

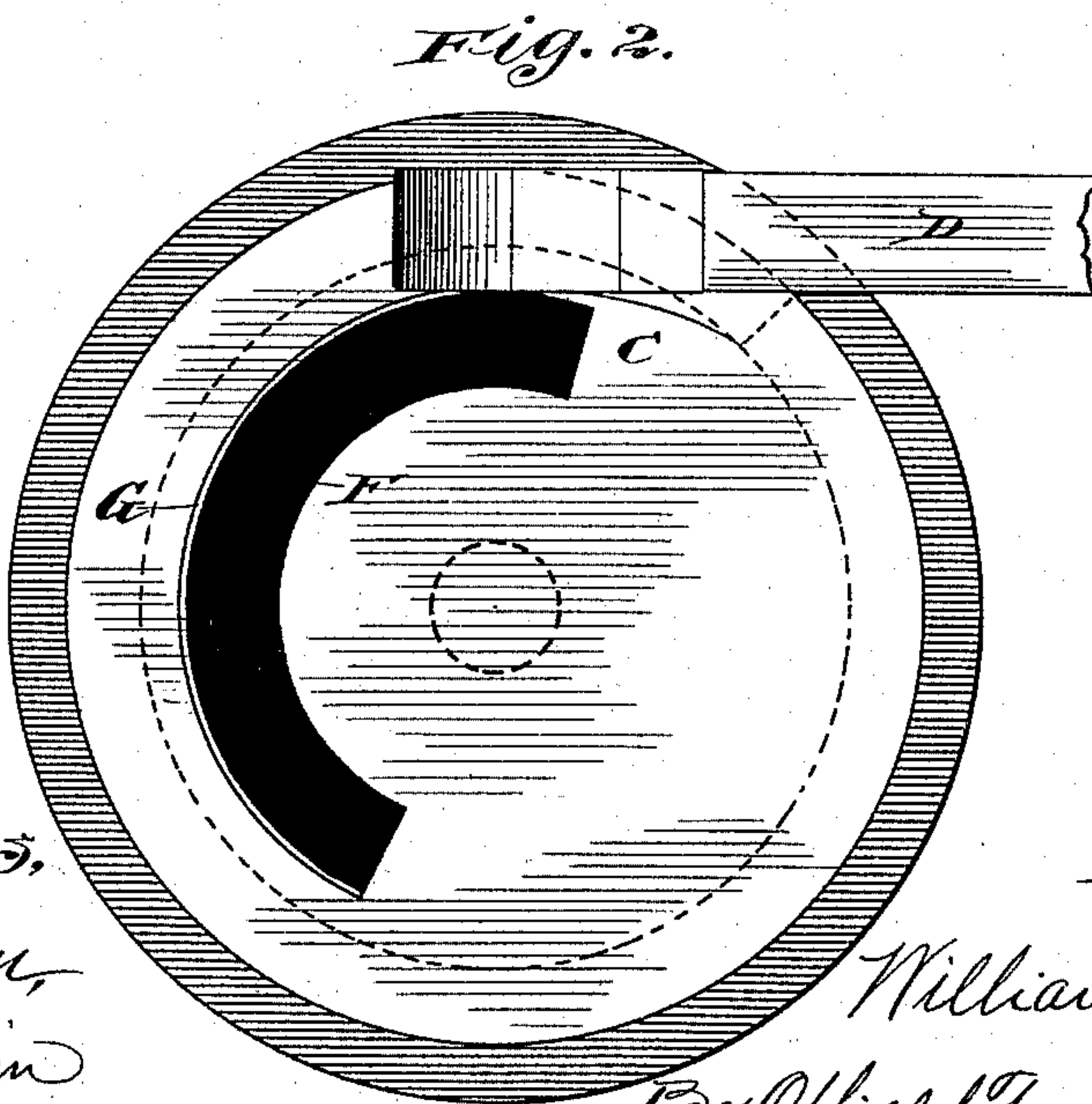
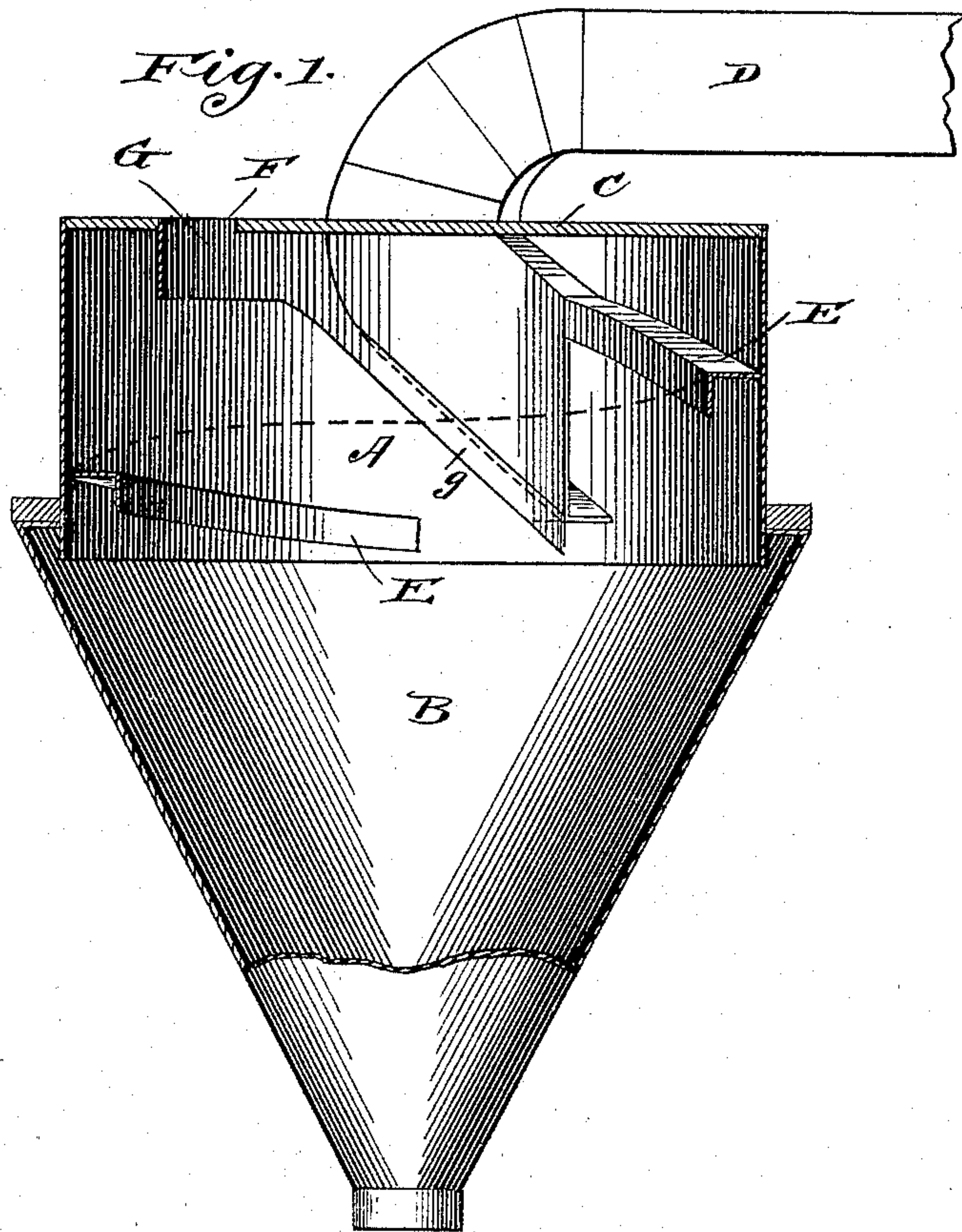
(No Model.)

2 Sheets—Sheet 1.

W. E. ALLINGTON.
DUST COLLECTOR.

No. 570,443.

Patented Nov. 3, 1896.



Witnesses,
J. M. Mann,
F. B. Goodwin

Inventor
William E. Allington
By Offield Towle Luthicrum
Attys.

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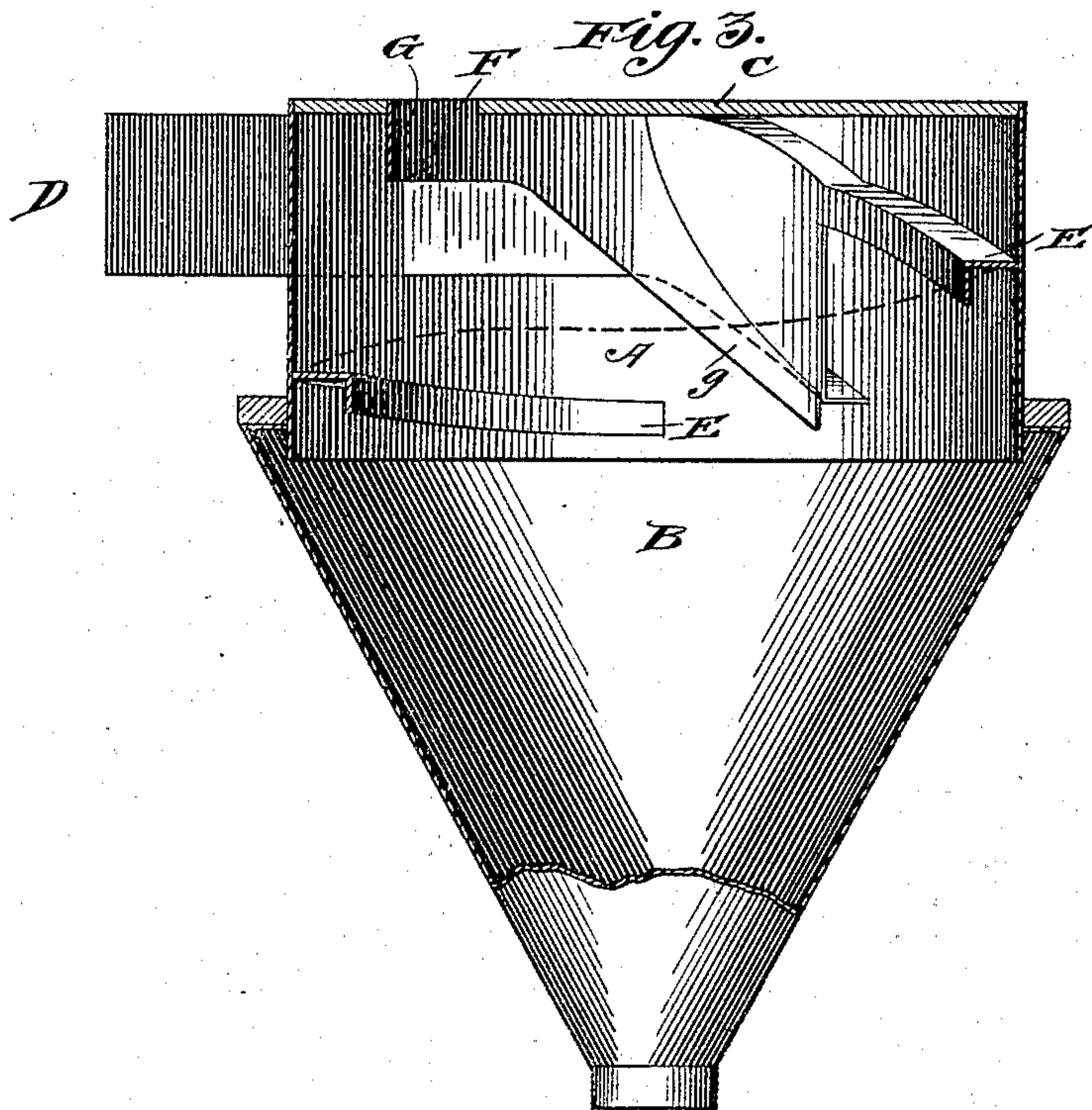
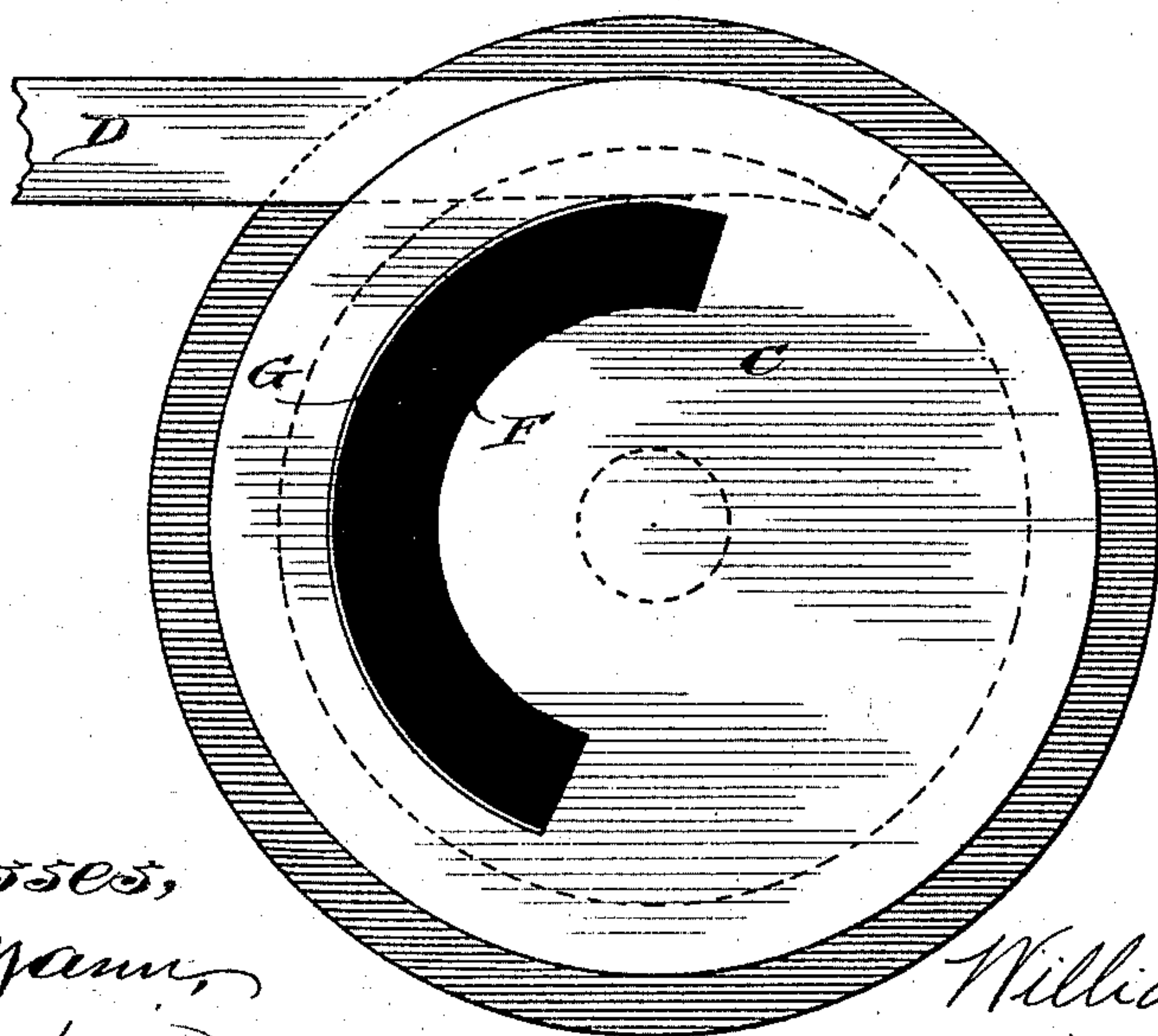


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM E. ALLINGTON, OF EAST SAGINAW, MICHIGAN.

DUST-COLLECTOR.

SPECIFICATION forming part of Letters Patent No. 570,443, dated November 3, 1896.

Application filed September 7, 1894. Serial No. 522,346. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. ALLINGTON, a citizen of the United States, residing at East Saginaw, Saginaw county, in the State of Michigan, have invented certain new and useful Improvements in Dust-Collectors, of which the following is a full, clear, and exact specification.

This invention relates to that class of dust-collectors in which a current of dust-laden air under blast is delivered into a separating-chamber tangentially to the axis thereof, so as to induce whirling or vortical movement of the air and the suspended solid particles carried thereby, and in which the separation is effected by the massing of the solid particles on the walls of the chamber by which they are directed toward an outlet, the purified air being permitted to escape through an opening in another part of the machine.

It has been found that in the operation of this class of machines the whirling body of air moves with greatest force or velocity at the periphery of the chamber and seeks to escape from the chamber at or near the periphery. It is not practical, however, to provide an escape-opening at the periphery of the machine, either in its side wall or end, because by so doing some of the dust or other impurities carried on the current will escape with the air, and so the common practice is to provide the escape-opening in the head of the machine and about the axial center thereof. With such a construction there must be at all times a sufficient volume of air delivered into the machine and under a sufficient force to compel the air as it parts with its dust or suspended solids to move against the action of centrifugal force toward the axis of the machine to seek the air-outlet. Recognizing these admitted facts, I have provided a construction wherein the escape of the air from the machine after purification from its suspended impurities is permitted without the necessity of such pressure in the machine as would react upon the blast-producing fan and which at the same time will not permit the escape of dust with the air.

Therefore my invention consists in a dust-collector having a separating-chamber into which the dust-laden air is delivered and which is provided at its end opposite the air-

inlet with an outlet for the separated dust and in its head or end opposite the dust-outlet with an escape-opening for the purified air, which opening is arranged intermediate the axis of the chamber and its peripheral wall.

My invention consists, further, in certain details of construction, which will be hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, Figures 1 and 2 show, respectively, in broken sectional elevation and in plan, a dust-collector in which the inlet is arranged in the head of the machine; and Figs. 3 and 4, similar views of a dust-collector also embodying my invention, but having the air-inlet in the side wall of the machine.

In the drawings I have shown a dust-collector comprising a separating-chamber having its inclosing wall made in two sections, one of which, marked A, is cylindrical and the other, B, conical or hopper-shaped. The upper end of the cylindrical portion has fitted thereto a head C, and in the construction shown in Figs. 1 and 2 an inlet-spout D enters through said head, said spout having an elbow and being extended inside of the chamber and inclined downwardly therein. In Figs. 3 and 4 the inlet-spout enters through the side of the cylindrical portion of the casing or inclosing wall. In both constructions I preferably employ a spiral flange E, which may be continuous with or joined to the upper portion of the end of the inlet-spout and continued about the cylindrical portion of the chamber approximately a complete turn.

The conical portion of the collector is provided with an outlet at its tip for the separated dust. The air-outlet is marked F, and it is formed in the head C between the axis of the machine and its peripheral wall, its precise location varying to some extent with the volume of air to be delivered to the machine and the pressure under which it is delivered, and also with the character of dust which is being operated upon. I locate it preferably as near the peripheral wall as possible, so as to take advantage of the tendency of the air to escape at this point, and as the dust is usually massed in a thin layer upon the peripheral wall the outlet may be

formed at a short distance only from said wall. The dust-laden air-current is delivered into the machine in a direction to strike the peripheral wall thereof, and the outlet is placed in the head on the opposite side of the axis from that of the mouth of the delivery-inlet. This is important in order to prevent the dust particles from finding a too-ready exit from the machine. The outlet, as shown, extends through a segment of about one hundred and eighty degrees, but may be longer or shorter, providing that it does not extend through a line drawn from the inlet to the axis of the machine.

It may be found expedient in some cases to employ a depending flange G, skirting the outer edge of the opening F and extending down along the inlet-spout, as shown at g. This flange will tend to prevent the dust from escaping with the air through the air-outlet.

The dust-collector of my invention is particularly adapted for use in circumstances where the saving of power is of greater consequence than the separation of the highest percentage of the fine dust from the dust-laden air-current. In many cases this saving of power is of vastly more importance than the complete separation of the dust from the air, and the machine is particularly adapted also for use in the separation of coarse solid particles from the carrying-current.

I have found in practice that the smallest power is required for operating a dust-collector in a construction wherein the purified-air outlet is arranged between the axis of rotation and the path of the whirling body of air, which path is bounded by the peripheral wall of the machine. In practical operation the dust-laden air-current usually travels several times around the machine to effect the separation of the dust. During this rotary movement it is constantly being acted upon by centrifugal force, which gives the air and the suspended impurities a tendency to escape at the periphery of the machine. It being impractical to locate the purified-air outlet in the peripheral wall for the reason that the dust would escape therewith, it becomes important to so locate the purified-air outlet that the air may escape in the freest possible manner, while at the same time the escape of the dust is prevented. I have discovered that by locating the purified-air outlet concentric to the axis of rotation and intermediate the path of the whirling air-current and said axis the air-current will escape freely and with practically the same velocity as upon entering the machine. This is not true where the air-exit is located centrally of the head of the machine, because the angu-

lar velocity of the current is constantly reduced by the counteraction of centrifugal force and the condensing or compression of the air particles due to the constant delivery into the machine of a volume of air under pressure.

It will be understood that it is necessary to maintain at all times within the separating-chamber a slight pressure in order to secure the rotary motion of the entering air-current, and the location and arrangement of the air-exit have always been controlled by a consideration of this necessity alone, no one heretofore having taken into account the consumption of power, commonly called "back pressure," upon the fan due to the forcing of the air-current from the periphery toward the axis of the machine, where the purified air was permitted to escape. Heretofore, also, to avoid back pressure the size of the purified-air outlet has been increased. Of course this is effective, but the result has been to permit the escape of the dust with the air through such outlet. Therefore so long as the central position of the air-outlet is retained a saving of power is effected only by impairing the operation of the machine to such an extent that it becomes worthless as a dust-collector.

What I claim as new, and desire to secure by Letters Patent, is—

1. A dust-collector comprising a separating-chamber formed by a casing having a head applied to one end thereof, said head being closed or imperforate at its central portion and provided with an air-outlet between the axis of the machine and its peripheral wall, an air-inlet entering the separating-chamber tangentially at a point on the opposite side of the axis from the air-outlet and a dust-discharge opening at the end of the casing opposite the air-outlet, substantially as described.

2. A dust-collector comprising a separating-chamber formed by a casing having a head applied to one end thereof, said head being closed or imperforate at its central portion and provided with an air-outlet between the axis of the machine and its peripheral wall, an air-inlet entering the separating-chamber tangentially at a point on the opposite side of the axis from the air-outlet, a dust-discharge opening at the end of the casing opposite the air-outlet and a flange depending from said head between the peripheral wall and the air-outlet, substantially as described.

WILLIAM E. ALLINGTON.

Witnesses:

FREDERICK C. GOODWIN,
S. T. MANN.