

(Model.)

2 Sheets—Sheet 1.

J. L. RODGERS.
TURBINE WHEEL.

No. 247,113.

Patented Sept. 13, 1881.

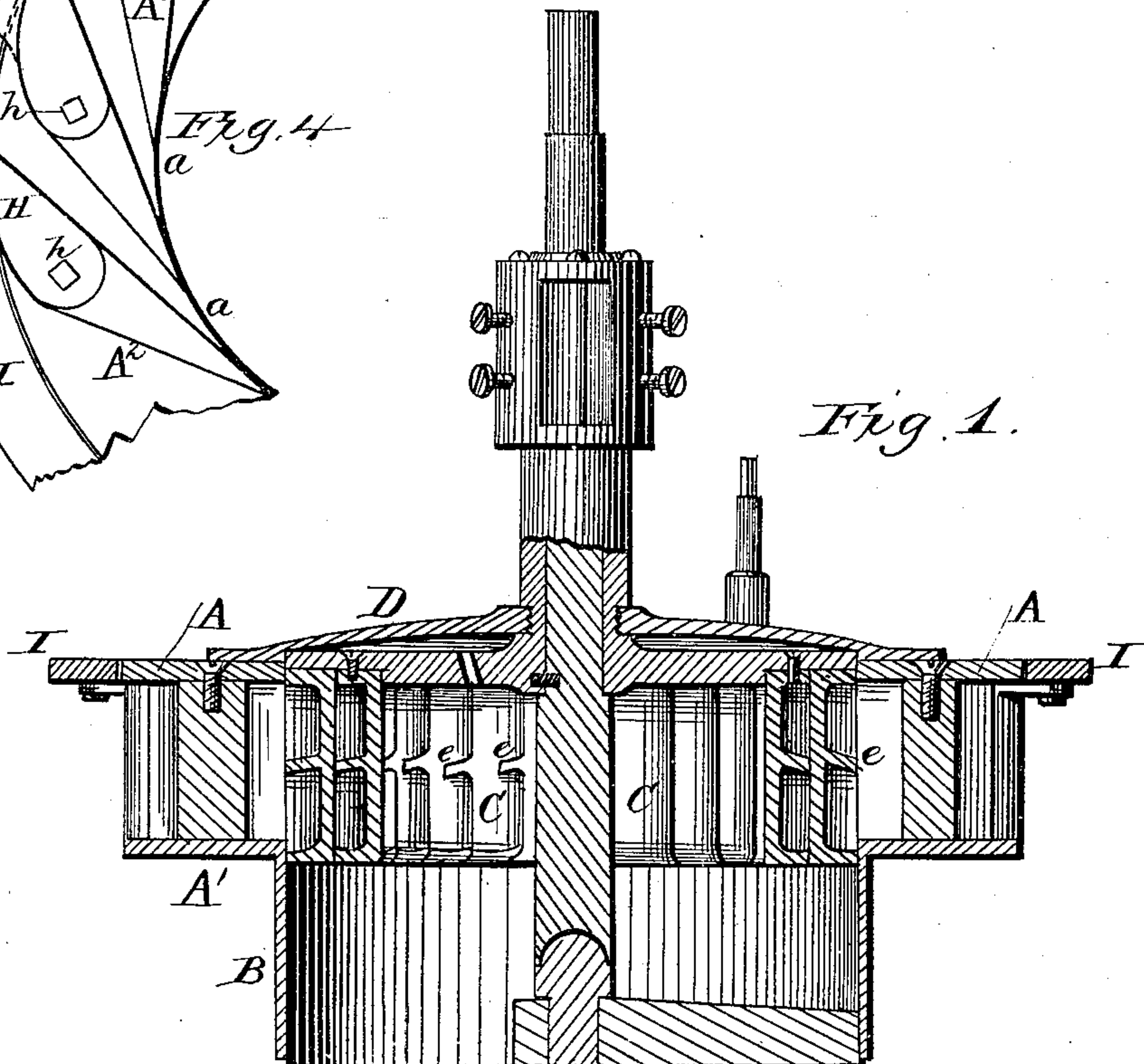
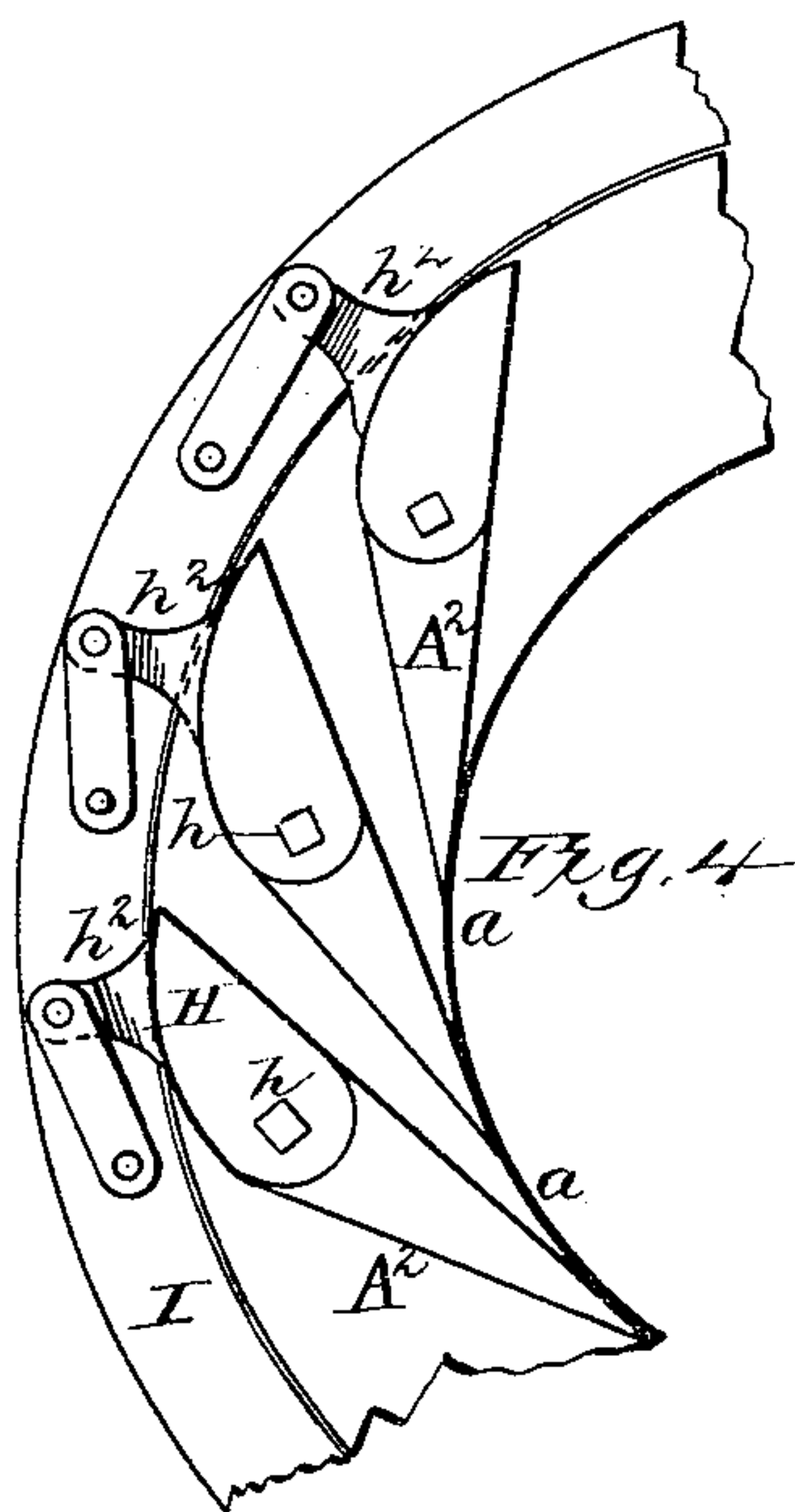


Fig. 5.

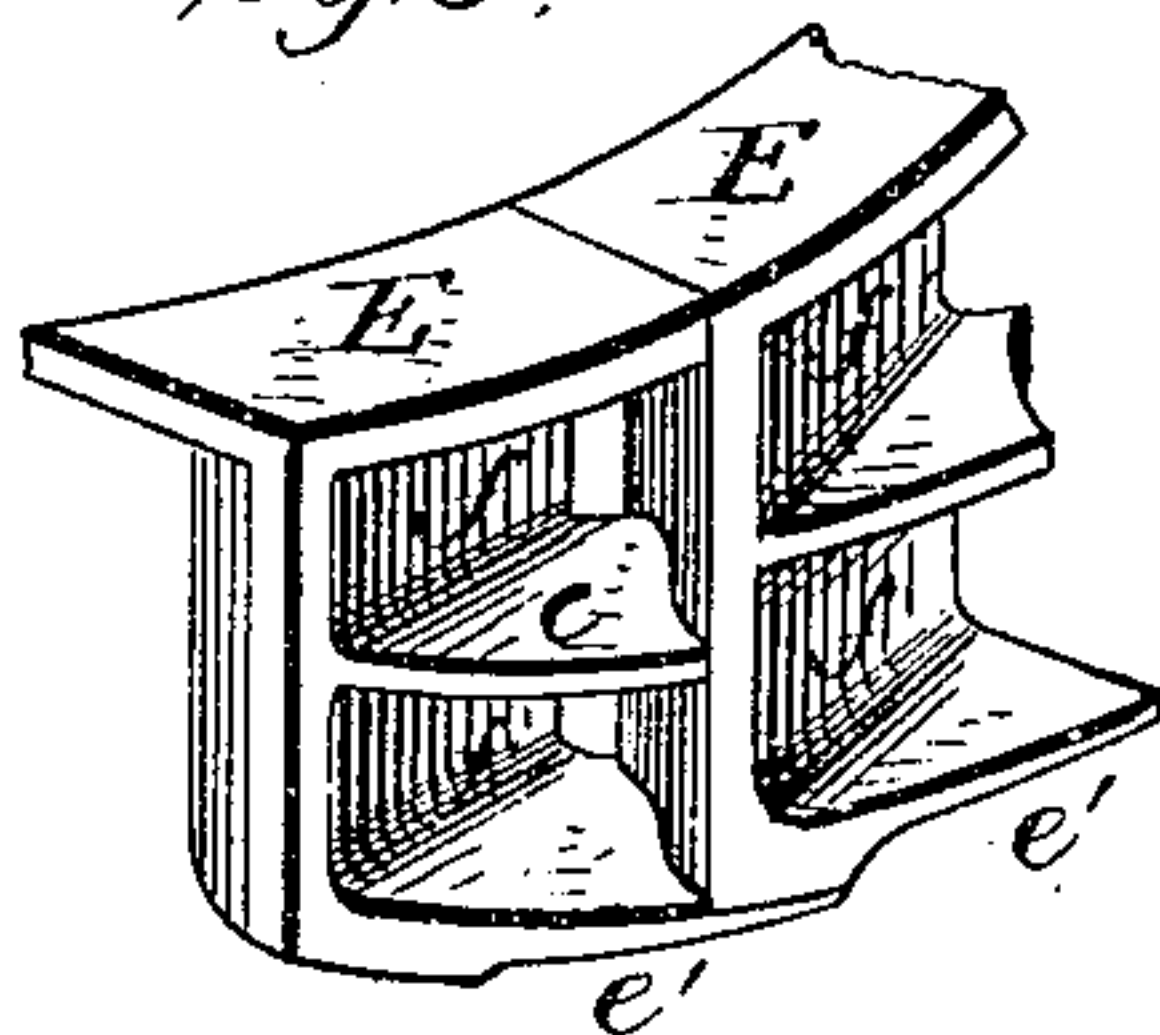
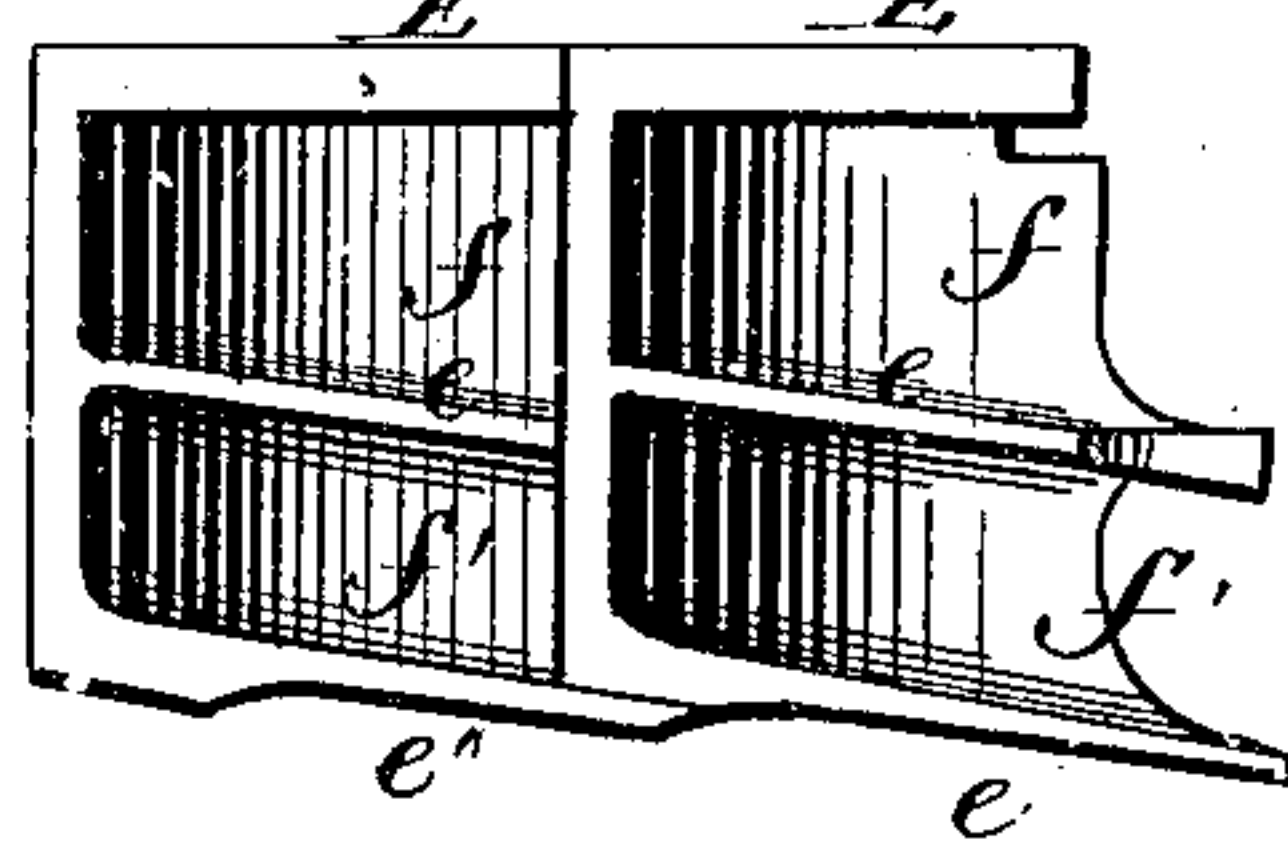


Fig. 6.



Witnesses.
F. L. Curand
Henry E. Waite

Inventor
Jas. L. Rodgers
by A. L. Smith & Co.
Attorneys

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Fig. 2.

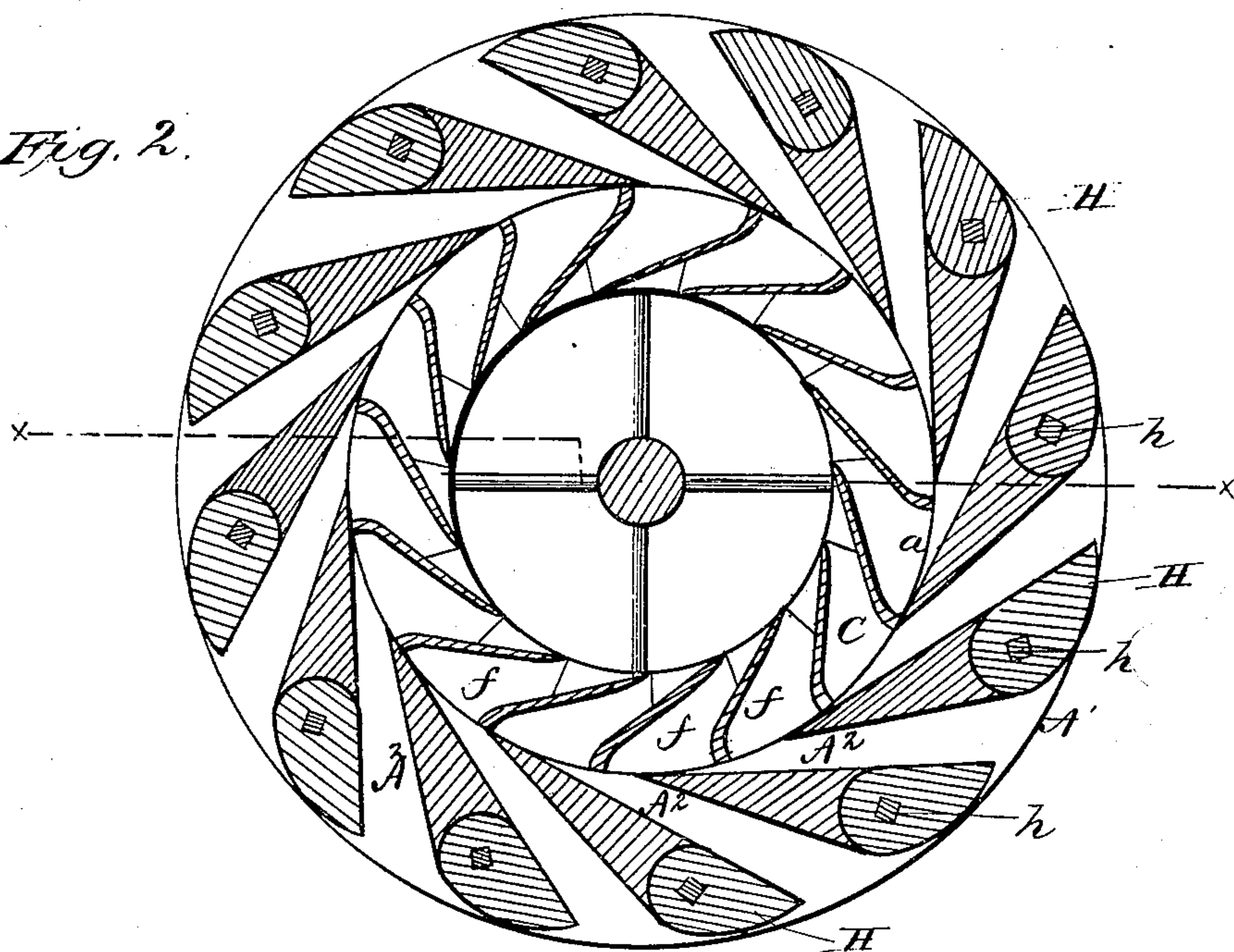
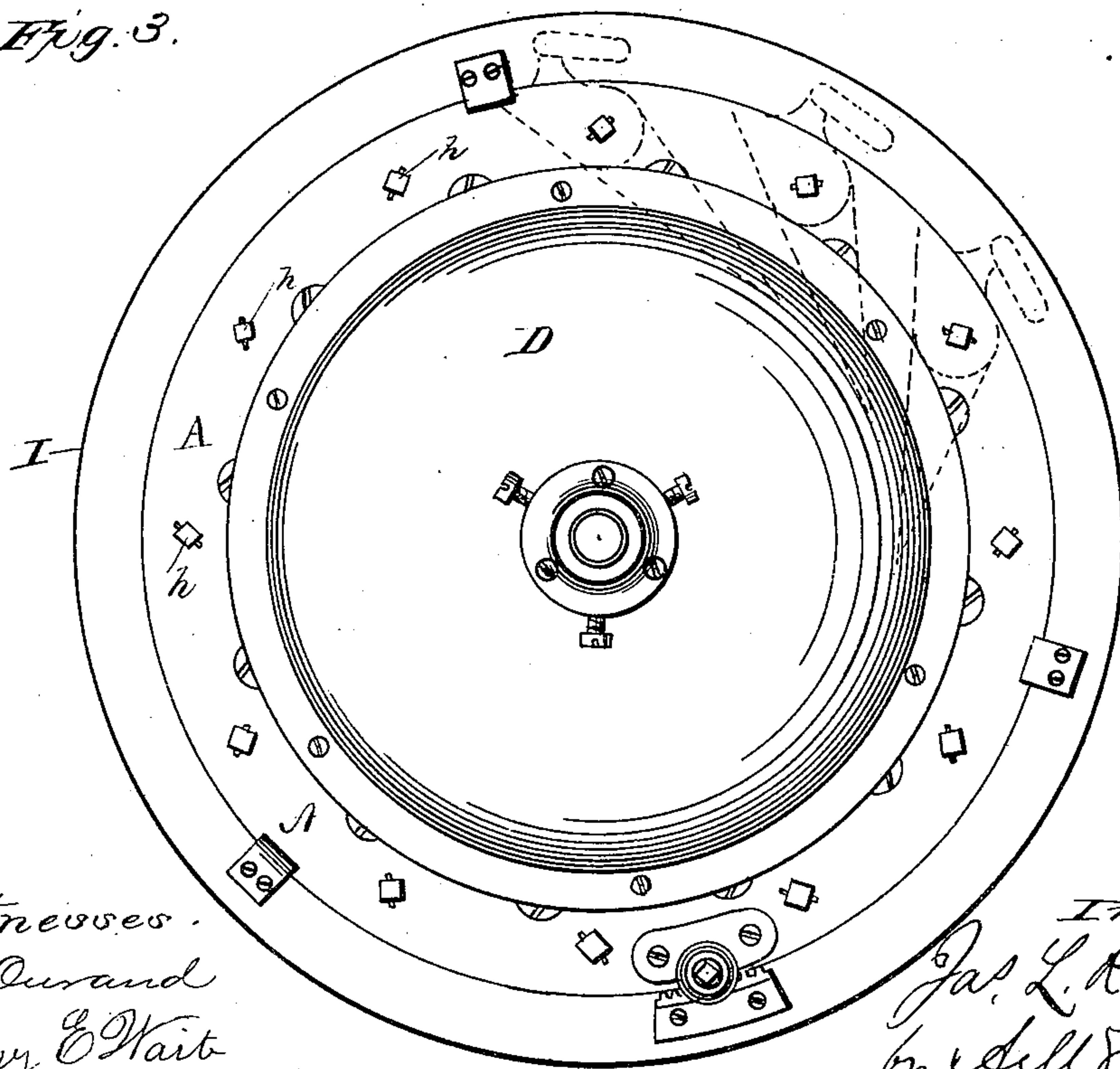


Fig. 3.



Witnesses.
F. L. Ourand
Henry E. Wait

Inventor,
Jas. L. Rodgers
by A. L. Smith & Co.
Attorneys

UNITED STATES PATENT OFFICE.

JAMES L. RODGERS, OF SPRINGFIELD, OHIO.

TURBINE WHEEL.

SPECIFICATION forming part of Letters Patent No. 247,113, dated September 13, 1881.

Application filed June 22, 1881. (Model.)

To all whom it may concern:

Be it known that I, JAMES L. RODGERS, of Springfield, county of Clarke, State of Ohio, have invented new and useful Improvements in Turbine Wheels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 represents a vertical section through a wheel having my improvements applied. Fig. 2 is a horizontal section through the same, taken just below the plane of the gate arms or levers. Fig. 3 is a plan or top view of the same, showing the arrangement of gates, &c., in dotted lines. Fig. 4 is a bottom view, showing the arrangement of the gates and the means for operating the same. Fig. 5 is a perspective view, and Fig. 6 is a front elevation of two of the double buckets.

My invention relates to a novel construction of buckets, adapting them more fully to utilize the weight and reactive force of the water; and it consists in the employment of double buckets, or buckets having a central partition, giving them each an upper and a lower compartment, the lower walls of both of which incline downward at the same angle, and which are consequently parallel, both compartments of the buckets having a central discharge, the partitions to the several buckets forming, when the latter are united and in place, a central ring or brace, materially strengthening and stiffening the wheel.

The wheel, in its organization and arrangement of parts, is similar to that described in Letters Patent granted to me October 20, 1874, No. 156,102, and it need not therefore be here described in detail further than is necessary to an understanding of my present improvements.

In the accompanying drawings, A A' represent the upper and lower rings of the wheel-case, between which the ways or guides for directing the water to the wheel are formed; and B, a vertical annular flange or rim, cast by preference in one piece with the lower ring, A', of the wheel-case.

C is the wheel arranged within the case A A', and covered by a cap-plate or disk, D, the outer edge of which overhangs the ring A, and is secured thereto.

E E are the buckets, two of which are shown detached in Figs. 5 and 6. These buckets are provided with a central partition, *e*, dividing them horizontally into two compartments, *ff'*, with the lower walls, *e* and *e'*, of each inclining to the rear at the same angle, thus making them parallel, as shown in Fig. 6. The rear end of the partition *e* is cut away to conform to the shape of the succeeding bucket, which abuts snugly against it, as shown, while the lower wall, *e'*, is extended underneath the bucket next in rear of it, the forward end of which rests upon and may be rigidly secured to said extension in any suitable manner. By this arrangement it will be seen that only a central discharge is left to the bucket, while both compartments thereof are provided with inclined bottoms, adapting each to utilize the weight and reactive force of the water, thereby greatly increasing the efficiency of the bucket. The partitions *e* of the several buckets, when the latter are secured in place, form a central ring, bracing or stiffening and strengthening the wheel, and, in connection with the overlapping lower walls, *e'*, of the buckets and the manner of uniting them, cutting off the bottom discharge, permit a material reduction in the weight and consequent cost of the wheel, while insuring the requisite strength.

The rings A A' of the wheel-case are separated by upright partitions A², which form the guides for directing the water to the wheel. These may be cast in one piece with the rings, or they may be made separate and secured thereto, uniting the rings in any suitable manner. They are in the form of an acute-angled triangle, set obliquely to radial lines crossing the rings, with their apices adjacent to the wheel C, the inner side or face, *a*, of the partitions being tangential, or nearly so, to the periphery of the wheel, as shown.

The base of the triangle or outer end of each partition is grooved vertically, or has a concavity formed in it in the arc of a circle of which the pivot *h* of the gate H is the center. The gates H are made somewhat similar in form to the guides or partitions—that is to say, they approximate their wedge or triangular form; but each has its base rounded to match the concavity in the outer end of the

partition, as shown, and the outer face, h' , of the gate, by preference, is also rounded, this form facilitating the movement of the gates under the pressure of the water. The gates H
5 have lever-arms h^2 formed upon or rigidly secured to their upper ends, said arms extending outward underneath the upper ring, A, of the wheel-case to a gate-ring, I, surrounding the ring A, and moving in suitable ways there-
10 on. The outer ends of the arms h^2 are connected, each by a pivoted swinging link, i , with the gate-ring I, the arrangement being such that as said ring is partially rotated around the ring A of the wheel-case the gates will be
15 simultaneously operated for opening or closing the water ways or passages between the guides or partitions A^2 . The employment of the pivoted links connecting the arms h^2 and the ring I permits said arms to vary their distance from
20 and their angle of relation to the ring, while at the same time it relieves the connection, to a great extent, of the friction incident to the use of the slotted and sliding connections ordinarily employed. These gate-arms may be
25 so arranged relatively to the gates and ring

also as to exert their greatest leverage at that point where the resistance to the movement of the gates is the greatest—viz., when the gates are closed and subject to the pressure of the water upon their outer faces only—the resist- 30
ance diminishing as the gates are thrown open, diminishing the leverage of the gate-arms.

The means for actuating the ring may be similar to those described in my former patent, as may also all parts of the wheel not 35
herein particularly described.

Having now described my invention, I claim—

In a turbine wheel, the double buckets having the lower and partition walls inclined at 40
the same angle, and parallel, or nearly so, and provided only with the central discharge, substantially as described.

In testimony whereof I have hereunto set my hand this 20th day of June, A. D. 1881.

JAMES L. RODGERS.

Witnesses:

A. P. LINN COCHRAN,
A. TORRELL.