W. C. YEOMANS.

SPARK ARRESTER.

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1,038,707. Patented Sept. 17, 1912.

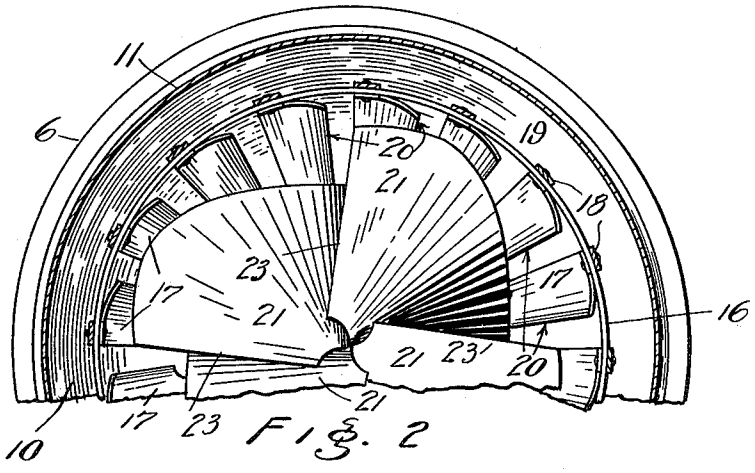

Fig. 2

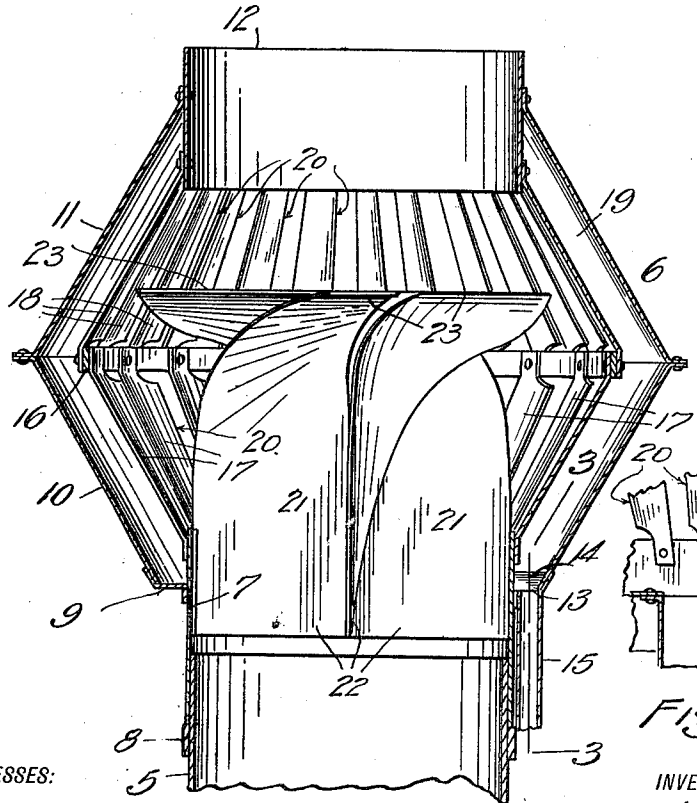

Fig. 1

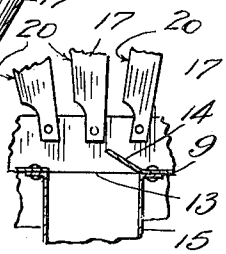

Fig. 3

WITNESSES:

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SPARK-ARRESTER.

1,038,707. Specification of Letters Patent. Patented Sept. 17, 1912.

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To all whom it may concern:

Be it known that I, WALLACE C. YEOMANS, a citizen of the United States, residing at Pe Ell, in the county of Lewis and State of Washington, have invented certain new and useful Improvements in Spark-Arresters, of which the following is a specification.

The object of my invention is the provision of an improved spark arrester which will serve to remove sparks and cinders from smoke prior to the emission of the same from a smoke-stack and without appreciably interfering with the draft.

The invention, generally stated, consists in employing within a smoke-stack a number of peculiarly shaped blades to impart a circulatory motion to the ascending smoke and thus cause the series of blade elements also provided within the stack to become operative and effect the eduction of the relatively heavy particles of cinders and partially burned fuel to within a collecting chamber therefor.

The invention further consists in the details of construction and combination of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a view partly in vertical section and partly in elevation of devices embodying my invention. Fig. 2 is a fragmentary horizontal section thereof. Fig. 3 is a detail sectional view through 3—3 of Fig. 1.

The reference numeral 5 designates the upper end of the smoke-stack proper and suitably secured thereto is a superposed shell 6. As illustrated, this shell is provided at its lower end with a sleeve 7 fitted over the exterior of the stack and may be supported upon a stack-collar 8. An annular shaped bracket flange 9 is secured to, or formed integral with, said sleeve and is connected at its outer periphery with the funnel shaped wall-plate 10. Fixedly secured about its lower peripheral edge to the upper peripheral edge of wall plate 10 is another funnel shaped wall-plate 11 inverted to converge upwardly and having its upper edge secured to the outer circumference of a short length of pipe 12 at a distance above the bottom edge of the latter to afford a portion of same projecting within the chamber interiorly of said wall plates. The axis of said pipe is arranged to be in alinement with the axis of the stack 5. The wall-plates 10 and 11 of the wall are imperforate, but the bracket flange 9 is provided with a discharge opening 13 for the delivery of cinders, etc., accumulated therein, and being directed thereinto during the operation of the invention through the agency of an inclined tongue 14 projecting upwardly, as represented in Fig. 3, from one end of an opening. Communicating with the opening 13 is a discharge tube 15. Positioned within said shell and medially of its height is a hoop 16 to which are secured the upper ends of a plurality of blades 17 whose lower ends are secured to the aforesaid sleeve 7. Also secured to the hoop are the lower end of a series of blades 18 whose opposite ends are secured to the pipe 12. The blades 17 and 18 are respectively disposed parallel to and in spaced relation to the shell plates 10 and 11 and constitute a fenestrated partition or the inner circular wall of a chamber 19. The several blades have their corresponding side edges 20 turned inwardly, as represented in Fig. 2. Interiorly of the space inclosed by said partition are guide vanes 21 which are fixedly secured together and to the sleeve 7. The lower portions 22 of the vanes are arranged to be radial or nearly so with respect to the stack axis and above are curved to assume somewhat spiral shapes to terminate in a substantially horizontal plane at their upper extremities 23. The upper portions of the vanes are advantageously made of greater width than the subjacent portions in order that they may extend into close proximity to the said partition.

The operation of the invention is as follows: The commingled combustion products, smoke and exhaust steam, as they ascend the stack, are influenced by the guide-vanes 21 to partake of a whirling motion with the result that the heavier particles of cinders and sparks are thrown outwardly by the ensuing centrifugal force to pass in a circular current about the inner periphery of the partition. In such travel, the inwardly protruding edges, or lips, 20 of the partition-blades 17 and 18 encounter the outer layer, so to speak, of the smoke column containing the cinders, etc., and divert the same through the interstices of the partition; while the central portion of the smoke column escapes through the pipe 12 unaccompanied by sparks or cinders. The mix-

ture of gaseous and solid combustion products impacts obliquely against the shell plates 10 and 11 resulting in the momentum of the solid components being overcome and their revolubly falling to the bottom of the chamber 19 whereat they are swept into the discharge tube 15 through the medium of the revolving current of smoke obtaining in said chamber and guiding effect of the opposing tongue 14 which is inclined upwardly in an opposite direction to the motion of the cinders.

What I claim, is—

1. In a spark arrester, the combination with a smoke-stack, a shell formed of two reversely arranged frusto-conical sections secured to the top of said stack, the maximum diameter of said shell being intermediate its height, two superposed series of blades, each of said series of blades being inclined similarly to the respectively adjacent section affording an annular space between said blades and shell, and a plurality of vanes arranged axially of said shell to effect a whirling motion to smoke passing upwardly through the shell.

2. In a spark arrester, the combination with a smoke-stack, of a sleeve adapted to fit over the exterior of the stack, a bracket flange secured to said sleeve and provided with a discharge opening, a pipe in axial alinement above said sleeve, a funnel-shaped plate secured to said flange, a conoidal plate secured to the above named plate and to said pipe, two superposed series of blades spaced respectively from said plates to afford an annular chamber therebetween, said blades being each curved to afford an inwardly protruding lip, and curved vanes fixedly secured to said sleeve for effecting a whirling motion to an ascending column of smoke and causing the same to be subject to the action of said blades.

3. In a spark arrester, the combination with a smoke-stack, of a sleeve adapted to fit over the exterior of the stack, a bracket flange secured to said sleeve and provided with a discharge opening, a pipe in axial alinement above said sleeve, a tongue blade extending in an inclined direction partly across said opening, a funnel-shaped plate secured to said flange, a conoidal plate secured to the above named plate and to said pipe, two superposed series of blades spaced respectively from said plates to afford an annular chamber therebetween, said blades being each curved to afford an inwardly protruding lip, and curved vanes fixedly secured to said sleeve for effecting a whirling motion to an ascending column of smoke and causing the same to be subject to the action of said blades.

4. In a spark arrester, the combination with a smoke-stack, of a sleeve adapted to fit over the exterior of the stack, a bracket flange secured to said sleeve and provided with a discharge opening, a funnel-shaped plate secured to said flange, a conoidal plate secured to the above named plate, a pipe secured to the smaller end of the last named plate and extending a distance therebelow, two superposed series of blades respectively secured to the sleeve and the pipe and spaced from said plates to afford an annular chamber therebetween, said blades being each provided with an inwardly protruding lip, and curved vanes fixedly secured to said sleeve for effecting a whirling motion to an ascending column of smoke and causing the same to be subject to the action of said blades.

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Witnesses:
AUGUST MAYER,
SILAS SAGE.