June 27, 1967 J. GÖMANN 3,327,906

APPARATUS FOR DISPENSING PASTE

Filed Sept. 8, 1965

Fig. 1

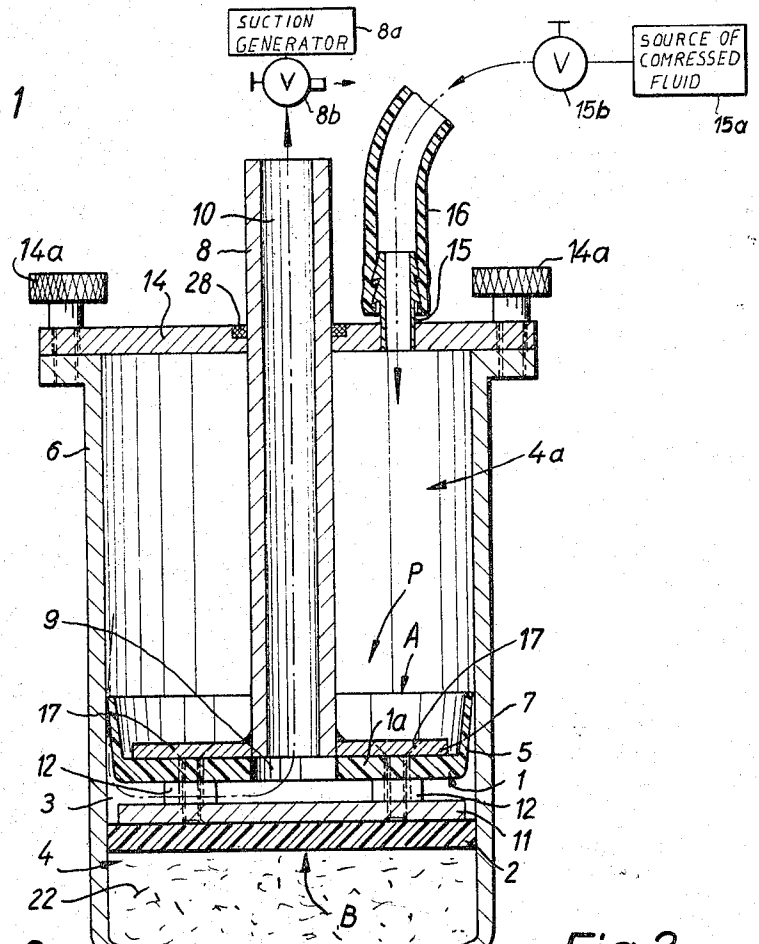



Fig. 3

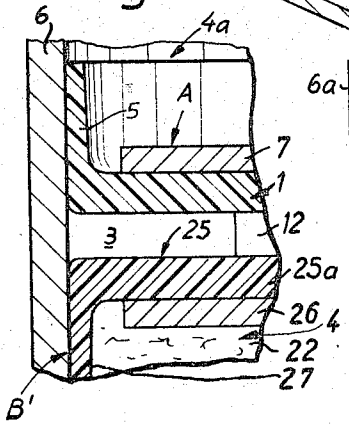
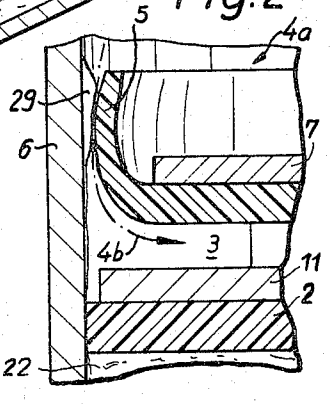



Fig. 2




Inventor:
Jürgen Gömann
by Michael J. Striker
Atty

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# APPARATUS FOR DISPENSING PASTE

Jürgen Gömann, Hamburg-Lohbrugge, Germany, assignor to Hauni, Korber & Co., K.G., Hamburg, Germany

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4 Claims. (Cl. 222—389)

The present invention relates to an apparatus for dispensing paste, and more particularly to improvements in pasters of the type which may be used in cigarette machines, cigar machines, filter cigarette machines and similar tobacco processing machines wherein a web of paper, tobacco foil or cork is to be provided with a continuous film of adhesive paste. Still more particularly, the invention relates to improvements in pasters of the type wherein paste contained in a cylinder or analogous receptacle is expelled in response to admission of compressed air or another suitable fluid.

In many heretofore known pasters for cigarette machines, the supply of paste in the cylinder is separated from the source of compressed fluid by a piston comprising or consisting of a single gasket which is normally elastic so that, and particularly when the paste hardens along the internal surface of the cylinder, at least some compressed fluid (normally air) penetrates into the paste and is discharged therewith through the nozzle of the paster. A serious drawback of such pasters is that air bubbles which are permitted to penetrate into the paste will interrupt the continuity of the film which issues from the nozzle so that certain portions of the travelling cigarette paper web or tape are not coated with adhesive. Consequently, the wrapper will burst open in response to internal pressure of tobacco which constitutes the filler of a cigarette rod or cigar rod and which is invariably wrapped with some compression so that it exerts a certain pressure tending to expand the wrapper.

It was found that even very thin incrustations of paste which accumulate along the internal surface of the cylinder will permit compressed air to penetrate into the paste in such quantities that the use of a so constructed paster in cigarette or cigar machines often leads to lengthy interruptions or to the production of defective tobacco-containing products. For example, a modern cigarette machine will produce up to 2,000 cigarettes per minute and, consequently, even short interruptions in proper operation of the paster will bring about substantial losses in output and starting material. Tobacco particles escaping from an improperly wrapped filler rod will contaminate the machine, and the adhesive on such opened wrapper will cause the wrapper to stick to machine parts which are in immediate contact therewith. In fact, it can happen that the adhesive applied to an opened wrapper coats the surfaces which guide the tobacco rod so that the rod cannot be removed from its channel and the operator must shut down the entire machine including all such attachments which feed tobacco, wrappers, filter mouthpieces and other components of the ultimate products.

Accordingly, it is an important object of the present invention to provide an improved paster which is constructed and assembled in such a way that compressed fluid used to expel paste from a cylinder cannot mix with paste even if the paste forms crusts which adhere to the internal surface of the paster cylinder.

Another object of the invention is to provide a novel piston which may be used in a paster of the just outlined characteristics and which positively prevents leak fluid from reaching that part of the cylinder which contains a supply of paste.

A further object of the invention is to provide a fluid-operated paster which may be readily installed in all



types of existing cigarette, cigar, filter cigarette, filter or cigarillo machines without necessitating any substantial alterations in the construction and operation of such machines.

Still another object of the invention is to provide a paster which, among others, may be used with advantage in apparatus of the type disclosed in a copending application Ser. No. 356,266 of Willy Rudszinat, filed Mar. 31, 1964 and assigned to the same assignee.

A concomitant object of the invention is to provide a paster wherein the piston which transmits pressure to a supply of paste performs a plurality of functions including preventing penetration of compressed fluid into the supply of paste and automatically evacuating any such fluid which happens to leak from its chamber.

Still another object of the invention is to provide a piston for use in a paster of the above outlined characteristics and to construct and assemble the piston in such a way that its component parts may be readily assembled or taken apart for the purposes of inspection, cleaning and/or replacement.

Briefly stated, one feature of the present invention resides in the provision of a paster, particularly for use in cigarette or cigar machines, which comprises a hollow cylinder having a paste discharging outlet at one end and a fluid admitting inlet at the other end, and a piston reciprocably received in and subdividing the interior of the cylinder into first and second chambers respectively communicating with the inlet and the outlet so that paste contained in the second chamber is expelled via the outlet in response to admission of compressed fluid into the first chamber via the inlet. The piston comprises a pair of sections which define between themselves a compartment extending along the internal surface of the cylinder between the two chambers, and the paster further comprises evacuating means defining a relief passage for escape of leak fluid from the compartment so that any fluid which happens to leak into the compartment from the first chamber is prevented from penetrating into the second chamber.

Each section of the piston preferably comprises an elastically deformable sealing element or gasket which engages the internal surface of the cylinder, and the evacuating means preferably comprises a hollow piston rod which is connected with one section of the piston and whose bore or bores constitute the relief passage which communicates with the compartment. The relief passage may discharge into the atmosphere or it may be connected to a suction generating device to make sure that pressure prevailing in the first chamber invariably exceeds the pressure which prevails in the compartment.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved paster itself, however, both as to its construction and its mode of operation, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of certain specific embodiments with reference to the accompanying drawings, in which:

FIG. 1 is an axial section through a paster which is constructed and assembled in accordance with a first embodiment of my invention;

FIG. 2 is an enlarged fragmentary detail view of the structure shown in FIG. 1 and illustrates the manner in which a crust of hardened paste can bring about leakage of compressed fluid from the first chamber into the compartment; and

FIG. 3 is a similar enlarged fragmentary detail view of a modified paster.

Referring first to FIG. 1, there is shown a paster comprising an elongated hollow metallic cylinder 6 of circular cross-sectional outline. The rear end of the cylinder 6 is closed by an end wall 14 which is secured thereto by

screws or bolts 14*a*. The connection between the rear end of the cylinder 6 and the end wall 14 is fluidtight, and the end wall is provided with an inlet 15 resembling a circumferentially ribbed nipple which is introduced into the discharge end of a flexible hose 16 forming part of a conduit connecting the inlet 15 with a source 15*a* of compressed fluid, for example, a suitable air compressor. The conduit contains a valve 15*b* which may be opened or closed by hand or in automatic response to certain types of impulses in a cigarette machine or cigar machine in which the paster is put to use.

The front end of the cylinder 6 is provided with an axially and forwardly extending outlet 6*a* which is fitted into a paste discharging nozzle 18 having a convex front end face 19 adapted to abut against a concave surface bounding a circumferential groove 20 provided in the periphery of a driven transfer wheel 21. The wheel 21 transfers a continuous film of paste to a disk-shaped rotary applicator, and the latter applies paste to a wrapper for a tobacco rod or filter rod in a manner as disclosed in the aforementioned copending application Ser. No. 356,266 of Rudszinat. The nozzle 18 can be considered as constituting the front portion of the outlet 6*a*.

The interior of the cylinder 6 accommodates a reciprocable piston P which is constructed and assembled in accordance with the present invention. This piston divides the interior of the cylinder 6 into a first chamber or plenum chamber 4*a* which communicates with the inlet 15 and extends all the way to the end wall 14, and a second chamber 4 which communicates with the outlet 6*a* and normally accommodates a supply of paste 22.

The piston P comprises two axially spaced sections A and B which define between themselves a relatively short compartment 3 extending all the way along the internal surface of the cylinder 6 in a zone between the chambers 4 and 4*a*. This compartment 3 serves to collect any such fluid which happens to leak from the chamber 4*a*, around the section A and toward the chamber 4. In order to insure that the pressure prevailing in the compartment 3 is always less than the pressure of fluid in the chamber 4*a* (when the valve 15*b* is open), the paster further comprises an evacuating device here shown as a hollow tubular piston rod 8 whose axial bore 10 constitutes a relief passage and may discharge to the atmosphere. Alternatively, the piston rod 8 may be connected to a suction generator, for example, to the suction side of a fan 8*a*, so that the latter actually sucks fluid from the compartment 3 which brings about several additional advantages to be described hereinafter. The connection between the piston rod 8 and the fan 8*a* preferably comprises a three-way valve 8*b* which is of known design and may be adjusted in three ways, namely, to seal the relief passage 10 from the fan 8*a* and from the atmosphere, to establish a connection between the passage 10 and the atmosphere but to seal the compartment 3 from the fan 8*a*, or to connect the compartment 3 only with the suction side of the fan 8*a*. The end wall 14 carries an annular sealing element 28 which engages the periphery of the piston rod 8 to prevent leakage of fluid through the end wall.

In the embodiment of FIG. 1, the section A of the piston P comprises a rigid disk-shaped stiffener 7 which resembles an annulus and is welded to the forward end of the piston rod 8 in such a way that its central aperture receives the foremost end of the piston rod and permits fluid to escape from the compartmnet 3. The diameter of the stiffener 7 is somewhat less than the internal diameter of the cylinder 6, and its front face bears against the rear side of a specially configurated sealing element or gasket 1, the latter comprising an annular central portion 1*a* which abuts against the stiffener 7 and an annular lip or flange 5 sealingly engaging the internal surface of the cylinder 6 and extending from the compartment 3 in a direction toward the end wall 14. The central portion 1*a* has an aperture 9 which allows fluid to flow from the compartment 3 into the relief passage 10 of the piston rod 8.



At least the flange 5 of the gasket 1 consists of elastic material, such as rubber or elastomeric plastic.

The section B of the piston P comprises a flat plate-or disk-like sealing element or gasket 2 which is in sealing engagement with the internal surface of the cylinder 6 and whose rear side abuts against the front face of a second stiffener 11. The diameter of the stiffener 11 is somewhat less than the internal diameter of the cylinder 6, and the two stiffeners 7, 11 are connected to each other by a series of screws, bolts or similar fasteners 17 whose heads are countersunk into the rear face of the stiffener 7. The compartment 3 accommodates a series of distancing elements or spacers 12 which resemble short sleeves or annuli and surround portions of the fasteners 17. These spacers 12 may also serve to prevent leakage of fluid from the chamber 4*a*, around the fasteners 17 and into the compartment 3.

The stiffeners 7, 11 prevent excessive flexing of the gaskets 1 and 2 and insure that the flange 7 and the marginal portion of the gasket 2 remain in requisite sealing engagement with the internal surface of the cylinder 6. The elasticity of the gasket 2 may be less than that of the gasket 1.

The paster of FIG. 1 is operated as follows:

In order to fill the chamber 4 with paste, the operator removes the screws 14*a* and the end wall 14 and withdraws the piston P from the cylinder 6. The end face 19 of the nozzle 18 abuts against the periphery of the transfer wheel 21 so that the outlet 6*a* is sealed. For example, the cylinder 6 can rest on the wheel 21 by gravity. Thus, in order to move the nozzle 18 away from the wheel 21, the mechanism which effects such movement must overcome the weight of the cylinder 6. In some instances, the paster may further comprise one or more springs (not shown) which bias the end face 19 into sealing engagement with the transfer wheel 21, or vice versa. The operator then fills the cylinder with paste 22 to a desired level and reinserts the piston P prior to reapplying the screws 14*a*. In the next step, the nozzle 18 is moved away from the transfer wheel 21 or vice versa so that paste contained in the chamber 4 may escape through a gap of predetermined width as soon as the valve 15*b* is opened to admit compressed fluid into the chamber 4*a*. The manner in which the transfer wheel 21 may be moved away from the nozzle 18 or vice versa is fully disclosed in the Rudszinat application Ser. No. 356,266.

When the valve 15*b* is open, fluid contained in the chamber 4 exerts a pressure against the internal, surface of the flange 5 and causes this flange to remain in strong sealing engagement with the internal surface of the cylinder 6. At the same time, fluid contained in the chamber 4*a* also bears against the stiffener 7 and causes the piston P to move toward the outlet 6*a* at the rate determined by the width of the gap between the nozzle 18 and transfer wheel 21. The wheel 21 rotates about a horizontal axis, as viewed in FIG. 1, and transfers a continuous film of paste in a manner as outline hereinbefore. It is also possible to use the wheel 21 as a means for transmitting paste directly to the web of a cigarette rod or cigar rod.

FIG. 2 shows a portion of the paster which was described in connection with FIG. 1, and this illustration further shows a hard crust 29 of solidified paste which adheres to the internal surface of the cylinder 6 and causes the flange 5 of the gasket 1 to yield so that some fluid can leak about the flange 5 and into the compartment 3 (see the arrow 4*b*). There are a number of circumstances under which the paste 22 in the chamber 4 will form a crust 29 or an otherwise configurated incrustation which is not stripped off by the marginal portion of the relatively stiff gasket 2 and is allowed to come into engagement with the flange 5 of the more elastic gasket 1. Of course, the dimensions of the crust 29 shown in FIG. 2 are exaggerated for the purposes of clearer illustration; nevertheless, even a relatively small incrustation can permit compressed fluid to leak from the chamber 4*a* and,

in the absence of the compartment 3, such leak fluid would penetrate into the supply of paste 22 where it would form bubbles and would prevent the nozzle 18 from discharging a continuous film of paste.

If the operator decides to connect the compartment 3 with the suction side of the fan 8*a*, the fan immediately withdraws any such fluid which happens to leak around the flange 5. At the same time, the fan 8*a* increases the pressure differential between the chamber 4*a* and compartment 3 so that the internal surface of the flange 5 is biased and the external surface of the flange is simultaneously drawn into strong sealing engagement with the cylinder 6. In other words, the compartment 3 then constitutes a suction chamber and contributes to superior sealing action of the gasket 1.

As soon as the flange 5 moves beyond the crust 29, it returns into full sealing engagement with the cylinder 6 and the compartment 3 is again sealed from the chamber 4*a*. As mentioned hereinabove, the thickness of the crust or crusts 29 is relatively small so that the quantity of compressed fluid which leaks into the compartment 3 when the flange 5 engages a crust is rather negligible. Such losses in compressed fluid may be readily compensated for by proper regulation of the valve 15*b* in such a way that pressure prevailing in the chamber 4*a* remains constant or nearly constant. The chamber 4*a* may be maintained at a very high pressure without any danger that fluid leaking around the flange 5 would penetrate into the paste 22 because such leak fluid is automatically withdrawn by the fan 8*a* or is permitted to escape into the atmosphere in response to suitable adjustment of the valve 8*b*.

Referring finally to FIG. 3, there is shown a portion of a paster which comprises a modified piston. The section B of the piston P shown in FIG. 1 is replaced by a section B′ comprising a rigid disk-shaped stiffener 26 which is located in the chamber 4, i.e., which comes in direct contact with paste 22, and a gasket 25 which is a mirror image of the gasket 1. Thus, the gasket 25 also comprises a disk-shaped central portion 25*a* (which, however, need not be provided with a central aperture 9) and an annular flange or lip 27 which extends in a direction from the compartment 3 and toward the outlet of the cylinder 6. The remainder of the paster shown in FIG. 3 is identical with the paster of FIG. 1. The material of the gasket 1 may but need not be more elastic than the material of the gasket 25. Also, the gaskets of my improved paster may but need not be bonded or otherwise attached to the respective stiffeners. If the gasket 25 of FIG. 3 is strongly flexible, its central portion 25*a* is preferably bonded or otherwise secured to the stiffener 26 to insure satisfactory sealing action by the flange 27. In FIG. 1, the gasket 2 may but need not be bonded to the stiffener 11. If the parts 2, 11 are connected to each other, the entire piston P may be withdrawn from the cylinder 6 as a unit. On the other hand, if the gasket 2 is loose, it centers itself with greater accuracy with reference to the cylinder. Also, if the gasket 2 is loose, it may be used as a sealing cap for the supply of paste 22 in the cylinder 6 while the remainder of the piston P is removed. For example, the gasket 2 may be applied over a freshly introduced supply of paste 22 while the paster is being transferred from the filling station back to a cigarette machine or cigar machine.

If desired, the chamber 4*a* may accommodate one or more springs, not shown, which assist the compressed fluid in maintaining the gasket 2 or 25 in contact with the supply of paste 22. In addition to receiving paste from the cylinder 2, the transfer wheel 21 also constitutes a means for regulating the outflow of paste from the outlet 6*a*.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features which fairly constitute essential characteristics of the generic and specific aspects of our contribution to the art and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is:

1. In a paster, a hollow cylinder having a paste discharging outlet at one end and a fluid admitting inlet at the other end; a piston reciprocably received in and subdividing the interior of said cylinder into first and second chambers respectively communicating with said inlet and said outlet so that paste contained in said second chamber is expelled via said outlet in response to admission of compressed fluid via said inlet, said piston comprising a pair of sections defining between themselves a compartment extending along the internal surface of said cylinder between said chambers; and evacuating means including a piston rod connected with one of said sections and defining a passage for escape of leak fluid from said compartment so that fluid which happens to leak from said first chamber is prevented from penetrating into said second chamber.

2. In a paster, a hollow cylinder having a paste discharging outlet at one end and a fluid admitting inlet at the other end; a piston reciprocably received in and subdividing the interior of said cylinder into first and second chambers respectively communicating with said inlet and said outlet so that paste contained in said second chamber is expelled via said outlet in response to admission of compressed fluid via said inlet, said piston comprising a pair of sections defining between themselves a compartment extending along the internal surface of said cylinder between said chambers; evacuating means defining a passage communicating with said compartment to permit escape of leak fluid so that fluid which happens to leak from said first chamber into said compartment is prevented from penetrating into said second chamber; and suction generating means connected with said evacuating means for withdrawing leak fluid through said passage.

3. In a paster, a hollow cylinder having a first end and a second end and comprising a fluid admitting inlet at said first end and a paste discharging outlet at said second end, said cylinder further comprising an end wall provided at said first end thereof; a piston reciprocably received in and subdividing the interior of said cylinder into first and second chambers respectively communicating with said inlet and said outlet so that paste contained in said second chamber is expelled via said outlet in response to admission of compressed fluid via said inlet, said piston comprising a pair of sections defining between themselves a compartment extending along the internal surface of said cylinder between said chambers, one of said sections separating said compartment from said first chamber; and evacuating means including a hollow piston rod connected with said one section and slidably extending through said end wall, said piston rod defining a passage communicating with and arranged to permit escape of leak fluid from said compartment so that fluid which happens to leak from said first chamber is prevented from penetrating into said second chamber.

4. In a paster, a hollow cylinder having a first end and a second end and comprising a fluid admitting inlet at said first end and a paste discharging outlet at said second end, said cylinder further comprising an end wall provided at said first end thereof; a piston reciprocably received in and subdividing the interior of said cylinder into first and second chambers respectively communicating with said inlet and said outlet so that paste contained in said second chamber is expelled via said outlet in response to admission of compressed fluid via said inlet, said piston comprising a pair of sections defining between themselves a compartment extending along the internal surface of said cylinder between said chambers, one of said sections

separating said compartment from said first chamber; evacuating means including a hollow piston rod connected with said one section and slidably extending through said end wall, said piston rod defining a passage communicating with and arranged to permit escape of leak fluid from said compartment so that fluid which happens to leak from said first chamber is prevented from penetrating into said second chamber; and annular sealing means mounted on said end wall and sealingly surrounding said piston rod to prevent leakage of fluid through said end wall.



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ROBERT B. REEVES, *Primary Examiner.*

STANLEY H. TOLLBERG, *Examiner.*