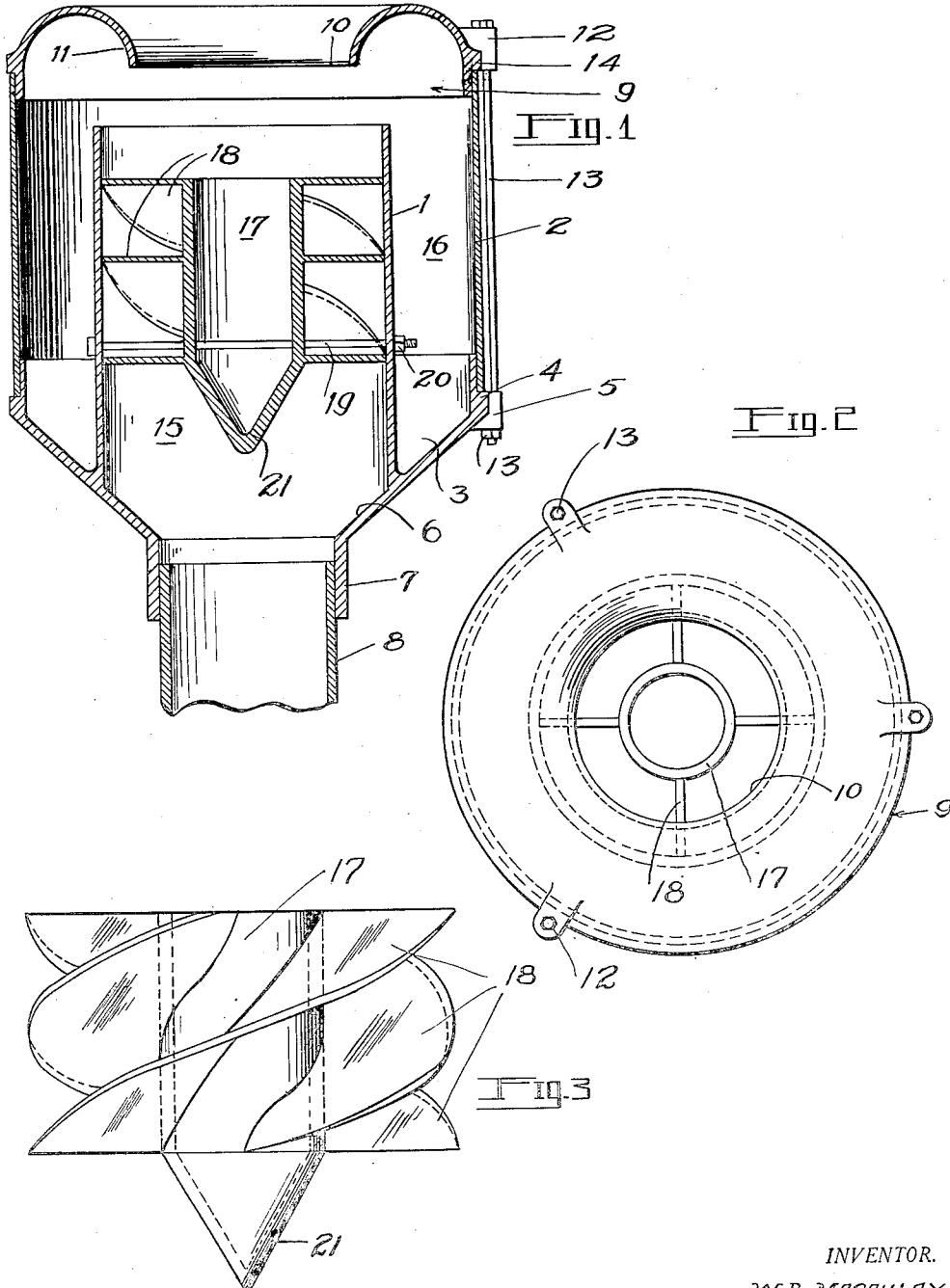


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SPARK ARRESTER.
APPLICATION FILED JULY 31, 1919.

1,362,025.

Patented Dec. 14, 1920.



Witness:
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SPARK-ARRESTER.

1,362,025.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WALTER B. MACAULAY, a citizen of the United States, and a resident of Marysville, county of Yuba, and State of California, have invented a new and useful Spark-Arrester, of which the following is a specification.

This invention relates to improvements in spark arresters and resides in the provision of a device of this character which will operate in a reliable and efficacious manner to prevent sparks from being carried out of a flue or chimney along with the combustion gases and setting fire to any inflammable material upon which the sparks might alight.

An object of the invention is to provide a spark arrester which will be relatively simple as to construction, inexpensive, capable of being readily attached to a chimney or flue, and which will separate the sparks from the gases of combustion by centrifugal action and cause the sparks to be collected in a chamber forming a part of the invention, there being provided novel means to cause the products of combustion to be given a whirling action as it passes through the arrester.

Another object of the invention is to provide a spark arrester of the character described which is constructed so that it may be easily cleaned without removing the device from the flue or chamber and which is compact, durable and of a pleasing ornamental appearance as well.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description, where I shall outline in full, that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings I have shown one form of the device of my invention, but it is to be understood that I do not limit myself to such form, since the invention, as expressed in the claims may be embodied in a plurality of other forms.

Referring to the drawings:

Figure 1 is a vertical sectional view of the spark arrester of my invention shown attached to a flue.

Fig. 2 is a top plan view of the arrester.

Fig. 3 is a side elevation of the means for producing a whirling motion of the products of combustion.

The invention preferably comprises an inner flue chamber and an outer spark receiving chamber which latter surrounds the former and receives the sparks which are thrown from the inner chamber by centrifugal force such as produced by a whirling motion given to the products of combustion as said products pass through the inner chamber. The outer chamber is closed at its upper end above the open upper end of the inner chamber save for an opening which is smaller than the diameter of the inner chamber and directly over the latter. There is provided means to cause the products of combustion to be given a rotary or swirling motion in passing through the inner chamber and the centrifugal action thus set up upon the heavier particles such as the sparks cause the latter to be thrown from the inner chamber into the outer or spark receiving chamber in a zone spaced from that through which the free gases pass in entering and discharging through the opening of the upper end of the outer cylinder, thus the sparks are separated from and do not pass out of the opening in the upper end of the outer chamber with the gases but are caused to be deposited in the outer chamber and are there collected in the bottom of such chamber.

In carrying out the invention I employ an inner cylinder 1 of metal or other fire proof material and this cylinder is surrounded by a similar but larger outer cylinder 2 which is spaced circumferentially from the cylinder 1 and extends above the upper end thereof. The inner cylinder is formed on its outer wall adjacent its lower end with an annular cup 3 which extends into and closes the lower end of the cylinder 2 there being an annular flange 4 on the outer wall of the cup and the lower edge of the outer cylinder rests on said flange. A series of apertured ears 5 are formed on the outer side of the cup 3.

The lower end of the cylinder 1 is restricted as at 6, that is, is preferably made frustoconical, and terminates in a cylindrical collar portion 7 for coöperation with the flue 8.

A closure cap rim 9 is mounted on the upper end of the cylinder 2 and is provided with a relatively small central opening 10, the opening being somewhat smaller in diameter than the diameter of the inner cylinder 1 and is directly over the upper end of

the latter. The closure 9 is trough shaped in cross section, inverted and provided with a central frustum 11 through which the opening 10 is formed thus the surface thereof of opposite to the cylinders is curved so as to act as a deflector for the sparks and prevent their escape through the opening 10. Apertured ears 12 are formed on the cap rim 9 and bolts 13 pass through the ears 12 and the ears 5 on the cup 3, having nuts 13' turned on their lower ends, thus securing the cap in place and holding the cylinders in assembled relation. The cap rim extends a short distance into the outer cylinder and has an external annular flange 14 which engages the upper end of said cylinder.

The arrangement of the cylinders 1 and 2 provides the inner flue chamber 15 and the outer spark receiving chamber 16.

Mounted within the inner flue chamber is means for causing the products of combustion to be given a rotating or swirling motion as they pass through said chamber and this means is mounted above the restricted lower end of the chamber. The restricted lower end of the chamber causes an acceleration of the up-flow and accentuates the swirling motion imparted to the products of combustion.

The means above mentioned comprises a core member 17 which is provided with spirally arranged vanes 18, the latter with the wall of the chamber forming a number of spiral passageways through which the products of combustion pass. The core 17 is disposed centrally within the inner cylinder 1 and the vanes contact with the wall of the cylinder. A bolt 19 is inserted through the cylinder 1 and through the core so as to hold the core and vanes in place, a nut 20 is turned on the bolt and access thereto may be had in the chamber 16. The vanes and core are spaced from the upper end of the chamber so as to leave a portion of the upper end to act as a guide for the sparks as the latter are thrown against said portion. The lower end 21 of the core 17 is extended below the vanes and is of conical form so as to break up or deflect the products of combustion and thereby cause said products to be more readily imparted a swirling motion and to increase the effectiveness of the centrifugal action on the sparks.

When the arrester is attached to a flue as shown in Fig. 1 the products of combustion enter the flue chamber 15, are broken up and deflected by the conical lower end 21 of the core and enter the passage-ways formed by the vanes 18 emerging with a swirling motion imparted thereto. The centrifugal force set up upon the sparks and solid particles of products of combustion causes the sparks and such particles to be thrown out upon the inside surface of the inner chamber and to be thrown from said chamber

out of the zone immediately below the opening 10 onto the curved wall of the cap 9. The curved wall will deflect the sparks downwardly to the bottom of the chamber. The cinders thus collected in the bottom of the chamber 16 may be removed as desired. By taking out the bolts 13, the cylinder 2 and cap 9 may be removed and the cinders may be readily removed from the cup 3.

I claim:

1. In a spark arrester a funnel shaped main portion having a collar attachable to a stack and having an inner upstanding cylindrical wall of larger diameter than the collar, and a cylindrical flange at the rim of the funnel; a shell seated on the rim about the funnel and extending above the said wall; a concave, overhanging deflecting cap rim on the shell top and having an inner diameter less than that of the wall; and a cylindrical core having a down-turned, tapered end above the bottom of the funnel portion and having helical blades spacing it from and positioning it in the wall.

2. In a spark arrester, a funnel shaped main portion having a collar attachable to a stack and having an inner upstanding cylindrical wall of larger diameter than the collar, and a cylindrical flange at the rim of the funnel; a shell seated on the rim about the funnel and extending above the said wall; a concave, overhanging deflecting cap rim on the shell top and having an inner diameter less than that of the wall; a cylindrical core having a down-turned, tapered end above the bottom of the funnel portion and having helical blades spacing it from and positioning it in the wall, and means passing through said wall and the core to secure the latter in place.

3. In a spark arrester, a funnel shaped main portion having a collar attachable to a stack and having an inner upstanding cylindrical wall of larger diameter than the collar, and a cylindrical flange at the rim of the funnel; a shell seated on the rim about the funnel and extending above the said wall; a concave, overhanging deflecting rim on the shell top and having an inner diameter less than that of the wall; bolts passing through the cap and to clamp the shell in place, and a cylindrical core having a down-turned, tapered end above the bottom of the funnel portion and having helical blades spacing it from and positioning it in the wall.

4. In a spark arrester, a funnel shaped main portion having a collar attachable to a stack and having an inner upstanding cylindrical wall of larger diameter than the collar, and a cylindrical flange at the rim of the funnel; a shell seated on the rim about the funnel and extending above the said wall; a concave, overhanging deflecting cap rim on the shell top and having an in-

ner diameter less than that of the wall; and a cylindrical core having a down-turned, tapered end above the bottom of the funnel portion and having helical blades spacing it from and positioning it in the wall, the funnel portion, its collar and the wall being integral.

5 In a spark arrester, a funnel shaped main portion having a collar attachable to a stack and having an inner upstanding cylindrical wall of larger diameter than the collar, and a cylindrical flange at the rim of the funnel; a shell seated on the rim about the funnel and extending above the said
10 wall; a concave, overhanging deflecting cap

rim on the shell top and having an inner diameter less than that of the wall; and a cylindrical core having a down-turned, tapered end above the bottom of the funnel portion and having helical blades spacing it from and positioning it in the wall, the core comprising a hollow body on which the blades are integrally formed.

In testimony whereof, I have hereunto set my hand at the city of Marysville, California, this 16th day of July 1919.

WALTER B. MACAULAY.

In presence of—
M. HARLEIL.