

June 16, 1942.

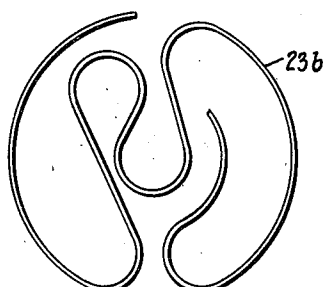
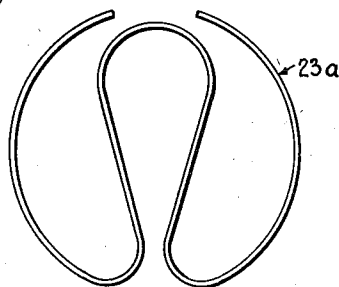
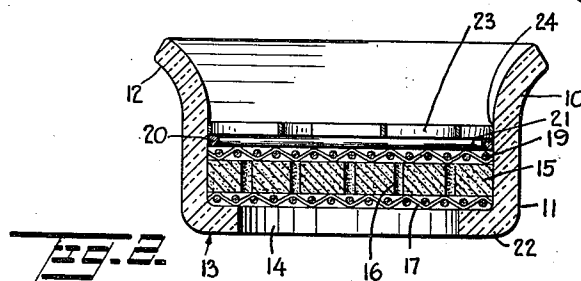
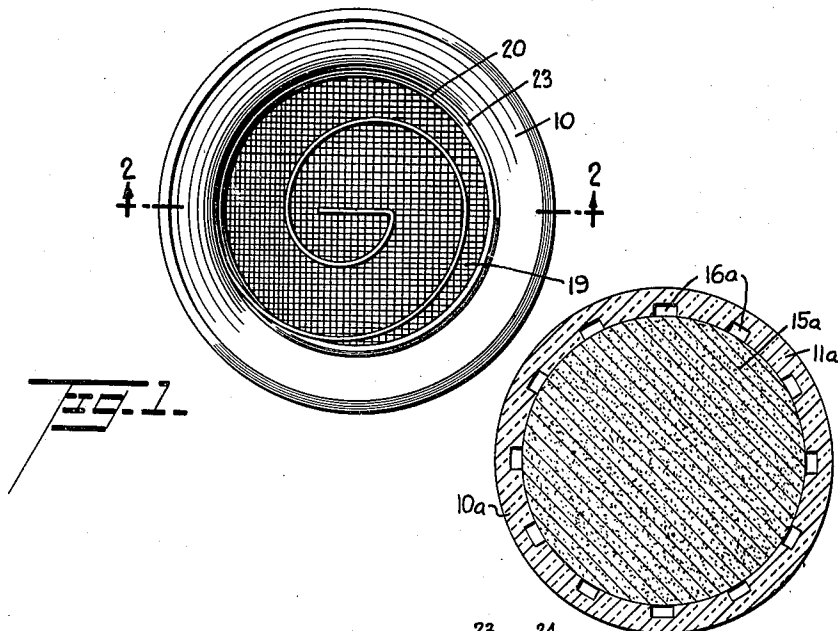
G. P. SCHMITT

2,286,231

CATALYST UNIT FOR LIGHTERS

Filed July 18, 1939

2 Sheets-Sheet 1



INVENTOR.
GEORGE PHILIP SCHMITT.
BY *Maxwell E. Spaw*
ATTORNEY.

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G. P. SCHMITT

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CATALYST UNIT FOR LIGHTERS

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2 Sheets-Sheet 2

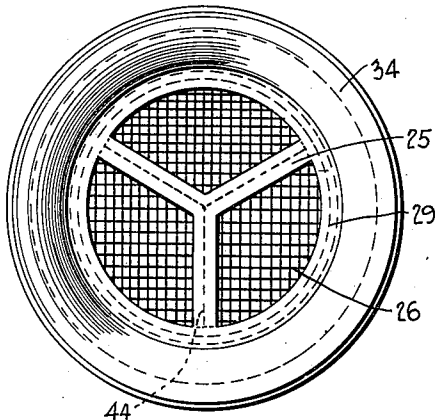


FIG. 6.

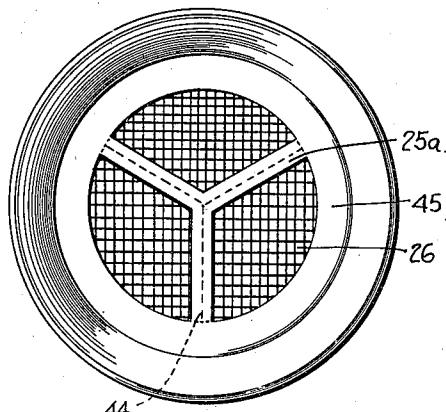


FIG. 8.

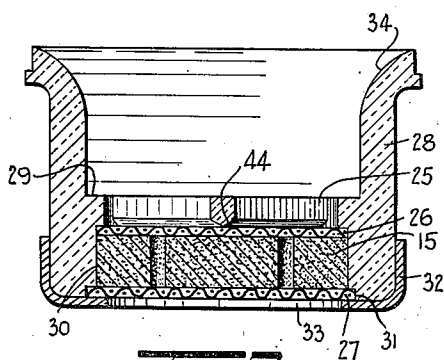


FIG. 7.

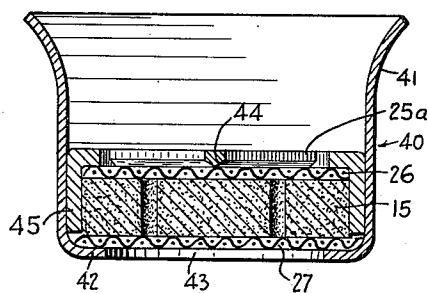


FIG. 9.

INVENTOR.
GEORGE PHILIP SCHMITT.

BY

Maxwell E. Sparrow

ATTORNEY.

UNITED STATES PATENT OFFICE

2,286,231

CATALYST UNIT FOR LIGHTERS

George Philip Schmitt, New York, N. Y., assignor, by mesne assignments, to Cardinal Products, Inc., a corporation of New York

Application July 18, 1939, Serial No. 285,129

5 Claims. (Cl. 67—7)

This invention relates to lighters which employ a catalyst for igniting cigarettes and the like, wherein the vapor of alcohol or other vaporizable liquid is employed for effecting such reaction upon the catalyst, in the presence of air, as will render such catalyst incandescent, so that a cigarette or the like applied thereto and drawn upon, may be ignited. More particularly this invention has reference to improvements in the catalyst unit consisting of the catalyst and parts associated therewith for adapting it to form the constituent of the catalytic lighter.

Lighters of this character, exemplified in United States Letters Patent No. 2,005,477 and No. 2,005,478, both dated June 18, 1935, provide mica or metallic disc protective covering means for the catalyst. As set forth in these patents catalytic lighters operate on the principle that platinum black or other catalytic compound can be made incandescent under the influence of vapor of certain volatile liquid in the presence of atmospheric air. The temperature resulting from the heat produced by the chemical reaction of the vaporizable fuel and air mixture in the presence of the catalyst is sufficiently elevated to ignite the cigarette when applied to or near the catalyst, and drawn upon.

The catalyst is contained in a holder, and positioned above and below the catalyst in the holder are perforated discs. Patent No. 2,005,478 discloses a thin, perforated disc, which may be of mica, positioned beneath the catalyst, through which the vaporizable fluid may pass for coaction with the catalyst; and a thin, perforated metallic disc used as a shield or front covering for the catalyst which enables a cigarette applied thereto to be quickly ignited, and at the same time protects the catalyst which may be in the form of spongy platinum composition, from rupturing while in use. It was found that the greater degree of stiffness in a metallic disc, over that possessed by a mica disc and the finer the mesh (to a limited extent) render the metallic disc a more efficient guard.

In the presence of a platinum catalyst, water results from the chemical action of vaporizable fuel and air (the fuel, being for example, alcohol vapor), and the catalytic action taking place in the lighter causes chemical reaction between the various elements. Experience has taught that in dealing with a catalyst employed for lighting purposes (which is a very delicate instrumentality) its efficiency is greatly impaired by permitting oxidation to take place. In fact, in a great many instances, lighters of the prior art refused

to function as a result of such oxidation. For these reasons it has been found by experiment, that it is necessary to provide a covering or shield for the catalyst which will resist oxidation and withstand high strength at elevated temperatures and resist chemical attack; and therefore, act as a vehicle to prevent the formation of moisture upon the catalyst—the nerve center of the lighter—and further to preheat the mixture of fuel and the catalyst for its next use and operation.

It is, therefore, one of the features of this invention to provide the catalyst with a cover or shield made of a metal or alloy that offers a high resistant to corroding influences, resistance to high temperatures, and withstands attack by chemical reagents.

It is known that chromium not only increases the immunity to corrosion, but, at the same time, improves the mechanical properties of the material containing the same in several important respects.

The heretofore used screens or covers for the catalyst, after the lighter had been in use, but a few times, became impaired or disintegrated under the high heat and on account of oxidizing, with the result that holes appeared in the screen large enough to cause parts of the catalyst to fall out of the holder, since the catalyst is but a ceramic mass made of compressed platinum black. By reason of the fact that the catalytic material and the screen above it covers a comparatively small area the screen becomes very hot and if not made of the proper material besides oxidizing and disintegrating, cannot withstand the intense heat. The material to be selected as a screen for the catalyst has to stand immense heat developed by the catalytic material as well as resist oxidation over a period of time.

It has been found that by making the catalyst cover or shield of nickel-chromium an instrumentality is produced which takes advantage of the excellent combination of oxidation resistance and high strength at elevated temperatures of nickel-chromium, and which, therefore, admirably withstands the influences brought about by the chemical action of the vaporizable fuel and air in the presence of the catalyst. The use of this alloy causes the moisture to dry out and the catalyst to be preheated for next use keeping the fuel near the catalyst in a vaporized condition, thereby increasing its efficiency.

It is, therefore, another object of the present invention to make the catalyst cover or shield of nickel-chromium material.

The area of the cover or shield for the catalyst and to which the tip of the cigarette is applied, is relatively small. Where a wire screen is employed as the cover or shield this necessarily limits the size of wire which may be used. This screen cover is preferably woven of fine wire to provide very fine meshes for securely keeping the catalyst element, which is susceptible to crumbling under pressure, from straying out of its confined space in tiny fragments, as might be the case if the meshes are coarser, to facilitate the ignition of the cigarette by minimizing the heating mass of the screen, and to prevent foreign matter from coming in contact with the catalyst. It is readily understood that by reason of the limited area of the screen cover and by further reason of the advisability of employing a finely-meshed screen cover or shield, for the catalyst, a selection of the proper material becomes of still greater importance.

It is a further object of the present invention to provide a cover or shield for the catalyst element having a mesh of sufficient fineness as to prevent minute fragments of the catalyst from escaping therethrough and foreign matter from being entrapped in the meshes.

It is a further object of the present invention to provide a guard above the screen shield covering the catalyst to safeguard against too much pressure being applied by the cigarette upon the catalyst and screen while the cigarette is being lighted. The screen being flexible, if too much pressure is exerted by the cigarette against the screen, the latter in turn will press against the catalyst and may injure the same. The guard prevents such injury.

It is still a further object of the present invention to provide slots in the catalyst pill cup for permitting the fuel vapors contacting the circumferential wall of the catalyst pill.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid and other objects in view, the invention consists in the novel selection, combination and arrangements of parts and materials hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated in the annexed drawings, wherein like parts are designated by the same reference characters or numerals throughout several views, and in which:

Fig. 1 is a top plan view of a holder with the catalyst and its associated elements.

Fig. 2 is a vertical sectional view taken through line 2-2 of Fig. 1.

Figs. 3 and 4 are views showing guards in modified forms employable in the invention.

Fig. 5 is a horizontal sectional view through a catalyst pill cup and pill showing the same in their respective relation and further showing vapor passage flutes in the cup.

Fig. 6 is a top plan view of a combined cup and guard.

Fig. 7 is a vertical sectional view of Fig. 6.

Fig. 8 is a top plan view of a catalyst holder and associated elements in another form.

Fig. 9 is a vertical sectional view of Fig. 8.

In the form of the invention shown in Figs. 1 and 2, the catalyst which may be a perforated block, pill or pellet of spongy platinum composition is contained in a suitable cup or holder. Beneath the catalyst is a wire screen preferably made of an alloy of nickel and copper, an example of which is known as "Monel" metal and

above the catalyst is located the top cover to shield the catalyst, which is in a form of a wire screen preferably made of an alloy of nickel and chromium, an example of which is known as "Nichrome." A retainer guard ring preferably made of an alloy of nickel and copper permanently locates the top covering and the catalyst in the cup or holder. Since nickel alloys of the "Monel" type are fairly resistant to scaling and oxidation at elevated temperatures, it has been found practical to make the lower screen and the retainer ring of such alloy. The wire screens above and below the catalyst are preferably woven of fine wire to provide very fine meshes, say, for example, 40,000 meshes per square inch with a thickness of wire of .002 inch.

The purposes of such finely meshed or perforated plate are to securely keep the catalyst element, which is susceptible to crumbling under pressure, from straying out of its confined space in tiny fragments, as might be the case if the meshes are coarse, to facilitate the ignition of a cigarette or the like by minimizing the heating mass of the screen, and to prevent foreign matter from coming in contact with the catalyst.

In Figs. 1 and 2 there is disclosed a cup or holder 10 preferably made of suitable plastic material which will glow upon heating of the catalyst. This holder has a parallel side-wall section 11 and a flared side-wall section 12 continuous therewith. The cup 10 is provided with a bottom portion 13 having a relatively large opening 14. Seated on the annular flange 22, surrounding opening 14 of bottom 13 is a wire screen or perforated disc 17 of suitable mesh and made preferably of an alloy of nickel and copper, such, as for example, what is generally known in the trade as "Monel" metal.

Above screen 17 is located the catalyst which is here shown as being in the form of a pellet, block or disc 15 and which may be composed of a suitably spongy platinum composition or the like. The catalyst may be provided with a plurality of perforations 16. Above catalyst 15 is located the protective top covering or shield 19 for the catalyst, which may be in direct contact with the latter.

Covering 19 is a perforated disc or plate or wire screen of suitable mesh and made preferably of an alloy of nickel and chromium, which may be in the proportion of about 80% nickel and 20% chromium, and which may further be of the type known in the trade as "Nichrome." The covering 19 and catalyst 15 are held in place by means of a retainer ring 20 preferably made of wire of metal alloy known as "Monel," or the like. This retainer ring 20 is sprung into place and thereby keeps the upper and lower wire screens with the catalyst in between, in their proper places. Above the retainer ring 20 and the opening 21 formed by the retainer ring 20 is a cigarette rest or guard 23. This guard may be in any suitable form of which are shown in Figs. 1, 3 and 4 and indicated respectively by the numerals 23, 23a and 23b. Guard 23 will prevent the cigarette from contacting directly the wire screen 19. The object in using these alloys is, that they withstand high heat, have mechanical endurance and offer resistance to oxidation and chemical attack as the two screen members are heated considerably during use of the lighter.

In Fig. 5 there is shown a modification in the form of a solid pellet 15a, the vapor passages being in the form of flutes 16a in the side-wall 11a of the cup or holder 10a. The purpose of

this modification is to overcome a possible weakness within the pellet caused by perforations or similar passages therethrough.

The embodiments of Figs. 6-9, inclusive, show the guard or cigarette rest 25 as being a solid member preferably in three-leg arrangement as shown. In this case the contacting of the cigarette with the catalyst for lighting purposes will not permit the cigarette to exert any pressure upon the wire screen 26 and therefore, upon the catalyst preventing crushing or other injuries to the catalyst 15.

As illustrated in Figs. 6 and 7, the cup or holder 28 is made preferably of translucent material thereby causing the same to glow when the catalyst is made incandescent as hereinbefore stated.

The guard 25 forms a shoulder 29 which acts as a rest for the edge of the cigarette. By reason of the guard 25 being integral with the cup 28 it will be found necessary to insert the pellet 15 with its top covering screen 26 and the lower screen 27 into the opening 30 of the cup 28 through the bottom of the cup. The lower screen 27 is preferably made slightly larger in diameter relative to the pellet 15 thereby fitting into an enlarged groove 31. The pellet 15 and the upper and lower screen 26 and 27 are held in their respective places by retainer ring 32, having a large central opening 33 for the passage of the fuel vapors. The cup 28 is preferably flared at its upper edge to facilitate the entrance of the cigarette for lighting purposes. It is understood that the holder or cup 28 may be made of metal.

In Figs. 8 and 9, the cup or holder 40 is flared at its upper edges as at 41 and has a turned in bottom 42 forming a shoulder for the support of the catalyst unit. Large opening 43 is provided in the bottom 42 for the passage of the vapors. In this modification the guard 25a is made integral with the retainer ring 45 which is employed to retain the upper and lower screens 27, 26 and the pellet 15 therebetween in their proper relation. As shown at 25, 25a the bottom portions of the guard legs are tapered as at 44 thereby providing edge contact only with the upper screen 26, the purpose mainly being to avoid blocking of the fuel passages.

This application is a continuation in part of copending application Serial No. 55,150, filed December 19, 1935.

From the foregoing description taken in connection with the accompanying drawings, it is apparent that improved simple, practical and inexpensive devices for the purpose intended are provided. It is apparent, however, that immaterial changes and modifications may be made by skilled persons without departing from the true spirit and scope of the invention as outlined in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a lighter employing vaporizable fuel and

a catalyst for coaction therewith, a holder enclosing said catalyst, a pair of heat and corrosion resisting members disposed at opposite sides upper and lower, respectively, of said catalyst, each of said members comprising a wire screen having closely woven wires the meshes of which being sufficiently fine as to prevent minute fragments of said catalyst from escaping therethrough and foreign matter from being entrapped in said meshes, said upper member being made of a composition of nickel and chromium, and means for retaining said upper member in said holder.

2. In a lighter employing vaporizable fuel and a catalyst for coaction therewith, a holder enclosing said catalyst, a heat and corrosion resisting member disposed above said catalyst, and a guard above said member with which the tip of a cigarette or the like may engage for ignition by said catalyst, said guard having tapering walls substantially merging in an edge adjacent the upper face of said member, said member being made of a composition of nickel and chromium.

3. In a lighter employing vaporizable fuel and a catalyst made incandescent by coaction therewith, a holder enclosing said catalyst, a heat and corrosion resisting member disposed over said catalyst, said holder being made of a material capable of glowing when the catalyst is made incandescent, said member being made of nickel and chromium.

4. In a lighter employing vaporizable fuel and a catalyst for coaction therewith, a holder enclosing said catalyst, a heat and corrosion resisting member disposed above said catalyst, said member comprising a wire screen having closely woven wires the meshes of which being sufficiently fine as to prevent minute fragments of said catalyst from escaping therethrough and foreign matter from being entrapped in said meshes, said member being made of a composition of nickel and chromium, means for retaining said member in said holder, and a guard above said member with which the tip of a cigarette or the like may engage for ignition by said catalyst, said guard extending over the face of said screen.

5. In a lighter employing vaporizable fuel and a catalyst for coaction therewith, a holder enclosing said catalyst, a pair of heat and corrosion resisting members disposed at opposite sides upper and lower, respectively of said catalyst, each of said members comprising a wire screen having closely woven wires the meshes of which being sufficiently fine as to prevent minute fragments of said catalyst from escaping therethrough and foreign matter from being entrapped in said meshes, said upper member being made of a composition of nickel and chromium, said holder having a circumferential edge surrounding said catalyst, said edge being recessed to permit passage of the fuel to the adjacent wall of said catalyst.

GEORGE PHILIP SCHMITT.