June 26, 1962 H. GANZ 3,040,752

FILTER CIGARETTES

Filed June 15, 1959

Fig. 1.

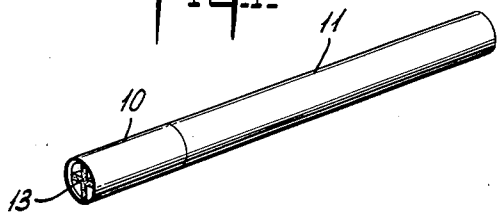


Fig. 2.

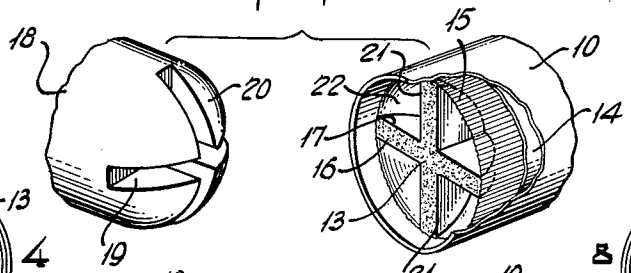


Fig. 3.

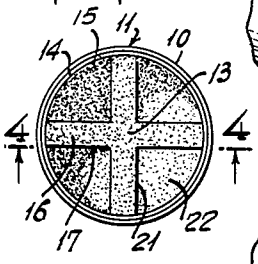


Fig. 7.

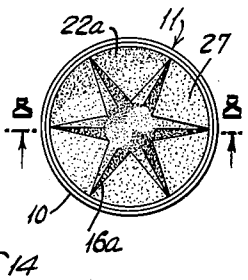


Fig. 6.

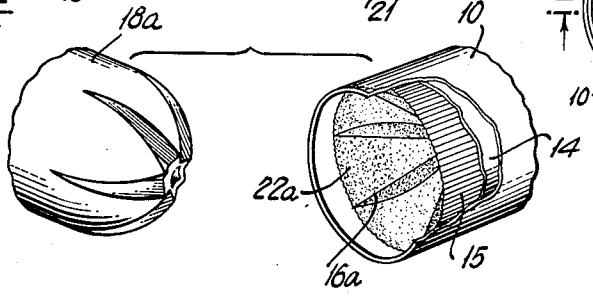


Fig. 4.

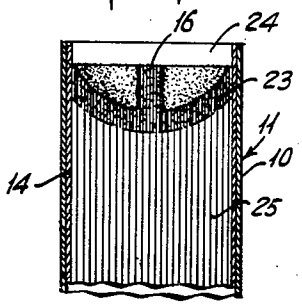


Fig. 5.

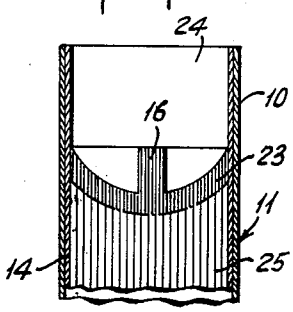


Fig. 8.

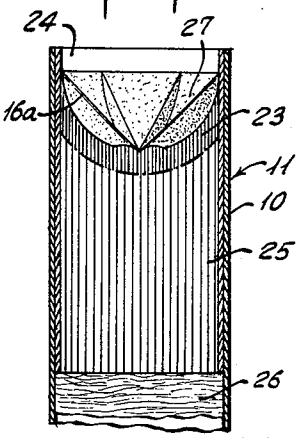


Fig. 9.

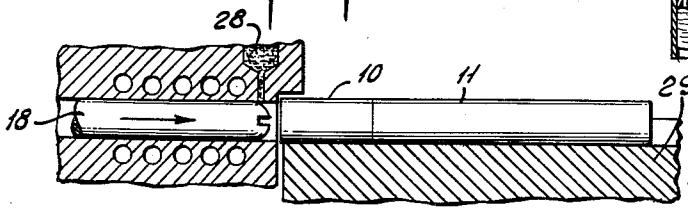
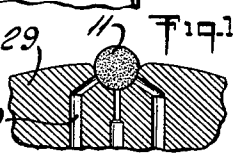


Fig. 10.



United States Patent Office 3,040,752 Patented June 26, 1962

3,040,752

FILTER CIGARETTES

Henry Ganz, 610 Churchill Road, Teaneck, N.J.

Filed June 15, 1959, Ser. No. 820,469
8 Claims. (Cl. 131—10)

This invention relates to new and useful improvements in filters and filter plugs for filtering smoke travelling through cigarettes and the like, and is an improvement of the conventional parallel plastic fiber filter wherein the contiguous end portions of the fibers are fused whereby there are substantially no free and unattached end portions in the end face of the filter.

Cigarettes, without filters, consist of paper and tobacco, the paper being wrapped around rolled tobacco in cylindrical form with the tobacco extending from one end of the cylinder to the other end. In cigarettes with filters, one end of the paper cylinder is devoid of tobacco. In this empty end there is positioned a filter or filter plug. The length of the plug is usually a fraction of the length of the paper cylinder which holds the tobacco and the filter plug. The filter plug is usually also made of paper wrapped around the filtering material to form a cylinder whose outer circumference is slightly less than the inner circumference of the paper cylinder that is wrapped around the tobacco to form the cigarette. In production, the filter and the tobacco are usually enwrapped by the cigarette paper simultaneously.

A filtering material commonly in use today is cellulose acetate. The filter plug is usually cylindrical in shape and made of paper wrapped around a bundle of parallel filaments or fibers of cellulose acetate to form a plug. It is also substantially of the same diameter as the cylinder of tobacco.

When the filter plug and tobacco are enwrapped in the usual manner to form a "filter cigarette," the tobacco extends from one end of the cigarette up to the filter with the filter extending from the tobacco to the opposite end of the cigarette.

With acetate material extending to the very end of the cigarette, objections have been raised that the tars and nicotine trapped in the filter material can be transferred to the tongue or lips of the smoker when the cigarette is placed between his lips. To overcome this objection, which has been called "filter feedback," one leading cigarette manufacturer leaves a recess in the outer end of the filter. However, leaving such a recess weakens the end of the cigarette so that it is flexible and gives laterally when pressed by the lips. And, even with a filter that extends to the end of the cigarette, i.e. those without the recessed end, the ends are also many times too flexible and weak laterally, and easily give under lip pressure.

My invention overcomes the above objections and gives to the filter end of such cigarettes a lateral trusslike support which makes the smoker's end of the cigarette firm and rigid, whether or not the end of the cigarette is recessed and regardless of the length of any such recess.

This support in performing its primary function of a support also act as a barrier to the escape of tars and nicotine through the filter.

Other and further objects and advantages of my invention will become apparent from a reading of the following detailed description taken in connection with the accompanying drawing in which—

FIG. 1 is a perspective view of a cigarette embodying my invention; and,

FIG. 2 is an enlarged view of an enlarged end of a filter cigarette with the means for forming the lateral support therein; and,

FIG. 3 is an enlarged front elevational view of the filter end of the cigarette of FIGS. 1 and 2; and,

FIG. 4 is a view taken on the line 4—4 of FIG. 3, in the direction of the arrows thereon; and,

FIG. 5 is a view similar to FIG. 4 but with a larger recess in the cigarette end; and,

FIG. 6 is similar to FIG. 2 but with the truss-like support modified to present a greater number of radial supports; and,

FIG. 7 is an enlarged elevational view of the modified form of my invention; and,

FIG. 8 is a view of FIG. 7 looking in the direction of the arrows 8—8; and,

FIG. 9 is a view of a simple apparatus used in connection with the formation of the filter of my invention.

FIG. 10 is a view illustrating means for holding the filter cigarette stationary.

Referring now to the various figures of the drawing for a complete detailed description of my invention, it will be seen in FIG. 1 that I have illustrated a so-called filter cigarette with the filter plug 10 at one end of the cigarette, the balance of the cigarette consisting of the tobacco wrapped in paper 11 in the usual cylindrical form. At the outer end of the filter plug 10 can be seen truss-like lateral support 13. This support, made of cellulose acetate, under pressure and heat has been fused and formed into the shape shown in FIGS. 1 and 2.

In FIG. 2, a portion of the cigarette at the filter end has been torn away to show the outer cylindrical paper wrapper 11, the paper cylinder 14 in which the cellulose acetate material 15 usually parallel filaments or fibers is contained to form the filter plug.

The truss-like support with its radially extending ribs 16 between which are hollow cavities 17, is formed by the insertion of tool 18. This tool is rod-like with one end cut as indicated in FIG. 2 or FIG. 6. It, of course, can also be cut or formed at the end in any other configuration or shape desired. As shown in FIG. 2 it has radial recesses cut therein so that upon the pushing of the tool 18 into the filter plug 10 pressure may be exerted upon the outer contiguous end portions of the acetate material by first pressing against the material to form the radial ribs 16.

The rod-like tool is so dimensioned that its outer circumference is less than the inner circumference of the paper cylinder which holds the acetate filter material. This is for the purpose of permitting the rod-like tool to be inserted into the paper cylinder 14 which holds the acetate filter. This tool 18 is heated and maintained at a temperature sufficiently high to cause the acetate to fuse. A temperature of approximately 180° F. has been found to be sufficient. This temperature to fuse the filter material, however, must be regulated according to feed of production, and in production this fusing operation must be operated so as not to materially block the openings between the filter filaments or fibers.

With the rod-like member 18 heated, it is then inserted into paper cylinder 14 at one end and pressed against the outer surface filter material 13 just long enough for the outer surface of the filter material to fuse. When the material fuses, it forms a somewhat hard shell over the area to which the heated rod has been pressed, thus leaving a somewhat rigid area conforming in inverse shape to the shape of the rod end 18. This is clearly shown in FIG. 2.

The end of the rod is usually rounded so that when the radial cuts 19 are made therein, as shown in FIG. 2, four prongs or fingers 20 are formed at the end thereof. These fingers are rounded on their outer sides. When the rod 18 is pushed into cylinder 14 and pressed against the filter material 13, the four cavities 17 formed therein each have two vertical walls 21 and one sloping or curved wall 22.

The hardening or fusing of the acetate by the heated rod 18 causes the filter material, where fused, to be thicker

or denser than the unfused adjacent filter material. This fused area (FIG. 2) extends over substantially the entire exposed radial area of the filter material. The fused area is sufficiently porous so that it does not act to prevent the smoke from passing therethrough. Neither does it render the filter more difficult for the smoker to draw the smoke through it. It does, however, act as an additional barrier and trap in cutting down on the amount of tars and nicotine that escape with the smoke passing out of that end of the cigarette filter. The smoke of the lit cigarette in travelling through the cigarette passes first through the unfused filter material and then through the dense or fused area of the same filter material thus in effect giving a double filter with one filter material.

The fusing at the end of the filter material makes the fused area thick and rigid and with the truss-like ribbed area formed as shown in FIG. 2, the lateral collapsing or inward flexing of the paper cylinder **14** is resisted when the pressure of the lips of the smoker is exerted against that end of the cigarette. When the heat and pressure from the member **18** is applied against the cellulose acetate filter, the fusing extends a short distance beyond the surface and into the filter material such as shown in FIG. 4 at **23** thus giving strength to the entire fused area.

While I have shown a ribbed fused area, it should be understood that by making the end of the tool **18** (FIG. 2) flat I can give a completely flat fused surface area to the filter material and this fused area can be deep as shown in FIG. 4 or it can be much shallower depending on temperature and pressure applied to the filter material. After the heated rod **18**, is illustrated, has been inserted into cylinder **14** and pressed against the filter material, the fused area takes the shape shown in FIG. 2. FIG. 3 is an end elevational view of the same fused area shown in FIG. 2.

In FIG. 4, which is a view taken along the line **4—4** of the filter of FIG. 3, the cellulose acetate filter material has been pressed downwardly a short distance to form a shallow recess **24**. This figure also illustrates the round shape the bottom of the fused area taken when the heated member **18** is inserted into the cylinder **14** and pressed against the filter material **25**.

In FIG. 5, the rod member **18** is inserted into cylinder **14** a somewhat greater distance to provide a deeper recess (**24**) than that shown in FIG. 4. The same numerals are used throughout the various figures of the drawing to denote the same parts.

FIG. 6 shows a modified rod-like heating and pressing member which is adapted to be inserted into the filter plug of the cigarette leaving therein on the filter material six radially extending ribs **16***a*.

FIG. 7 is an end elevational view of the fused filter which has been shaped by the member **18***a* of FIG. 6. It should be understood that I can provide any number of ribs desired although I am only showing two different formations, one with four radial ribs (FIG. 3) and one with six radial ribs (FIG. 7) merely as illustrative of the various forms into which I can shape the fused material. For example, while I have illustrated (in FIG. 8) the fused area **23** to be rounded, I can by making the end of the rod-like element flat and by making radial cuts therein cause the fused area **23** to be flat and to extend at substantial right angles to the vertical ribs that would be formed by the radial cuts.

In operation and to prevent the filter material from sticking to the heated pressing rod **18**, I can cover the surface of that end of the member **18** that comes into contact with the filter material with a small amount of wax, generally paraffine wax or some similar material. This not only prevents the cellulose acetate from sticking to the member **18** but leaves a thin layer of such material on the outer surface of the fused area thus giving additional strength to the fused truss-like portion of the filter material. If wax is not used for this purpose, water or a small amount of steam can be applied to the rod with the heat to the rod being regulated so as to insure fusing. The use of the water or steam will also prevent the cellulose acetate from adhering to the rod.

Since such wax is porous it does not in any way retard the passing of the smoke through the filter. It does, however, operate as an additional or third barrier to the passage of tars and nicotine through the filter. I have found that it particularly retards the passage of tars therethrough.

It can thus be seen that I have provided a triple barrier filter against the passage of nicotine and tars therethrough—the first barrier is the non-fused cellulose acetate, the second is the fused layer of cellulose acetate and the third is the thin layer of material such as wax. At the same time I have also provided a strong lateral support to resist lateral flexing or crushing of the filter.

In FIG. 9, I have shown a simple device indicating how the rod-like member could act upon filter cigarettes moving along in production. The member **18** would be pushed to the right to enter the filtered end of the cigarette and would immediately be drawn back. This could be set up in any well known manner such as by spring and cam means or by any other well-known means. The wax in liquid form could be fed from a reservoir **28** onto the forward or pressing end of member **18**. The supply of wax to member **18** can be controlled in any well-known manner. Such a simple mechanism as this would not interfere with present cigarette production and would not require alteration of present machinery.

In FIG. 10 I have shown pipe means **30** through which a vacuum can be drawn (by any standard means) sufficient to hold the cigarette **11** in place while member **18** compresses and fuses the cellulose acetate as heretofore described. In FIG. 10 the cigarette is set in a groove which can, if desired, be also machined out of member **29**. Other means such as a mechanical means may also be employed.

While I have illustrated the filter plug of my invention as being inserted into a cigarette with the fused filter material at the outer end of the cigarette, it should be understood that I may have the fused area on the inner end of the plug. For example, I could have the plug shown in the drawings reversed so that the fused end is next to the tobacco or I can have the center radial portion of the plug composed of the fused material with the unfused material on both sides of the fused material. I can also, if desired, have only fused material with no unfused material in the plug.

Also, while I have disclosed cellulose acetate as the primary filtering material, it should be understood that other filtering materials of the same class or group as cellulose acetate may be used provided such material is capable of being fused and when fused is sufficiently porous to permit smoke to pass therethrough.

While I have shown and described a preferred embodiment of my invention, it should be understood that various modifications thereof may be made, all within the scope of the appended claims, without departing therefrom.

What I claim is:

1. A cigarette comprising a cylindrical body of tobacco, a cylindrical filter unit adjacent one end of the tobacco and in alignment therewith and of substantially the same diameter as the body of tobacco, a wrapping sheet around the tobacco and the filter unit, said filter unit comprising a cylindrical body of cellulose actate material with substantially all of the contiguous end portions of fibers of said acetate material at the outer end face of the filter being fused whereby there are substantially no free and unattached end portions in the said end face of the filter.

2. A cigarette as defined in claim 1 in which the fused acetate material has a porous coating of wax on its end face.

3. A cylindrical filler plug for cigarettes comprising fused and non-fused cellulose acetate material encom-

passed within a paper wrapping, with the fused portion being porous and extending over substantially all of the entire circular outer area of one end of said cylinder.

4. A cylindrical filter plug for cigarettes comprising fused and non-fused cellulose acetate material encompassed within a paper wrapping with the fused portion being porous and extending throughout substantially the entire outer circular area of one end of said cylinder, said fused area being formed into a truss-like support.

5. A cylindrical filter plug for cigarettes comprising fused and non-fused cellulose acetate material encompassed within a paper wrapping, with the fused portion being porous and extending over substantially the entire outer circular area of one end of said cylinder, and including radial strengthening ribs formed in said fused area.

6. A cylindrical filter plug for cigarettes comprising cellulose acetate material enclosed within a paper wrapping, a portion of said cellulose acetate material at one

end of said cylinder being fused by heat and having radially extending ribs, said ribs having their outer portions substantially flat.

7. A cylinder filter plug for cigarettes comprising cellulose acetate material enclosed within one end of a cigarette, a portion of the said cellulose acetate material at one end of said cylindrical plug being fused by heat, said fused portion having a porous layer of wax on its outer face.

8. A filter for cigarettes and the like, said filter comprising heat-fusible material of the class of cellulose acetate, said material being enwrapped by paper to form a cylindrical plug, said material at one end of said plug having a substantial portion of its outer surface fused.

References Cited in the file of this patent

UNITED STATES PATENTS

2,688,380	MacHenry	Sept. 7, 1954
2,881,770	Touey	Apr. 14, 1959