

June 5, 1934.

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1,961,695.

FLUE SPARK SCREEN

Filed Feb. 2, 1933

2 Sheets-Sheet 1

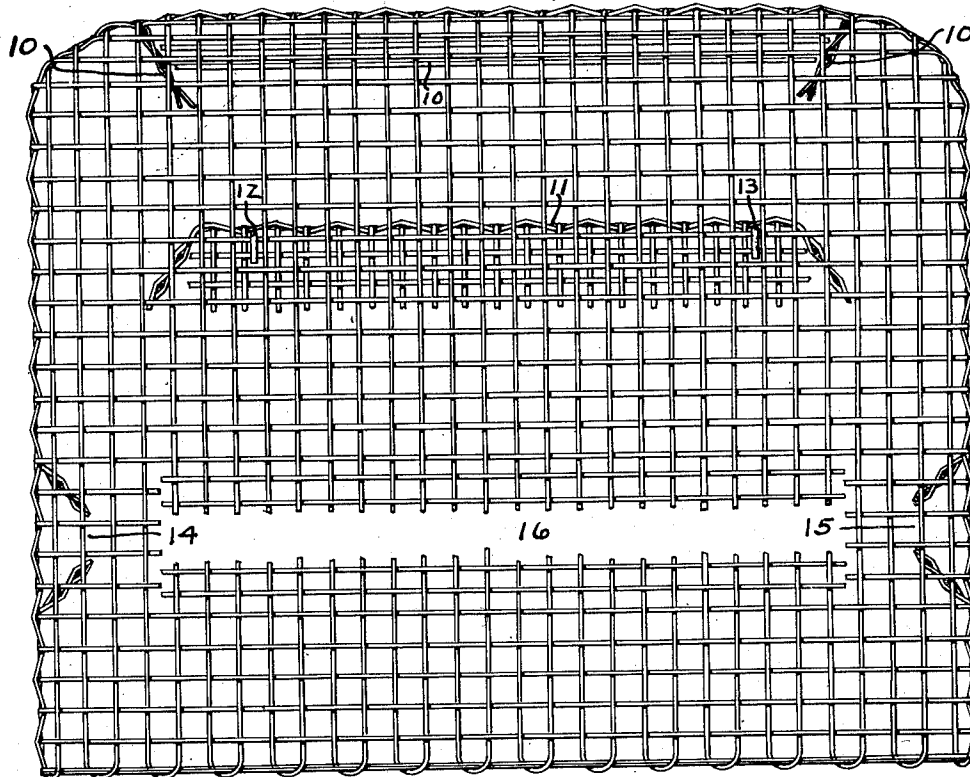


Fig. 1.

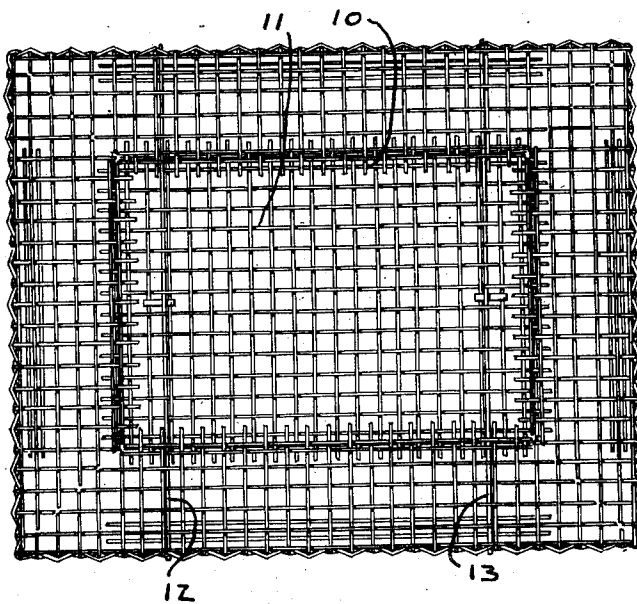


Fig. 2.

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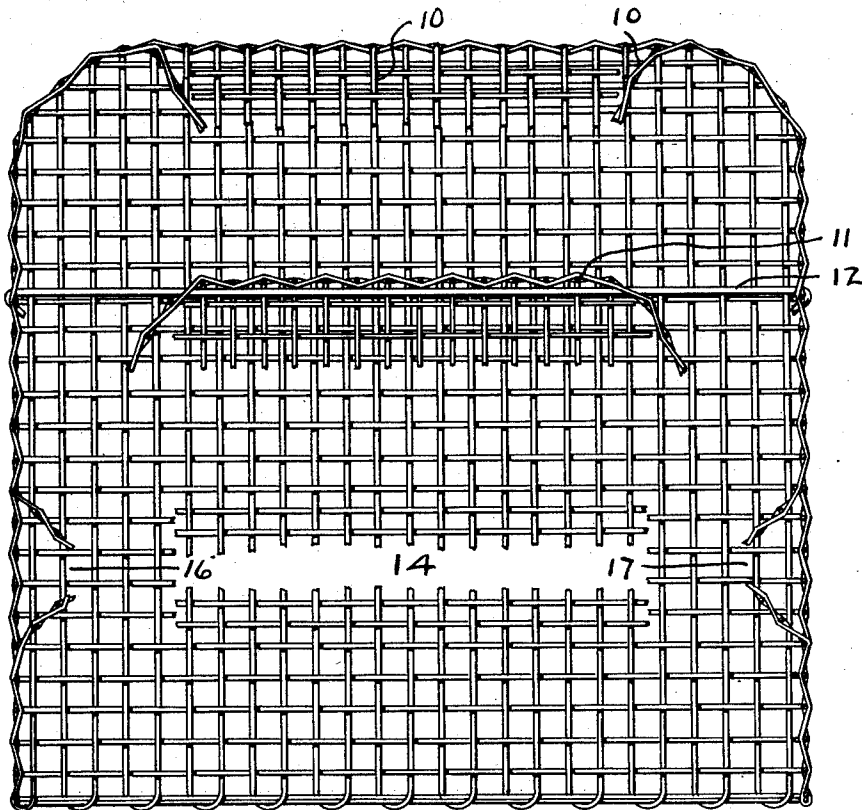


Fig. 3.

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UNITED STATES PATENT OFFICE

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FLUE-SPARK SCREEN

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8 Claims. (Cl. 183—97)

This invention relates to the art of screens to be employed over the tops of flues and chimneys for the purpose of eliminating fire hazard due to sparks escaping from such flues and chimneys.

5 In burning soft coal, much soot usually collects in the flue and smoke passages leading from the furnace to the flue and it is a frequent occurrence that this collected soot becomes ignited and burns with considerable intensity. As the soot burns, additional heat is
10 thereby generated in the flue, and accordingly the flow of air through the flue rapidly increases and fans the burning soot with such force as to tear loose large flakes and particles of the
15 soot and carry them up and out of the top of the flue with the result that there is present a great fire hazard particularly in the case of wood shingles being employed on the roof adjacent the chimney. These large burning chunks
20 of soot continue to burn until consumed after dropping onto the roof. Also, it frequently occurs that papers and trash are to be burned, in which case, pieces of burning paper will be lifted and carried up through the flue to blow
25 about and drop back onto the roof adjacent the chimney.

If these large chunks of burning soot or scraps of burning paper or the like may be held back and prevented from discharging from the flue
30 for a time interval until they are burned out or broken up, the fire hazard would be greatly reduced. Tiny particles of burning soot escaping from the flue will either burn up or the combustion stop before they fall to the roof, or even
35 if they do fall to the roof while still burning, the heat generated by each particle is so limited and easily dissipated that the wood in contact therewith is not raised to the kindling temperature by the time the combustion of the particle is
40 completed or stopped by the cooling off of the isolated particle.

In forming a spark arrestor, it is necessary that any device applied to the flue must not interfere with the normal draft. A difficulty
45 heretofore encountered, particularly as applied to residence or low draft flues, has been that the devices would become clogged with soot or lined with paper scraps so that eventually, the flue draft would be so seriously reduced as to require the removal of the device. The problem,
50 therefore, in eliminating the fire hazard arising from soot burning in the flue and from trash burning, is to provide some structure that will retain burning masses until either consumed,
55 extinguished, or broken up into small particles

and that will not cause a reduction of the draft in the flue by the filling in or the covering over of the structure by such masses.

It is a primary object of my invention to provide means for arresting the discharge of burning particles issuing from a flue until the particles are consumed or broken up into small masses less than that normally required to ignite wood. An important object of the invention is not only to arrest such burning particles as above
65 indicated, but to break up the larger particles and allow the smaller particles to escape without clogging up the device to a point affecting the flue draft.

A still further important object of my invention is to provide a total effective outlet opening which may never be reduced to less than that of the flue cross-section regardless of the amount of soot and the like leaving the flue. Other objects and advantages such as the extreme simplicity and relative low cost of production, will become apparent in the following description of my invention as illustrated in the accompanying drawings, in which

Fig. 1 is a side elevation of a structure embodying my invention;

Fig. 2, a top plan view of the structure on a reduced scale, and

Fig. 3, an end elevation.

Like characters of reference indicate like parts in the several views in the drawings.

In forming the structure, I employ some perforate or reticulated metal material which may be formed in a variety of ways such as the expanded metal used commercially in place of
90 wood laths as a plastering ground, or woven wire commonly known as wire cloth. It is preferable that the material employed be treated so as to be acid and weather resistant so that corrosion may be avoided over a long period of time. Preferably such treatment consists in porcelain
95 enameling the material.

In the form herein shown and described, the woven wire material is indicated and is preferably of a mesh not to exceed a half inch. The material is shaped into substantially a rectangular box-like form with the under side open and the upper corners rounded. The central
100 portion of the top side of the box is cut away to leave an opening therethrough bounded by a margin of the wire protruding inwardly and downwardly with the edge therearound presenting a plurality of spaced apart spikes for the purpose of impaling and tearing up the sparks or pieces of burning soot. This inwardly
105 110

and downwardly turned marginal portion is indicated by the numeral 10 in the drawings.

Spaced downwardly from the top of the box is located a stop 11 formed from a perforate material, here shown as being woven wire of the same nature as that of the material forming the outer box. This stop has the same outer marginal conformation as that of the top opening through the box but is formed to have down and outwardly turned marginal flanges which extend under but in spaced relation below the marginal portion 10 above indicated as shown in Figs. 1 and 3. The stop 11 is here shown having its major portion substantially flat and horizontally disposed with the flanges extending outwardly and downwardly therefrom. This stop 11 while having the flanges projecting beyond the inner ends of the marginal portion 10, terminates from the respective sides and ends of the box to provide an opening therebetween entirely around the stop. The flanges carried by the stop 11 are provided with spike-like members extending therefrom. The stop 11 is supported in the position above indicated by any suitable detachable means, here shown, for example, as by the cross members 12 and 13, which are provided at their ends with short open hooks, and which extend laterally across under the major portion of the stop 11 to be carried by their ends, detachably connected to the sides of the box, permitting the removal or renewal of the stop when destroyed or rendered ineffective through the action of the heat and flue gases.

Spaced below the stop 11 and above the lower edges of the walls forming the box, are openings through the respective sides and ends here shown as being formed by making horizontal cuts through the walls and bending portions of the walls adjacent the cuts inwardly so as to provide inturned flanges or guards, one above and one below each of the openings. The degree of bending of these portions determines the size of the opening through the walls of the box. The horizontal margins of the inturned wall portions carry a plurality of spaced apart projecting spikes for the purpose of impaling and tearing up the sparks or pieces of burning soot. In the drawings the end openings are designated by the numerals 14 and 15 while the side openings are designated by the numerals 16 and 17. The area of these openings may be varied to meet different draft conditions by the degree of bending of the guards above and below the openings.

In use, the structure above described is mounted over the flue, (not shown) so that the total discharge from the flue is received through the lower opening into the structure. Assuming that particles of soot are coming from the flue, these particles are carried up by the draft to within the structure to have the majority of them strike the under side of the stop 11 where the smaller particles may pass on through and such major particles as are not broken up by the impact against the stop to permit their fragments to go on through, are retained in the main by the force of the draft against the under side of the stop until these larger particles are either burned out completely or are reduced in size by burning to permit them to go on through. The holes through the side walls of the structure as well as through the stop 11 are purposely selected to be of that size which will permit only those particles of soot going through as are so small that they would be completely consumed

or would stop burning when they struck the roof of the building adjacent the chimney, the combustion being complete or stopped before the kindling temperature of the roof was reached. That is, no harm is done in permitting these smaller sparks of this nature to escape.

Those particles of soot which may not cling to the under side of the stop 11 as above indicated may be carried around under the marginal flanges of the stop 11 by the draft, but by reason of the angularity of these flanges, and the spiked edges such particles are torn to pieces or deflected downwardly and toward the side walls or ends of the structure. The upper guards about the openings through the walls and ends prevent such particles from passing directly therethrough. The tendency of the draft from the flue is to carry the particles around against the outer walls above these openings to cause the particles to strike the side walls and impaling spikes a number of times as they are carried up therealong. The upper curved corners of the structure direct these particles inwardly and by reason of the marginal portion 10, such particles are further directed downwardly in the direction of the top side of the stop 11. By the time these particles have been driven against the side walls and rebounded therefrom to be again carried back against the walls, the particles are reduced in size by the time they pass out from under the periphery of the marginal portions 10 so that they may be permitted to safely escape through the central opening in the top of the structure.

Such particles of soot as may come from the flue and travel upwardly adjacent the side walls and ends are deflected away therefrom initially by the under guards about the openings through the side walls so as to deflect such particles back into the main path to cause them to strike principally against the under side of the stop 11.

Conditions are sometimes encountered where the soot will build up in the structure to such an extent as to fill in the perforations through the walls and even at times to fill in the passageways between the walls and the stop 11 so that the draft in the flue would be considerably affected were some other means not provided to take care of this situation. It is for this purpose that the openings 14, 15, 16, and 17 are provided so that even though the perforations in the walls become clogged and the upper structure closed off by filling in of the soot, the draft is not interfered with since the gases may escape through the side openings indicated. The soot will in time, of course, clean itself under the action of wind or rain or may even burn out from the heat in the flue.

It is thus to be seen that I have provided a very simple structure which has a minimum number of parts and which may be readily manufactured to sell at a comparatively low price. While the structure is exceedingly simple, it is effective for the purpose intended.

While I have here shown the structure in the one best form now known to me, it is obvious that structural changes may be made without departing from the spirit of the invention and I therefore do not desire to be limited to that precise form beyond the limitations as may be imposed by the following claims.

I claim:

1. A spark arrestor comprising a foraminous receptacle open on the under and top sides and having an in and downturned marginal flange portion around the top opening, a stop spaced

below the upper side formed to leave an opening therearound between its marginal edge and the walls of the receptacle, a down and out-turned flange projecting from the stop to form by its outer edge the marginal edge of the stop, and having horizontally aligned slit-like openings through the walls of the receptacle below the stop.

2. A spark arrestor comprising a foraminous receptacle open on the under and top sides and having an in and downturned marginal flange portion around the top opening, a stop spaced below the upper side formed to leave an opening therearound between its marginal edge and the walls of the receptacle, a down and out-turned flange projecting from the stop to form by its outer edge the marginal edge of the stop, and having horizontally aligned slit-like openings through the walls of the receptacle below the stop, and inturned guards above and below said wall openings, the guards below the openings being directed inwardly and upwardly toward the under side of said stop and the guards above the openings being directed downwardly and inwardly over the lower guards.

3. A spark screen comprising an outer foraminous receptacle having openings at both top and bottom, a horizontally disposed stop spaced between the receptacle openings with a marginal opening around the stop between it and the receptacle, and marginal out and down turned flanges extending from the stop, said receptacle being provided with slot-like openings through its wall below the stop.

4. A spark screen comprising a foraminous receptacle with top and bottom openings, and a stop carried within the receptacle in spaced relation from the top and bottom ends and the sides of the receptacle, means for directing sparks from under the stop downwardly and outwardly against the sides of the receptacle, and means above the stop for directing sparks passing around the stop back down against the top side of the stop, said receptacle being provided with relief openings through its wall below the stop, means below the relief openings for directing sparks inwardly under the stop, and means above the relief openings for directing down coming sparks away from said means below the relief openings.

5. A spark screen comprising an outer foraminous receptacle having openings at both top and bottom, a horizontally disposed stop spaced between the receptacle openings with a marginal opening around the stop between it and the receptacle, and marginal out and down turned flanges extending from the stop, said receptacle being provided with slot-like openings through its wall below the stop, and spikes extending from both of said flanges within the planes of the respective flanges.

6. A spark arrestor comprising a foraminous receptacle open on the under and top sides and having an in- and downturned marginal flange portion around the top opening, a stop spaced below the upper side formed to leave an opening therearound between its marginal edge and the walls of the receptacle, a down and out-turned flange projecting from the stop to form by its outer edge the marginal edge of the stop, and having horizontally aligned slit-like openings through the walls of the receptacle below the stop, and spikes extending from both of said flanges within the planes of the respective flanges.

7. A spark arrestor comprising a foraminous receptacle open on the under and top sides and having an in and downturned marginal flange portion around the top opening, a stop spaced below the upper side formed to leave an opening therearound between its marginal edge and the walls of the receptacle, a down and out-turned flange projecting from the stop to form by its outer edge the marginal edge of the stop, and having horizontally aligned slit-like openings through the walls of the receptacle below the stop, and inturned guards above and below said wall openings, the guards below the openings being directed inwardly and upwardly toward the under side of said stop and the guards above the openings being directed downwardly and inwardly over the lower guards, and spikes extending from both of said flanges and from said guards, the spikes in all instances being in the planes of the members from which the spikes extend.

8. A spark screen comprising a foraminous receptacle open at the top, a stop carried in the receptacle in adjustable relation with the top opening, said receptacle having side wall openings, and guards about said side openings.

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