

(No Model.)

E. W. HOOVER.
DUST ARRESTER.

No. 432,200.

Patented July 15, 1890.

Fig. 1.

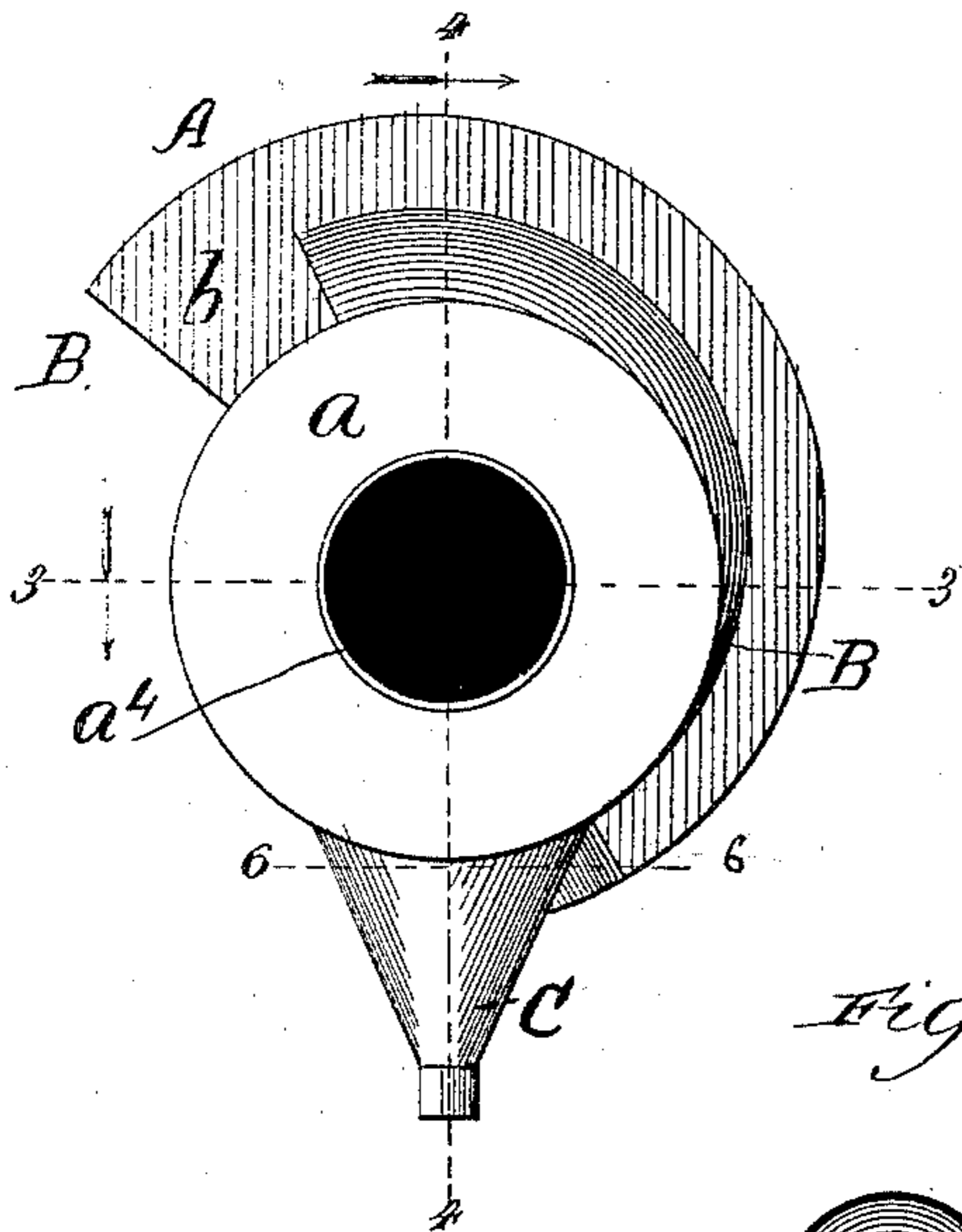


Fig. 2.

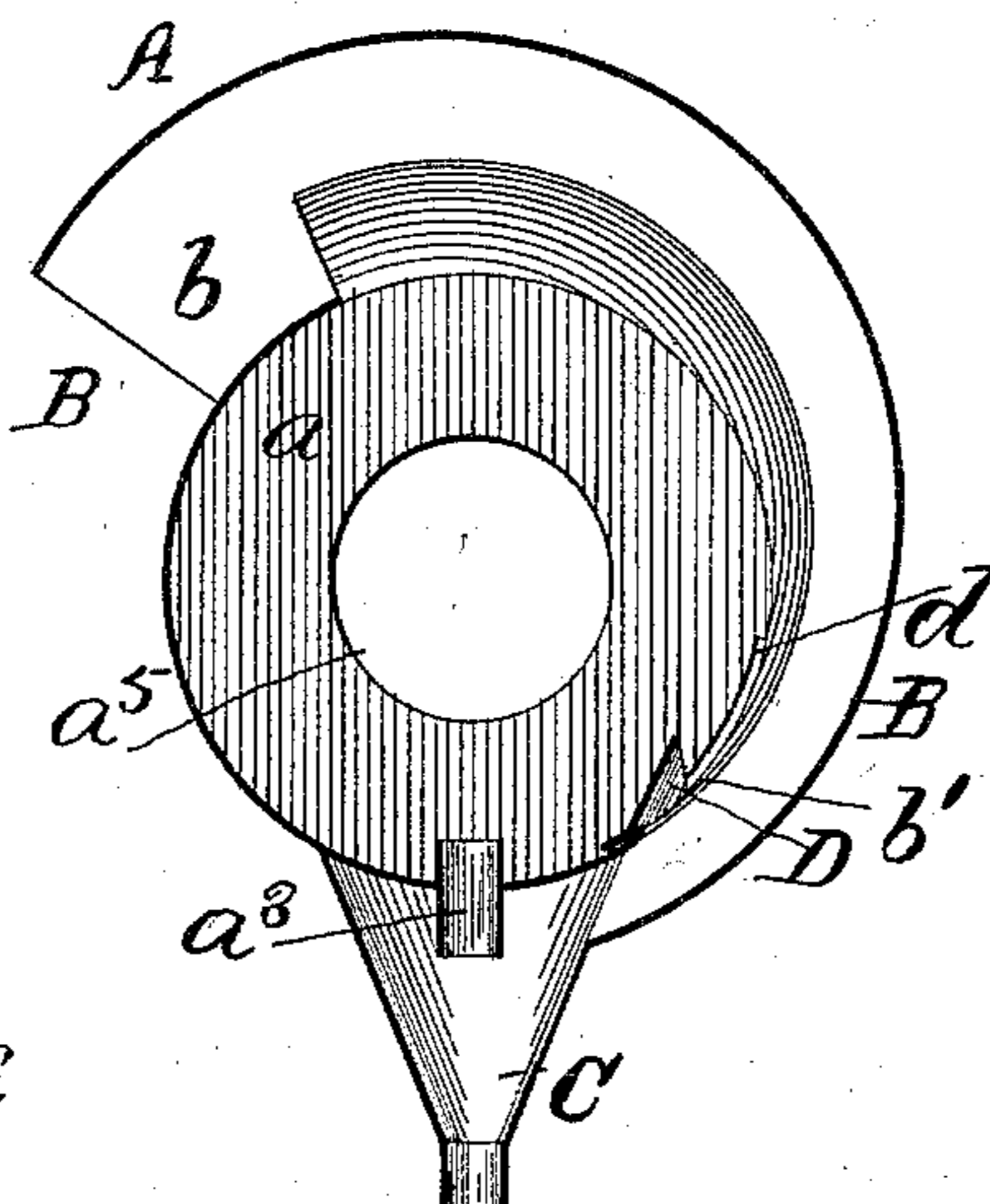


Fig. 6.

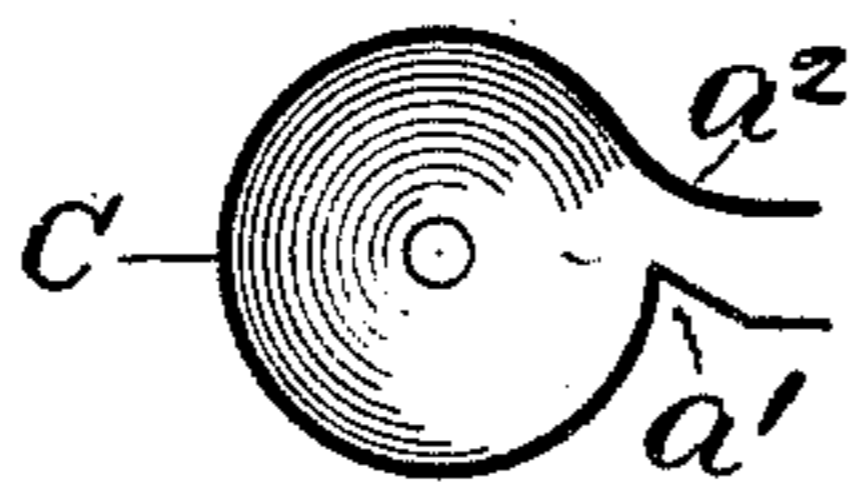


Fig. 3.

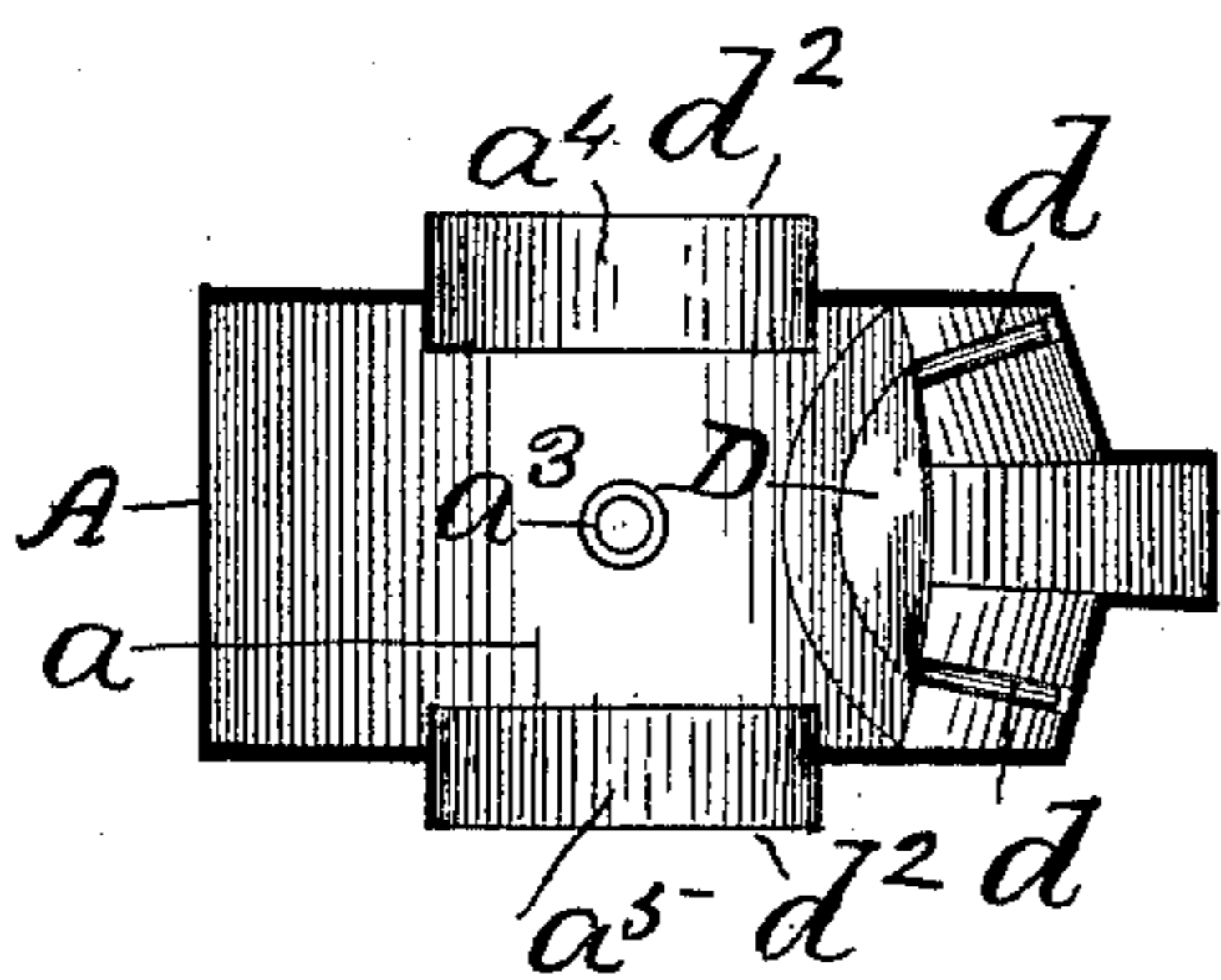
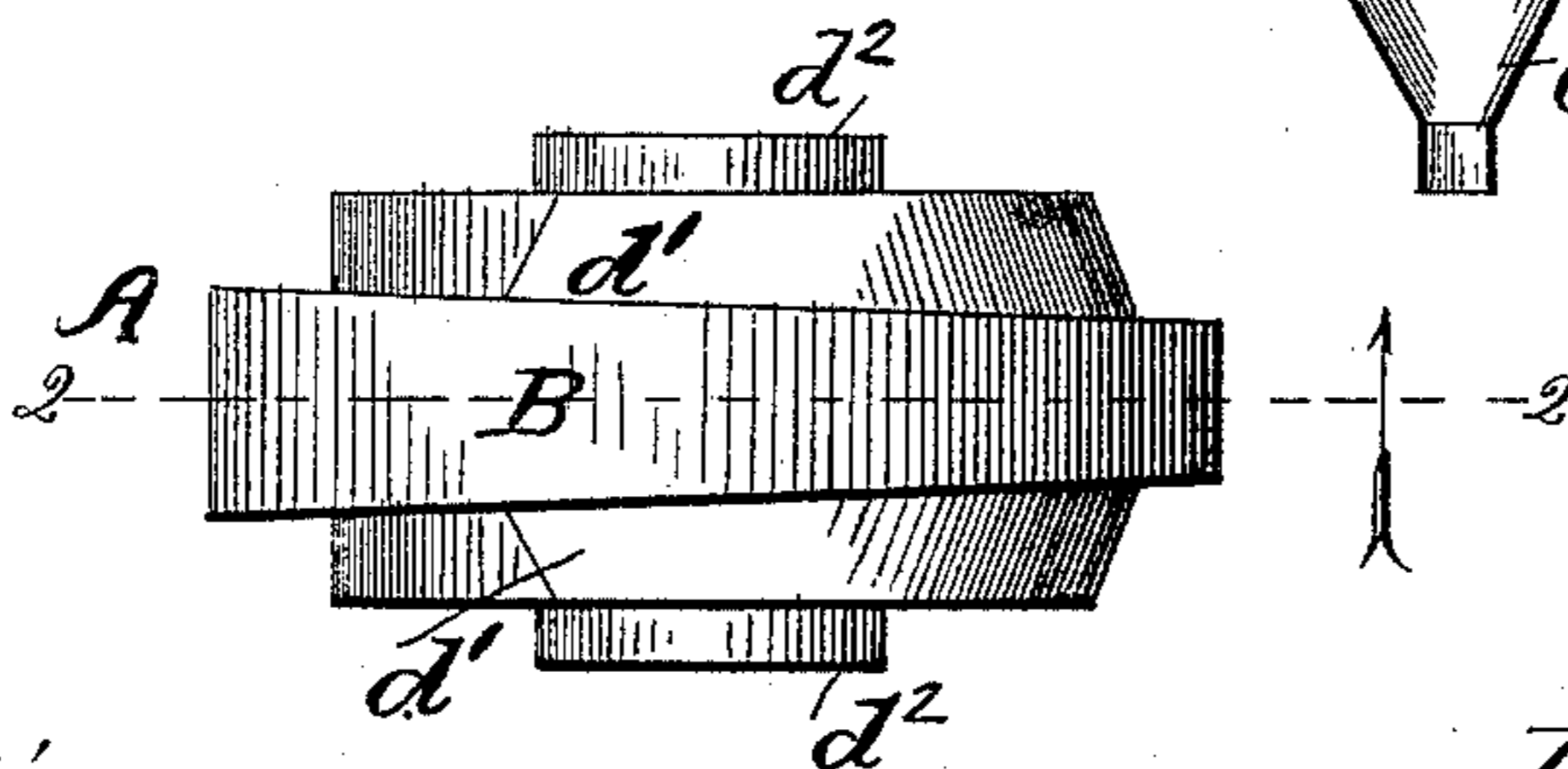


Fig. 5.



Witnesses:
E. E. Daylord,
L. M. Freeman.

Inventor:
E. W. Hoover.
By G. B. Coupland & Co.
Attorneys

UNITED STATES PATENT OFFICE.

ELIAS W. HOOVER, OF CHICAGO, ILLINOIS.

DUST-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 432,200, dated July 15, 1890.

Application filed October 1, 1889. Serial No. 325,639. (No model.)

To all whom it may concern:

Be it known that I, ELIAS W. HOOVER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dust-Arresters, of which the following is a full, clear, and exact description, that will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to that class of devices which are employed to prevent the escape into the atmosphere of shavings, fine dust, and refuse matter from mills, factories, and manufacturing establishments.

The object is to prevent the escape from the device into the atmosphere of any shavings or inflammable or explosive dust, the air being at the same time separated and expelled and prevented from entering with the body of refuse matter into the shavings or dust vault and relieving the fan-blower from any back-pressure. These objects may be accomplished by the device illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a device embodying my improved features; Fig. 2, a vertical central section on the line 2 2, Fig. 5. Fig. 3 is a section on the line 3 3, Fig. 1, looking in the direction indicated by the arrow; Fig. 4, a vertical central section on the line 4 4, Fig. 1, looking in the direction indicated by the arrow; Fig. 5, a top or plan view; and Fig. 6, a horizontal section on the line 6, Fig. 1.

The device is intended to be attached to the delivery end of a conveyer-pipe and operated by a fan-blower for the purpose of removing shavings, dust, and other fine refuse and conducting and depositing the same in a suitable receptacle.

Referring to the drawings, A represents a circular casing or shell having the chamber a and provided around a part of its outer circumference with the spiral circular duct B, which gradually and uniformly diminishes in area from its initial to its terminal point, where it merges into the chamber a and runs out in the conical hopper or discharge-spout C, attached to and projecting downwardly from the under side of the casing A. At the

point of junction with the receiving and discharging hopper C the inclosing horizontal wall on one side is made to form the re-entering angle a' , the opposite corresponding side being somewhat curved or rounded out, as shown at a^2 , Fig. 6, whereby the discharge into the hopper is directed off to one side, so as to be tangential thereto, and thereby give a spiral downward motion to the incoming current from the duct B. The object of this feature is to cause the refuse matter to follow around the sides of the hopper and be more gradually discharged therefrom than if shot straight down and out of the hopper, thus giving the greater part of the current of air forced into the hopper a chance to separate from the shavings, dust, &c., into the center and escape upwardly through the relief-tube a^3 , leading from the conical discharge-hopper into the chamber a , where it mingles with the larger volume of air coming from the duct or circular passage B, and finally escapes into the atmosphere through the large openings a^4 a^5 in the sides of the casing, thus preventing any back pressure on the fan and allowing but little air to pass in with the shavings and dust or other refuse matter.

As the circular duct B gradually decreases both in width and depth, and as its outer and large end b , into which the refuse is forced from the blower-fan, is the measure of the volume received, it is obvious that only a constantly-diminishing part of this current, made up of shavings, dust, &c., can remain in the duct B. Thus the residue of the current, which is of course the heavier part of it, is made to follow closely the inner circumferential bottom of the duct by the action of centrifugal force. That being the case, the lighter or air part of the current will naturally be displaced and forced into the central chamber a and expelled through the large central openings on each side of the casing by reason of the duct gradually diminishing in cross area. The greater volume of air forced in by the fan is thus carried past the conical discharge-hopper, and what does not escape through the central openings in the casing on the first circuit is again merged with the constantly-incoming current and the operation of separating the air-current from the refuse repeated.

Having now outlined the general construction and operation of the device shown, it remains to describe some peculiar features that facilitate these operations.

5 The concavo-convex tangential deflecting-plate D is secured on the inside of the casing at the point where the spiral duct merges into the discharge-hopper. This deflecting-plate is set at an angle corresponding to that
10 of the contracting sides of the discharge-hopper, (see Fig. 2,) and arches over the terminal end b' of the spiral duct B, as shown in Fig. 4. The guide-ribs $d\ d$ (see Figs. 2, 3, and 4) are secured to or formed on the interior of the casing A and are located at the sides
15 of the deflecting-plate D and diverge backward therefrom until they run out against the respective sides of the inclosing-casing. These ribs serve to guide the heavier particles of the refuse inwardly to and under the
20 plate D and into the discharge-hopper. The larger volume of refuse closely follows the central line of the duct B and is deflected into the conical discharge-hopper. Should
25 the refuse matter not be expelled in the first circuit it will pass over the deflecting-plate and again unite with the incoming volume, and so on continuously.

30 The sloping sides $d'\ d'$ of the inclosing-casing (see Fig. 4) have the effect of throwing the heavier refuse into the bottom of the spiral or circular duct, so that it will more readily pass into and be discharged through the hopper.

35 The axial or central air-escape openings $a^4\ a^5$ are provided with tubes $d^2\ d^2$, which serve to trap the refuse and dust making the circuit of the casing and prevent the same from escaping with the air expelled, and also prevent
40 the entrance of rain or snow. The air-escape tube a^3 projects both above and below the inclosing under side of the casing A, so as to curb or flange the passage through the same against the entrance of the refuse or
45 dust, and thereby provide for the free escape of the air-current. By this arrangement the

contents of the casing are kept in a continuous circuitous motion, thus insuring a nearly-perfect separation of the air from the refuse matter before the latter is discharged into the
50 final receptacle or receiving-vault.

It will readily be seen that by this form of construction and operation a sufficient amount of air will not pass into the shavings-vault to become a disturbing element; neither is it
55 possible for the fan to be affected by any back-pressure.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—
60

1. In a dust-arresting device of the character described, the combination of the cylindrical chambered casing having a curved duct extending part way around the periphery of said casing and gradually diminishing in
65 cross-section from its initial to the terminal point, the conical discharge-hopper, the air-escape tube connecting the cylindrical casing and discharge-hopper, and the flanged openings in the respective sides of said casing, substantially as described.
70

2. The combination of the circular separating-chamber, its conveyer-duct, the conical hopper attached to and extending downwardly from the under side of the casing, and the
75 air-escape tube forming a flanged passage between the hopper and the separating-chamber, substantially as and for the purpose set forth.

3. The combination of a separating-chamber and its conveyer-duct, the receiving and discharge-hopper dependent from the casing, the deflecting-plate located at the point where the said duct merges into said hopper, and the
80 guide-ribs diverging backward from said deflecting-plate until they run out against the inclosing-walls, substantially as and for the purpose set forth.

ELIAS W. HOOVER.

Witnesses:

L. M. FREEMAN,
J. B. DONALDSON.