

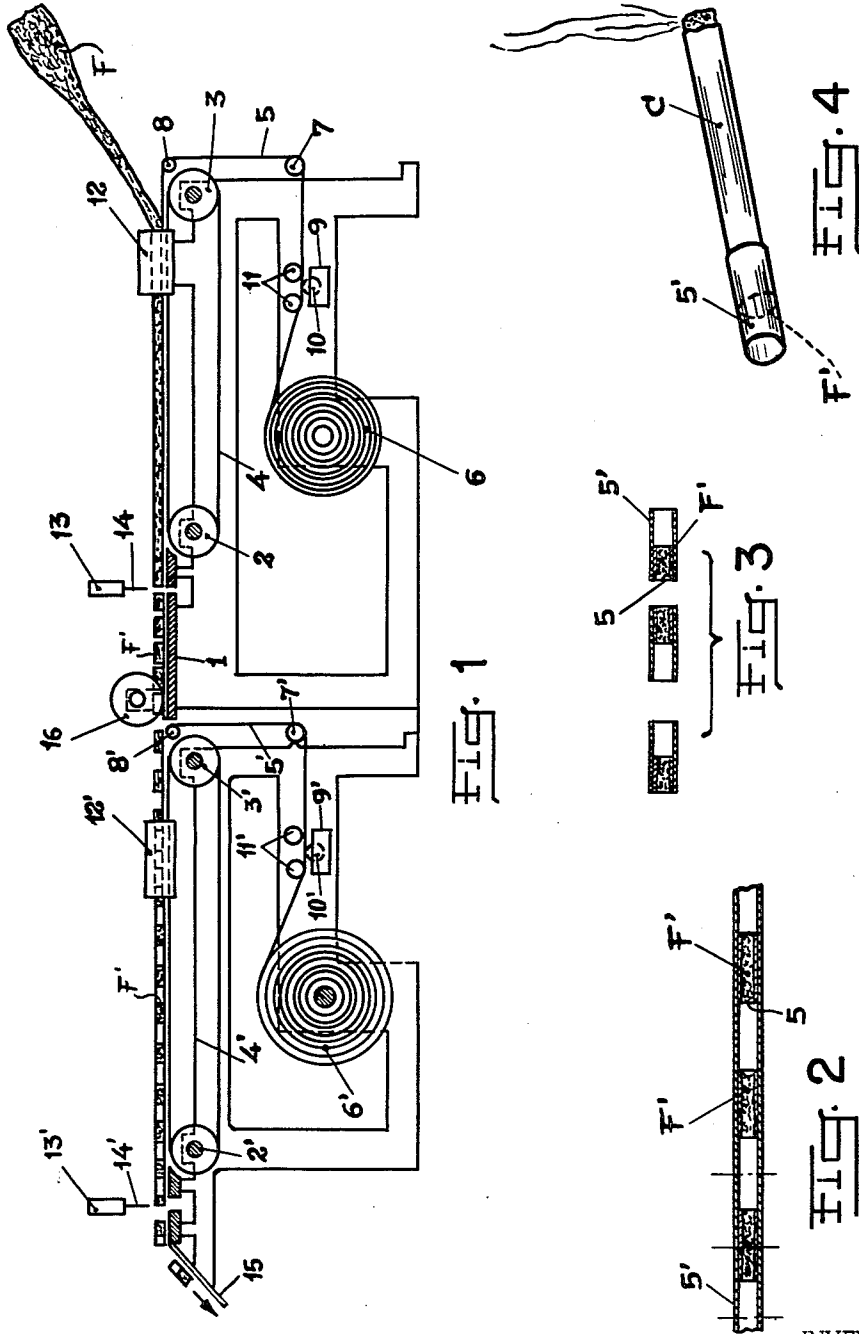
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MACHINE FOR MAKING FILTER UNITS FOR CIGARETTES

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**MACHINE FOR MAKING FILTER UNITS
FOR CIGARETTES**

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The present invention is related to the tobacco industry and concerns a machine for making filter units for cigarettes, said units being designed to supply makers of filter-tip cigarettes or to be sold separately to be used by the individual smoker in connection with conventional cigarettes unprovided with filter tips.

Nowadays the demand for filter-tip cigarettes has been increasing, chiefly for reasons connected with the smoker's health, since the filter units incorporated in cigarettes eliminate in large amounts the nicotine and tars of tobacco smoke, preventing these substances from reaching the smoker's lungs.

Smokers all over the world, impressed by the insistent recommendations and warnings of medical men, demand cigarettes less harmful to the human body, in other words, filter-tipped cigarettes. The effects generated by this increasing demand for cigarettes equipped with good filter units have already surpassed the sphere of interest of cigarette makers and have brought the matter to the attention of the governments of a great many countries such as France, Great Britain, Germany and the United States.

However, the makers of filter-tipped cigarettes, in their endeavor to satisfy the requirements of their customers, have met serious difficulties of a practical and financial nature in their aim of producing almost perfect filters with a simultaneous reduction of the high cost of making filter-tipped cigarettes. This is because the manufacture of the filter units and their subsequent incorporation in the cigarettes—which should preferably occur at the time the cigarettes are made in the special cigarette making machines—render necessary not only the use of special and expensive machinery but also the carrying out of accurate, costly and time-consuming operations, due to the special nature of the starting materials which constitute the filter wick.

For the incorporation of filter units in cigarettes, in the machines used for making filter-tipped cigarettes, the filter unit must exhibit a certain degree of rigidity, called the "body" of the filter since otherwise the filtering matter will give way and become loose so that the final product—the filter-tipped cigarette—will present deficiencies.

There are, nowadays, two very well known types of filter units and their methods of manufacture present also several analogies. These two types are: (a) the filter made of crepon paper or of crepon paper with an admixture of cotton; and (b) the filter comprising fibers of cellulose acetate.

The filtering matter is introduced in the conventional cigarette making machine and is therein surrounded by a layer of thin cigarette paper, just as if it were a small amount of tobacco of equal volume.

The necessary rigidity of the filter units is obtained by the following methods:

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(a) In the crepon paper filter, by the compression or stamping of said paper.

(b) In the cellulose acetate filter, by a previous treatment of the fibers with a chemical substance, the most commonly used being tri-acetine which solidifies and glues the fibers.

In accordance with the first method—crepon paper filter units—the filtering matter is initially treated and compressed by mechanical means, and, after transformation into a sort of wick, is cut and wrapped in thin cigarette paper in a conventional cigarette making machine.

In accordance with the second method—cellulose acetate filter units—before the units are introduced in the cigarette making machines (wherein the filter units are wrapped in thin cigarette paper) the surface of the filtering wick or member is sprayed with a suitable solvent or glue, tri-acetine being mostly used for this purpose. Due to this spraying, the cellulose acetate fibers develop and extend, providing the filter unit with an arrangement which ensures the necessary rigidity required of same.

It is found, however, that in both types of filter units, the filtering matter thus arranged by their respective methods forms a great many rectilinear channels which are disposed longitudinally of the filter.

The cellulose acetate filter unit has channels in greater number and of greater capillarity than the crepon paper filter unit. It is alleged that the cellulose acetate filter contains no less than 20,000 continuous fibers.

These channels render easier the aspiration of tobacco smoke. But, on the other hand, said channels limit considerably the filtration of tobacco components for the very simple reason that they permit the free passage of considerable quantities of minute particles of the tars contained in tobacco. Even though one were to try to increase the filtering capacity of said filter units, one would meet with an insurmountable obstacle: one would have to employ thinner fibers designed to produce channels of greater capillarity. But, even if that were possible, it should be pointed out that the aspiration of smoke would become more difficult and would require abnormal efforts on the part of a smoker or else the minute diameter of said channels would result in the choking up of the filter unit in a very short time. Because of the fact that it renders easy the aspiration of smoke in view of the many channels it contains, the cellulose acetate filter unit has already reached the upper limit of its filtration capacity.

The novel machine for the production of filter units according to the present invention solves these and many other related problems in the manufacture of filter-tipped cigarettes, in a manner entirely different from the means heretofore employed.

The necessary rigidity for the formation of the "body" of the filter is obtained through the rigidity of the outer wrapping of the filtering matter, thus dispensing with the various and costly manipulations of said matter from the inherent properties of which derives, according to conventional methods, the necessary rigidity (body) of the filter unit. Accordingly fairly thick paper is employed, weighing anywhere from 100 to 120 g. per sq. m., or else a double layer of thinner paper weighing 50 to 60 g. per sq. m., both of them gummed and having a double objective: (a) the increase of the rigidity of

the wrapping and (b) the gluing (fixing) of the filtering wick within the unit.

The necessary rigidity being thus obtained by means of the enveloping paper itself, which assumes a cylindrical form, manufacturers are thereby given the opportunity of employing any one of various staple or synthetic simple or combined fibers of indifferent thickness or else of employing cheaper and thinner fibers, nowadays of less easy manipulation than those used in conventional crepon paper or cellulose acetate filters.

The novel machine ensures an ideal and more natural accommodation of the fibers which form a kind mesh, thus eliminating the channels which give free passage to considerable quantities of particles of the tars contained in cigarette smoke. This web formation obviously provides a larger filtering surface and, since no channels are present, said particles of tar are forced to zig-zag thus coming in contact with the surfaces of the fiber mesh, adhering thereto. Thus, a more perfect filtration is ensured along the labyrinths provided by the fiber mesh and filtration is carried out in an almost ideal manner so much so that it is hardly conceivable that a better industrial filtration can ever be provided by any other method.

Besides, an economy of 50% in filtering matter is obtained, since a bare 5 g. of fiber per linear meter is used, whereas filters made of cellulose acetate fibers require 10 g. per linear meter. On the other hand, the filters made by the machine of the present invention provide 20% more filtration than filters of cellulose acetate, nowadays considered the most efficient type of filter.

The machine of the present invention is exemplified in the attached drawings, wherein:

FIG. 1 illustrates, diagrammatically partly in section and inside elevation, the improved filtering unit fabricating machine according to the present invention for the manufacture of recessed-type filter units.

FIG. 2 illustrates in longitudinal section an uncut length of wrapped filter lengths as produced in the machine illustrated in FIG. 1.

FIG. 3 illustrates, also in longitudinal section, individual filter units severed by the machine from a length of wrapped filter lengths ready for incorporation or attachment to previously made cigarettes.

FIG. 4 illustrated in perspective view a cigarette equipped with a filter unit manufactured by the machine claimed in the present application and illustrated in FIG. 1.

In the manufacture of filter units by the improved machine, the necessary rigidity or "body" of the wick used in the manufacture of the filter unit is obtained, not by means of a special treatment of the filtering matter, as with the use of tri-acetine, in the case of cellulose acetate filaments, but by the treatment of the paper wrapping of said wick, in fact, by an application of glue and a subsequent wetting of all the inner face of said paper wrapping or by a direct application of glue to same, immediately before the introduction of filtering matter.

Thus, the manufacture of the filter unit is greatly simplified and for the filtering matter of same use may be made of materials, such as cotton filaments, which up to now could not even be envisaged, since by themselves they do not form wicks sufficiently rigid to be later manipulated in cigarette making machines.

The machine shown in FIG. 1 is designed for the application of two gummed paper wrappers around a wick made of filtering matter, thus comprising in effect two similar simple sections disposed in series. Therefore only the right section of the machine will be described in detail, while the same reference characters, with the addition of a prime, will be used for the corresponding elements of the left section of the machine.

Atop a convenient opening provided in a table 1, there are mounted two parallel rollers 2, 3 over which passes an endless tape 4, said rollers being actuated so

as to pull out and move a web of paper 5, issuing from a supply roll 6 and which is trained around direction changing rollers 7 and 8.

Between the roll 6 and the roller 7 there is a glue vat 9 provided with two superposed rollers 10, 11 between which passes the paper web 5 which is thus coated with glue by the roller 10 before arriving at the upper part of table 1 whereat it enters a known type of curler 12 receiving at the same time an appropriate wick of filtering material F, forthcoming from a source of supply (not illustrated).

The linear velocity of the paper web 5 and the length of curler 12 are related so as to ensure the perfect gluing together of the edges of the paper tube 5, formed by the curler 12, as the latter emerges with its filter charge from said curler 12. The resulting paper tube with its charge of filtering material is carried by the endless tape 4 to a cutter 13 of known type having a knife 14, which cuts the tube into predetermined filter lengths F' which are carried in sequence by a suitably actuated wheel 16 onto a second gummed paper web 5', in the left section of the machine, which is moved at a greater speed than that of the paper web 5 by means of rollers 2' and 3' and the endless tape 4'. The filter lengths F' are wrapped in the paper web 5' by a curler 12', so that they are regularly spaced in the resulting tube, which is cut by the cutter 13' and its knife 14' alternately across the open spaces and across the filter lengths F' to produce the filter units which are discharged down a slide 15.

Because of this difference in speed, the product issuing from the curler 12' of the second (left) section of the machine shown in FIG. 1 will be of the type illustrated in FIG. 2, thus comprising a second outer wrapper 5' which encloses the smaller complete and isolated filter lengths F' which, on being severed by cutter 13' and its knife 14', at the end of the machine shown in FIG. 1, alternately across the open spaces and across the wicks of filtering material F', as indicated in FIG. 2, will present the form of recessed type filter units shown separately in FIG. 3 and with which may be manufactured the improved filter-tipped cigarettes illustrated at C in FIG. 4.

Thus, the machine herein described and claimed is capable of manufacturing separated individual recessed type filter units designed for the manufacture of recessed type filter-tipped cigarettes, or to be sold to and used by smokers themselves in connection with their preferred non-filter-tipped cigarettes.

As shown by the specification and drawings, the machine of the present invention ensures the complete and satisfactory achievement of the aims of the invention in a very simple and practical manner, devoid of appreciable drawbacks.

The object of the present invention when actually realized will surely comprise all the modifications in detail and in construction which may be construed as included in the scope of the appended claim.

I claim:

A machine for making filter units for cigarettes including first and second sections arranged in series, the first section including a former for incorporating a wick of filter material in a web of paper, means for feeding a web of paper carrying an adhesive on one surface to the former, means for feeding a wick of filter material onto the surface of the web of paper carrying the adhesive as it enters the former, the former including means for applying the web of paper around the wick of filter material and for producing a tube containing the filter material, said second section of the machine including a former, means for feeding a second web of paper carrying an adhesive on one surface to the former of the second section of the machine, means located between the former of the first section of the machine and the former of the second section of the machine for

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cutting the tube containing filter material delivered by the former of the first section of the machine into predetermined filter lengths, means located between the cutting means and the former of the second section of the machine for successively delivering said filter lengths onto the surface of the second web of paper carrying the adhesive as said second web of paper moves to the former of the second section of the machine, the former in the second section of the machine including means for applying the second web of paper around the filter lengths delivered successively thereonto and for producing a tube containing the filter lengths, means for feeding the second web of paper at a greater speed than that of the web of paper fed to the former of the first section of the machine so that the filter lengths are

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spaced apart in the tube issuing from the former of the second section of the machine, and means for cutting the resulting tube containing the spaced-apart filter lengths issuing from the former of the second section of the machine into filter units of predetermined length each containing a filter.

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