No. 887,893. PATENTED MAY 19, 1908.

P. M. & C. M. WICKSTRUM.

SPARK ARRESTER.

APPLICATION FILED DEC. 30, 1907.

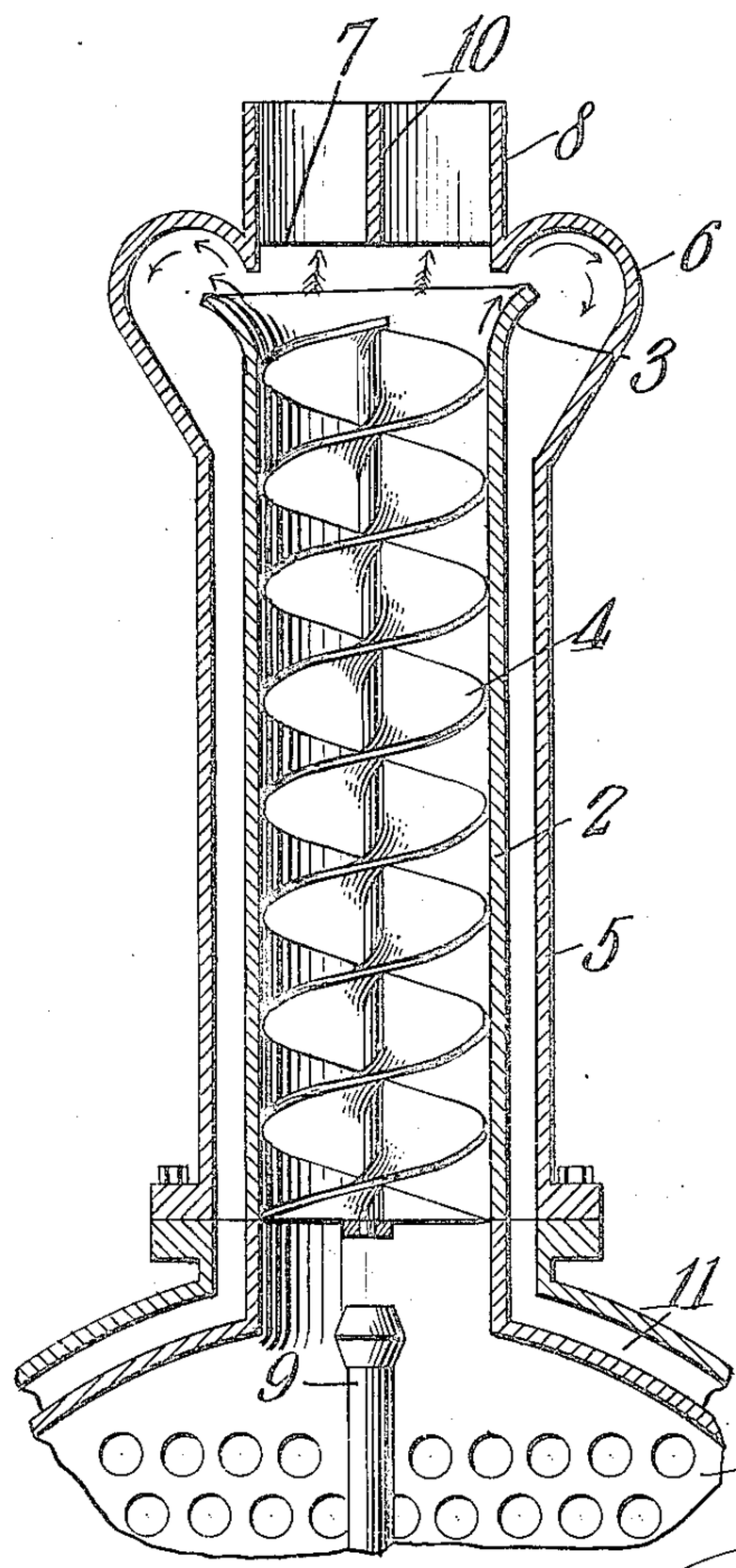

Fig. 1.

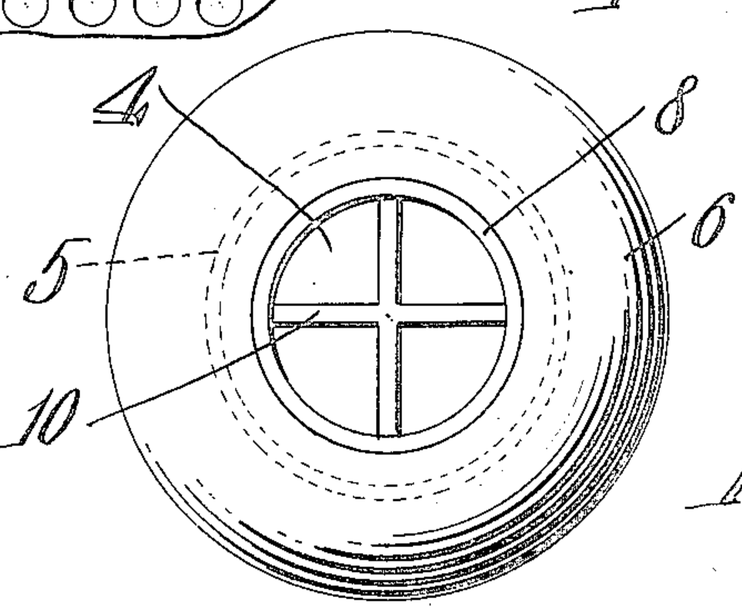

Fig. 2.

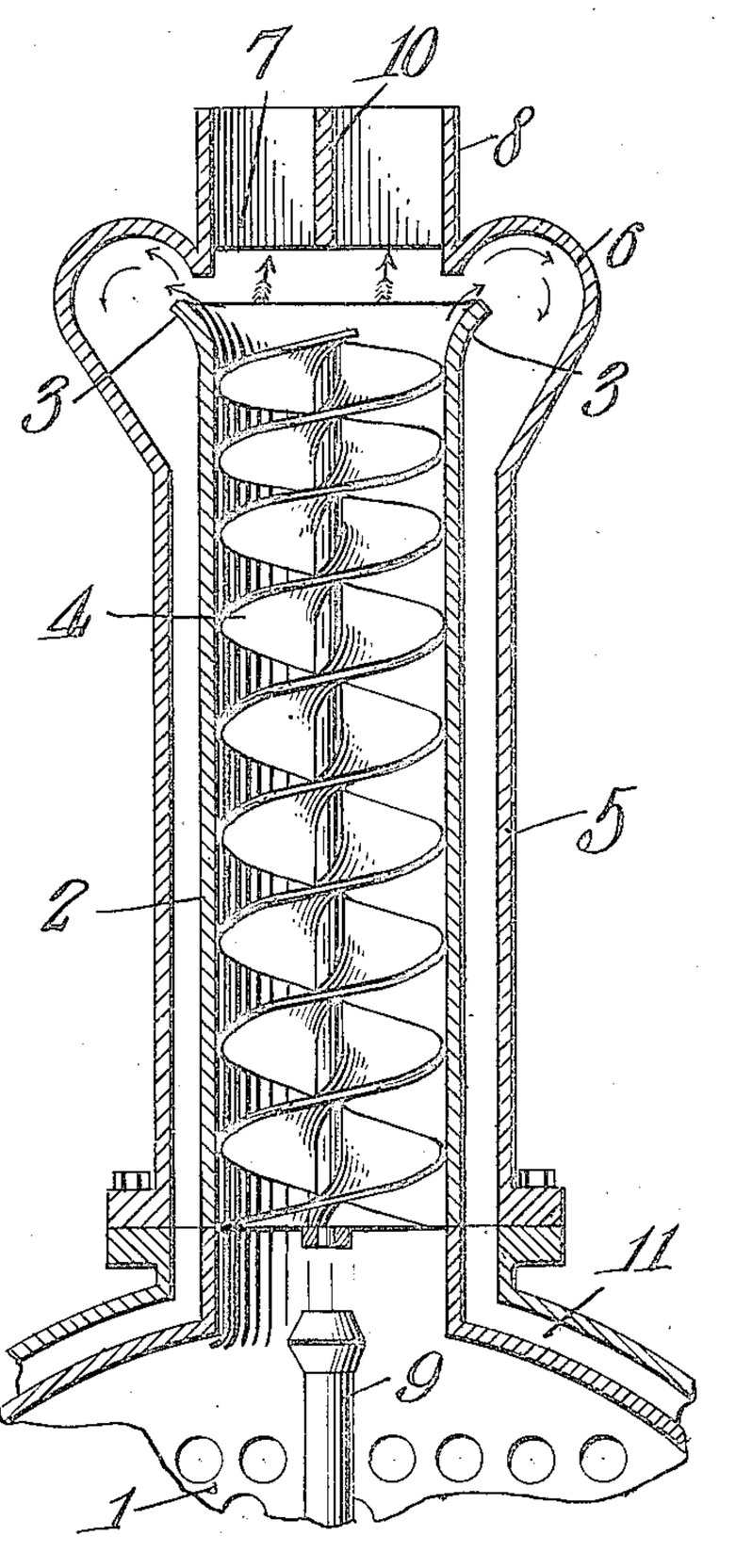

Fig. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

PETER M. WICKSTRUM AND CECIL M. WICKSTRUM, OF LINCOLN, NEBRASKA.

SPARK-ARRESTER.

No. 887,893. Specification of Letters Patent. Patented May 19, 1908.

Application filed December 30, 1907. Serial No. 408,614.

To all whom it may concern:

Be it known that we, PETER M. WICKSTRUM and CECIL M. WICKSTRUM, citizens of the United States, residing at Lincoln, in the county of Lancaster and State of Nebraska, have invented a new and useful Spark-Arrester, of which the following is a specification.

This invention relates to spark arresters, the same being designed for use in connection with furnaces of any form from which cinders and the like are discharged with the gaseous products of combustion.

The object of the invention is to provide means whereby said products of combustion while passing through the outlet stack of a furnace may be given a whirling motion so that all heavy particles embodied therein will be thrown beyond the wall of the stack by centrifugal force while the gaseous products which maintain a central position within the stack are free to pass out in the usual manner.

Another object is to provide means whereby the exhaust can be utilized for giving an impulse to the products of combustion and thus increase the effect veness of the spark arrester by increasing the whirling action of the combustion products.

A still further object is to provide means whereby the whirling action can be gradually increased toward the discharge end of the stack to insure separation of the solid and gaseous substances immediately prior to the emission of said products from the stack.

Another object is to provide means whereby the whirling action of the gaseous products is checked immediately subsequent to the separation of the solid particles therefrom so that said gaseous products may be projected a considerable distance beyond the end of the stack as a result of the force with which they are expelled from the stack.

With these and other objects in view the invention consists of certain novel features of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawings: Figure 1 is a section through a stack embodying the present improvements parts of the device being shown in elevation. Fig. 2 is a plan view thereof. Fig. 3 is a section through a slightly modified form of spark arrester, portions of the device being shown in elevation.

Referring to the figures by characters of reference, 1 designates a furnace of any desired structure and having a cylindrical outlet stack 2 the upper end of which is slightly flared as indicated at 3. Within this stack is provided means whereby a whirling action may be imparted to the products of combustion while being projected through the stack, said means consisting preferably of two or more concentric worms or helices 4 of the same diameter as the internal diameter of the stack and extending up to the outlet end of said stack. A jacket 5 surrounds and is spaced from the stack 2 and is provided at its upper end with a hood or enlargement 6 having a central opening 7 which is preferably of the same diameter as the internal diameter of stack 2. This opening is surrounded by a tubular extension 8. Hood 6 is preferably curved downwardly so as to lap the flared portion of the stack 2. An exhaust pipe 9 is preferably located within the lower portion of stack 2 for directing exhausted steam into the stack and one or more transverse partitions 10 are located longitudinally within the tubular extension 8 for the purposes hereinafter set forth. Outlet passages 11 extends from the lower end of jacket 5 and the collected cinders, etc. are designed to be discharged through these passages.

It is thought that the operation of the device herein described will be fully understood from the foregoing description when read in connection with the accompanying drawings. The products of combustion upon entering the stack 2 are brought into contact with the helices 4 and are forcibly expelled through the stack by the steam exhaust from pipe 9. The helices impart a whirling movement to the products of combustion and as the solid products are of greater specific gravity than the gaseous products they will hug the inner surface of the stack 2 and be drawn outwardly by centrifugal force as soon as they enter the flared portion 3 of the stack. They will thus be caught by the inverted upper portion of hood 6 and deflected downward as indicated by arrows in Fig. 1 into the jacket 5 and thence through outlets 11. The gaseous products do not follow the course taken by the solid products but instead whirl upward into the tubular extension 8 where this

whirling action is promptly checked by the partitions 10 and said gaseous products are thus projected straight upward from the stack and in view of the momentum imparted to them by the operation described they will be carried to a considerable distance above the stack.

If desired the momentum of the whirling combustion products can be accelerated by bringing the coils of the helices closer together toward the outlet end of the stack as indicated in Fig. 3. The separation of the solid products from the gaseous products is thus rendered more effective.

Although but two concentric helices have been disclosed in each construction illustrated it is to be understood that if preferred one, or more than two, may be utilized in lieu thereof.

What is claimed is:

A spark arrester comprising a stack having a flared outlet end, a jacket surrounding and spaced from the stack, said jacket having an annular outlet at its lower end, the upper end of said jacket being enlarged and rounded to constitute a hood having a central outlet, said hood extending over the flared end of the stack and having its outlet disposed directly above the stack, the flared portion of the stack being overhung by the hood, a tubular extension surrounding the outlet of the hood and extending upward therefrom, intersecting vertical partitions within said extension and parallel with the longitudinal axis of the stack, and means immovably mounted within the stack for imparting a whirling action to combustion products passing through the stack, the partitions constituting abutments for stopping the whirling action of the products.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

PETER M. WICKSTRUM.
CECIL M. WICKSTRUM.

Witnesses:
ELLA NELSON,
OTTO BARTH.