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PATENTED NOV. 22, 1904.

A. STEINBART.
CENTRIFUGAL GAS PURIFIER.

APPLICATION FILED MAY 12, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

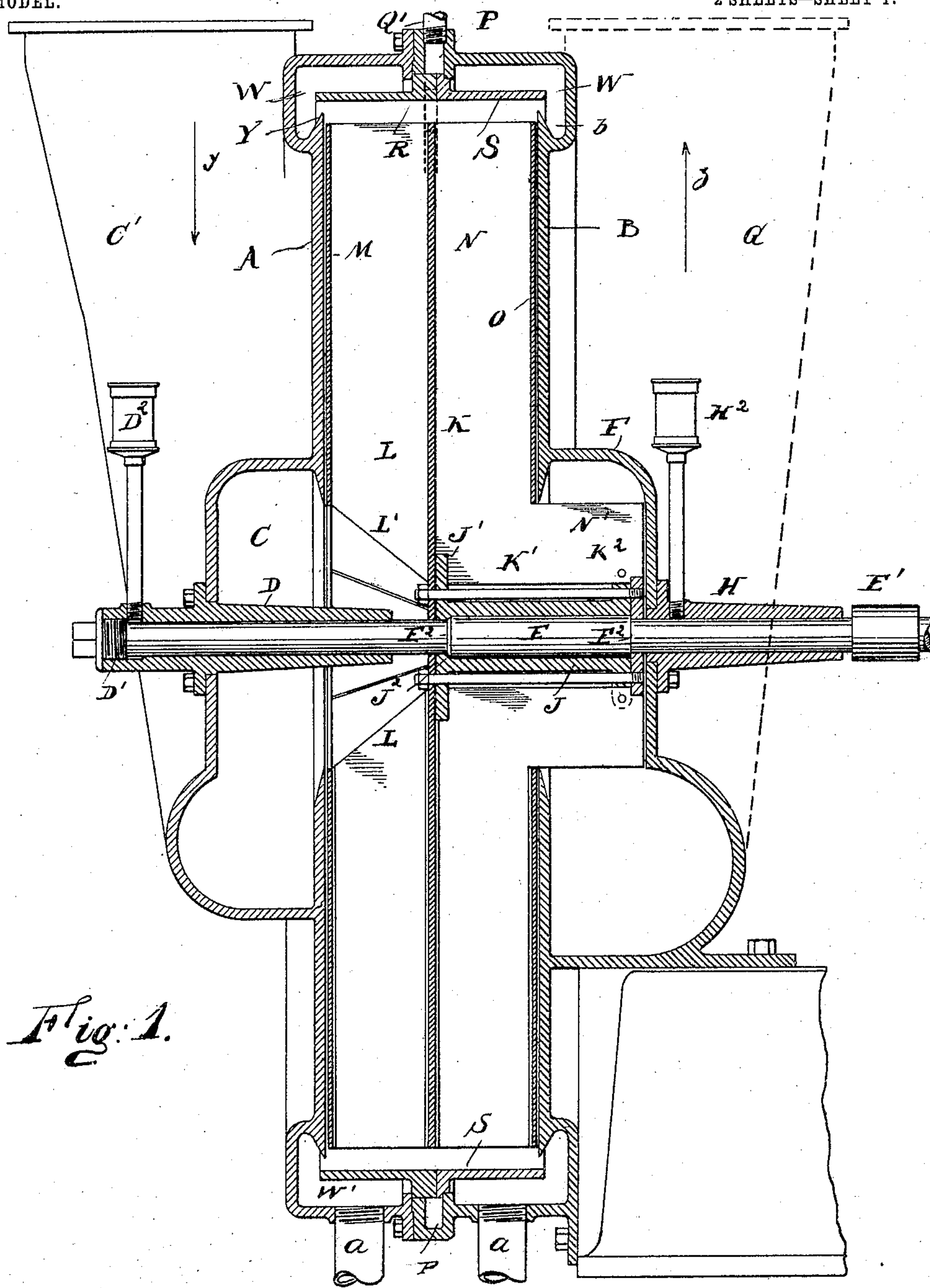


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

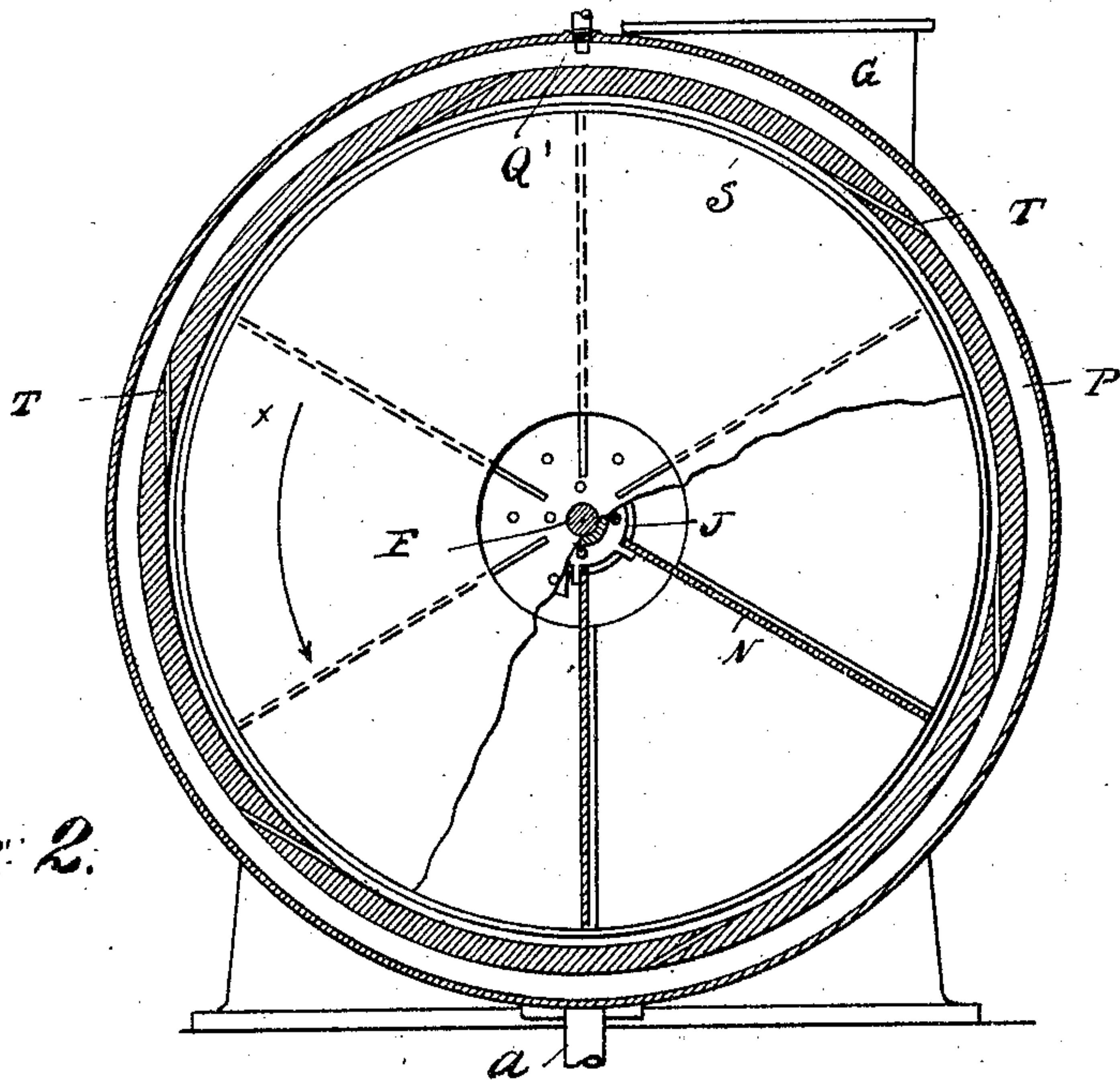
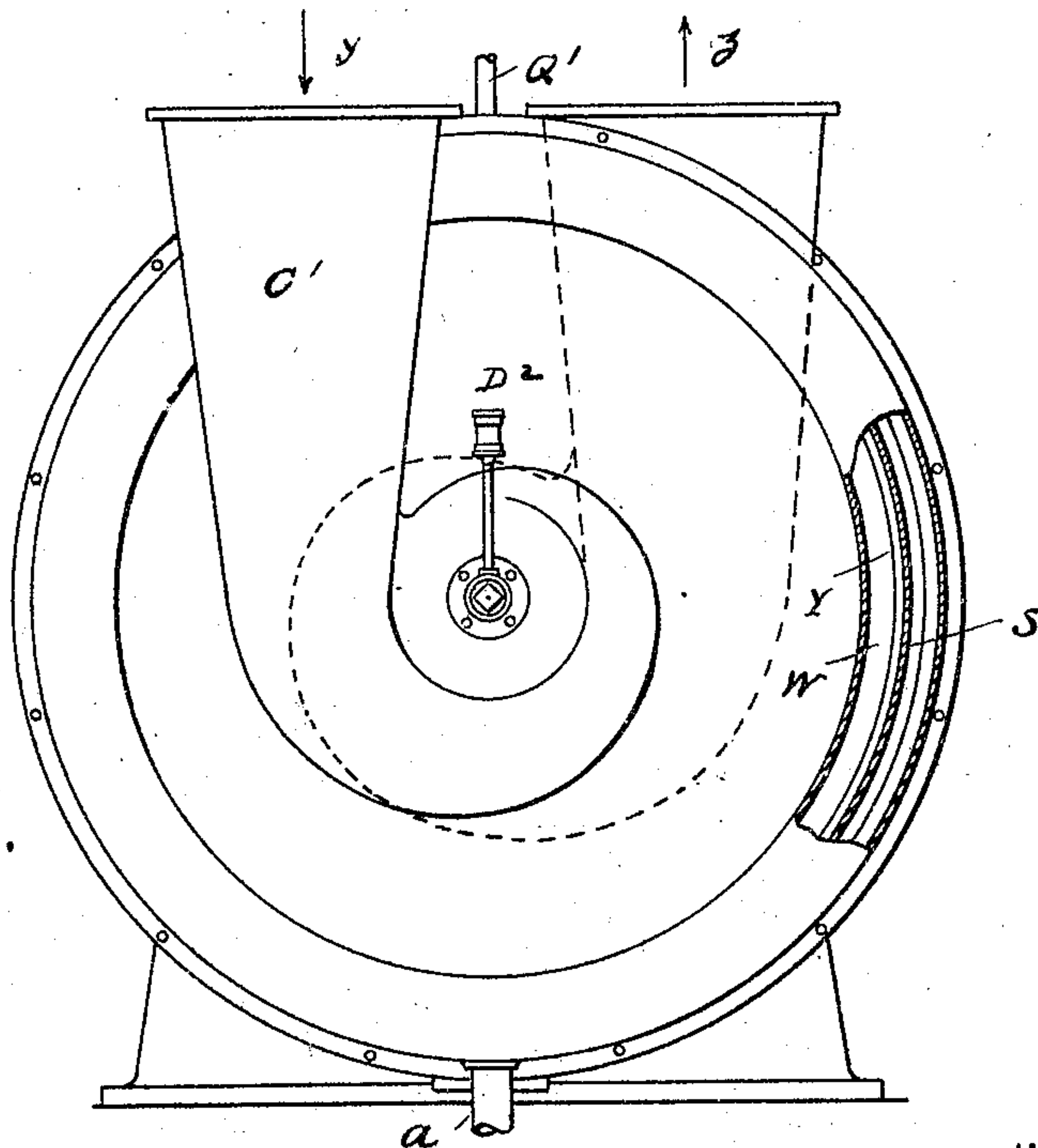


Fig. 3.



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ALFRED STEINBART, OF CARLSTADT, NEW JERSEY.

CENTRIFUGAL GAS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 775,462, dated November 22, 1904.

Application filed May 12, 1904. Serial No. 207,591. (No model.)

To all whom it may concern:

Be it known that I, ALFRED STEINBART, a citizen of the United States, residing at Carlstadt, county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Gas-Purifiers, of which the following is a specification.

The object of my invention is to provide a new and improved gas-purifier for the purpose of removing impurities from gas taken from blast-furnaces, coke-ovens, gas-generators, &c., and which is to be used for operating internal-combustion engines.

In the accompanying drawings, in which like letters of reference indicate like parts in all the figures, Figure 1 is a vertical transverse sectional view of my improved gas-purifier. Fig. 2 is a vertical central longitudinal sectional view of the same, parts being broken out and others shown in section. Fig. 3 is a side view of the same, parts being broken away and others shown in section, Figs. 2 and 3 being drawn on a smaller scale than Fig. 1.

The purifier is constructed with a rotary fan mounted in a cylindrical casing, the axis of the fan being horizontal.

The case is formed with the two halves or sections A and B, which are bolted together and are in turn supported on a suitable base. The half or section A is provided on its outer side with a central outwardly-extending enlargement C, which communicates with a tapering inlet-duct C', which, as shown in Fig. 3, is curved approximately spirally at the lower end, where it merges into the enlargement C, so as to give the entering gas a rotary movement before it enters the casing proper. A sleeve D is secured in an opening in said lateral enlargement or chamber C and projects from the inner and outer surfaces of the same, and in the outer end of said sleeve D a thrust-bearing D' is screwed for the horizontal fan-shaft E, which is mounted at one end part in this sleeve D. A suitable oil-cup D² is secured on the outer end part of the sleeve D for the purpose of lubricating the bearing. The other half or section, B, of the cylindrical casing for the rotary fan is also provided at its center on the outer side with the laterally-extending enlargement or chamber F, which

communicates with the flaring gas-outlet duct G, the lower end of which is also curved spirally where it communicates with the chamber F, so as not to check the rotary movement of the outgoing gas.

A sleeve H is secured in a central opening of the walls of the chamber or enlargement F to form a bearing for the fan-shaft E, which shaft carries a driving-belt pulley E' at its outer end. A suitable lubricating-duct H² is secured on said sleeve H. Part of the shaft E is increased in diameter to form two shoulders E². A hub J surrounds that part of the shaft of greater diameter, which hub has a flange J' and an internal shoulder J², against which the left-hand shoulder E² fits. A plate K² rests against the right-hand shoulder E² and is adjacent to the inner surface of the wall of the enlargement or chamber F. Bolts K' are passed through the flange of the hub through a metal disk K, resting against the flange J', the inner ends of which bolts are screwed into the plate K², as shown.

A series of radial wings L are secured to the central disk K, each having its inner end beveled off, as shown at L', so as to taper from the edge of the opening forming communication between the chamber C and fan-casing toward the hub J, and the said plates or wings L are connected at their free edges by an annular disk M close to the side of the section A of the fan-casing. To the opposite side of the disk K, L-shaped radial wings N are secured, the shorter inner arms N' of which project outward into the enlargement or chamber F of the casing-section B. The outer edges of the longer arms of said wings N are connected by an annular disk O, which is close to the side wall of the section B of the fan-casing.

Between the flanges of the sections A and B an annular water-chamber P is formed around the casing and is provided at the top with a pipe Q' for admitting water under pressure. The inner wall of this chamber is formed by a rib R, projecting outward from an annular plate S, concentric with the rotary fan and a short distance from the circumference of the same and which, as shown, has slightly greater width than the fan. Within this rib a series of

openings or waterways T are formed which are tangential to the inner surface of the annular plate S, and these waterways are formed at equal distances around the entire circumference of the fan. In the example shown there are six; but there may be more or less. At the bottom of the casing outlet-pipes a for the waste water and dirt are provided.

The fan-casing is provided at its circumference with a lateral enlargement W or annular chamber which is formed around the circumference of the fan-casing. As shown, this enlargement extends laterally—that is, it has greater width than the fan-casing, and where this chamber meets the outer side walls of the casing proper a knife-edged annular rib Y is formed which projects beyond the circumference of the fan proper. Between the edge and the outer side of the wall of this enlargement W an annular pocket b is formed around the entire casing at each side, which pocket b communicates with the chamber W.

The operation is as follows: The fan is rotated in the direction of the arrow x , Fig. 2, and the gas to be purified enters in the direction of the arrow y , Figs. 2 and 3, and the purified gas is discharged in the direction of the arrow z , Figs. 1 and 3, the speed of the entering gas is increased, and to this gas is given a rotary motion by the volute form of the inner end of the inlet-duct and enters that half of the fan b between the central disk K and the left-hand casing-section A, Fig. 1, passes over the circumferential edge of the disk K, and enters that section of the fan between the disk K and the wall of the right-hand casing-section B, and then passes into the volute inner end of the exit-duct, which volute conformation prevents a sudden checking of the gas. By centrifugal force the particles of solid matter and like impurities carried along with the gas are thrown outward against the inner surface of the annular plate S and are washed by the jets of water issuing from the fan-casing proper through the tangential opening T in the direction of the movement of the fan and also of the movement of the gas carried around by the fan, and said water flows to the side edges of the annular plate S and passes into the grooves b and the enlargement W. The knife-edges Y at the top of the upper half of the casing prevent the water from flowing from said grooves down the inner faces of the side walls of the casing. The water flows from these grooves into the bottom pockets W' and from the same is carried off through the bottom outlet-pipes a .

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

1. In a gas-purifier, the combination with a circular casing, a fan mounted to rotate therein and having a vertical central partition extending to the rim of the fan, and means for injecting water into the path of the fan tan-

gentially to the circumference of the fan, substantially as set forth.

2. In a gas-purifier, the combination with a circular casing having an outwardly-extending enlargement at the center of each side, a gas-inlet tube being connected with one enlargement and having its end curved spirally, where it merges into the enlargement, the other enlargement being connected with a gas-outlet tube, which tube has its inner end curved spirally, where it merges into the enlargement, and a fan mounted to rotate in said casing, substantially as set forth.

3. In a gas-purifier, the combination with a casing, and a rotary fan therein, of gas inlet and outlet tubes connected with the opposite sides of the casing, at the center, the inner ends of said tubes being shaped spirally, substantially as set forth.

4. In a gas-purifier, the combination with a casing, and a rotary fan therein, of a tapering inlet-pipe having its inner end shaped spirally, and connected with one side of the casing, and a flaring outlet-pipe curved spirally connected with the other side of the casing, at said spiral end, substantially as set forth.

5. In a gas-purifier, the combination with a circular casing and a rotary fan therein, of a tapering gas-inlet pipe connected with one side of the casing and a flaring outlet-pipe connected with the other side, the dimensions of the inlet-pipe being less than those of the outlet-pipe, substantially as set forth.

6. In a gas-purifier, the combination with a casing, and a rotary fan therein, an annular plate held concentric with the fan, and a short distance from the circumference of the same, and water-inlets formed in said plate, substantially as set forth.

7. In a gas-purifier, the combination with a casing, and a rotary fan therein, an annular plate held in the casing concentric with the fan and a short distance from the circumference of the same, water-inlet openings being formed in said plate tangentially to the circumference of the fan, substantially as set forth.

8. In a gas-purifier, the combination with a circular casing, and a rotary fan therein, of an annular plate held concentric with the fan and a short distance from the circumference of the same, an annular chamber being formed by the casing around said plate, substantially as set forth.

9. In a gas-purifier, the combination with a circular casing and a rotary fan therein, of a plate concentric with the fan within said casing, and a short distance from the circumference of the fan, a chamber formed at the rim of the casing around said plate and forming grooves at the sides of the fan and circumference of the same, substantially as set forth.

10. In a gas-purifier, the combination with a circular casing, and a rotary fan therein, an

annular plate held concentric with the fan and a short distance from the circumference of the same, the width of said plate being slightly greater than that of the fan, so that the side edges of the said plate overlap the sides of the fan, a chamber formed around said plate at the rim by the casing, which chamber forms grooves around the fan at the sides and circumference thereof, the inner walls of said grooves being formed as knife-edges and located between the side edges of the annular plate and the side walls of the fan-casing and projecting beyond the circumference of the fan, substantially as set forth.

11. The combination with a casing, of a shaft having shoulders, a hub on the shaft, a circular plate on the shaft and resting against one shoulder, a fan-disk mounted loosely on the shaft and resting against the hub, and bolts passed through the hub, the fan-disk and the

plate resting against the shoulder, substantially as set forth.

12. The combination with a casing, of a shaft having two shoulders, a circular plate resting against one shoulder, a hub mounted on the shaft and provided with an offset resting against the shoulder opposite the one against which the circular plate rests, a fan-disk mounted loosely on the shaft and resting against the hub and bolts passed through the fan-disk, the hub and the opposite plate resting against the shoulder, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED STEINBART.

Witnesses:

OSCAR F. GUNZ,
SOPHIE M. BAEDER.