

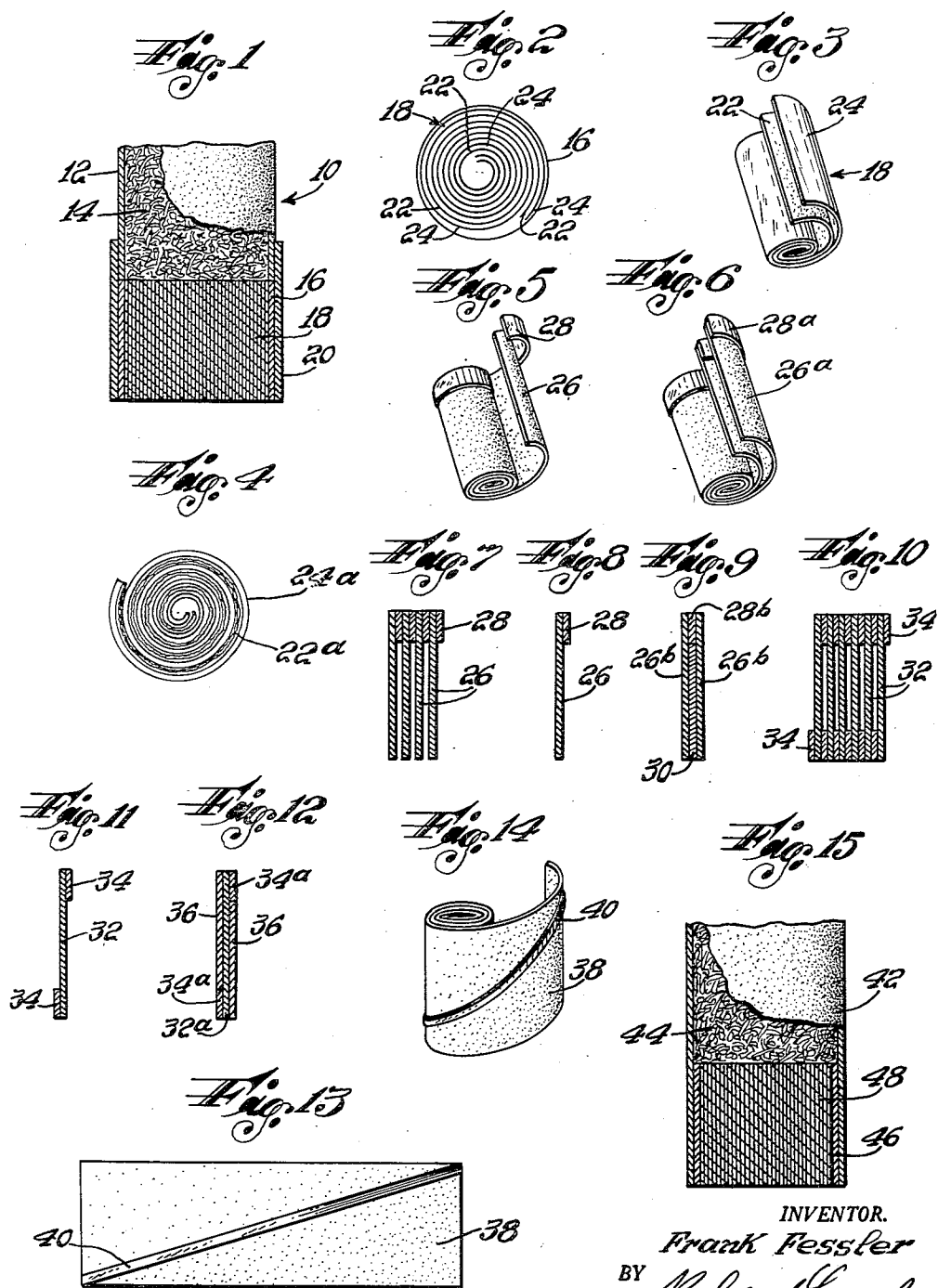
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FILTER

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FILTER

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2 Claims. (Cl. 131—10)

This invention relates to a filter, more particularly to a filter cigarette, the present application being a continuation-in-part of my application Serial No. 167,302, filed June 10, 1950, and entitled "Tobacco Smoker's Article," now Patent #2,762,375, issued September 11, 1956.

In view of the large consumption of tobacco products, especially with the spread of consumption of smoking tobacco products during the last decades, many efforts have been made to lessen the harmful effects of smoking by purifying tobaccos or tobacco smoke. However, none of the known attempts seems to have proven entirely satisfactory.

Among the actual developments to reduce the irritating effects of tobacco smoke, absorbent filters provided in cigarettes became popular. My invention is concerned with such a filter, and the primary object of the invention is to generally improve the known filters.

While the known filters retain nicotine and irritating tarry substances of the smoke, they are not effective enough in their retaining action. A more specific object of my invention is, therefore, to increase the effectiveness of the known filters.

One of the actions that take place when tobacco smoke is drawn through a cigarette is condensation. Tobacco smoke contains noncondensable gases and condensable vapor, the latter being converted into a liquid and/or semisolid state when cooled. In order to convert such vapors into liquids or semisolids which can be separated from the non-condensable gases, the temperature of the smoke has to be lowered sufficiently. Thus, my present invention has for one of its objects to provide cigarettes with filter means which will further the condensation of the condensable constituents of tobacco smoke.

It is known that a low temperature of tobacco smoke will in general furnish a less irritating and a more enjoyable smoke. Also, it has already been suggested to provide perforated metal inserts in tobacco pipes to cool the smoke, but so far it was impossible to introduce in cigarettes inserts of good heat-conducting properties. An important object of my invention is to provide efficient heat-conducting inserts in cigarettes.

A copending application of mine, Serial Number 284,951, deals with metal inserts in cigarettes or cigars laid across the path of the tobacco smoke drawn through a cigarette or cigar. Being good heat conductors, these metal inserts contribute to the lowering of the temperature of the tobacco smoke, improving the quality of the filter to retain liquefiable matter to be deposited, and thus considerably reducing obnoxious compounds in the tobacco smoke. The present invention is concerned with metal inserts of a different construction for cooling the stream of tobacco smoke drawn through cigarettes.

My invention is concerned with the combined use of inserts or condensers of the kind referred to and of filtering material. One object of my invention is to provide a condenser-filter for conventional filter cigarettes so that existing commercially used equipment may be employed to make my new cigarette.

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To the accomplishment of the foregoing and other objects which will appear hereinafter, my invention consists of a filter cigarette, the elements thereof, and the relation of the elements one to the other, as are more particularly described in the specification and sought to be defined in the claims.

The specification is accompanied by a drawing in which:

Fig. 1 is a fragmentary partially sectioned elevation of a cigarette embodying features of my invention, the cigarette being schematically illustrated to enlarged scale;

Fig. 2 is a fragmentary end view, schematically shown, of the mouth end of the cigarette of Fig. 1, the outside wrapper being removed;

Fig. 3 is a perspective view of a pluglike condenser-filter as used, for instance, in the cigarette of Fig. 1, the plug forming a coil and being schematically shown partially unrolled;

Fig. 4 is an enlarged, expanded, partial cross-sectional view of a condenser-filter;

Figs. 5 and 6 are perspective views of two modifications of a filter device in coil form, the coils being again schematically shown partially unrolled;

Fig. 7 is a fragmentary longitudinal section taken through the condenser-filter of Fig. 5;

Fig. 8 is a longitudinal section through two contiguous layers of the condenser-filter of Figs. 5 and 7;

Fig. 9 is a vertical section through a portion of one form of filter constructed in accordance with the invention;

Fig. 10 is a fragmentary longitudinal section through a further modification of a condenser-filter;

Fig. 11 is a longitudinal section of a single crepe paper layer of the device of Fig. 10, with a contiguous layer of metal foil on each side;

Fig. 12 illustrates one more modification of my condenser-filter;

Fig. 13 is a plan view of a blank of crepe paper having a strip of metal foil superposed upon it;

Fig. 14 is a perspective view of a coiled plug formed from the structure of Fig. 13, the plug illustrating a further modification of my filter-condenser and being again schematically shown partially unwound; and

Fig. 15 is a view similar to that of Fig. 1, but showing a different cigarette construction.

Referring to the drawing in greater detail and having first reference to Fig. 1, in a cigarette designated 10, a wrapper 12 encloses a roll 14 of tobacco, and a wrapper 16 encloses a tobacco fume-condensing and deposit-collecting plug 18. A wrapper 20 joins the tobacco section and condenser-filter section. Fig. 2 illustrates one way of forming the plug 18. According to Fig. 2, the plug is formed by rolling two superposed ribbons of crepe paper 22 and metal foil 24, respectively, upon themselves. In the coiled condition which is shown in Figs. 2 and 3, the outermost winding is metal foil and is in thermal contact with the wrapper 16. The convolutions of the ribbons form longitudinally disposed channels for the tobacco smoke, the channels being defined both by crepe paper and metal foil surfaces. The ribbons are closely wound so that the channels formed will constitute narrow passages and will ensure the most favorable conditions for transmission of heat from the flow of smoke to the metal foil. The liquids and/or semisolids obtained by condensation in part caused by the metal foil, are suspended in the tobacco smoke stream in form of mists or fumes and coalesce into drops which deposit on the crepe paper.

In Fig. 4, the roll is formed by the crepe paper coil 22a and the metal foil coil 24a. The two coils form a multitude of generally longitudinally extending relatively restricted passages. The stream of tobacco smoke, while being cooled upon contact with the metal, passes through

both the crepe paper and the passages, and condensed matter is deposited in and on the crepe paper.

The condenser-filter shown in Fig. 5 is formed by coiling a ribbon of crepe paper 26 and a ribbon of metal foil 28, the latter ribbon having the same length as the former but being of a narrower width. The cigarette smoke flows through the passages between the convolutions of crepe paper and metal foil, and through the crepe paper.

The condenser-filter of Fig. 6 is similar to that of Fig. 5 except that there are two crepe paper ribbons 26a and two metal foil ribbons 28a alternately coiled, and that the metal foil coils are not loose between the crepe paper coils.

In Figs. 7 and 8, the structural relationship of the crepe paper and metal foil coils is shown, as it appears in the plug of Fig. 5. There is a metal foil winding between every two crepe paper windings, and the winding is arranged so that the outermost layer will be metal foil.

To increase the filtering action of the condenser-filter of Figs. 5, 7 and 8, I provide layers 30 of filtering material as shown in Fig. 9 to fill the empty spaces between adjacent coils 26b of crepe paper. The crepe paper layers 26b correspond to the crepe paper convolutions 26 in Fig. 5 and to the crepe paper layers 26 in Figs. 7 and 8, and the layer 28b of metal foil corresponds to the metal foil convolutions 28 in Fig. 5 and to the metal foil layers 28 in Figs. 7 and 8.

In the embodiment of Figs. 10 and 11, the plug is formed by coiling a sheet or ribbon 32 of crepe paper and two narrow ribbons 34 of metal foil, the latter two ribbons being superposed on the opposite faces, and extending along the opposing longitudinal edges, of the crepe paper. The empty spaces between adjacent coils 32 shown in Fig. 10, may be filled with filtering material.

In Fig. 12, one of the coils 32 of Fig. 10 is identified by the reference character 32a, the filtering material to fill the empty spaces between the coils 32a being designated 36.

Where filtering material is used to fill such empty spaces as shown in Figs. 7 and 10, pulp, for instance, may easily be applied to the supporting layer 26 of Fig. 7 and Figs. 10 and 32, respectively. The condenser-filter plugs of Figs. 7 to 12 allow the cigarette smoke to pass through the spaces between the windings, or force the smoke to flow through filtering material.

Figs. 13 and 14 relate to a condenser-filter which is formed by rolling up a blank 38 of crepe paper having a strip 40 of metal foil diagonally superposed upon it.

Referring now to Fig. 15, a wrapper 42 encloses both a roll 44 of tobacco and a cylinder 46 formed by rolling a strip of cardboard or the like on itself. The cylinder 46 receives a condenser-filter plug 48. With the mouth end of the cigarette tube 42 being empty, the cylinder can be sufficiently compressed to allow its introduction. It is held in place within the paper tube by its expansion after insertion.

It will be clear that wherever crepe paper has been referred to, other filtering material may be used as well, for instance, layers of pulp, cotton, or asbestos, shavings of soft absorbent wood, husks or leaves.

It will be apparent that while I have shown and described my invention in a number of forms, many changes and modifications may be made without departing from the spirit of the invention defined in the following claims.

I claim:

1. A filter comprising layers of uniform strips of material in spaced relation and a plurality of strips of material which differs from the material of said layers arranged in mutual edge-to-edge relation between the said strips, the second plurality of strips having a combined width corresponding to the width of the layers of strips, the combined strips being coiled to form a roll.

2. A filter for cigarettes comprising a concentric roll of at least two superposed strips, one of said strips being absorbent material, the other strip being metal foil, the strip of metal foil being narrower than the strip of absorbent material, and added absorbent material arranged in mutual edge-to-edge relation to the metal foil strip.

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