

(No Model.)

2 Sheets—Sheet 1.

P. ERB.  
SCREW PRESSURE BLOWER.

No. 536,925.

Patented Apr. 2, 1895.

FIG. 1.

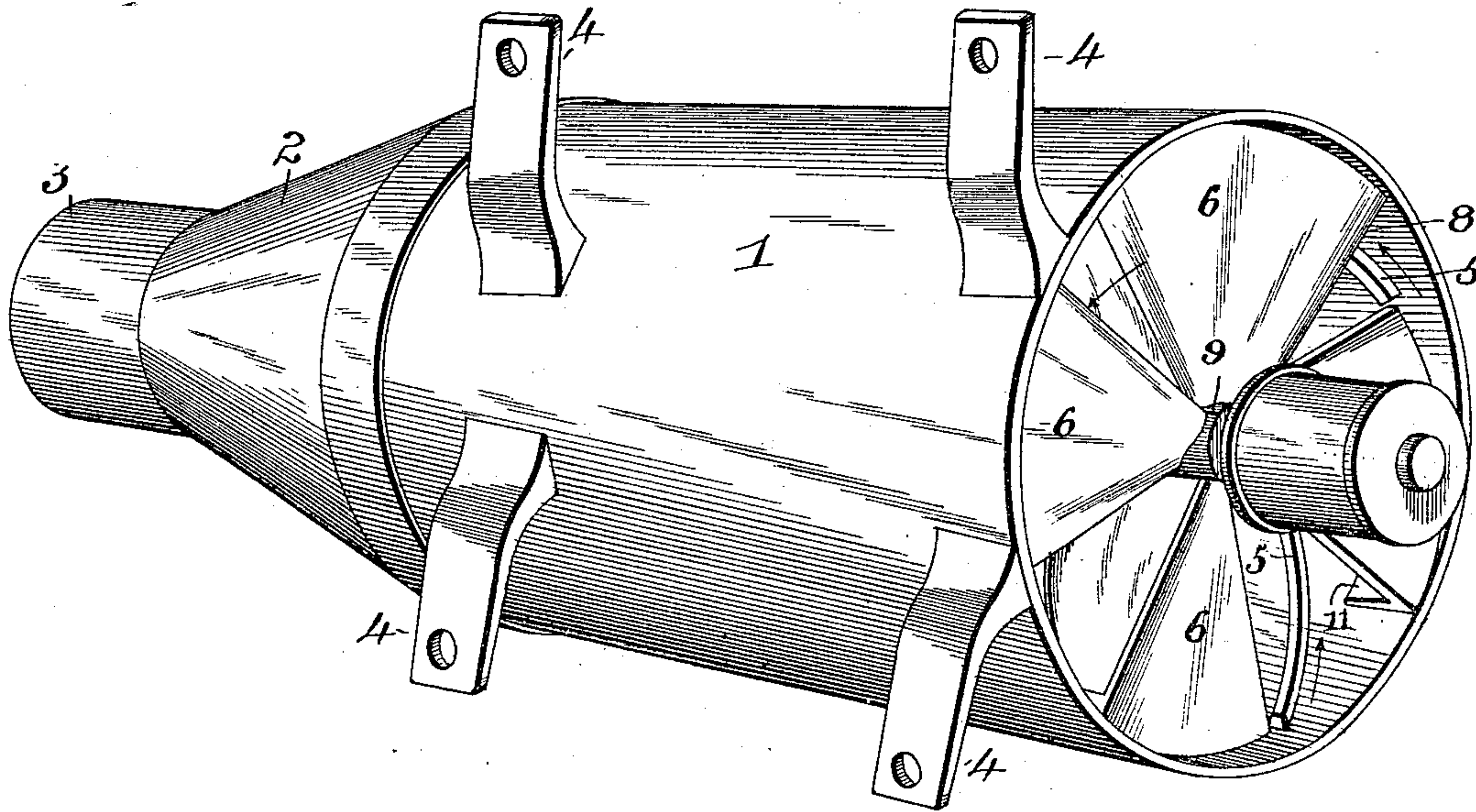
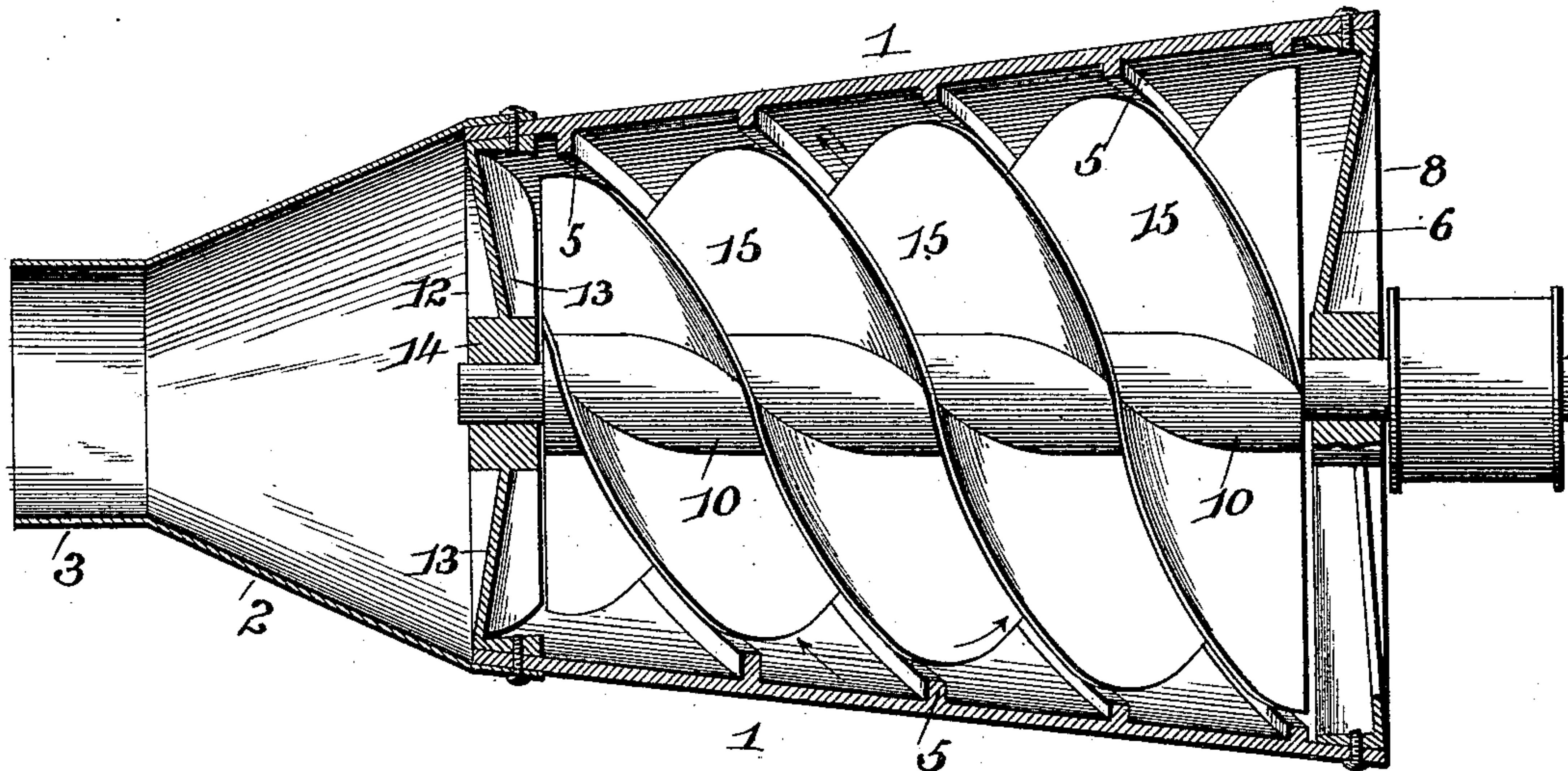


FIG. 2.



Inventor

*Paris Erb*

Witnesses

*Jas. K. McLathran*  
*[Signature]*

By *His* Attorneys,

*Chas. Snow & Co.*

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FIG. 3.

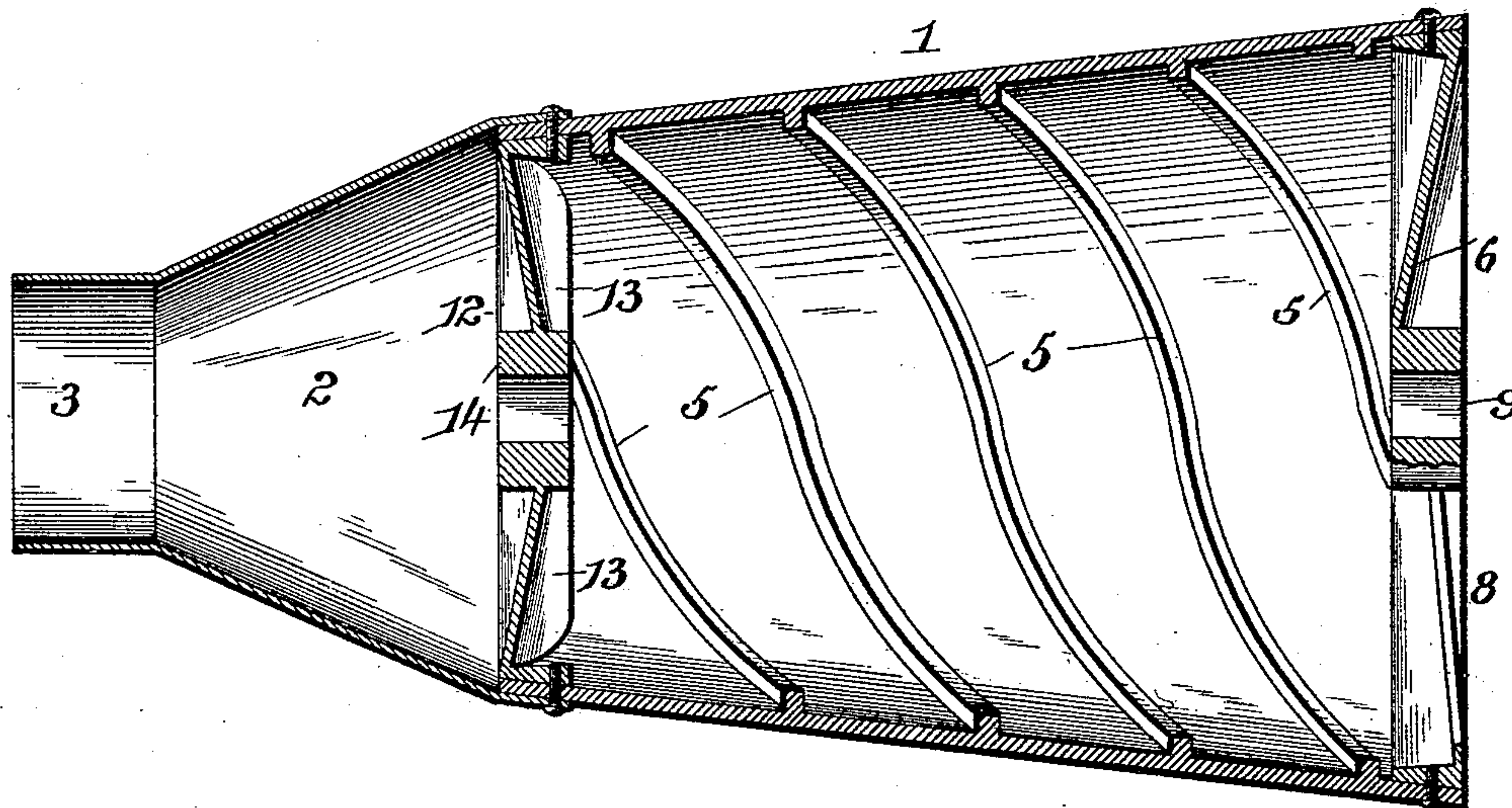
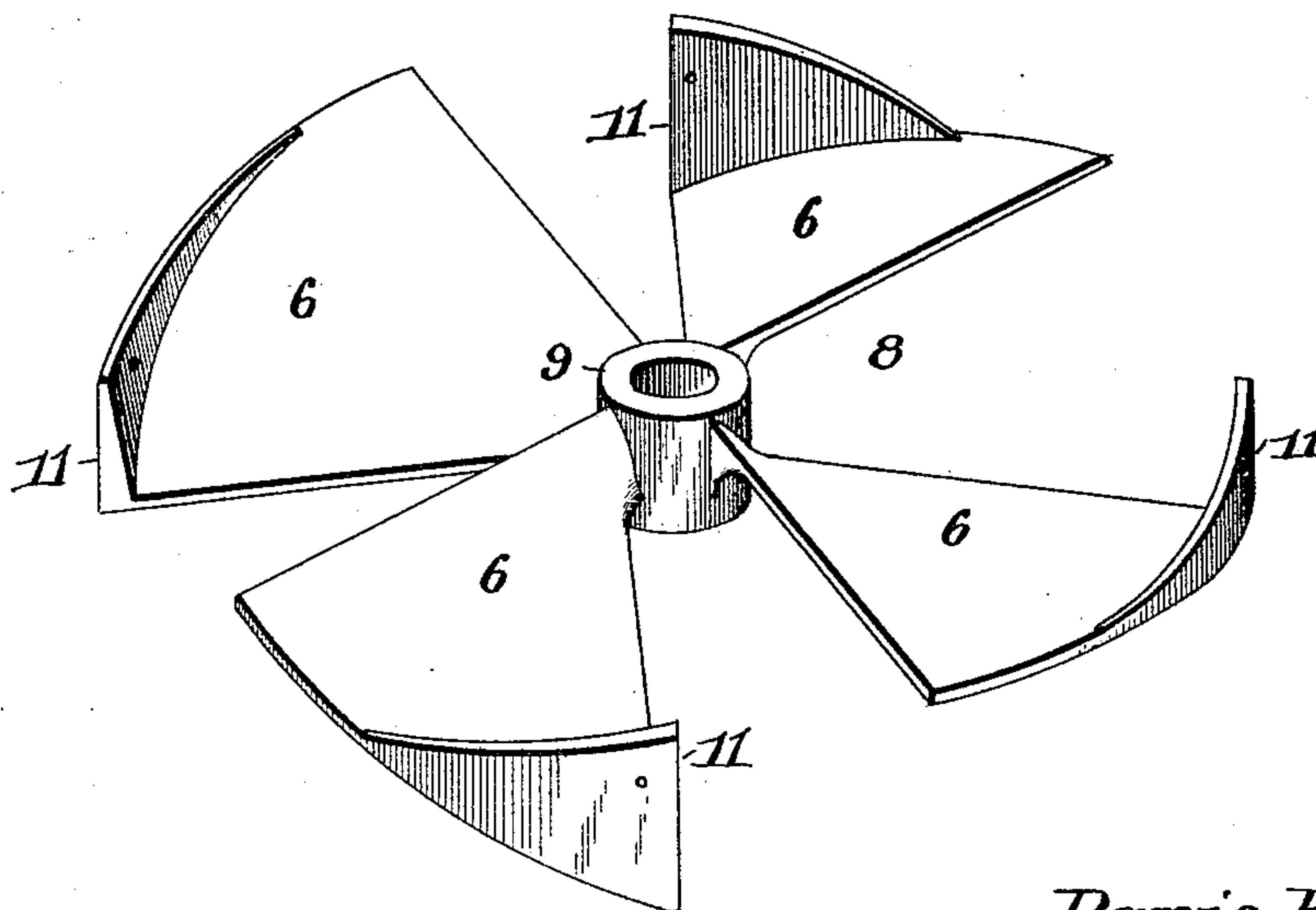


FIG. 4.



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# UNITED STATES PATENT OFFICE.

PARIS ERB, OF LANCASTER, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO  
FRANKLIN SUTTON AND JOHN L. SUTTON, OF SAME PLACE.

## SCREW-PRESSURE BLOWER.

SPECIFICATION forming part of Letters Patent No. 536,925, dated April 2, 1895.

Application filed December 8, 1893. Serial No. 493,185. (No model.)

*To all whom it may concern:*

Be it known that I, PARIS ERB, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented a new and useful Screw-Pressure Blower, of which the following is a specification.

My invention relates to a direct pressure blower adapted for use in connection with forges, cupola and other furnaces, and for use in producing exhaust drafts, the objects in view being to provide a construction whereby back pressure, or pressure in opposition to the direction of the draft, is prevented, and whereby the current of air is given a spiral or twisting movement; and furthermore, to provide a concentrating casing whereby a blast of uniform density is the result.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings: Figure 1 is a perspective view of a blower embodying my invention. Fig. 2 is a central section of the casing with the fan in position. Fig. 3 is a central section of the casing with the fan removed. Fig. 4 is a view of the stationary guard at the inlet end of the casing.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 represents the conical casing, which is tapered from its inlet to its outlet end and is provided with an outlet funnel 2, which is abruptly tapered to the nozzle 3. Said casing is provided with perforated ears 4, to facilitate the attachment of the apparatus to a suitable base or support, not shown. The casing is provided, upon its interior surface, with spirally-disposed ribs 5, which extend from the inlet to the outlet end of the main body of the casing. These ribs terminate at one end, opposite the blades 6 of the stationary inlet guard 8; said guard having the central hub 9, which forms one of the bearings for the axial fan-shaft 10. The outer ends of the blades 6 are provided with perpendicular longitudinally-tapered blocks 11, which are secured to the inner surface of the casing, and the blades

are spirally-disposed to agree with the spiral arrangement of the ribs.

An outlet guard 12, similar in construction to the inlet guard above described, is arranged at the outlet or reduced end of the main portion of the casing, and is provided with wings 13, and a central hub 14, which forms the other bearing for said axial fan-shaft.

The fan consists of a series of spirally-arranged blades 15, the pitch of which agrees with that of the ribs upon the inner surface of the casing, whereby, when the fan is rotated in the direction indicated by the arrows *a* in Fig. 1, the air which enters through the spaces between the wings of the stationary inlet guard is thrown outwardly by centrifugal force and is caused to travel between the guiding ribs on the shell of the casing in the direction indicated by the arrows *b* in Fig. 1. The spiral wings of the fan terminate close to the inner edges of the wings of the guards, and the peripheries of said spiral wings operate close to the inner edges of the guiding ribs; and, inasmuch as the pitch of the spiral wings agrees with that of the ribs, the air is forced, by a positive pressure, in the direction of the ribs.

The wings of the rotary fan are reduced in circumference toward the outlet end of the blower, such reduction being more abrupt than the tapering of the walls of the casing, and the guiding ribs are increased in projection toward the outlet end of the casing to preserve a uniform interval between the peripheries of the fan blades and the ribs.

The spiral direction of the current of air through the blower assists in the concentration of the blast and produces a whirling or twisting action, whereby a blast of uniform density is produced.

From the above description it will be seen that the construction of my improved blower is simple and that it may be manufactured at a comparatively small cost. Any suitable means for supplying power to the shaft may be employed. It will be seen, furthermore, that inasmuch as the casing is tapered or conical throughout its length a gradual compression of the air is attained, instead of allowing this compression to be accomplished solely at the outlet end of the blower. The



latter construction causes an amount of friction and interference with the blast which is avoided by the continuously-tapering casing. Furthermore, the conical shape of the casing enables the manufacturer to construct the same from a single casting and form the interior ribs integral therewith, whereby the jointing of two separately-constructed halves is avoided. It should be noted, also, that the helical arrangement of the blades causes the blast to be pressed or forced forward by a steady pressure in that direction, and therefore the blower depends upon pressure in the direction of the axis of the cylinder or casing instead of centrifugal motion, as in those blowers provided with blades or wings which are arranged more nearly parallel with the axis of rotation. Again, it is apparent that inasmuch as the shaft of the fan is made of small diameter, and the entire space between the shaft and the walls of the casing is occupied by the blades, a greater volume of air is received at the inlet end of the casing. Hence a stronger blast is produced than would be possible if the shaft approximated in diameter the bore of the cylinder or casing.

Having described my invention, what I claim is—

1. In a blower, the combination of a continuously tapered or conical casing provided with integral ribs arranged spirally upon its inner surface and increasing in projection toward the smaller or outlet end of the casing, and a rotary fan having blades extending spirally from one end of the casing to the other and reduced continuously in diameter toward the smaller or outlet end of the casing, substantially as specified.

2. In a blower, the combination of a continuously tapered or conical casing, guards located respectively at the inlet and outlet ends of the casing and each comprising a cen-

tral hub and a series of radial spaced flat wings, the planes of which are deflected from any radial plane embracing the axis of the hub, and a rotary fan having its shaft mounted in the hubs of said guards, and having blades extending spirally from one end of the casing to the other and reduced continuously in diameter toward the small or outlet end of the casing, substantially as described.

3. In a blower, the combination of a conical casing provided upon its interior surface with spirally-disposed parallel guiding ribs which increase in projection from the inlet to the outlet end of the casing, a concentrating funnel arranged at the outlet end of the casing, stationary guards disposed at the outlet and inlet ends of the casing and comprising central hubs arranged in alignment, and angularly-disposed wings provided at their outer extremities with blocks which are secured to the inner surface of the casing, the inclination of said wings corresponding with that of the guiding ribs which terminate respectively at the edges of the wings, and a rotary fan having its shaft mounted in said hubs and provided with parallel spirally-disposed wings which terminate contiguous to the inner edges of the wings of the guards and have their peripheries arranged close to the inner edges of the guiding ribs, said wings being reduced in circumference toward the outlet end of the blower, and the pitch of the same being equal to that of the guiding ribs, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

PARIS ERB.

Witnesses:

V. K. ALEXANDER,  
N. D. ALEXANDER.