

(No Model.)

4 Sheets—Sheet 1.

G. M. CAPELL.
CENTRIFUGAL FAN.

No. 535,483.

Patented Mar. 12, 1895.

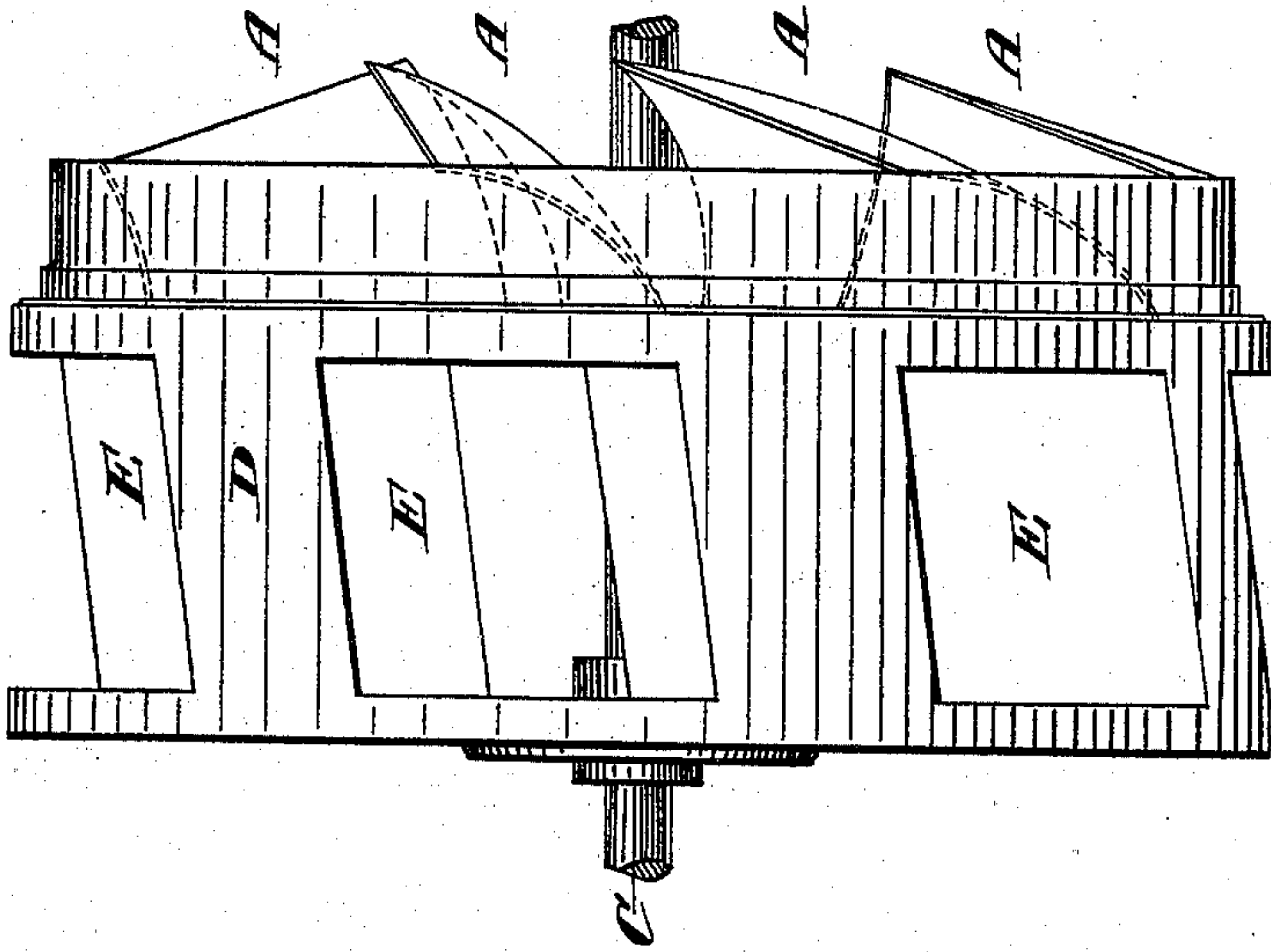


FIG. 2.

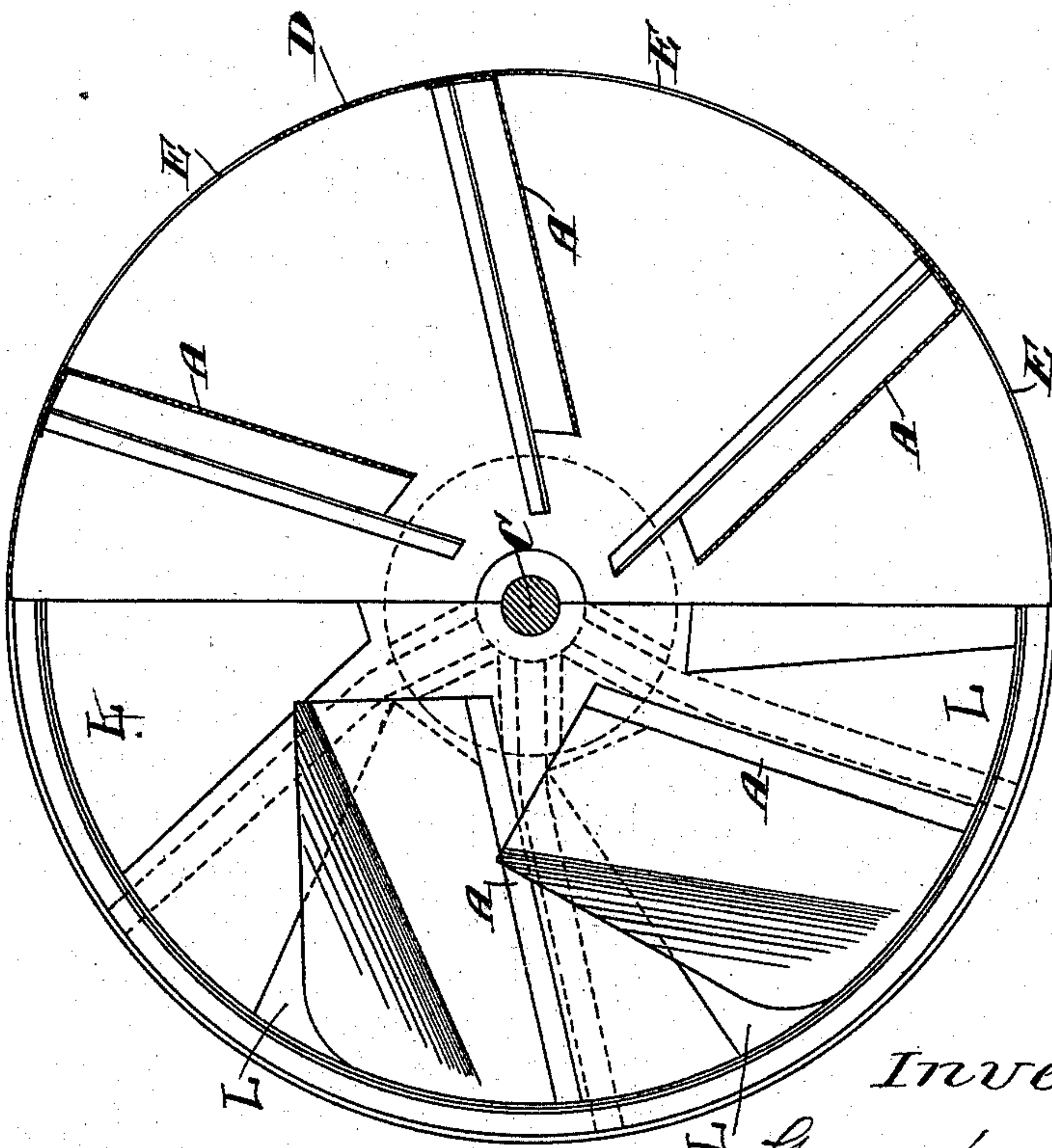


FIG. 1.

Witnesses:

E. B. Bolton

E. A. Scott

Inventor:

George Marie Capell

By

Richard H. Lee

his Attorneys.

(No Model.)

4 Sheets—Sheet 2.

G. M. CAPELL.
CENTRIFUGAL FAN.

No. 535,483.

Patented Mar. 12, 1895.

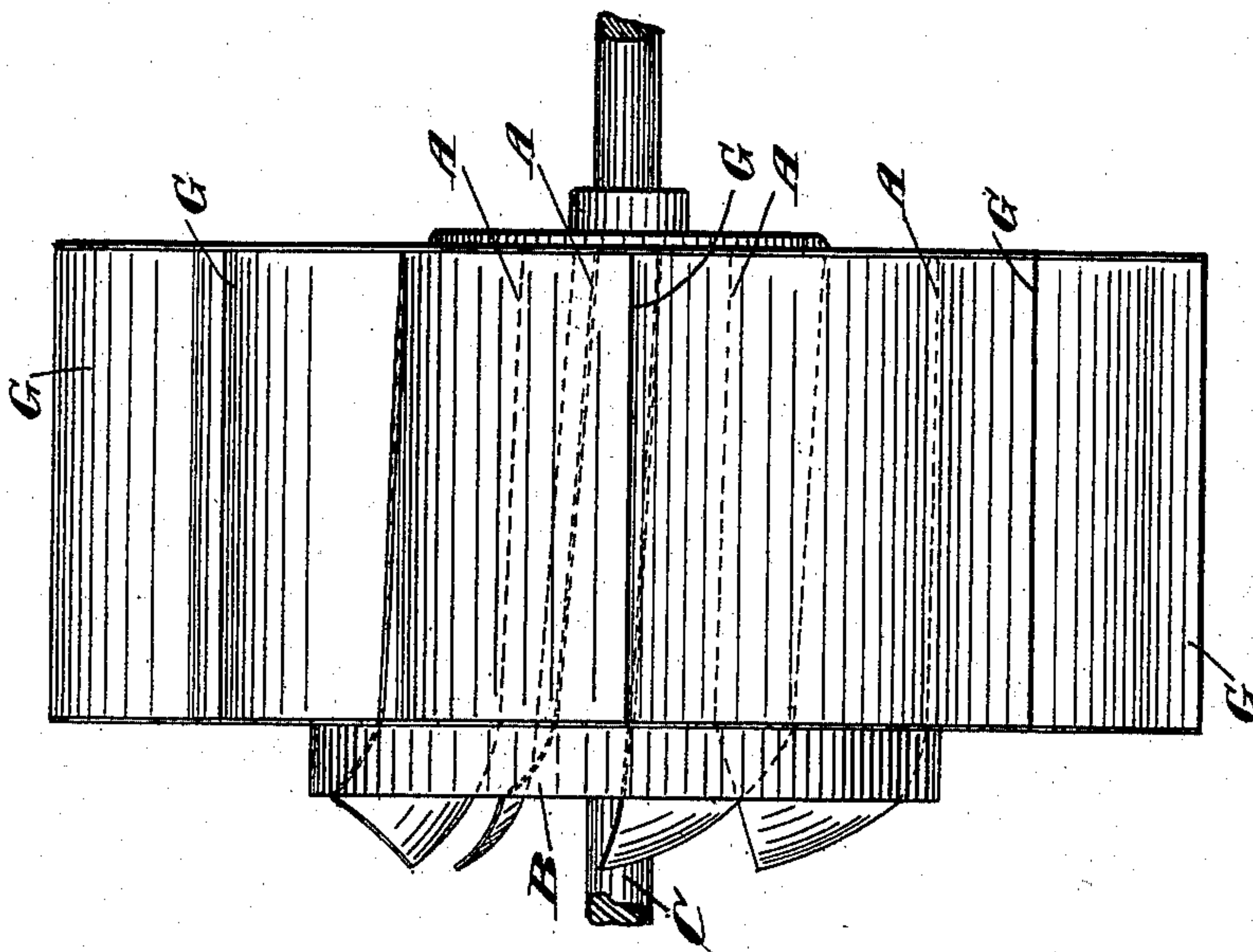


FIG. 4.

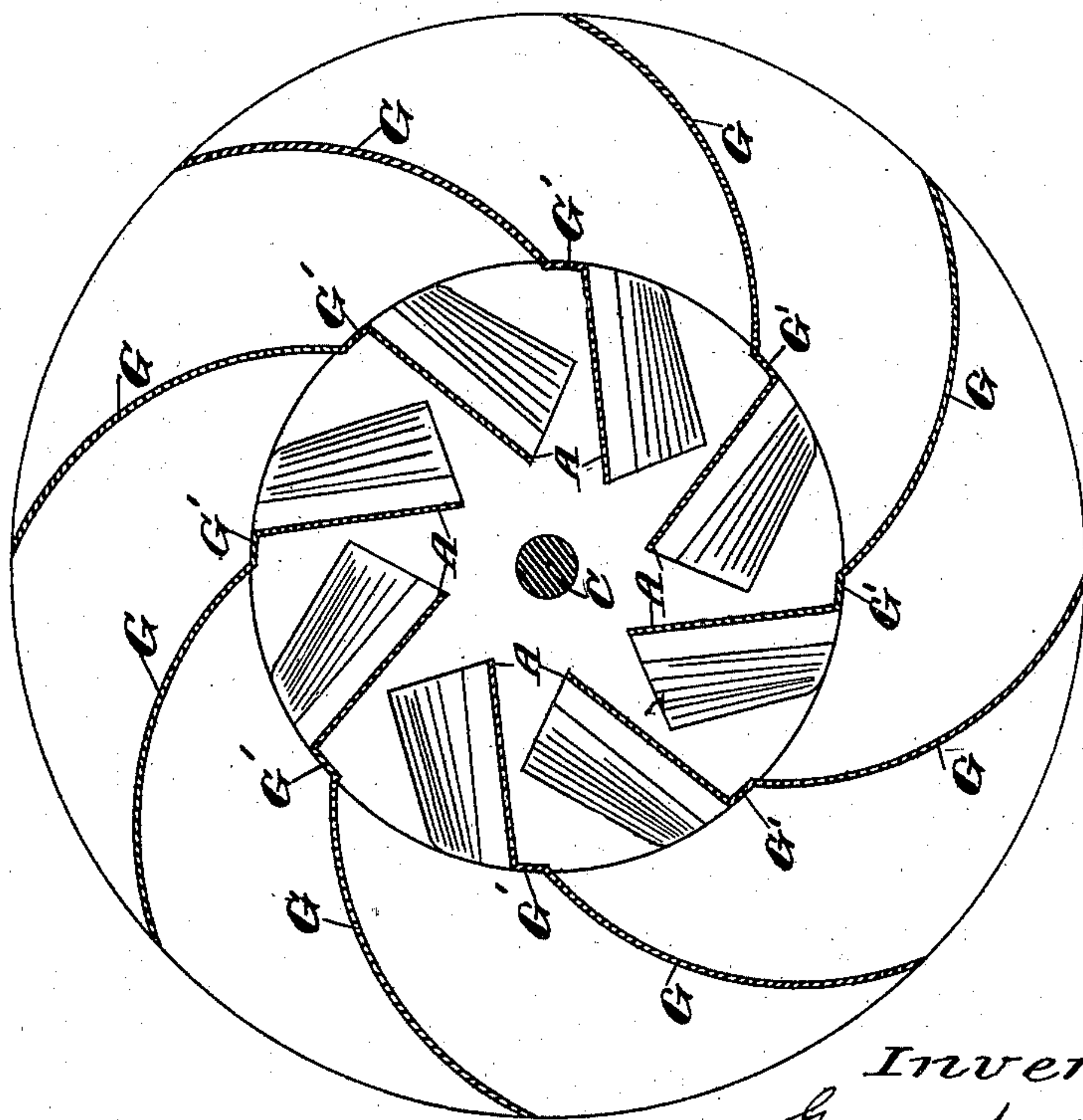


FIG. 3.

Witnesses:

E. B. Bolton
E. A. Scott

Inventor:
George Marie Capell

By *Richard L. Lee*
his Attorneys.

(No Model.)

4 Sheets—Sheet 3.

G. M. CAPELL.
CENTRIFUGAL FAN.

No. 535,483.

Patented Mar. 12, 1895.

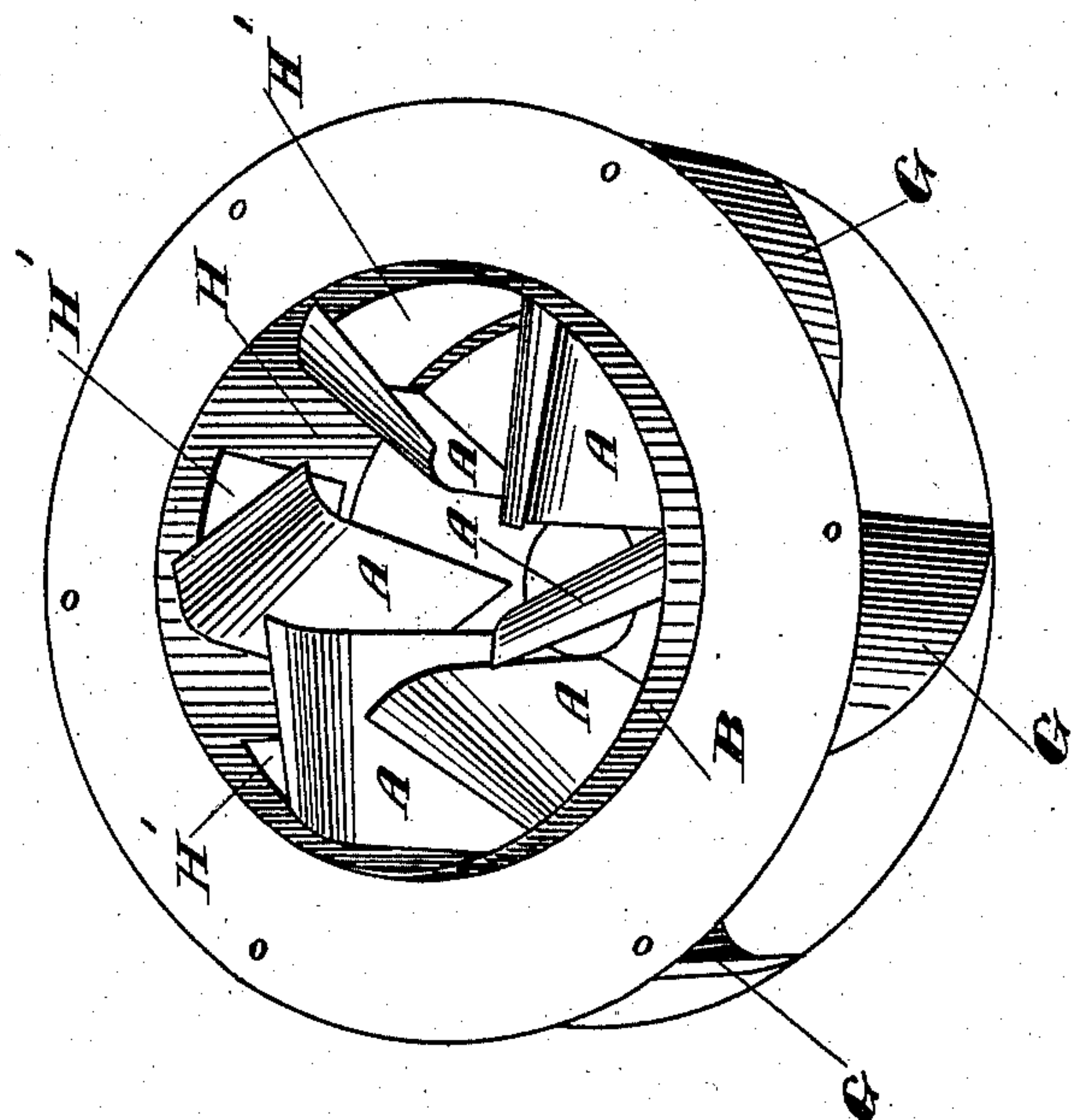
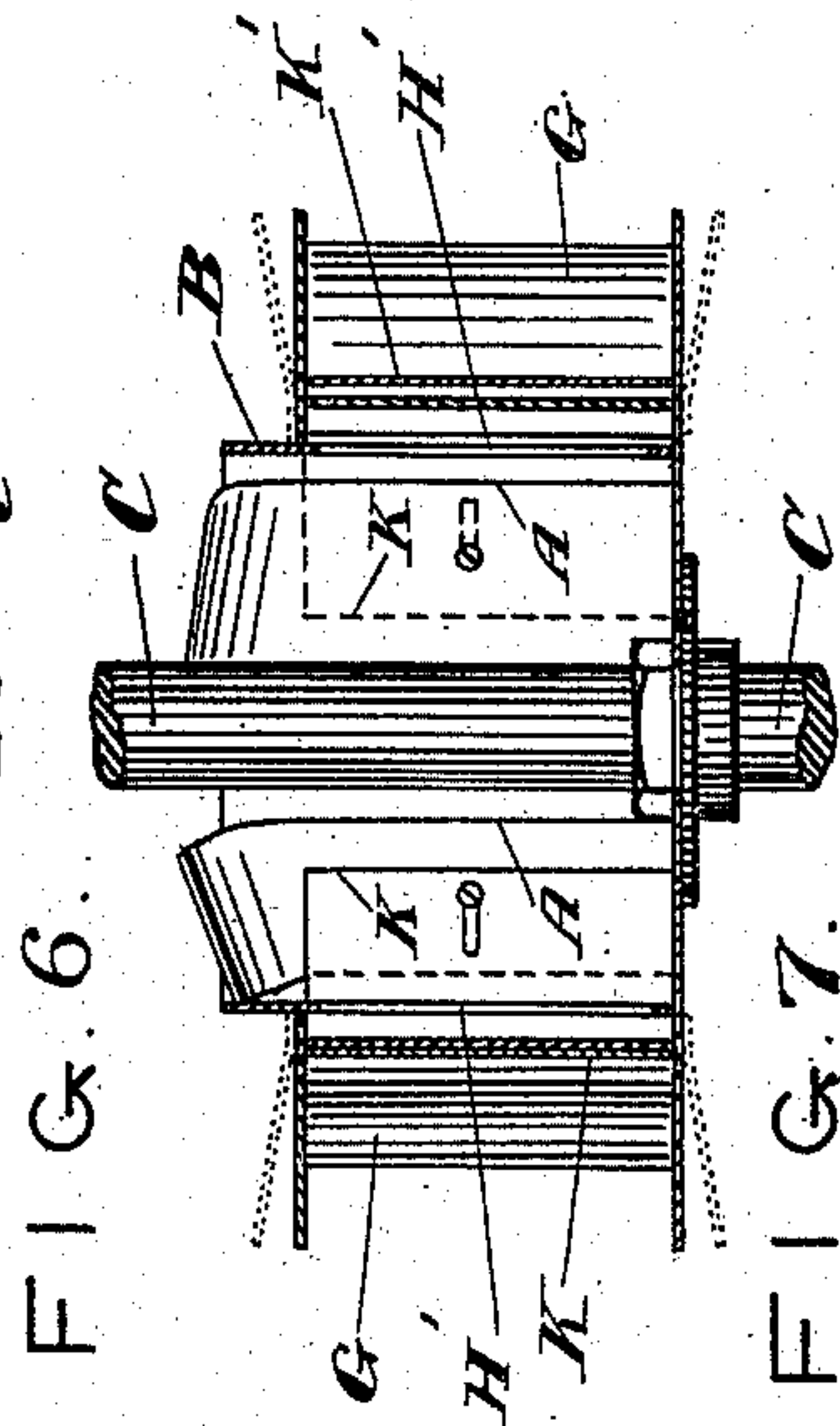
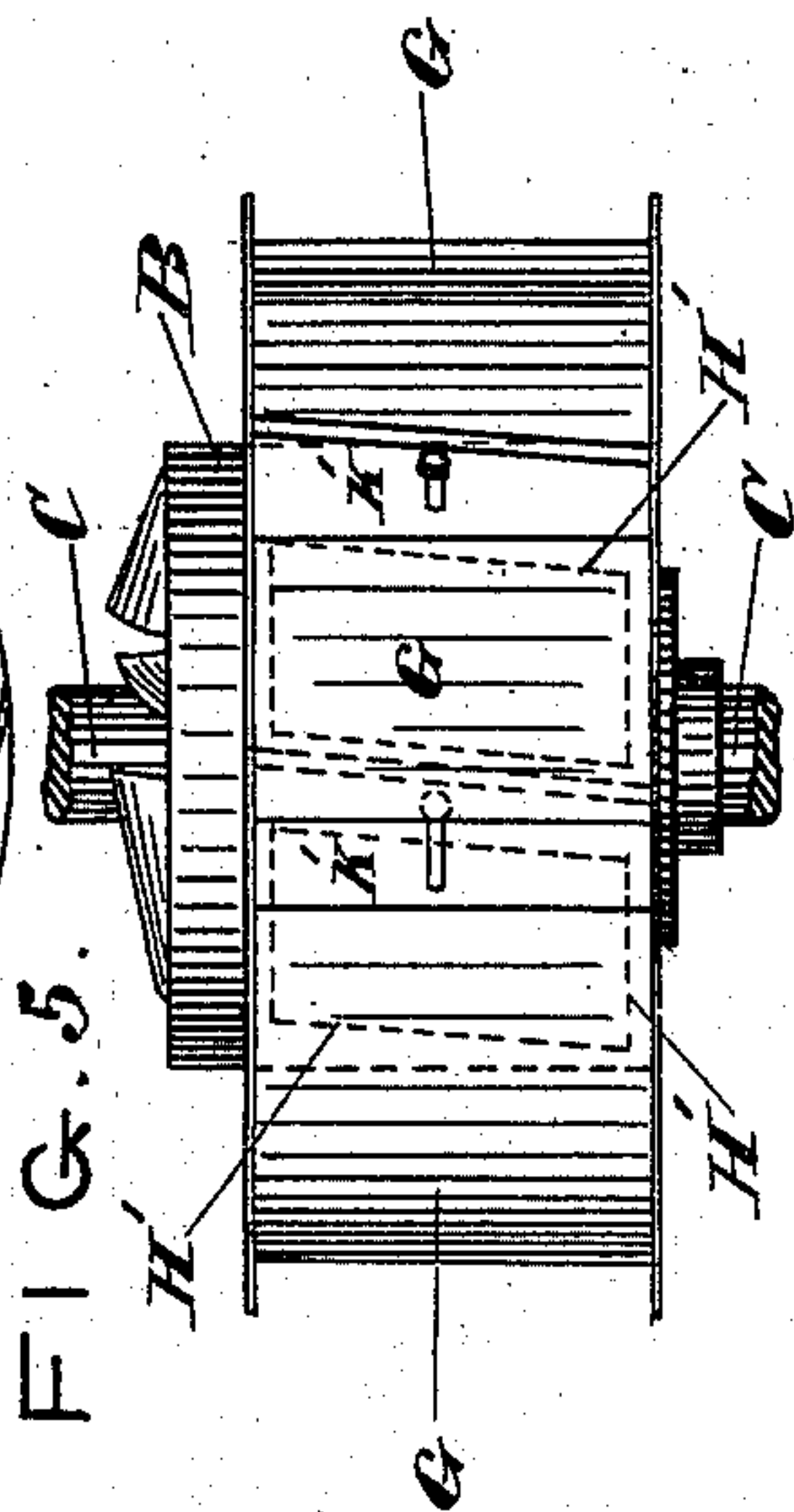
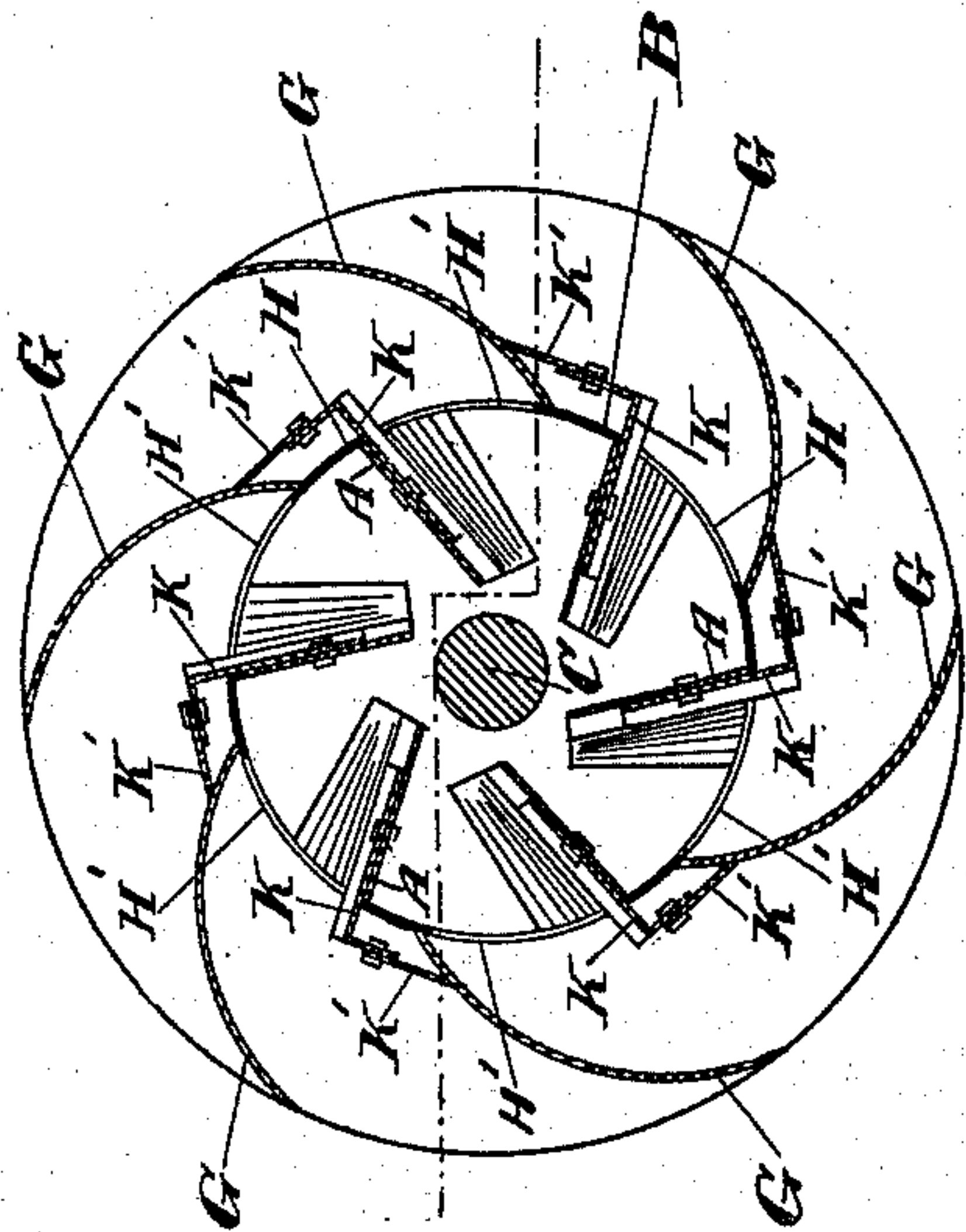


FIG. 8.



Witnesses

E. B. Bolton
E. A. Scott

Inventor:
George Marie Capell

By *Richard H. V.*
his Attorneys.

(No Model.)

4 Sheets—Sheet 4.

G. M. CAPELL.
CENTRIFUGAL FAN.

No. 535,483.

Patented Mar. 12, 1895.

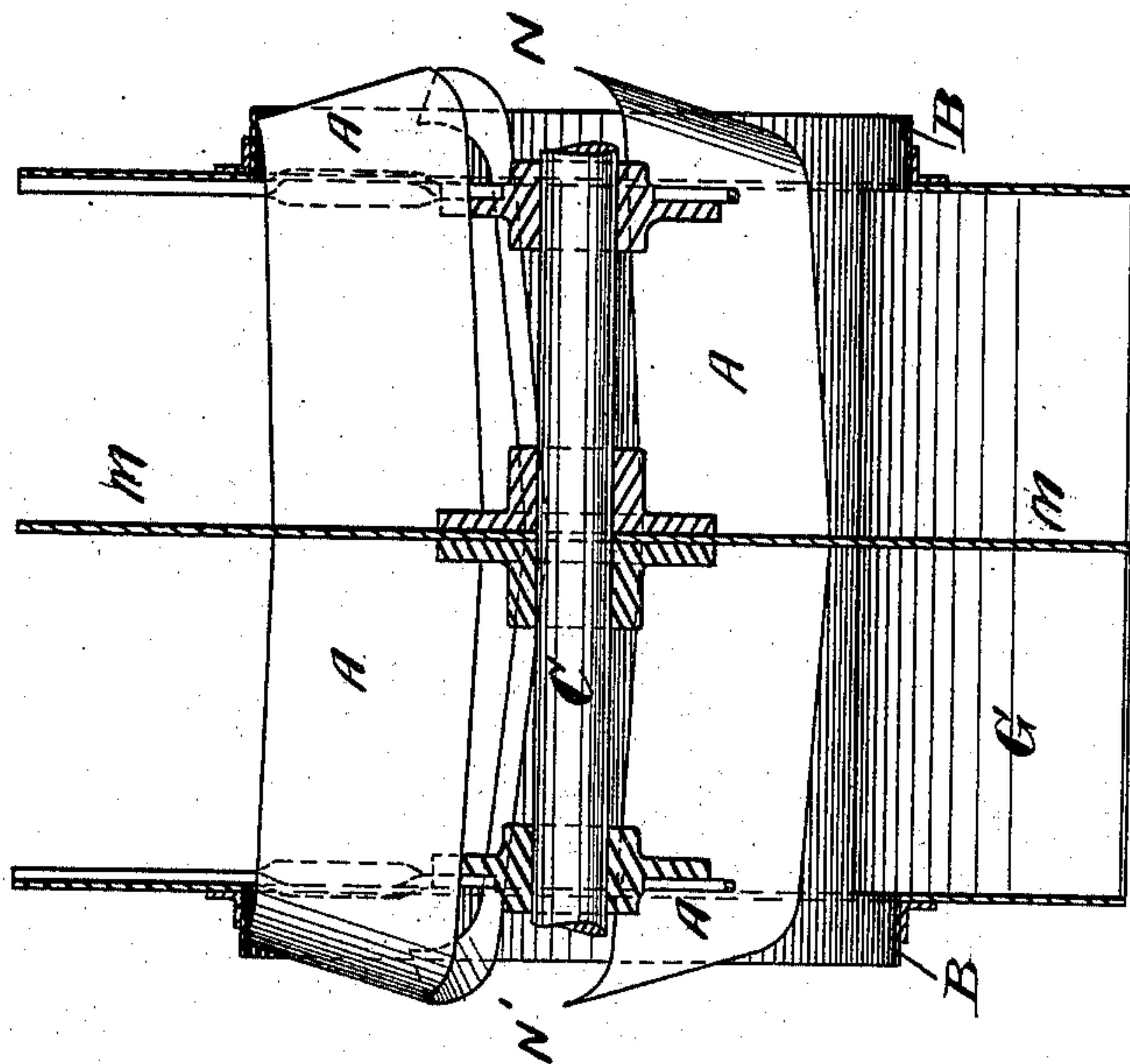


FIG. 10.

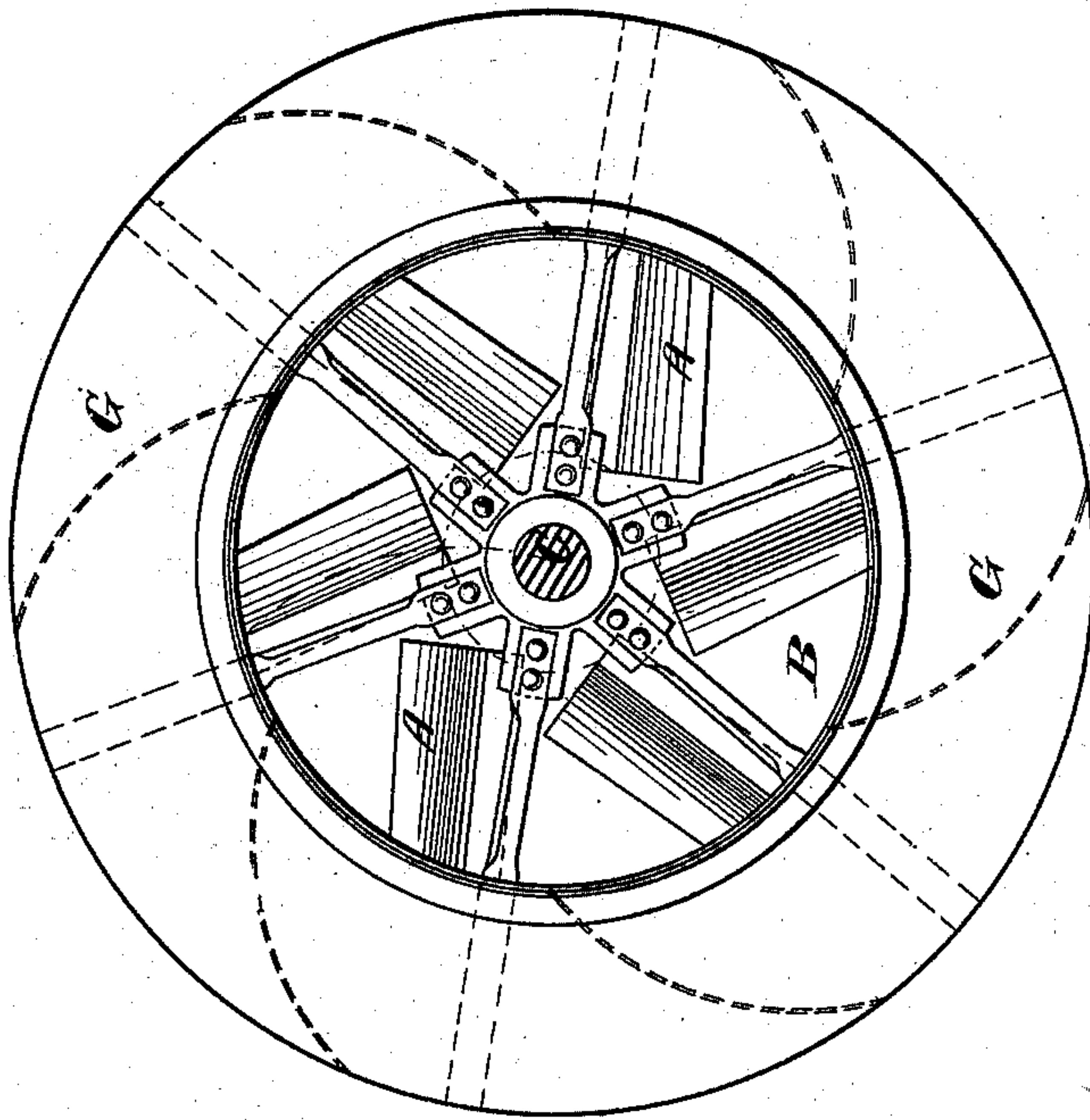


FIG. 9.

Attest
Walter M. Alden
James M. Allen

Inventor
George M. Capell
by *Richards & Co.*
Attys.

UNITED STATES PATENT OFFICE.

GEORGE MARIE CAPELL, OF PASSENHAM RECTORY, ENGLAND.

CENTRIFUGAL FAN.

SPECIFICATION forming part of Letters Patent No. 535,483, dated March 12, 1895.

Application filed January 9, 1894. Serial No. 496,250. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MARIE CAPELL, residing at Passenham Rectory, in the county of Northampton, England, have invented Improvements in Centrifugal Fans for Air or Liquid, of which the following is a specification.

My invention relates to fans used to produce centrifugal action upon air for blowing or exhaust purposes and which are equally applicable as centrifugal pumps for liquids, and consists of a special construction of inner blades, about or within the inlet for air or liquid, so that they produce a combined effect both as a helix and as a centrifugal blade upon the indraft of air or liquid. The said blades may be used alone with a suitable supporting case or frame and an axial spindle, or may be combined with an outer portion or series of blades, formed to act centrifugally upon the passing air or liquid at a different angle to the inner portion of the blades so as to reinforce their action.

In order that my invention may be the better understood I now proceed to describe the same in reference to the drawings hereto annexed and to the letters marked thereon.

Figure 1 is a sectional elevation of a drum fan fitted with only one internal set of my helically scooped blades. Fig. 2 is an outside end view of the same. Fig. 3 is a sectional elevation of my internal helically scooped plates extended by external reinforcing blades of different curve supported between two disk frames. Fig. 4 is an end elevation of the same. Fig. 5 is a sectional elevation of my combined internal helically scooped blades and external curved blades separated by a perforated drum and supported between two disk frames. Fig. 6 is a plan of the same. Fig. 7 is a sectional plan of the same, and Fig. 8 is a perspective view of the same. Figs. 9 and 10 show a side elevation and a transverse section of a duplicate right and left handed fan.

The feature of my invention which is common to all these modifications is the construction of the internal blades A which are arranged tangential to a circle of about one-fourth of the diameter of the periphery of the said blades. Around the inlet I place a cylindrical ring or flange B and I prolong the

inner blades A into the said ring or flange B, and so twist the ends of the blades helically in the direction of rotation that the extremity of the blades nearest to the axis C and at the point of minimum linear velocity of rotation project farthest from the body of the fan, thus screwing or leading the air or liquid at the point of least velocity, to cause it to enter into the grasp of the blades, and by their helical twist to force the air or liquid into the main body of the blade which gives it there-after a further centrifugal motion. The outer ends of the blades may be secured to an outer drum D, pierced by perforations E, as shown in Figs. 1 and 2. As a modification I may extend outward these inner blades as above described by extension blades G G, Figs. 3 and 4 curved in the usual curved form for centrifugal action, an intermediate step G' being introduced between the two parts of the blade, and the said step may be adjustable as to form by sliding plates K K' Fig. 5, so that the upper part of the step extends beyond the drum or lower part of the blade, and their relative obliquity is so arranged that the air or liquid as it is delivered from the internal part of the blades is caused to strike or impinge upon the inner curved faces of the outer portion G of the next following blade. For greater strength I may introduce between the internal and external portions of these blades a drum H provided with suitable orifices H' for the passage of the liquid or air from the inner part of the blade to the outer blades or extension of blades upon the outer periphery of the drum.

I may gradually increase the width between the casings of the outer portion of the fan as shown in dotted lines in Fig. 7 to reduce the velocity of the discharge from the fan, where it enters into the outer atmosphere or casing; or when pumping liquids or blowing air or gas for a definite purpose I may complete the case in the usual way with a tangential circular orifice preferably expanding in exhaust fans.

Where great strength is required the disk frame which is hereinabove described as provided with an inlet orifice admitting the projection of the inner blades therethrough, may be continued down to the axle, and connected thereto by a further boss, as in Fig. 1, orifices

L being provided therein between the blades as inlets, and the projecting helical scoops A of my inner blades, may be attached to the solid portion of the said disk, as a continuation of the inner blades instead of forming an intrinsic part of them as heretofore described.

It is obvious than any of the above single fans may be duplicated by two similar fans being built upon a central dividing disk M with double inlets N N' right and left on either side as shown in Figs. 9 and 10, the inner blades A in that case being placed at corresponding angles from either side right and left handed respectively.

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

1. In combination in a centrifugal fan or pump having an annular inlet protected by a ring flange, the blades projecting through the said annular inlet and placed helically to the plane of the fan, tangentially to a circle about the axis of rotation and pointing in advance of the direction of rotation, the first entering

point of each vane in the inlet being acute angled, and projecting to the greatest extent in the direction of rotation at the part nearest to the axis in the form of a helical scoop, substantially as described.

2. In a centrifugal fan or pump, the combination of the blades A projecting through the annular inlet of the fan and terminating in a helical scoop near the axis, the curved extension blades G, the said blades A being set back by a step from the blades G and arranged at an angle tangentially to the axis and pointing in advance of the direction of rotation so that the air or liquid from the lower part of the one blade will impinge upon the rear part of the following upper blade, substantially as described.

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

GEORGE MARIE CAPELL.

Witnesses:

RICHARD A. HOFFMANN,
CHARLES H. CARTER.