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[33] **Great Britain**

[31] **32,791/67**

[54] **APPARATUS FOR APPLYING ADHESIVE TO
CONTINUOUS WEBS**
8 Claims, 5 Drawing Figs.

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131/69, 118/410**

[51] Int. Cl. **B31f 1/00,
A24c 5/24**

[50] Field of Search **156/461,
444, 457, 466; 131/69; 118/410, 411, 415, 412**

[56]

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ABSTRACT: In a cigarette filter-plug rod-making apparatus in which filter material is continuously wrapped in a garniture to form a continuous rod, adhesive is applied to the wrapper web before it enters the garniture at a metered rate either by a pasting wheel for starch or by a gun for polyvinyl acetate.

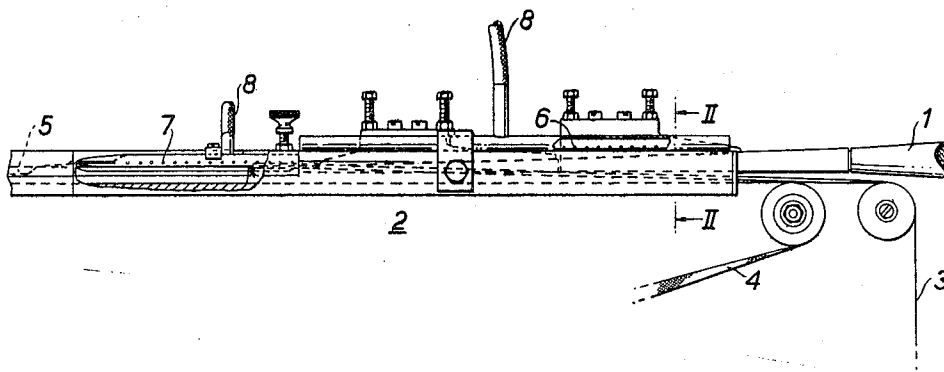
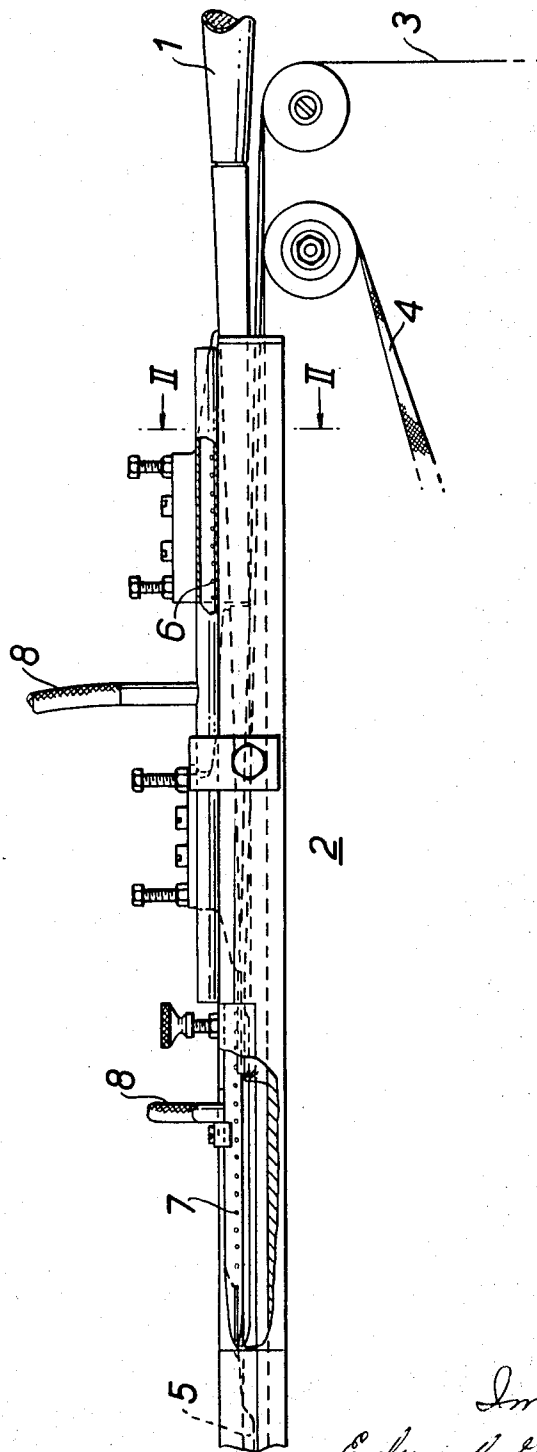


FIG. 1.



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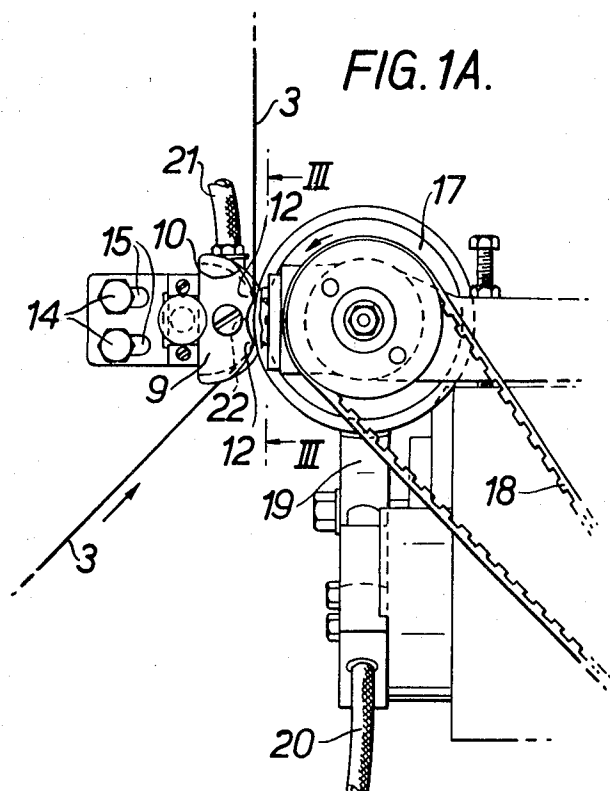


FIG. 2.

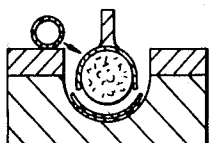
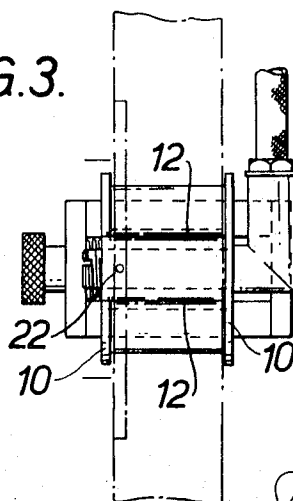


FIG. 3.



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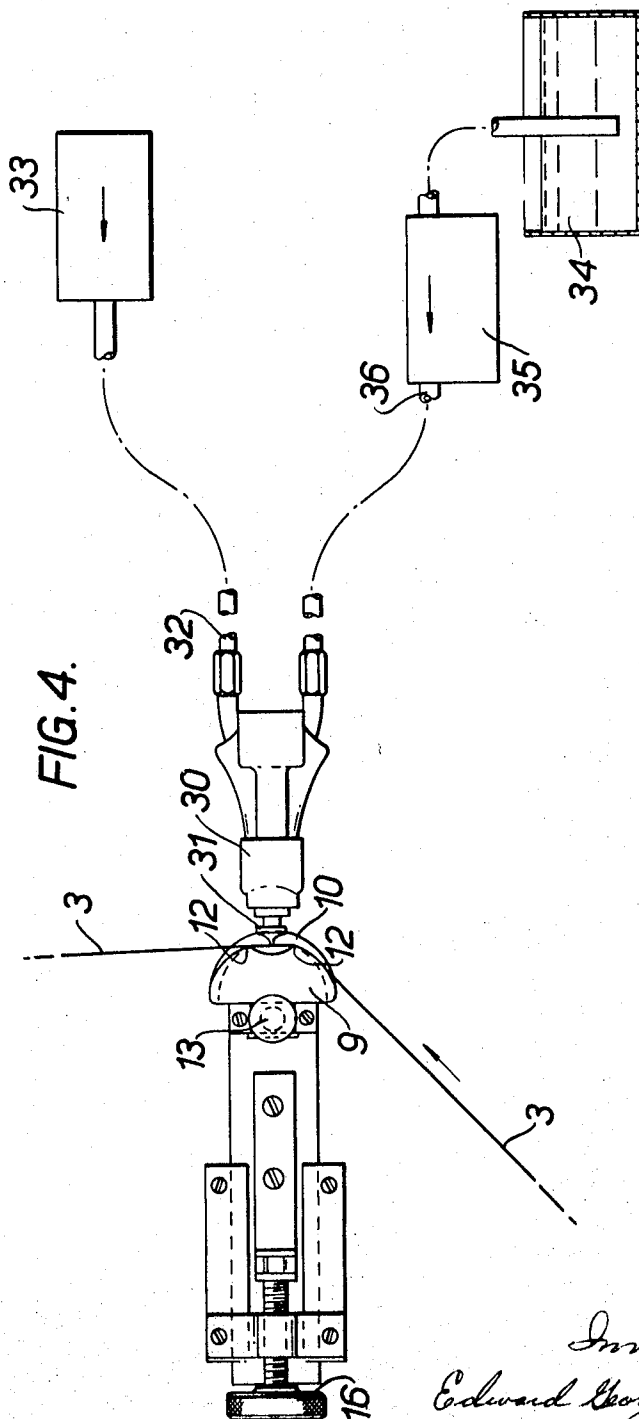
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APPARATUS FOR APPLYING ADHESIVE TO CONTINUOUS WEBS

This invention relates to improvements in the manufacture of continuous wrapped rods such as are used in the cigarette industry to make cigarettes and filter plugs. The invention is particularly concerned with sealing the wrapping around the filler which forms the body of the rod, and with the problems which arise in applying adhesive to the wrapping at high machine speeds.

The usual rod-making machine operates on the principle of drawing a continuous filler and a web of wrapping material for the filler through a garniture, where the wrapping is folded and sealed around the filler, by means of an endless garniture tape which is laterally flexible to be capable of taking the shape of the rod. The adhesive is usually applied to an up-standing margin of the wrapper web in the garniture, e.g. from the edge of a wheel which rotates in contact with the wrapping web in the garniture. As these machines are operated at higher and higher speeds it is found that there is a risk of bursting or splitting of the rod produced. We have now found that one of the factors causing this is that the line of adhesive on the wrapping web tends to wander, possibly due to fluttering of the web in the garniture which is set up by the effect of the periodic passage through the garniture of the increased thickness of the joint in the endless garniture tape.

The invention therefore provides for the adhesive to be applied to the web outside the garniture. If any difficulty is experienced as a result of the presence of the gummed web in the garniture this can be overcome by providing means, such as, for example, air jets, to hold the gummed part of the web clear of any parts it might foul. At the present moment it appears that this is advantageous if the adhesive used is starch, but that it might be unnecessary with a synthetic adhesive, the use of which is contemplated in this invention, such as polyvinyl acetate.

To assist in applying the adhesive, the web can be supported to have an appropriate tension and resilience by means acting on the web just upstream and just downstream of a zone in which the adhesive is applied. One way of doing this is with a bridge over which the web runs and which has two humps engaging the web. The adhesive can then be applied to the opposite side of the web from the bridge and between the jumps by an applicator such as, for example, a pasting wheel the periphery of which interferes with the web between the humps, or by a gun the nozzle of which is directed between the humps and which can be set at an appropriate angle to the web. To help the web take up all the adhesive that is applied and to help avoid accumulating adhesive on the applicator, resilient means, such as air jet means, can be provided to act between the humps to urge the web towards the applicator.

The bridge can be provided with shoulders to guide the edge of the web and position it laterally and can also have means to adjust not only its lateral position but also its movement towards and away from the web.

In one arrangement that is convenient for applying starch, the pasting wheel could be used with air jets as aforesaid, and in another, for applying polyvinyl acetate, the gun could be used without using resilient means to urge the web towards the nozzle.

It is important that the adhesive should be applied to the web in a regular line of even thickness. To do this it is necessary to vary the rate at which the adhesive is applied according to how fast the rod maker is operating. In the case of the pasting wheel this is achieved by running the wheel at a speed which is constantly proportional to that of the wrapping web, which may be done by rotating the wheel with a drive connected to the garniture tape guide. In the case of the nozzle however a way to achieve an even film of adhesive is to provide means for supplying an accurately metered feed of adhesive at a rate which is varied, possibly by a mechanical or electromechanical connection, according to the rate of operation of the rod maker. The feed means could comprise a pump and is desirably one which has a flexible operating member rather

than one having interfaces in the adhesive between which there is relative movement. Such a pump is a peristaltic pump; this has the additional advantage that when in the course of time the flow path of the adhesive through the pump becomes fouled up it can readily be renewed simply by replacing a section of flexible pipe.

Some embodiments of this invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a view in elevation of apparatus for making a continuous rod of cigarette filter plug,

FIG. 1A is a view of one form of continuous rod making apparatus.

FIG. 2 is a view on line II—II of FIG. 1,

FIG. 3 is a view on line III—III of FIG. 1A,

FIG. 4 is a view of a different form of continuous filter rod-making apparatus.

Referring to the drawings, filter material is fed through a funnel 1 into a garniture indicated generally at 2 on to a web of wrapping paper 3 which is carried on a garniture tape 4. The construction of a garniture of this type is well known and it operates to fold and seal the paper 3 around the filter material to form a continuous rod 5 of circular cross section which is subsequently cut up to provide filter plugs for filter tip cigarettes. In addition to the normal rod-making garniture, two banks of air jets 6 and 7 are provided to hold the paper web 3 away from the folding members of the garniture. Air for these jets is supplied through a pipe 8.

The adhesive for sealing the paper around the material is applied to the web of paper before it enters the garniture by a pasting apparatus positioned therebelow. FIG. 1A shows apparatus for applying starch paste to the web 3 and FIG. 4 shows apparatus for applying polyvinyl acetate to the web 3. In each case the adhesive is applied in a continuous thin strip running close to one edge of the paper.

Each pasting apparatus comprises a bridge over which the web 3 runs and which has a pair of guide shoulders 10 between which the web 3 is positioned laterally and two humps 12 across which the paper 3 is tensioned. The guide 9 is arranged in each case for adjustment across the web by means of a setting screw 13 and for adjustment towards and away from the web by means of, in the case of the apparatus shown in FIG. 1, screws 14 and slots 15, and in the case of the apparatus shown in FIG. 4, a micro-screw arrangement 16.

Referring now specifically to the apparatus of FIG. 1A, a pasting wheel 17 is rotated by means of a band 18 and is positioned to hold the paper 3 against the bridge 9. Starch paste is applied in known fashion to the wheel 17 from a grooved wheel 19, the paste being fed to this wheel from a reservoir by means of a pipe 20. In addition, air is blown through a pipe 21 and a jet 22 in the bridge 9 (see FIG. 3) to urge the paper web 3 closely against the periphery of the starch wheel 17. The speed of rotation of the wheel 17 is varied according to the speed of the web 3 so that an even line of adhesive can be applied to the paper 3. The wheel 17 rotates in the opposite direction to the movement of the web 3 and at a slightly faster speed. The arrangement of the bridge 9 provides a good way of transferring the adhesive from the wheel 17 to the paper 3 and the provision of the air jet 22 assists in removing virtually all the paste from the wheel 17. The air jets 6 and 7 in the garniture 2 operate to help keep the line of pasted paper clear of the folders in the garniture 2.

In the embodiment of FIG. 4 polyvinyl acetate adhesive is applied in a liquid form through a gun 30 having a nozzle 31 operated by an air valve to which air is fed along a line 32 from a source 33 and to which the adhesive is fed from a reservoir 34 by means of a peristaltic pump 35. This pump acts on a flexible section of tubing 36 to impart a succession of contractions to the tube so as to force the liquid adhesive into the gun 30. This mode of pumping is particularly effective since it provides a very consistent rate of flow of adhesive which can be carefully metered and also there are no pairs of moving and stationary surfaces in the pump across which the adhesive

might be sheared, leading to possible polymerization of the adhesive and jamming or fouling of the pump. In addition, as the pump 35 does not act directly on the liquid but only on the tube carrying it when, in the course of time, the flow passage of the liquid through the pump starts to become fouled up it is only necessary to replace the tube 36. The setting of the pump can also readily be adjusted to deliver the adhesive at different rates and this setting could also be mechanically adjusted to vary the selected rate according to the speed of operation of the filter rod maker so as to ensure that an even line of adhesive is always applied to the paper web 3. As is shown in the drawing, the nozzle 31 is positioned close to the web 3 and may even in some circumstances deflect the web 3 from its line between the two humps 12 of the bridge 9.

I claim:

1. Apparatus for making a continuous wrapped rod by continuously enclosing a filler in a continuous wrapper web, comprising a garniture having means to fold and seal the web around the filler, and adhesive-applying device to apply adhesive continuously to a marginal portion of the web and located at a station upstream of the folding and sealing means of the garniture, stationary support means for tensioning the web at said station, said support means comprising a pair of support members spaced apart longitudinally of the web, and over which the web is drawn and tensioned, and adhesive-applying nozzle disposed on the opposite side of the web from said support means to apply adhesive to the web at a location between said support members, said support members being spaced apart by a distance greater than the width of the nozzle measured longitudinally of the web, whereby a short unsupported length of web is provided between the nozzle and each support member.

2. Apparatus according to claim 1, wherein the said support means is a bridge and the support members are two humps on said bridge, the bridge having at least one shoulder arranged to engage an edge of the web to position it laterally.

3. Apparatus according to claim 1, comprising means located between and remote from the two support members to discharge an air jet against the web to urge it towards the adhesive-applying means.

4. Apparatus according to claim 1, wherein the adhesive-applying means comprises a gun including said nozzle to direct adhesive onto the web, and a peristaltic pump to feed adhesive to the nozzle at a metered rate.

5. Apparatus as claimed in claim 1, wherein said support means comprises a bridge having an arcuate peripheral surface over which said web is drawn, said arcuate surface having a cutout portion at said location at which said adhesive is applied, the surface portions of said arcuate surface on either side of said cutout portion forming said support members.

6. Apparatus according to claim 5, wherein means is provided for adjusting the lateral position of said bridge with respect to the web and for adjusting the position of said bridge in a direction towards and away from the web.

7. Apparatus according to claim 5, wherein said arcuate surface of said bridge is depressed between the lateral edges thereof over at least part of its length so as to form guide shoulders between which said web is drawn over the depressed surface.

8. Apparatus according to claim 7, wherein said adhesive applying means comprises a gun including said nozzle to direct adhesive onto a marginal portion of the web, and a peristaltic pump to feed adhesive to the nozzle at a metered rate.

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