

April 24, 1962

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3,030,963

CIGARETTE CONSTRUCTION

Filed Nov. 18, 1960

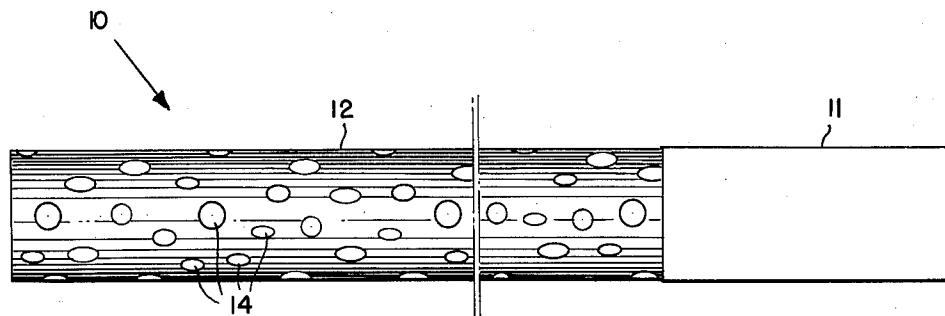


FIG. 1.

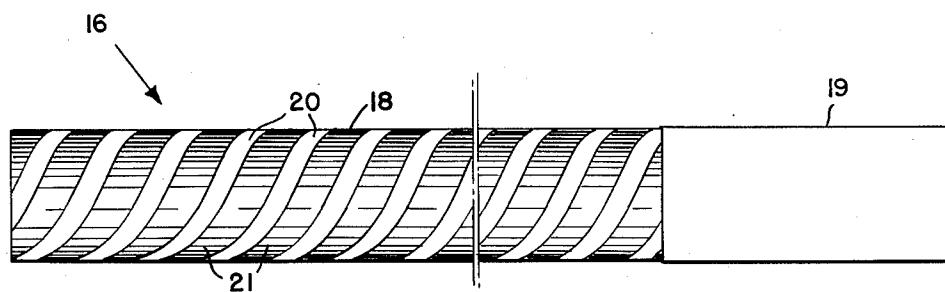


FIG. 2.

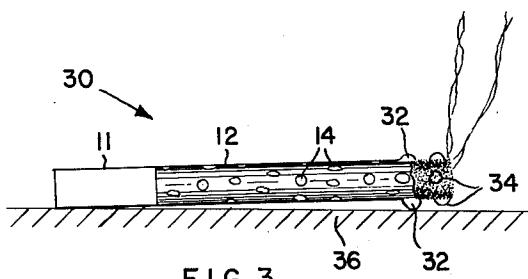


FIG. 3.

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3,030,963

## CIGARETTE CONSTRUCTION

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Filed Nov. 18, 1960, Ser. No. 71,868

6 Claims. (Cl. 131—4)

This invention relates to an improved cigarette construction and, more particularly, to a cigarette wrapper construction providing a substantial degree of fire protection and providing a partial retention of the cigarette ash.

Numerous suggestions have heretofore been made for reducing the fire hazard involved in connection with smoking and for retaining the ashes formed by a burning cigarette. These suggestions all involve the use of elaborate apparatus providing a cigarette structure which will cause a cigarette to cease burning when at rest upon a surface, such as, for example, a holder or an ash tray, and many of which will cause a cigarette to cease burning even when held away from any contacting surface if the cigarette is not puffed frequently.

It is the primary object of this invention to provide a cigarette having a wrapper which will provide, during burning of the cigarette, barrier areas for spacing the burning portion of the cigarette from a surface in engagement with the cigarette and, at the same time, provide a cigarette which will continue burning even when not being puffed.

It is a further object of the invention to provide a wrapper which, when burned, will serve to retain the cigarette ash until the ash is broken away by the application of external force such as the pressing of the ash against an ash tray by a person holding the cigarette.

These and other objects of the invention, relating particularly to the construction thereof, will become evident from the following description when read in conjunction with the accompanying drawing, in which:

FIGURE 1 is a showing of a cigarette having spaced areas thereof providing barrier areas;

FIGURE 2 is a showing of a cigarette having elongated areas thereof in the form of helical bands providing barrier areas;

FIGURE 3 is a showing of a burning cigarette treated in accordance with one embodiment of the invention and resting upon a supporting surface.

In FIGURE 1 there is indicated generally at 10 a cigarette having the conventional tobacco filler wrapped within a paper or similar combustible wrapper 12 and provided with a tipped end 11. The structure thus far described is the commonly employed cigarette structure.

In the cigarette of my invention shown in FIGURE 1, the wrapper is treated in areas forming spaced spots to provide barrier areas which will be suitable for spacing the burning portion of the cigarette from a surface in engagement with the cigarette. Thus, if the cigarette is placed or falls upon a wood, fabric, paper or similar combustible surface, the surface will not be materially damaged by heat from the cigarette and the danger of fire resulting from contact of a burning cigarette therewith is substantially eliminated.

The spots shown in FIGURE 1 may be of various sizes, shapes and spacings. For example, the spots may be approximately  $\frac{1}{16}$ " diameter spaced on approximately  $\frac{1}{4}$ " centers, however, the spot diameters may range from approximately half to approximately twice this size with approximately proportionally spaced centers.

While the foregoing approximate dimensions have been found suitable, the invention is not limited thereby. The essential consideration is that the size of the spots and

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the relation between the size of the spots and the spacing of the spots be such that the existence of the treated areas will not serve to extinguish the cigarette such as would occur if the entire surface of the cigarette were treated while, at the same time, the spots must be of sufficient size and proximity to provide a suitable barrier between the burning portion of the cigarette and a surface in contact therewith to effectively protect the surface from the burning portion of the cigarette.

It will be evident that the treatment is not limited to a pattern of spots such as the spots 14 shown in FIGURE 1. In FIGURE 2 there is indicated generally at 16 a cigarette having a wrapper 18 and a tipped end 19. In FIGURE 2 the wrapper 18 is treated along bands forming helical convolutions 20 extending around the cigarette in spaced relation. The widths of the bands 20 and the spacings 21 between the bands are selected to provide, upon burning of the cigarette, sufficiently large barrier areas to provide the desired result and sufficiently wide combustible areas so as not to arrest combustion of the cigarette when it is not being puffed.

It will be evident that in addition to the patterns shown in FIGURES 1 and 2, that various other patterns may be employed such as blocks, straight lines, etc.

The barrier areas are formed by dry deposits of alkali silicate on the cigarette wrapper. The quantity of composition water and the quality of silica in the dry silicate deposit are of prime importance. Silica must be present in an amount corresponding to at least 0.013 gram per square centimeter of the area covered by the deposit, and the water of composition must account for at least 15 percent of the weight of the dry silicate deposit. There are no upper limits for the water of composition and silica present in the dry silicate deposit. If either the water or silica content of the dry silicate deposit fall below the lower limits set forth above, the applicant's end purpose is defeated. Preferably, the silicate deposit is from evaporation of an aqueous solution of a water-soluble silicate in which the silica radical ( $\text{SiO}_2$ ) accounts for at least approximately 14.5 percent of the total weight of the solution. Such a solution, when placed upon a cigarette wrapper, does not run or spread freely, but instead has a tendency to form a relatively thick layer covering a restricted area, in consequence of which it facilitates treatment of the cigarette wrapper.

The aqueous solution of a water-soluble silicate may be applied to a large sheet of cigarette paper by any suitable means. Preferably, it is printed on, in the desired pattern of barrier areas. Then the wet paper and the solution printed thereon are dried, preferably by the application of heat. Even in its dry state, the barrier forming material retains some water in its composition. The temperature must not be high enough to drive off the water of composition. If desired, the barrier forming solution may be dried without applying heat, but if heat is applied, the temperature preferably is substantially less than 212° F., otherwise the water of composition may be vaporized, and the steam causes the silicate to foam up. When the solution dries, it leaves on the cigarette paper a rather heavy deposit which forms the barrier area of the invention. The cigarette paper is then cut up into individual cigarette wrappers.

In FIGURE 3 there is shown generally at 30 a cigarette spotted with barrier areas, as shown in FIGURE 1. As one example, these barrier areas were formed by dry deposits from drops of a sodium silicate solution applied to the cigarette wrapper. The silica radical ( $\text{SiO}_2$ ) accounted for at least 14.5 percent of the total weight of the treatment solution. As another example, the sodium silicate solution had a viscosity of 1700 centipoises at 68° F., a sodium to silica molecular ratio of 1:2.4, and a Baumé reading of 52° at 20° C. As a further example,

the sodium silicate solution had a high viscosity, a sodium to silica molecular ratio of 1:2 and a Baumé reading of 59° at 20° C. In each case, when the heat of the burning cigarette reached a barrier area, the dry sodium silicate forming the barrier foamed up and swelled to form an outwardly projecting protuberance, as indicated at 32, that was cool to the touch. The protuberances remained on the external surface of the ash as indicated at 34. The cigarette is shown resting upon a surface 36 and, as will be evident from the drawing, the protuberances 32 serve to raise the burning end of the cigarette from the supporting surface 36. The protuberances remaining in position on the cigarette ash, as indicated at 34, further insure protection of a supporting surface from the heat of the burning cigarette.

By way of summary, a dry, water-containing deposit of a water-soluble silicate, which deposit forms a barrier area of the invention, must contain at least 0.013 gram of silica per square centimeter of the area covered by the deposit. There is no upper limit for the silica present in the dry silicate deposit. Water of composition should account for at least 15 percent of the weight of the dry silicate deposit. There is no upper limit for the water content of the dry silicate deposit. The solution applied to the cigarette paper may be dried without the application of drying heat, but if such heat is applied, the temperature preferably is lower than 212° F.

This application is a continuation-in-part of my copending application Serial No. 651,637, filed April 9, 1957, now abandoned.

What is claimed is:

1. A cigarette construction comprising a combustible wrapper, a body of tobacco contained by said wrapper, and dry, water-containing deposits of a water-soluble silicate on said wrapper effectively providing an all over pattern of non-combustible wrapper areas separated by combustible wrapper areas, each of said silicate deposits containing at least 0.013 gram of silica per square centimeter of wrapper area covered by said deposit, being thereby adapted for foaming up under the heat of the burning cigarette to provide a protuberance for being interposed between the burning portion of the cigarette and a supporting surface underlying the cigarette, and for holding the burning portion of the cigarette elevated from the supporting surface.

2. A cigarette construction comprising a combustible wrapper, a body of tobacco contained by said wrapper, and deposits of dry, water-containing sodium silicate on said wrapper effectively providing an all over pattern of non-combustible wrapper areas separated by combustible wrapper areas, each of said silicate deposits containing at least 0.013 gram of silica per square centimeter of wrapper area covered by said deposit, being thereby adapted for foaming up under the heat of the burning cigarette to provide a protuberance for being interposed between the burning portion of the cigarette and a supporting surface underlying the cigarette, and for holding the burning portion of the cigarette elevated from the supporting surface.

3. A cigarette construction comprising a combustible wrapper, a body of tobacco contained by said wrapper,

and spaced dry, water-containing spots of a water-soluble silicate on said wrapper effectively providing an all over pattern of non-combustible wrapper areas, each of said spots containing at least 0.013 gram of silica per square centimeter of wrapper area covered by said spot, being thereby adapted for foaming up under the heat of the burning cigarette to provide a protuberance for being interposed between the burning portion of the cigarette and a supporting surface underlying the cigarette, and for holding the burning portion of the cigarette elevated from the supporting surface.

4. A cigarette construction comprising a combustible wrapper, a body of tobacco contained by said wrapper, and spaced dry, water-containing stripes of a water-soluble silicate on said wrapper effectively providing an all over pattern of non-combustible wrapper areas, each of said stripes containing at least 0.013 gram of silica per square centimeter of wrapper area covered by said stripe, being thereby adapted for foaming up under the heat of the burning cigarette to provide a protuberance for being interposed between the burning portion of the cigarette and a supporting surface underlying the cigarette, and for holding the burning portion of the cigarette elevated from the supporting surface.

5. A cigarette construction comprising a combustible wrapper, a body of tobacco contained by said wrapper, and deposits on said wrapper of solute from a viscous sodium silicate solution having a sodium to silica ratio of 1:2 and a Baumé of 59° at 20° C., said deposits effectively providing an all over pattern of non-combustible wrapper areas separated by combustible wrapper areas, each of said deposits being adapted for foaming up under the heat of the burning cigarette to provide a protuberance for being interposed between the burning portion of the cigarette and a supporting surface underlying the cigarette, and for holding the burning portion of the cigarette elevated from the supporting surface.

6. A cigarette construction comprising a combustible wrapper, a body of tobacco contained by said wrapper, and dry, water-containing deposits of a water-soluble silicate on said wrapper effectively providing an all over pattern of non-combustible wrapper areas separated by combustible wrapper areas, each of said silicate deposits containing at least 0.013 gram of silica per square centimeter of wrapper area covered by said deposit, and containing water of composition in an amount equal to at least 15 percent of the weight of said deposit, said silicate deposit being thereby adapted for foaming up under the heat of the burning cigarette to provide a protuberance for being interposed between the burning portion of the cigarette and a supporting surface underlying the cigarette, and for holding the burning portion of the cigarette elevated from the supporting surface.

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