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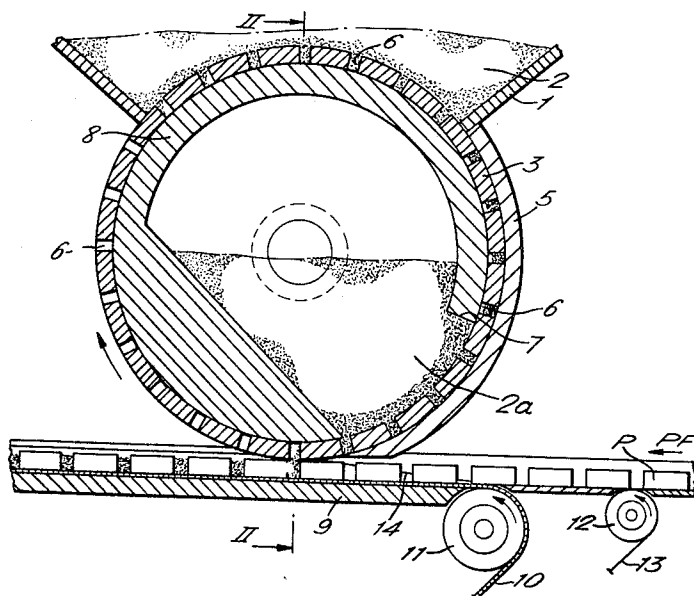
[72] Inventor **Desmond Walter Molins**
London, England
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[73] Assignee **Molins Machine Company Limited**
London, England
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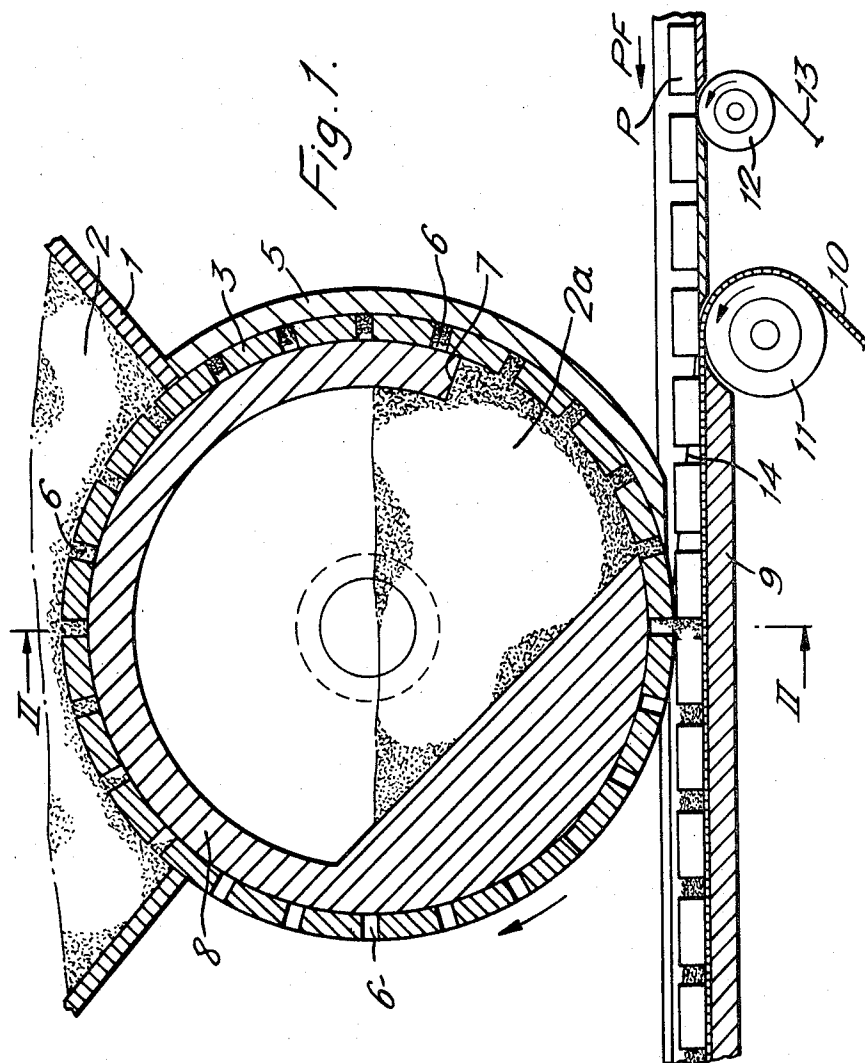
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Primary Examiner—Houston S. Bell, Jr.
Attorney—Craig, Antonelli, Stewart & Hill

[54] APPARATUS FOR PRODUCING COMPOSITE FILTER PLUGS FOR CIGARETTES 10 Claims, 4 Drawing Figs.

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141/105, 141/129, 222/367
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B65b 3/04, B67c 3/02
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100, 101, 102, 104, 105, 129, 285, 286 (Inquired);
118/406(Inquired); 222/136, 138, 139, 344, 345,
346, 367 (Inquired)

ABSTRACT: A device for feeding measured quantities of powdered material comprises a feed wheel having peripheral pockets open at both ends which receive and discharge material through their outer ends, and in which the quantities to be discharged can be augmented from within, either from an auxiliary supply within the wheel or from within the inner ends of pockets long enough to accommodate more than the required quantity; in either case a stationary metering plate prevents excessive discharge.





Inventor

Desmond Walter Molina

By Watson, Cole, Shindler & Watson
Attorneys

Fig. 2.

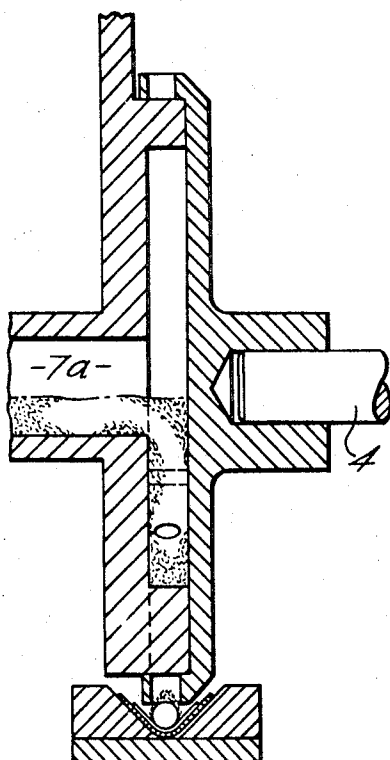
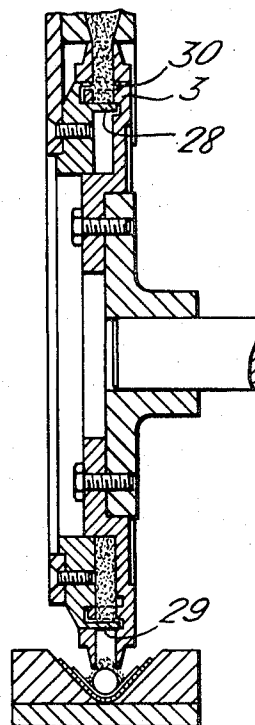
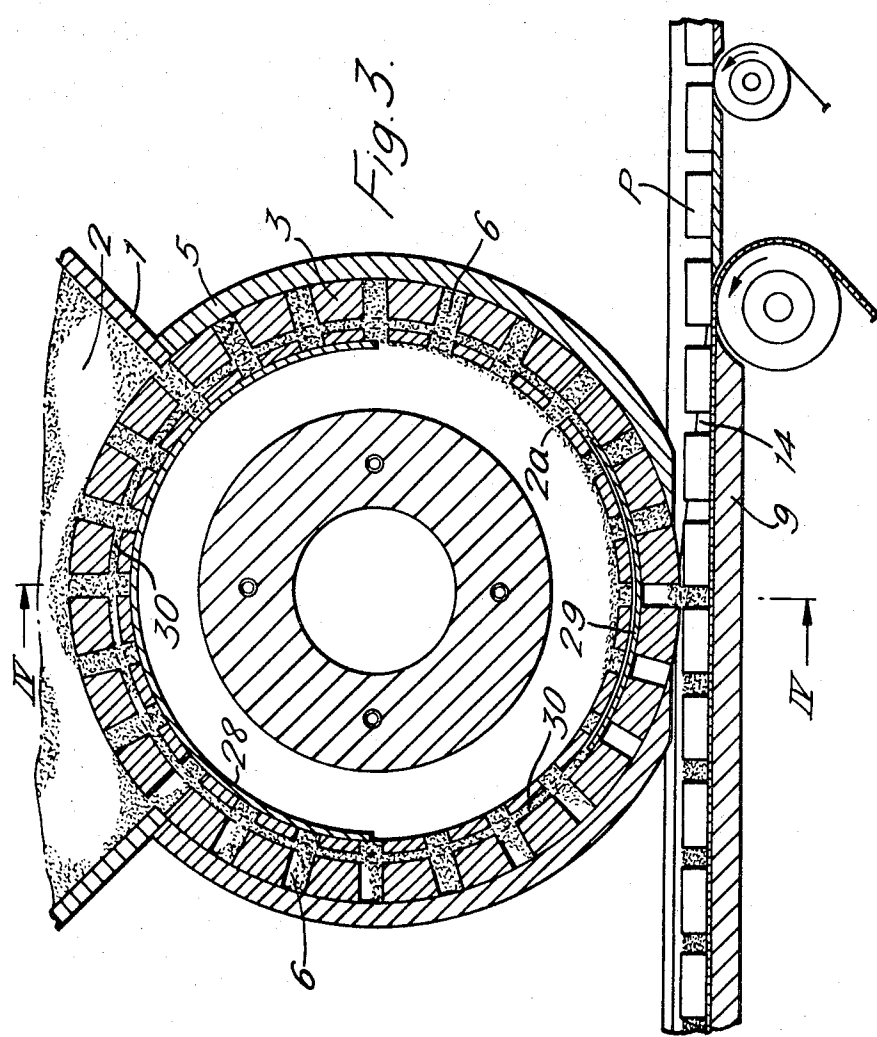


Fig. 4.



Inventor
Diamond Walter Molina
BY Watson, Cole, Shindle & Watson
Attorneys



Inventor
Desmond Walter Molins
BY Watson, Cole, Shindler & Watson

APPARATUS FOR PRODUCING COMPOSITE FILTER PLUGS FOR CIGARETTES

This invention relates to apparatus for producing composite filter plugs for cigarettes and more particularly to apparatus for producing a continuous filter rod having portions of powdered filter material interposed between conventional plugs at regular intervals.

It has been proposed to produce such a continuous filter rod by feeding filter plugs in succession on to a continuous wrapper with gaps between successive plugs at regular intervals, and feeding powdered or granular material into the gaps by means of a rotating wheel having peripheral pockets which receive the material from an overhead hopper, and which deliver it into successive gaps with which they register. However, it is sometimes found that owing to the speed of rotation of the rotatable transfer wheel through the hopper the wheel receives less material than its pockets are capable of accommodating.

According to the present invention there is provided apparatus for dispensing powdered material in measured quantities and at spaced intervals by means of a rotating wheel having peripheral pockets which successively receive materials from an overhead hopper and then discharge their contents into spaces between filter plugs on a continuous moving wrapper, the said pockets being arranged so that after the pockets have moved past the hopper, further material can be added from within the wheel to the quantities of material to be discharged from the pockets, before said contents are discharged.

The pockets are, in a preferred construction, open at their inner ends as well as at their outer ends, stationary cover means being provided at the region of the hopper to cover the inner ends of the pockets, and stationary metering means being provided at the region of discharge to restrict the quantity of material added from within the wheel. According to one embodiment, means are provided to supply additional material to the interior of the wheel for addition to the quantities to be discharged from the pockets.

According to a further embodiment, each pocket is longer than required to accommodate the required quantity of material to be discharged, the said further material being added to said quantity from the inner end of the pocket by centrifugal force, said stationary metering means constituting an arcuate plate extending through an annular groove in the wheel across each pocket as the latter moves past the region of discharge.

Alternatively each pocket is of the length required to accommodate the required quantity of material to be discharged and receives material from each end in succession, said stationary metering means constituting an arcuate member arranged to cover the inner end of each pocket as the latter moves past the region of discharge.

Apparatus in accordance with the invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a front elevation;

FIG. 2 is a section on the line II-II, FIG. 1; and

FIGS. 3 and 4 are views similar to FIGS. 1 and 2 but illustrating a modified construction.

The apparatus shown in FIGS. 1 and 2 comprises a hopper 1 shown in part filled with powder 2 such as granules of activated carbon, having an opening in its bottom closed by the upper part of a wheel 3 carried by a horizontal shaft 4. A stationary masking plate 5 extending downwards from the hopper 1 to alongside the lowest part of wheel partially covers the outer periphery of the wheel 3 to prevent undesired escape of powder.

The wheel 3 is provided with slots or pockets 6, open at both ends, which are regularly spaced around the periphery thereof, each pocket being of a size to accommodate the required quantity of powdered material to be discharged. A stationary drum 8 is arranged within the wheel 3 to accommodate a reservoir of the powder material 2a. The drum is

provided with an arcuate opening 7 through which the powder communicates with the slots 6, and a feed opening 7a through which powder is supplied to the interior of the wheel.

Below the wheel 3 a horizontal bed-plate 9 supports an endless conveyor belt 10 which passes over said bed-plate 9 around a guide pulley 11. Around a further guide pulley 12 a continuous strip of wrapper paper is fed towards the bed-plate in advance of the conveyor belt 10 so that the strip 13 passes on to the upper surface of said belt 10.

Conventional filter plugs P are fed (as indicated by the arrow PF) in a stream at equally spaced intervals so as to rest on the paper strip 13 and hence travel with the said strip and with the belt 10 below the wheel 3.

The pockets or slots 6 in the wheel 3 are spaced apart so as to register with successive gaps in the stream of plugs. The plugs P, paper strip 13, conveyor belt 10 and wheel 3 are all driven by a common prime mover (not shown) so that the plugs move from right to left as seen in FIG. 1 at the same speed as the linear speed of a point on the circumference of the wheel 3, with the pockets 6 of the wheel 3 above the gaps in the stream of plugs as the former pass their lowermost positions.

The bed-plate 9 carries folder members (not shown in the drawing) secured to its upper surface, which members serve in known manner to form a trough into which the belt 10 and paper strip 13 run so that said belt and strip are lifted at their edges (as indicated at 14) and thus have a U-shape in cross section as they pass under the wheel 11.

In operation, as the wheel 3 revolves, each pocket 6 receives powder as it passes under the bottom opening of the hopper 1. At the speeds normally employed in the operation of the apparatus, the pockets 6 are sometimes not completely filled by powder from the hopper, and thus the pockets require topping-up if they are to deliver their full capacity of powder. Owing to the centrifugal forces exerted on the powder 2 in the pockets 6, this tends to be thrown outwardly, and the plate 5 acts to retain the powder in the pockets during its journey from the hopper 1 to the lowermost position of the pockets in their cycle of rotation. During this period the inner faces of the pockets communicate with the powder 2a contained in the drum 8 through the aperture 7, and consequently the pockets are topped-up. This topping-up is facilitated by the powder in the pockets being centrifuged outwards in the individual pockets owing to the motion of the wheel, thus allowing gravitational feed of further powder 2a into the pockets from within the wheel. If desired, the powder in the drum 8 may be centrifuged into the pockets by providing a paddle-wheel within the drum acting on the powder 2a.

When the pockets approach their lowermost position the powder 2 is no longer retained by the plate 5, but falls into the gaps between the plugs. This emptying of the powder from the pockets is produced by the action of gravity together with centrifugal force due to the rotation of the wheel 3. The stationary drum 8 cuts off the supply of powder from within the wheel 3 just before, or at about the same time as, a pocket moves away from the plate 5, thus metering the quantity discharged from each pocket.

While each pocket 6 is thus discharging its powder, a gap between the plugs P is just beneath it and the powder falls into this gap, so that as the stream of plugs passes on to the left of the wheel, each gap contains a quantity of the powder determined by the capacity of the pockets 6. Further folding members (not shown) constituting a so-called garniture thereafter serve to produce further folding of the strip 13 to form a tube enclosing the plugs and intervening powder, conventional gumming and heating devices (not shown) serving to secure said tube so that in the result a composite filter rod is formed.

FIGS. 3 and 4 show a modified construction: parts identical with or corresponding to parts in FIGS. 1 and 2 have the same reference numerals.

In this construction the pockets 6 are longer than is required to accommodate the quantities required to be discharged. As in the construction of FIGS. 1 and 2, the pockets are open at

both ends, but the further material added to the quantities to be discharged is principally contained in the inner end portions of the pockets, being centrifuged outwardly to ensure that the outer portions are completely filled. An arcuate fixed plate 28 extends over the inner ends of the pockets in the region of the hopper to close those ends while the pockets are receiving material from the hopper; this corresponds to the upper part of the drum 8 in FIG. 1. To restrict the amount of material added to the quantity in each pocket to be discharged, an arcuate plate 29, constituting metering means, is accommodated in an annular groove 30 formed in the wheel 3 and acts to cut off the inner end portions of the pockets from the outer end portions, which contain the material to be discharged. The plate 29 thus corresponds in function to the lower part of the drum 8 in FIG. 1, in that they both constitute metering means at the region of discharge to restrict the quantity of material added from within the wheel. In the construction according to FIGS. 3 and 4, however, the outer end portion of a pocket beyond the plate 29 is dimensioned to accommodate the quantity of material required to be discharged, and this portion is completely filled due to the action of centrifugal force, as the wheel rotates, urging material outwardly from the inner portion of the pocket. The material remaining in the inner portion after a pocket has reached the plate 29 may be regarded as surplus, and some spillage may occur, resulting in a small quantity of reserve material within the lower part of the wheel as indicated in FIG. 3.

I claim:

1. Apparatus for dispensing particulate material in measured quantities of predetermined volume comprising an annular wheel having a plurality of generally circumferentially positioned regularly spaced slots around the periphery thereof, said slots extending between the exterior and interior surfaces thereof, means coacting with said slots during loading for defining a compartment of predetermined volume, said compartment extending between the exterior surface and the interior surface of said wheel, means for continuously rotating said wheel in a given direction whereby said slots successively follow a circular path through a loading station and an unloading station, means for successively feeding particulate material into said slots through their peripheral ends at said loading station to at least partially fill said compartments, and further feed means between said loading station and said unloading station for subsequently feeding particulate material into each of said compartments of predetermined volume whereby each of said compartments is completely and uniformly filled before said compartments are successively emptied at said unloading station.

2. Apparatus as claimed in claim 1 wherein said compartments of predetermined volume fully occupy said slots and extend between the exterior and interior surfaces of said annular wheel, and wherein said further feed means for subsequently feeding particulate material into each of said compartments comprises a stationary cylindrical drum located within said wheel with the periphery of said drum contiguous with the in-

terior surface of said wheel, a chamber within said drum and an arcuate opening in the periphery thereof at a position along said path between said loading and unloading stations exposing the interior surface of said wheel to said chamber whereby particulate material retained in said chamber will be fed through said arcuate openings into the interior ends of said slots.

3. Apparatus as claimed in claim 1, said means coacting with said slots including stationary cover means contiguous with the interior surface of said wheel at said loading station to close the interior ends of said slots and retain particulate material in said slots.

4. Apparatus as claimed in claim 1, said means coacting with said slots including stationary metering means contiguous with the interior surface of said wheel at said unloading station to close the interior ends of said slots and prevent particulate material flowing into said slots during discharge.

5. Apparatus as claimed in claim 4 wherein said stationary metering means comprises an arcuate member.

6. Apparatus as claimed in claim 1 wherein said wheel contains an annular axially extending groove passing through said slots, the compartments of predetermined volume in said slots extends between the exterior surface of said wheel and said annular groove, and said further means for subsequently feeding particulate material into said compartments comprising the remainder of said slots extending from said annular groove to the interior surface of said wheel, said apparatus further comprising a stationary plate axially extending into said groove at said unloading station to close one end of each of said compartments and allow only said predetermined volume of particulate material to be discharged from each of said compartments.

7. Apparatus as claimed in claim 1 further comprising means for retaining said particulate material in said slots, said retaining means extending about the periphery of said wheel from said loading station to said unloading station whereby particulate material fed into said slots is retained therein until reaching said unloading station.

8. Apparatus as claimed in claim 1 wherein said means for successively feeding particulate material into said slots at said loading station comprises a hopper.

9. Apparatus as claimed in claim 1 further comprising a continuous conveyor passing through said unloading station and means to drive said conveyor synchronously with said wheel whereby said individual predetermined volumes of particulate material are sequentially discharged from said slots in said wheel onto said conveyor.

10. Apparatus as claimed in claim 9 for dispensing powdered cigarette filter material, said continuous conveyor being capable of carrying a continuous wrapper having filter plugs equally spaced thereon, said conveyor drive means being capable of synchronously driving said conveyor such that said predetermined volumes of said filler material are sequentially discharged into the spaces between said filter plugs.