

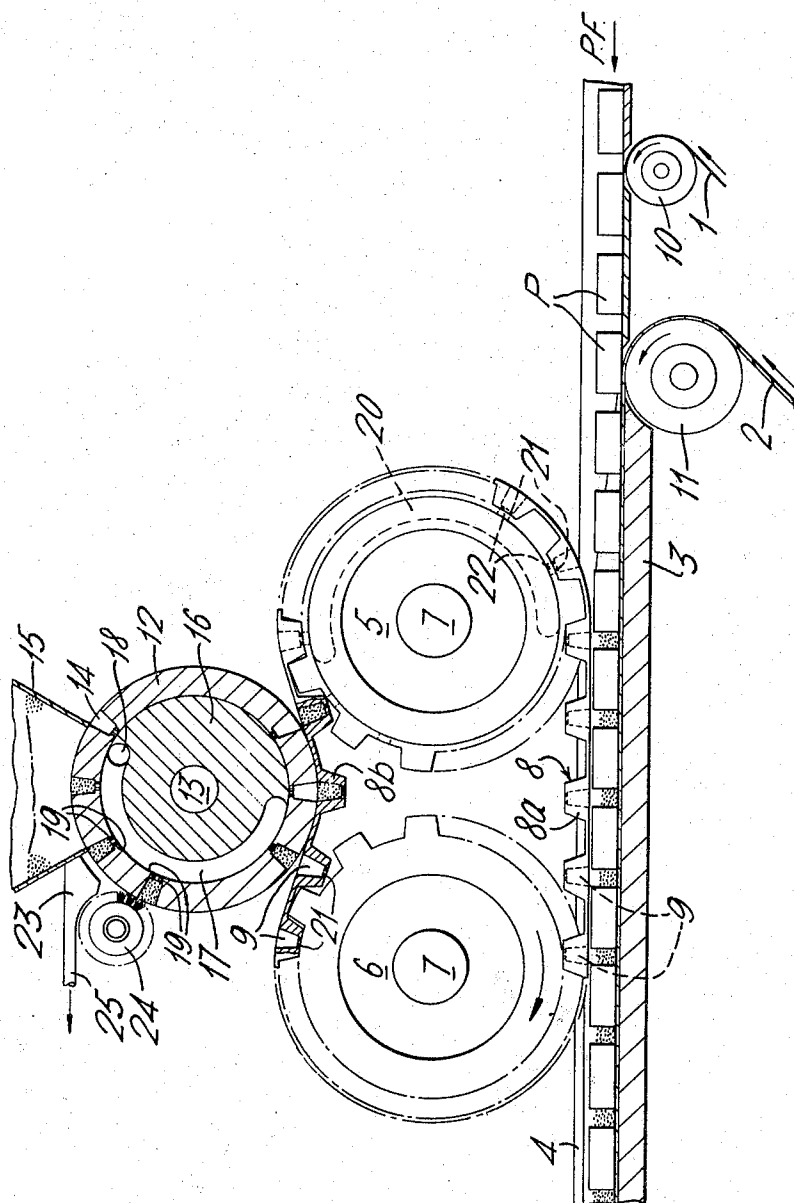
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# APPARATUS FOR THE MANUFACTURE OF FILTER PLUGS

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APPARATUS FOR THE MANUFACTURE OF  
FILTER PLUGS

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4 Claims. (Cl. 93—1)

This invention relates to apparatus for the manufacture of filter plugs for cigarettes and more particularly to apparatus for the manufacture of composite filter rod containing powdered filter material as well as conventional filter plugs.

In British patent application No. 39,207/63, filed Oct. 4, 1963, there is disclosed an apparatus in which pockets in a flexible band are filled with powdered filter material as they pass beneath a powder hopper, the band then passing around a wheel, and thus becoming inverted, whereupon the powdered filter material drops from the pockets into gaps between successive filter plugs travelling below the band on a wrapper supported by a moving belt.

It is an object of the present invention to provide an improved form of apparatus for making composite filter rod containing portions of powdered filter material.

According to the invention, there is provided apparatus for producing composite filter rod containing portions of powdered filter material, comprising means for feeding a stream of filter plugs with gaps between successive plugs at regular intervals on to a continuous wrapper, means for advancing said wrapper, an endless flexible band mounted so that a lower run thereof extends parallel to and immediately above said stream of plugs on said wrapper, a rotatable transfer member mounted above and in contact with an upper run of said band, a powder hopper arranged to allow powder to descend on to said transfer member, and common driving means connected to drive the wrapper advancing means, the band and the transfer member in synchronism so that each of a plurality of powder-receiving pockets in said band travels beneath the transfer member in register with one of a plurality of similar pockets in the latter and thereafter each pocket of the band travels along said lower run in register with one of said gaps.

In such apparatus, powder may descend from the hopper on to the transfer member, which conveniently comprises a wheel or drum, and fill the pockets thereof, then travel in each of the pockets until the latter is facing downwardly at which stage the powder falls out of the pocket and enters one of the pockets of the band, moving in register with the pocket of the transfer member. The powder then remains in the pocket of the band until this pocket reaches the band's lower run, whereupon the powder again falls, this time into that one of the gaps between plugs which is then travelling in register with the pocket.

It is necessary to provide for retention of the powder in the pockets, both of the wheel or other transfer member and of the band, as each pocket moves between the upward-facing position in which the pocket receives the powder and the downward-facing position in which the powder is allowed to fall out. For this purpose, retaining plates in contact with appropriate parts of the surface of the wheel and band may be provided. Such plates are however undesirable with certain types of powder, e.g. with granules of activated carbon the use of such plates (against which the powder necessarily rubs) leads to the production of dust from the granules, such dust being capable of marking the wrapper undesirably and being abrasive. Therefore we prefer to apply suction to the

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base of each pocket as it travels through the relevant region, so that atmospheric pressure retains the powder in the pocket.

In order that the invention may be fully understood, a preferred embodiment thereof will now be described in some detail, reference being made to the accompanying drawing which shows a sectional side elevation of apparatus embodying the invention.

As seen in the drawing, a stream of conventional filter plugs P are fed by any convenient means, indicated by arrow PF, on to a continuous paper wrapper 1 which in turn is fed on to a conveyor belt 2 serving to transport the wrapper and plugs from right to left. The belt 2 is supported on and slides over a base-plate 3 which is shaped in known manner to bring the belt and wrapper to a U form. Later forming blades 4 (constituting a garniture, in the terminology of the cigarette-making art) effect further folding so that the wrapper forms a tube enclosing the plugs, means (not shown) being provided to seal such tube to form a finished filter rod.

Above the stream of plugs on wrapper 1, two toothed wheels 5, 6 are carried on horizontal shafts 7 extending at right angles to the length of belt 2; on the wheels 5, 6 is carried an endless flexible band 8 having a toothed inner face engaging the wheels 5, 6 to provide a positive driving connection thereto, and having pockets 9 in its outer surface. The lower run 8a of the band 8 travels horizontally, immediately above the stream of plugs, and a common prime mover (not shown) is connected to shafts 7, to the plug feeding means, and to drive pulleys 10, 11 for the wrapper 1 and belt 2 respectively. By virtue of this common drive, the pockets 9 while they travel on the lower run 8a of band 8 are kept in a fixed position relative to the stream of plugs P, so that each pocket 9 lies directly above a gap between successive plugs P. The spacing of said gaps to be employed determines, of course, the required spacing of pockets 9 on the band 8.

Above the upper run 8b of band 8 is mounted a transfer drum 12, carried on a shaft 13 parallel to shafts 7. The wheel 12 is symmetrically placed above and between the two wheels 5, 6 and its lowest part is somewhat below the level of the highest parts of wheels 5, 6 thus as shown the upper run 8b of band 8 is not straight but dips around the said lowest part of wheel 12 so that said wheel and band are in contact over an appreciable distance. At regular intervals around the circumference of the wheel 12 pockets 14 are provided, the spacing of said pockets being the same as that of the pockets 9 on the band 8, and the shaft 13 is connected to the common prime mover (not shown) so that the wheel rotates with a circumferential speed equal to the speed of the band 8 and so that each pocket 14 travels in register with a pocket 9 of the band through the region where the band 8 is in contact with wheel 12.

Above the wheel 12 is a powder hopper 15 having a discharge opening in its base which is closed by said wheel. As each pocket 14 passes over the top of the wheel, it is filled with powder from the hopper 15, and conveys such powder half-way round said wheel to the band 8. To retain the powder in the pockets 14 during such travel, the wheel 12 is recessed and contains a stationary member 16 grooved to provide a chamber 17 facing the inner surface of said wheel around approximately one-half of its circumference, extending from the region below hopper 15 to just before the lowest point of the wheel (considered in its direction of motion). A conduit 18 extending parallel to shaft 13 connects the chamber 17 to a suction pump (not shown) and each pocket 14 of wheel 12 has a fine drilling 19 in its base affording communication with the chamber 17 while that pocket is passing over said chamber. Thus just after each pocket 14 comes under hopper 15, suction is applied through its drilling 19 to the base

of the pocket and atmospheric pressure assists the filling of said pocket with powder from the hopper, while when the pocket moves clear of the hopper and travels around the wheel towards its lowest point, the continued application of suction through the base of the pocket enables atmospheric pressure to retain the powder in the pocket, even though in the latter part of such travel the pocket is increasingly tilted downward. Just before each pocket 14 reaches the lowest point of wheel 12, it passes beyond chamber 17, but by this time the pocket 14 is covered by the band 8 and one of the pockets 9 is in communication with the pocket 14, hence the powder falls from the pocket 14 to the pocket 9.

A similar expedient enables the powder in each pocket 9 to be held therein as the pocket 9 travels around the right-hand wheel 5 to reach the lower run 8a of band 8, a suction chamber 20 being provided in a stationary member within a recess in the wheel 5, together with a drilling 21 in the base of each pocket 9 and drillings 22 in the wheel 5. As each pocket 9 reaches and travels along the lower run 8a of the band 8, suction is no longer applied through drillings 21, which are now open to atmosphere, so that the powder may fall from the pockets into the gaps between plugs P travelling below said pockets.

Where the powder employed is liable to mark the wrapper 1 and/or is abrasive, it must be prevented from arriving anywhere but in the pockets 14, 9 and the gaps between plugs P. With the apparatus described, the powder is in general confined to the proper places, but it is possible for the circumferential surface of wheel 12 outside pockets 14 to be contaminated by powder, or dust derived from the powder, and for such contamination to be partly transferred to band 8 and hence to reach the wrapper. However, this form of apparatus may readily be provided with means for avoiding this undesirable effect, as illustrated. Adjacent the hopper 15, and so placed as to be passed by pockets 14 immediately after they pass clear of said hopper, is a suction nozzle 23 and a rotary brush 24. The nozzle 23 is spaced from the surface of wheel 12 and connected by a conduit 26 to a suction pump (not shown), and serves to produce a strong air-current sufficient to remove stray powder or dust from the wheel 12 but—by virtue of its spacing from the wheel's surface—does not exert sufficient suction as compared with the suction through chamber 17 to remove powder from pockets 14. Rotary brush 24 sweeps the surface

of the wheel 12 in a direction opposed to the movement of said wheel and serves to dislodge any powder or dust tending to adhere thereto and bring the dislodged material towards nozzle 23 for removal by the suction applied therethrough.

It will be understood that the foregoing detailed description refers only to one preferred embodiment of the invention, and that various changes or modifications may be made in the details of the apparatus described without departure from the scope of the invention.

I claim:

1. Apparatus for producing composite filter rod containing portions of powdered filter material, comprising means for feeding a stream of filter plugs with gaps between successive plugs at regular intervals on to a continuous wrapper, means for advancing said wrapper, an endless flexible band mounted so that a lower run thereof extends parallel to and immediately above said stream of plugs on said wrapper, said band having a plurality of powder-receiving pockets, a rotatable transfer member mounted above and in contact with an upper run of said band, said transfer member having a plurality of similar powder-receiving pockets, a powder hopper arranged to allow powder to descend on to said transfer member, and common driving means connected to drive the wrapper advancing means, the band and the transfer member in synchronism so that each of the pockets of said band travels beneath the transfer member in register with one of the pockets of the latter and thereafter each pocket of the band travels along said lower run in register with one of said gaps.

2. Apparatus as claimed in claim 1 in which the transfer member is a wheel.

3. Apparatus as claimed in claim 2, in which retaining plates are arranged in contact with the surfaces of the wheel and of the band to retain powder in the pockets thereof while each said pocket moves from an upward-facing position to a downward-facing position.

4. Apparatus as claimed in claim 2, including means for applying suction to the base of each pocket of the wheel and of the band to retain powder therein as each pocket moves from an upward-facing position to a downward-facing position.

No references cited.

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