Sept. 20, 1938. J. W. LEARY 2,130,689

PASTE APPLYING DEVICE FOR CIGARETTE MACHINES

Filed March 5, 1935

Fig. 1

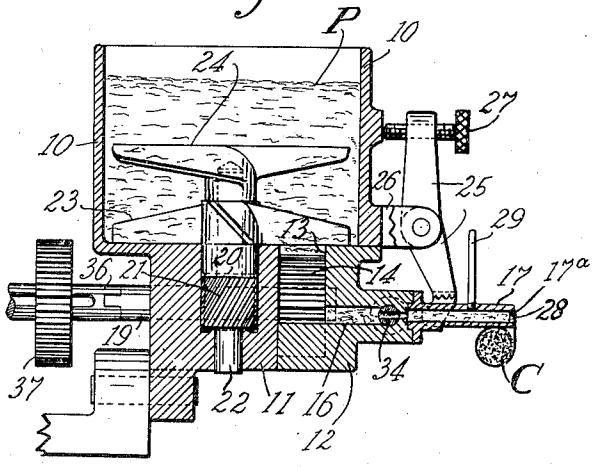


Fig. 2

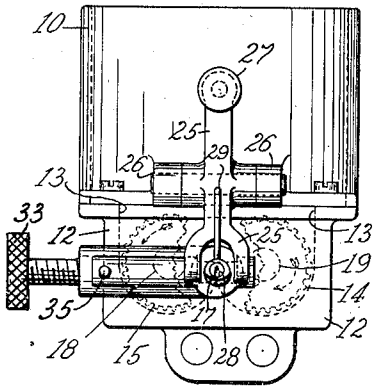


Fig. 3

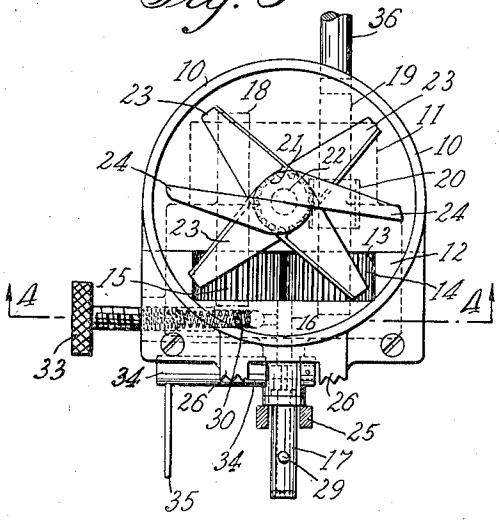


Fig. 4

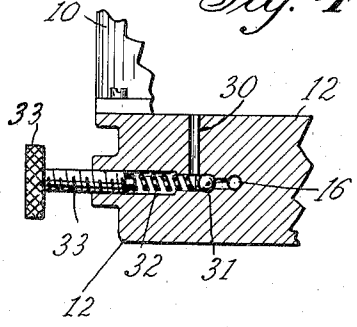
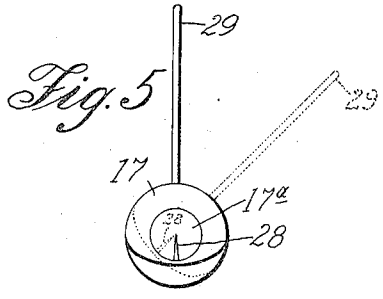


Fig. 5



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Patented Sept. 20, 1938 2,130,689

UNITED STATES PATENT OFFICE

2,130,689

PASTE-APPLYING DEVICE FOR CIGARETTE MACHINES

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Application March 5, 1935, Serial No. 9,477

13 Claims. (Cl. 131—43)

This invention relates to improvements in cigarette machine pasters, its main object being to provide a paste-applying device suitable for various types of paste and all speeds of operation.

To permit the operation of cigarette machine pasters at high speeds it has been found necessary to make use of the gear-pump principle by which the paste is scooped in definite amounts from a paste receptacle and delivered under pressure through a nozzle to the cigarette paper margin of the traveling cigarette rod. In previous paster constructions utilizing this gear-pump principle there have been provided a pair of intermeshing paste delivery gears coacting to deliver paste to the nozzle, and a pair of intermeshing paste pick-up gears which receive paste between their teeth from the receptacle and deliver an oversupply of paste to the spaces between the intermeshing teeth of the delivery gears in order to insure their filling without the formation of air locks or pockets. It is an object of this invention to eliminate the necessity of these paste pick-up gears, and to this end a single set of paste delivery gears is located under the outlet of the paste receptacle which is provided with a propeller acting to force the paste down into the spaces between the meshing teeth of the gears and fill the same without cavitation.

In the prior paster constructions, furthermore, whatever amount of paste was once caught between the teeth of the delivery gears, that very same amount was fed through the nozzle and there was no way of controlling either its pressure or flow.

Another object of the invention, therefore, is to enable controlling of the pressure of the paste delivered to the nozzle. To this end the gears feed the paste to the nozzle through a delivery duct which is connected to the paste receptacle by a by-pass provided with an adjustable relief valve. Accordingly, the valve will open when the pressure of the paste in the orifice exceeds that determined by the setting of the relief valve; and thus the gears may feed an oversupply to the orifice and the resistance of the relief valve to the return flow of the oversupply through the by-pass will maintain a substantially uniform pressure and flow of the paste.

A further object of the invention is to vary the flow of the paste through the nozzle in contradistinction to the pressure, and with this end in view the orifice is equipped with an adjusting valve.

Still another object of the invention is to provide means for varying the width of the paste stripe applied to the cigarette paper by the nozzle. To effect the same the nozzle carries a plug having a narrow slot, whereby the width of the stripe may be readily varied by rotating the nozzle to bring the slot out of vertical position.

With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawing which forms a part of this specification and in which like characters or reference indicate the same or like parts:

Fig. 1 is a sectional side elevation of the paste applying device;

Fig. 2 is an end elevation of the same, seen from its delivery end;

Fig. 3 is a plan view of the same;

Fig. 4 is a sectional end elevation illustrating the pressure control mechanism; and

Fig. 5 is an end elevation of the feeding nozzle.

In carrying the invention into effect there is provided a paste reservoir having an outlet in its bottom, a gear-housing beneath said outlet, a set of intermeshing gears in said housing arranged below said outlet to receive paste therefrom and force it through a delivery duct in the housing terminating in a discharge orifice leading to a nozzle, clamped on the housing. In the best constructions contemplated the said gears deliver an oversupply of paste to said orifice, the surplus paste being returned to the reservoir through a by-pass controlled by an adjustable relief valve which may be set to assure a uniform flow of paste to the nozzle; and a rotary propeller is provided within the reservoir to force the paste stored therein down between the meshing teeth of the gears and thus prevent cavitation of the paste in the spaces between the meshing teeth.

These various means and parts may be widely varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention, therefore, is not to be restricted to the specific construction shown and described.

The paste applying device consists of a reservoir or pot 10 on the base 11 of which is mounted a gear-housing 12 provided with a chamber 13 which covers the outlet formed in the bottom of the reservoir 10 (Fig. 1). Within the chamber 13 of gear-housing 12 are located a pair of gears 14 and 15 meshing with each other and operating on the gear pump principle to scoop

the paste in definite amounts from the outlet of the paste reservoir 10 and deliver the paste under pressure through a delivery duct 16 in housing 12 and an orifice between said duct and a nozzle 17 to the overlap edge of the cigarette paper on the traveling cigarette rod C (Fig. 1). The duct 16 is suitably arranged to receive the paste directly as it is forced out from between the meshing teeth of the gears 14 and 15 and conduct it to the nozzle 17. For this purpose the inlet of the delivery duct may be disposed adjacent the point where the gear teeth disengage as shown clearly in Figs. 1 and 4.

Gear 15 is fastened to a horizontal idler shaft 18 supported in bearings of the base 11, and gear 14 is mounted on a horizontal drive shaft 19 also supported by base 11. On shaft 19 is also mounted a spiral gear 20 meshing with a spiral gear 21 attached to a vertical shaft 22 journaled in bearings of lug 11. The upper portion of shaft 22 extends into the paste reservoir 10 and carries a pair of propellers or agitators 23 and 24 having pitched blades. While propeller 23 feeds paste to and prevents cavitation between the meshing teeth of the gears 13 and 14 even though viscous starch paste of jelly-like consistency is used, agitators 24 serve the purpose of continuously stirring the mass of paste P in the receptacle 10. It should be understood that the agitator 24 may be omitted when less viscous paste is used.

The bore of the nozzle 17 communicates with an extrusion orifice at the discharge end of the duct 16 in housing 12, (Fig. 1) and the nozzle 17 is adjustably clamped against the extrusion orifice of the housing by means of a forked clamp lever 25 fulcrumed on a pair of lugs 26 of the receptacle 10. The upper end of the lever 25 carries a thumb screw 27 by means of which its forked end is held pressed against the nozzle 17. In the outer end of the bore of the nozzle 17 is inserted a plug 17a having a narrow slot 28. Upon loosening thumb screw 27 the nozzle 17 can be turned by grasping a handle bar 29 to swing the slot 28 from a vertical position to a more or less inclined position, thus varying the width of the stripe of paste applied to the traveling cigarette paper strip (see dotted position of nozzle 17 in Fig. 5).

In order to control the pressure of the paste forced through the nozzle 17, the gears 14 and 15 coact to feed an oversupply of paste through the duct 16 which is connected with the paste receptacle 10 by means of a by-pass 30 which communicates with a horizontal tap leading from the duct 16 as shown in Fig. 4. This by-pass is ordinarily closed by a ball-valve or other type of relief valve 31 in the tap, (Fig. 4) under the pressure of a spring 32. The pressure of spring 32 against the ball-valve 31 can be regulated by means of an adjusting screw 33 so that the relief valve will open when the pressure of the paste in the orifice exceeds that desired, thus permitting control of the pressure of the paste fed to the nozzle 17 in relation to variations in viscosity for different kinds of paste to maintain a substantially uniform flow of the paste regardless of its consistency.

The amount of paste fed to the nozzle 17 can be regulated by means of an adjusting valve 34 located in the duct 16 near the discharge orifice of housing 12. Valve 34 may be turned by handle bar 35 to vary the flow of paste supplied to the nozzle 17 in contradistinction to its pressure.

The entire paste-applying device is driven by means of a main shaft 36 suitably coupled to the paster drive shaft 19. Shaft 36 is provided with a gear 37 (Fig. 1) driven by a gear train (not shown) from the main drive of the cigarette machine.

While, as mentioned above, the paster may feed starch paste of a highly viscous nature, it is suited for thinner starch pastes or casein pastes, or wherever a paster with the described characteristics is required outside the cigarette machine art, as in wrapping.

What is claimed is:

1. In a paste-applying device, the combination with a paste reservoir having an outlet, of a gear-housing communicating with said outlet, a pair of intermeshing gears supported by said housing in positions below said outlet, a nozzle on said housing, said housing being provided with an orifice leading from the meshing teeth of said gears to said nozzle, a rotary propeller within said reservoir acting to force the paste stored therein down between the intermeshing teeth of said gears and thus prevent cavitation of the paste in the spaces between said meshing teeth, said gears coacting to deliver an oversupply of paste to said orifice, said housing being also provided with a by-pass connecting said orifice and reservoir, an adjustable relief valve controlling the return flow of the oversupply of paste through the by-pass to said reservoir, whereby the relief valve may be set to assure a uniform flow of the paste through the nozzle regardless of variations in its consistency, an adjusting valve in said orifice to vary the flow of the paste to said nozzle, and a plug inserted into the outer end of said nozzle and provided with a narrow slot so that the width of the paste stripe applied by said nozzle may be varied by turning the nozzle.

2. The combination with a paste reservoir having an outlet, of a gear-housing communicating with said outlet, a pair of intermeshing gears supported by said housing in positions below said outlet, a nozzle on said housing, said housing being provided with an orifice leading from the meshing teeth of said gears to said nozzle, and said gears coacting to deliver an oversupply of paste to said orifice, a by-pass connecting said orifice and reservoir, an adjustable relief valve controlling the return flow of the oversupply of paste through said by-pass to said reservoir, whereby the relief valve may be set to assure a uniform flow of paste through the nozzle regardless of its consistency, and a plug inserted into the outer end of said nozzle and provided with a narrow slot so that the width of the paste stripe applied by said nozzle may be varied by turning the nozzle.

3. In a paste-applying device, the combination with a paste reservoir, of a rotatable nozzle in communication with said reservoir, and mechanism co-acting with said reservoir to force paste from the reservoir through said nozzle, said nozzle having a slot through which the paste passes so that the width of the paste stripe applied by said nozzle may be varied by turning the nozzle to change the position of the slot.

4. In a paste-applying device, the combination with a paste reservoir, of a rotatable nozzle in communication with said reservoir, mechanism co-acting with said reservoir to force paste from the reservoir through said nozzle, said nozzle having a slot through which the paste passes so that the width of the paste stripe applied

by said nozzle may be varied by turning the nozzle to change the position of the slot, and means mounting said nozzle for rotation about a generally horizontal axis whereby the width of said stripe of paste applied to a wrapper strip traveling horizontally adjacent the nozzle may be varied.

5. In a paste-applying device, the combination with a paste reservoir, of a rotatable nozzle in communication with said reservoir, and mechanism co-acting with said reservoir to force paste from the reservoir through said nozzle, said nozzle having a slot through which the paste passes so that the width of the paste stripe applied by said nozzle may be varied by turning the nozzle to change the position of the slot, and said mechanism comprising a pair of intermeshing gears arranged to receive paste from said reservoir and deliver it to said nozzle.

6. In a paster for cigarette machines, the combination with a nozzle having an aperture in the form of a narrow slot arranged to engage with the traveling strip of cigarette paper, of a paste reservoir, means for supplying paste from said reservoir to said nozzle for application to the cigarette paper, and mechanism mounting said nozzle for rotation about an axis transverse to said slot whereby the width of the paste stripe applied by said nozzle may be varied by turning the nozzle to change the position of the slot.

7. An appliance for dispensing a pasty material, said appliance comprising a paste reservoir, an extrusion nozzle in communication with said reservoir by means of a delivery duct, a pair of intermeshing delivery gears adapted to force paste from the reservoir through said duct directly to said nozzle, means to regulate the rate of extrusion through said nozzle, means to actuate said gears to feed material from the reservoir in excess of the demand by said nozzle, a tap on the delivery duct between the delivery gears and the extrusion nozzle, and a by-pass duct leading back to the reservoir from said tap, to provide for re-circulation of said material in excess of the demand.

8. A paste-dispensing appliance having the features claimed in claim 7, in which said reservoir is recessed to afford bearings for said gears and said feeding mechanism includes a shaft with an arm swinging around an axis disposed suitably to cause the arm to sweep paste into the recess, acting to load the inter-tooth spaces of the gears as their exposed peripheral portions rotate divergently, and serving to fill the recess and prevent cavitation in the space between the gears.

9. An appliance for dispensing a pasty material: said appliance comprising a paste reservoir; an extrusion nozzle in communication with said reservoir by means of a delivery duct; a single pair of intermeshing delivery gears adapted to force paste from the reservoir through said delivery duct directly to said nozzle; said duct having a valve through which the paste passes so that the flow of the paste to said nozzle may be varied at will; a tap on the delivery duct located between said valve and the pair of gears, and a by-pass duct leading back to the reservoir from said tap, to provide for re-circulation of a moiety of said pasty material in excess of a predetermined nozzle demand; means to actuate said gears to feed an oversupply to the delivery duct normally; and means to feed directly to said gears from the reservoir a positive flow of pasty material adequate to maintain a plenum supply of material for loading the gears, thus serving to avoid cavitation in the supply of paste at the region of gear action.

10. A paste-dispensing appliance having the features claimed in claim 9, in which said flow-regulating means includes a ball valve biased by a spring to close said by-pass, and opening said by-pass under a predetermined pressure by the pasty material, and means to change the tension of the spring to modulate such pressure responsive action.

11. In a paste-applying device, the combination with a paste reservoir having an outlet, of a gear housing communicating with said outlet, a pair of intermeshing gears supported by said housing directly below said outlet, said housing being provided with an extrusion orifice and a delivery duct leading directly thereto from the meshing teeth of said gears, a tap leading from said duct at a region thereof intermediate its inlet end and the extrusion orifice, means within said reservoir acting to force the paste stored therein directly down into the space between the intermeshing teeth of said gears, thus acting to load the intertooth spaces of each gear and also serving to prevent cavitation of the paste in the space between the divergently rotating portions of the gears, said gears co-acting to deliver an oversupply of paste from their convergently rotating underparts through said delivery duct to said orifice, said housing being also provided with a by-pass duct extending back to said reservoir from said tap, an adjustable relief valve controlling the return flow of the oversupply of paste through the by-pass to said reservoir, said valve being disposed between said duct and said by-pass, and means whereby the relief valve may be set to assure a uniform flow of the paste through the extrusion orifice regardless of variations in its consistency.

12. The combination with a paste reservoir having an outlet, of a gear housing communicating with said outlet, a pair of intermeshing delivery gears supported by said housing directly below said outlet, said housing being provided with an extrusion orifice and a delivery duct leading thereto from the meshing teeth of said gears, and co-acting with said gears to deliver an oversupply of paste to said duct, a by-pass connecting said duct and reservoir, an adjustable relief valve controlling the return flow of the oversupply of paste through said by-pass to said reservoir, whereby the relief valve may be set to assure a uniform flow of paste through the orifice regarless of its consistency, and an adjusting valve in said duct to vary the flow of paste through said orifice.

13. In a paste-applying device, the combination with a paste reservoir, of a delivery duct leading from the reservoir and having an extrusion orifice, mechanism co-acting with said reservoir to force an oversupply of paste from the reservoir through said duct toward said orifice, devices providing a return conduit between said duct and said reservoir, at the pressure side of the orifice, and a relief valve controlling the return flow of any oversupply of paste through the return conduit to said reservoir whereby any excess of paste at the orifice will be relieved.

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