annular gasket against which the mouth of the bottle to be filled is brought by command to cooperate coaxially and tight. A tube protrudes from the lower discharge mouth of the head and extends coaxially downwards and engages the bottle for a section of predetermined length, as the bottom end of this same tube itself determines the filling level of the liquid in the bottle. The tube makes the gas escape from the bottle while this is progressively filled with liquid and even before filling the same tube is often also used for putting gas under pressure, usually carbon dioxide, into the bottle, and is also useful for washing the inside of the bottle itself and for other purposes.

[0002] The heads which are referred to, usually extend upwardly with a cylindrical body, having a round section, inside which there are axially movable means for the axial activation of said tube (if required) and onto which there is slidably mounted a slide which carries fixed rods which extend downwardly and which support under the said head a gripper for the gripping of the neck of the bottle. Said slide is laterally provided with a roller which detects the shape of a cam usually with simple action, which is surmounting the same roller and cylinder-and-piston and fluid pressure means are provided to constantly upwardly push said slide, to ensure the contact of the said roller with the relative cam.

[0003] Document GB 453 060 A discloses a carousel filling machine, according to the preamble of claim 1, comprising vertical guide means, a slide which carries a plate, a roller, a cam, a cylinder and piston unit ensuring contact between the roller and the cam and which is coupled to a part of the slide and to a part of the carousel and provided with a connection to a feeding circuit. The cylinder is open at the bottom.

[0004] According to the invention, there is provided a carousel filling machine constructed and operating in accordance with appended claim 1 and dependent claims.

[0005] Further characteristics of the invention, and the advantages which derive from it, will appear more evident from the following description made with reference to the figures in the two attached sheets of drawings, in which:

- Figure 1 shows laterally and with portions in section a filling head with the improvements to the elevation unit of the bottles;
- Figure 1 a shows laterally a different elevation unit of the bottles connected to a filling head and provided with the improvements which are referred to;
- Figures 2 and 3 show other details of the head of

Figure 1, taken respectively according to the sections II - II and III - III.

[0006] In the Figures, reference numeral 1 indicates partially the carousel which is rotating around a vertical axis and onto the perimeter of which carries laterally fixed and with angular equal-spacing, by means of screws 2, the filling heads formed by a distributor box 3 having the shape of a parallelepiped, provided at the bottom with a discharging mouth 4 downwardly open, against which there is placed with lateral seal the mouth of the bottle B to be filled, in said box being housed the valve means intercepting the connection between said mouth 4 and the feeding duct 5 of the product P, obtained in the carousel 1. From the mouth 4 there is co-axially projecting the tube 6 which in the phase of filling engages the bottle B to determine in this the maximum level of the fed liquid. Reference numeral 7 indicates the external control of an air valve, not relevant for the understanding of the invention, which is driven by means of fixed portions during the rotation of the carousel 1.

[0007] On top of box 3 there is fixed with screws 8 (Fig. 2) a flange 9 which on its turn carries a fixed tubular body 10, vertical and with rounded section which is completing the filling head in the operative connection with the feeding parts of the gas under pressure to the tube 6, to the axial displacement means of the same tube and to the driving parts of the valve placed in the box 3, means not considered here in their details because not necessary for the understanding of the invention. On the lower portion of the body 10 slides the tubular slide 11 which on the lower end carries an enlarged base 111 to which there may be fixed in 112 the upper end of a couple of vertical rods 12 which pass through guide holes 13 obtained in the flange 9 and which with the lower end carries the gripper means 14 for the gripping of the neck of the bottle B, for the raising of the same against the discharging mouth 4 of the head. For the vertical displacement of the slide 11 with the gripper 14 provide the rotation of the carousel 1 and one fixed and simple effect cam 15, with which co-operates a horizontal axis roller 16 laterally mounted on the base 111 of the same slide 11. Because of the simple effect shape of the cam 15, means must be provided to upwardly push the slide 111, in such a manner to maintain said roller 16 in contact with the control cam 15. According to the invention, these means are constituted by a cylinder and piston vertical unit G, placed laterally to the slide 11, in a distant position from the roller 16 in such a manner to not interfere with the cam 15. The unit G comprises an external cylindrical jacket 17, having rounded section, the upper end of which is closed and bell-shaped, and carries in integral manner a co-axial blind stake 117, having a rounded section, externally provided with an annular seat with a rubber O ring 18 which frictionly engages a hole 19 obtained in a base or lateral appendix 20 provided with an annular portion with which it is inserted and fixed with any suitable technique to the upper end of the slide 11. The jacket 17 has a height or

length which is superior to the run C performed by the movable portions of the head in their operative movement (Fig. 1) and in the same jacket there is co-axially housed a rod 21, axially hollow, the upper end of which is externally enlarged as indicated with reference numeral 121, to realise a piston which is laterally provided with a seat for a guide ring 22, for example in suitable rigid plastics or other suitable material and which above this carries a seat for at least a lip annular seal 23, which is exposed to wear and which periodically must be substituted. Inside of the rod 21 there is housed a counteracting spring 24 with cylindrical spiral, with suitable features, which operates between the portions 21 and 17 and which simply has the function to maintain the unit G in the correct position, also without air under pressure in the relative feeding circuit (see further). When the unit G is in the retracted position, as shown in Figure 1 with continuous line, the rod 21 projects for a correct portion from the lower end of the jacket 17, with its lower end co-axially provided with a stake 221 which is axially hollow in order to communicate with internal pressure chamber of the unit G and which is externally provided with an annular seat for a rubber O ring 25, in such a manner that the same stake engages with lateral seal a vertically hollow and open upwardly hole, obtained in the flange 9 and which constitutes the terminal portion of a circuit 26 obtained in the same flange, open on the side of this toward the carousel 1 and communicating with a distribution annular chamber and/or with a duct 27 placed onto the carousel 1 and in its turn connected with a centralized source 28 for the feeding of compressed air at pre-established and constant values of pressure, through a rotating distributor (not illustrated) placed for example onto the vertical axis of the same carousel, the whole in a manner which is conceivable and easily realisable by the persons skilled in the art. The air under pressure which arrives from the duct 26, passes through the axial cavity of the stake 221 and enters in the internal seal chamber of the unit G which in such manner is pushed in extension to raise the slide 11 and to maintain the roller 16 in the requested co-operation with the cam 15.

[0008] It is clear how, in absence of air under pressure in the circuit 26 and when the heads are at the level of the raising station of the gripper 14, only by operating with the hands or with a gripper which may be given in the kit, it is easy to press the units G in opposition to their weak internal spring 24, with the short run necessary to extract the stakes 117 and 221 from their seats so as to remove the units G from the carousel, to proceed to the substitution of their internal gasket 23. Once the gasket is substituted, the inverse operation is repeated and the units G are re-assembled in their seat, the whole with an easy, quick procedure which can be performed also by personnel not qualified, because it is not necessary to operate onto other portions of the heads and of the filling machine. It is to be understood that another possibility is that the G unit is fed not through one of its end axial stakes, but through an external lateral duct, flexible for

example, provided at the ends with screw connections or with quick and removable connection couplings to the delivery circuit of the air under pressure.

[0009] The part of the internal chamber of the unit G which is placed under the piston with the sliding and seal gaskets 22, 23, is downwardly open and is automatically protected from the inlet of foreign particles. However, it is to be understood that, if required, the unit G may be reversed with the rod upwardly oriented and that said chamber may be differently upwardly open, with axial opening of the stake 117 and with closing of the stake 221 and/or it is to be understood that this same chamber may be protected, for hygienically reasons, by applying by means of snap, screw or other technique, onto the lower end of the jacket 17, of an annular cap and of porous material, not illustrated in the drawings because easily conceivable by the persons skilled in the art. The improvements which are referred to must be intended as protected also for the groups of filling heads illustrated in the Figure 1 a, in which the bottle B is raised by the bottom by means of a plate 14' carried by an arm 114 integral to a slide 11' which runs onto a vertical guide 10 disconnected from the filling head (not illustrated in Figure 1a) and integral to the carousel 1 of the filling machine, said slide being laterally provided with a roller 16 which is pushed against the cam 15 (as from the solution of Figure 1) by means of the cylinder and piston unit G, acting between the appendices 211 of the slide 11' and 110 of the guide 10'. The feeding circuit 29 for the air under pressure to the seat 26 in which there is placed the lower stake 221 of the unit G, is now longitudinally obtained in the guide 10' and in its lower appendices 110, as indicated with dotted line. A dowel 30 and a fork 31 may be used to fix in removable manner the upper stake 117 and the lower stake 221 of the unit G to the relative lateral appendices 211, 110. The fork 31 tangentially engages with a lower annular groove of the rod 21 and with its lower appendix is fixed with a screw to the appendix 110.

Claims

1. Carousel filling machine, provided on the periphery with equidistant filling heads which extend upwardly with a cylindrical and vertical body inside of which there are axially movable means for the axial activation of a filling level tube (6) comprising a pneumatic apparatus for the connection of the said filling level tube (6) with the delivery of gas under pressure and the means for the actuation of the interception valve of a duct (5) for the feeding of the liquid product, in which for every filling head there are provided relative vertical guide means (10, 10') upon which is running a slide (11, 11') which carries a gripper or a plate (14, 14') for the raising and the lowering of a bottle during the filling phase and which slide (11, 11') is provided laterally with a roller (16) which de-

fects the shape of a surmounting annular and fixed cam (15), and in which contact means are provided to constantly upwardly push said slide (11, 11'), to ensure the contact of the said roller (16) with said cam (15), said contact means comprising a cylinder-and-piston unit (G) laterally and externally placed with respect to said slide (11, 11'), coupled or removably fixed with its upper end to a part (18, 211) connected to the said slide (11, 11'), and coupled or removably fixed with its lower end to a part (9, 110) connected to the carousel (1) and provided with a removable and preferably quick type connection to a compressed air feeding circuit (29) obtained in the carousel (1) and which feeding circuit is connected through a rotating coupling to a source (28) for the delivery of the air at correct values of pressure, which pushes said unit (G) in extension and the said slide (11, 11') upwardly,

characterised by the fact that the said cylinder and piston unit (G):

- is provided at said upper end, formed by a jacket (17), and at said lower end, formed by a rod (21), with removable coupling or fixing means, and coupled to said parts (18, 211, 9, 110), of which to the lower fixing means, are constituted by a co-axial stake (221) provided with a lateral seal (25) and which stake (221) is axially hollow for the communication with a internal pressure chamber of the unit and is pre-arranged to be removably inserted in a hole obtained in said part (9, 110) connected to the carousel, and which hole is communicating with the air feeding circuit (26-29) for the air under pressure, and
- is provided with a cylindrical screw spring (24) arranged at the interior, which urges the unit(g) in extension with a strength which is sufficient at least to maintain the same unit in the correct position also in absence of air under pressure in a relative air feeding duct (26).

2. Machine according to claim 1, **characterised by** the fact that the cylinder and piston (G) unit is at its upper end provided with an axial and blind stake (117), coupled or removably fixed to a lateral appendix (20, 211) of an upper end of the slide (11, 11').
3. Machine according to claim 1, **characterised by** the fact that the lower and axially hollow stake (221) is externally provided with an annular seat with a rubber O ring (25) which co operates with said hole of the feeding circuit (26) for the feeding of the air under pressure.
4. Machine according to claim 2, **characterised by** the fact that the upper and blind stake (117) is externally provided with an annular seat which houses a rubber O ring (18), to ensure a correct friction-cooperation

between the stake (117) and a relative housing hole (19).

5. Machine according to claim 1, **characterised by** the fact that an upper and blind stake (117) is removably fixed to a relative lateral appendix (211) with a threaded and perpendicular dowel (30) while the lower stake (221) of the same cylinder and piston unit (G) is fixed to said part (9, 110) connected to the carousel, by means of a fork (31) with screw.
6. Machine according to claim 1, **characterised by** the fact that a part of the internal chamber which is placed under a piston with sliding and sealing gaskets (22, 23), and is interposed between the external jacket (17) and the rod (21), is not under pressure and is freely open to the atmosphere with its lower end and is downwardly oriented in such a manner to be protected against the inlet of foreign bodies.
7. Machine according to claim 1, **characterised by** the fact that the cylinder and piston unit (G) is upwardly oriented with the rod (21) and a part of the internal chamber which is placed under a piston with sliding and sealing gaskets (22, 23), and is interposed between the external jacket (17) and the rod (21) of said unit, is not under pressure and is freely open to the atmosphere with its upper end, in such a manner that the said part of the internal chamber may retain at its inside lubrication material of the piston-and-cylinder unit and the particles of material produced by the relative sliding of the portions which compose the same unit.
8. Machine according to claim 6 or 7, **characterised by** the fact that chamber said part of the internal may be closed onto its end which is freely open to the atmosphere, with a cap of porous material for example screwed or snap-fixed or with other removable means onto the open end of the said jacket (17).

Patentansprüche

1. Drehtischfüllmaschine, die auf dem Umfang mit im gleichen Abstand angeordneten Füllköpfen versehen ist, die sich mit einem zylindrischen und vertikalen Körper nach oben erstrecken, in dem sich axial bewegliche Mittel für die axiale Betätigung eines Füllstandsrohrs (6) befinden, wobei eine pneumatische Vorrichtung für die Verbindung des Füllstandsrohrs (6) mit der Zuführeinrichtung für Gas unter Druck und den Mitteln zum Betätigen des Überwachungsventils einer Leitung (5) zum Zuführen des flüssigen Produkts vorgesehen ist, wobei für jeden Füllkopf entsprechende vertikale Führungsmittel (10, 10') vorgesehen sind, auf denen sich ein Schlitten (11, 11') bewegt, der eine Greifvorrichtung oder

eine Platte (14, 14') für das Anheben oder Absenken einer Flasche während der Phase des Befüllens trägt und wobei der Schlitten (11, 11') seitlich mit einer Walze (16) versehen ist, die die Form einer ringförmigen darüber und stationär angeordneten Schulter abtastet und in der Kontaktmittel vorgesehen sind, um den Schlitten (11, 11') konstant nach oben zu schieben, um den Kontakt der Walze (16) mit der Schulter (15) sicherzustellen, wobei die Kontaktmittel eine Zylinder/Kolbeneinheit (G) umfassen, die relativ zu dem Schlitten (11, 11') seitlich und außen platziert, mit ihrem oberen Ende an einem mit dem Schlitten (11, 11') verbundenen Teil (18, 211) angekoppelt oder lösbar befestigt und mit ihrem unteren Ende an einem mit dem Drehtisch (1) verbundenen Teil (9, 110) angekoppelt oder lösbar befestigt ist und die mit einer lösbaren Verbindung, vorzugsweise einer Schnellverbindung, zum Anschluss an ein in dem Drehtisch (1) vorgesehenes Druckluft-Zufuhrsystem (29) versehen ist, wobei das Zufuhrsystem über eine Drehkupplung mit einer Quelle (28) für die Zufuhr von Luft mit korrekten Druckwerten verbunden ist, wodurch die Einheit (G) in eine ausgefahrene Stellung und der Schlitten (11, 11') nach oben geschoben werden,
dadurch gekennzeichnet, dass die Zylinder/Kolbeneinheit (G):

- an dem oberen, von einer Hülse (17) gebildeten Ende und an dem unteren, von einem Stab (21) gebildeten Ende mit lösbaren Kupplungs- oder Befestigungsmitteln versehen und mit den Teilen (18, 211, 9, 110) verbunden ist, wobei die unteren Befestigungsmittel von einem koaxialen Stab (221) gebildet werden, der mit einer seitlichen Dichtung (25) versehen ist, wobei der Stab axial hohl ist, um die Verbindung mit einer inneren Druckkammer der Einheit zu ermöglichen und so angeordnet ist, dass er herausnehmbar in eine in dem mit dem Drehtisch verbundenen Teil (9, 110) vorgesehene und mit dem Luftzufuhrsystem (26/29) für Druckluft in Verbindung stehende Öffnung eingeführt werden kann, und
- mit einer zylindrischen im Inneren angeordneten Schraubenfeder (24) versehen ist, die die Einheit (G) mit einer Kraft in die ausgefahrene Stellung drückt, die ausreichend ist, um diese Einheit zumindest auch dann in der korrekten Stellung zu halten, wenn keine Druckluft in einer zugeordneten Luftzufuhrleitung (26) vorhanden ist.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Zylinder/Kolbeneinheit (G) an ihrem oberen Ende einen axialen und umschlossenen Stab (117) aufweist, der mit einem seitlichen Fortsatz (20, 211) eines oberen Endes des Schlittens

(11, 11') gekoppelt oder lösbar verbunden ist.

3. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** der untere und axial hohle Stab (221) auf seiner Außenseite mit einem ringförmigen Sitz mit einem O-Ring (25) aus Gummi versehen ist, der mit der Öffnung des Zufuhrsystems (26) für die Zufuhr der Druckluft zusammenarbeitet.
4. Maschine nach Anspruch 2, **dadurch gekennzeichnet, dass** der obere und umschlossene Stab (117) auf seiner Außenseite mit einem ringförmigen Sitz versehen ist, der einen O-Ring (18) aus Gummi beherbergt, um eine bezüglich der Reibung korrekte Zusammenarbeit zwischen dem Stab (117) und einer entsprechenden Gehäuseöffnung (19) sicherzustellen.
5. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** ein oberer und umschlossener Stab (117) in einem entsprechenden seitlichen Fortsatz (211) mit einem ein Gewinde aufweisenden und sich senkrecht erstreckenden Passstift (30) herausnehmbar befestigt ist, während der untere Stab derselben Zylinder/Kolbeneinheit (G) mittels einer Schraube aufweisenden Gabel (30) an dem Teil (9, 110) befestigt ist, der mit dem Drehtisch verbunden ist.
6. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Teil der inneren Kammer, der unterhalb eines Kolbens mit Gleit- und Abschlussdichtungen (22, 23) platziert ist und der zwischen der äußeren Hülse (17) und dem Stab (21) der Zylinder/Kolbeneinheit (G) angeordnet ist, an seinem unteren Ende nicht unter Druck steht und gegenüber der Umgebungsluft geöffnet ist und nach unten so ausgerichtet ist, dass er gegen das Eindringen von Fremdkörpern geschützt ist.
7. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Zylinder/Kolbeneinheit (G) mit dem Stab (21) nach oben ausgerichtet ist und ein Teil der inneren Kammer, der unterhalb eines Kolbens mit Gleit- und Abschlussdichtungen (22, 23) platziert ist und der zwischen der äußeren Hülse (17) und dem Stab (21) der Einheit angeordnet ist, an seinem oberen Ende nicht unter Druck steht und gegenüber der Umgebungsluft geöffnet ist, so dass dieser Teil der inneren Kammer in seinem Innenraum ein Schmiermittel der Zylinder/Kolbeneinheit und die Materialpartikel aufnehmen kann, die während der Gleitbewegung der die Einheit bildenden Teile relativ zueinander erzeugt werden.
8. Maschine nach Anspruch 6 oder 7, **dadurch gekennzeichnet, dass** der Teil der inneren Kammer an seinem Ende, das gegenüber der Umgebungsluft

geöffnet ist, mit einer Kappe aus porösem Material, die beispielsweise aufgeschraubt oder eingerastet werden kann oder durch andere lösbare Mittel auf dem offenen Ende der Hülse (17) verschlossen werden kann.

Revendications

1. Machine de remplissage à carrousel, munie, sur sa périphérie, de têtes de remplissage équidistantes qui s'étendent vers le haut avec un corps cylindrique et vertical à l'intérieur duquel se trouvent des moyens axialement mobiles pour l'activation axiale d'un tube de niveau de remplissage (6) comprenant un appareil pneumatique pour le raccordement dudit tube de niveau de remplissage (6) avec la délivrance du gaz sous pression et le moyen pour l'actionnement de la soupape d'interception d'une conduite (5) pour l'alimentation du produit liquide, dans laquelle, pour chaque tête de remplissage, sont fournis des moyens de guidage verticaux relatifs (10, 10') sous lesquels circule un coulisseau (11, 11') qui porte un dispositif de préhension ou une plaque (14, 14') pour soulever et abaisser une bouteille lors de la phase de remplissage, et qui est muni latéralement d'un rouleau (16) qui détecte la forme d'une came fixe et annulaire en surplomb (15), et dans laquelle les moyens de contact sont fournis pour pousser constamment vers le haut ledit coulisseau (11, 11'), pour assurer le contact dudit rouleau (16) avec ladite came (15), lesdits moyens de contact comprenant une unité de cylindre et de piston (G) placée de façon latérale et externe par rapport audit coulisseau (11, 11'), son extrémité supérieure étant couplée ou fixée de façon amovible à une pièce (18, 211) raccordée audit coulisseau (11, 11'), et son extrémité inférieure étant couplée ou fixée de façon amovible à une autre pièce (9, 110) raccordée au carrousel (1) et munie d'un raccordement de préférence de type rapide et amovible à un circuit d'alimentation en air comprimé (29), obtenu dans le carrousel (1), et lequel circuit d'alimentation est raccordé par l'intermédiaire d'un couplage rotatif à une source (28) pour la délivrance de l'air à des valeurs de pression correctes, lequel pousse ladite unité (G) en extension et ledit coulisseau (11, 11') vers le haut,
caractérisée en ce que ladite unité de cylindre et de piston (G) :

- est munie, au niveau de ladite extrémité supérieure, formée d'une chemise (17), et au niveau de ladite extrémité inférieure formée d'une tige (21), d'un moyen de fixation ou de couplage amovible, est couplée auxdites pièces (18, 211, 9, 110), dont les moyens de fixation inférieurs (16) sont constitués d'un grain coaxial (221) muni d'un joint latéral (25), et lequel grain est creux

axialement pour la communication avec une chambre de pression interne de l'unité et qui est préagencé pour être inséré de façon amovible dans un orifice obtenu dans ladite pièce (9, 110) raccordée au carrousel, et lequel orifice communique avec le circuit d'alimentation en air (26, 29) pour l'air sous pression, et
- est munie d'un ressort à vis cylindrique (24) agencé à l'intérieur, qui amène l'unité en extension avec une force qui est suffisante au moins pour maintenir la même unité dans la bonne position même en l'absence d'air sous pression dans une conduite d'alimentation en air relatif (26).

2. Machine selon la revendication 1, **caractérisée en ce que** l'unité de cylindre et de piston (G) est munie, au niveau de l'extrémité supérieure, d'un grain axial et aveugle (117), couplé ou fixé de façon amovible à un appendice latéral (20, 211) d'une extrémité supérieure du coulisseau (11, 11').
3. Machine selon la revendication 1, **caractérisée en ce que** le grain inférieur et creux axialement (221) est muni à l'extérieur d'un joint annulaire ayant un joint torique en caoutchouc (25) avec ledit orifice du circuit d'alimentation (26) pour l'alimentation de l'air sous pression.
4. Machine selon la revendication 2, **caractérisée en ce que** le grain supérieur et aveugle (117) est muni sur l'extérieur d'un joint annulaire qui loge un joint torique en caoutchouc (18), pour assurer une coopération par frottement correcte entre le grain (117) et un orifice de logement relatif (19).
5. Machine selon la revendication 1, **caractérisée en ce qu'un** grain supérieur et aveugle (117) est fixé de façon amovible à une annexe latérale relative (211) avec un goujon fileté et perpendiculaire (30), tandis que le grain inférieur (221) de la même unité de cylindre et de piston (G) est fixé à ladite pièce (9, 110) raccordée au carrousel, au moyen d'une fourche (31) avec une vis.
6. Machine selon la revendication 1, **caractérisée en ce qu'une** partie de la chambre interne qui est placée sous un piston ayant des bagues d'étanchéité coulissantes (22, 23), et qui est interposée entre la chemise externe (17) et la tige (21) de l'unité de cylindre et de piston (G), et n'est pas sous pression et est ouverte librement à l'atmosphère avec son extrémité inférieure et est orientée vers le bas, d'une manière telle qu'elle est protégée de toute entrée de corps étranger.
7. Machine selon la revendication 1, **caractérisée en ce que** l'unité de cylindre et de piston (G) est orientée

vers le haut avec la tige (21) et une partie de la chambre interne qui est placée sous un piston ayant des bagues d'étanchéité coulissantes (22, 23), et est interposée entre la chemise externe (17) et la tige (21) de ladite unité, et n'est pas sous pression et est ouverte librement à l'atmosphère avec son extrémité supérieure, d'une manière telle qu'une partie de la dite chambre interne peut retenir au niveau de son matériau de lubrification intérieur de l'unité de cylindre et de piston et des particules de matériau produites par le coulisement relatif des parties qui composent la même unité.

8. Machine selon la revendication 6 ou 7, **caractérisée en ce que** ladite partie de la chambre interne peut être fermée au niveau de son extrémité qui est librement ouverte à l'atmosphère, grâce à un bouchon en matériau poreux, par exemple vissé ou fixé par emboîtement, ou grâce à tout autre moyen amovible fixé sur l'extrémité ouverte de ladite chemise (17).

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