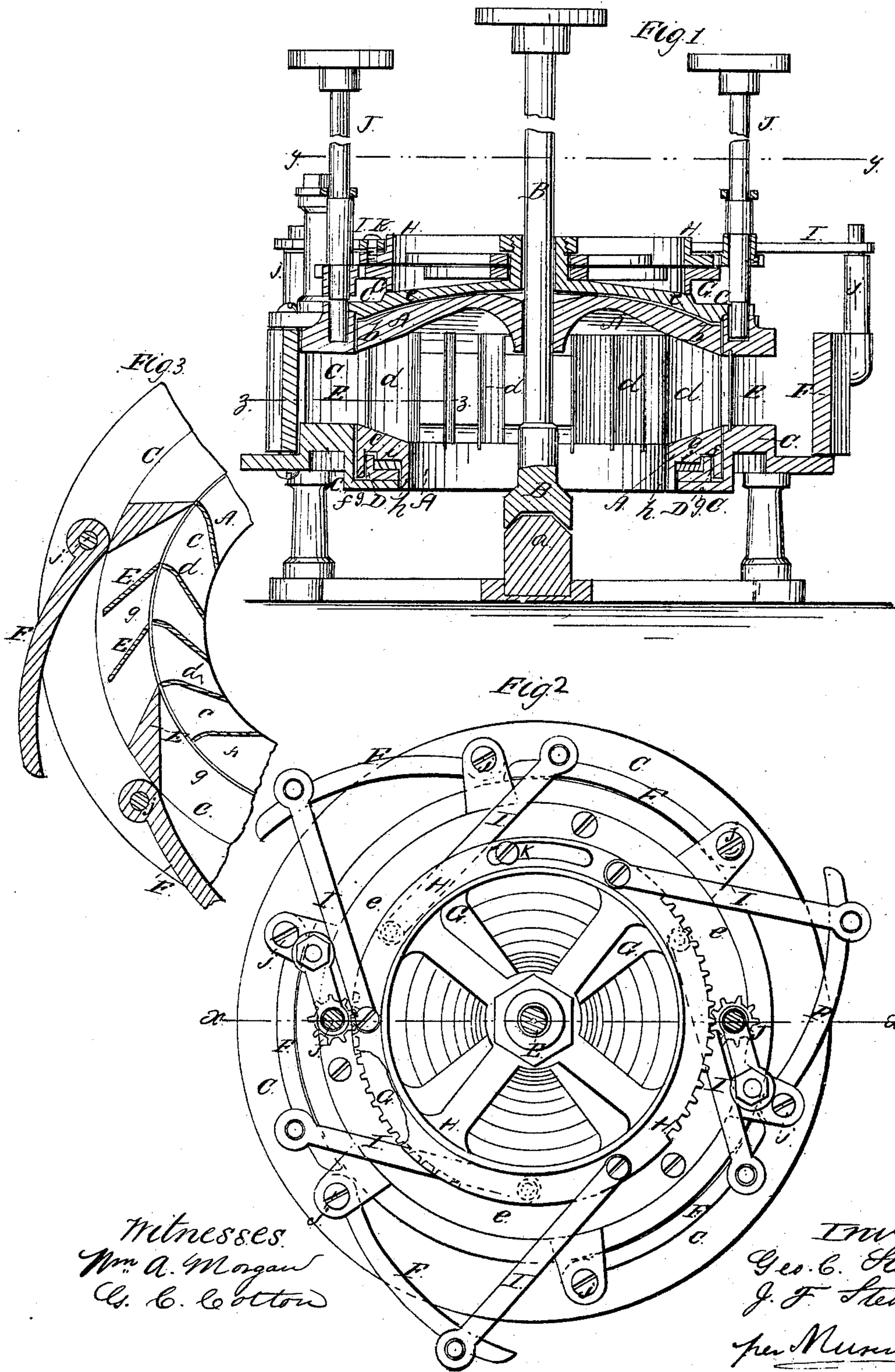


G.C. & J.F. Stevens,

Turbine Wheel.

No. 90,204.

Patented May 18, 1869.



Witnesses.
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GEORGE C. STEVENS, OF WEST TOWNSEND, AND J. F. STEVENS, OF
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Letters Patent No. 90,204, dated May 18 1860

IMPROVEMENT IN TURBINE WATER-WHEELS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, GEORGE C. STEVENS, of West Townsend, in the county of Middlesex, and J. F. STEVENS, of Fitchburg, in the county of Worcester, and State of Massachusetts, have invented a new and useful Improvement in Turbine Water-Wheels; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a vertical central section of our improved water-wheel, the plane of section being indicated by the line *z z*, fig. 2.

Figure 2 is a plan or top view of the same, partly in section, the plane of section being indicated by the line *y y*, fig. 1.

Figure 3 is a detail horizontal section of the same, taken in the plane of the line *z z*, fig. 1.

Similar letters of reference indicate like parts.

The object of this invention is to construct a water-wheel, in which the power of the water is utilized in the most practical manner, and in which the power can be regulated by the gates more conveniently than heretofore.

The invention consists, first, in having the swinging gates attached to separate rings, so that they can be regulated separately, or all together, as may be desired.

The invention also consists in making the top and bottom plates of the wheel thickest on their edges, so as to provide funnel-shaped entrances for the water, to diminish its friction against the said plates.

A represents the water-wheel, fitted round a vertical shaft B, which rests on a fixed step, *a*, and works in suitable journals.

The wheel consists of the upper circular plate *b*, of the lower annular plate *c*, and of the buckets *d d*, between them.

The plates *b* and *c* are thickest at their edges, as shown, so as to produce an opening between them, which is wider on the inner, and narrower on the outer side. This is to allow the water a free escape after doing its work, and to prevent friction. The buckets are of ordinary construction.

The wheel is fitted under the crown-plate *e* of a case, or shell, C, and rests with its lower edge *f* upon the annular lower plate D of said case, or shell, a downward-projecting flange, *h*, of the wheel, working inside of the edge of said plate *g*, as shown.

In the case C is formed, around the wheel A, a series of stationary guide-plates, or chutes, E E, which serve to conduct the water in a certain required an-

gle against the buckets of the wheel. This is best illustrated in fig. 3.

F F are the swinging gates. The same are pivoted, or hinged to the case C by means of pins, *j*, or otherwise, as indicated in the drawings, and are swung more or less open by suitable mechanism.

Each gate is large enough to control at least one passage between the chute-plates E, or two, three, or more of them.

It will be seen, that by this arrangement of the stationary chutes between the wheel and the gates, the water is always carried at the same angle against the buckets of the wheel, whatever may be the position of the gates, or the quantity of the water introduced.

That part of our invention which relates to the application of the stationary chutes between the gates and the wheel, is entirely independent of any form of wheel, or mode of operating the gates, and of packing-rings, or other devices.

Around the shaft B are, above the case C, arranged two or more wheels, or rings, G H, each of which is, by means of arms, I I, connected with the outer ends of some of the gates, so that if, for example, six gates are arranged, each ring may be connected with three of them, as in fig. 2.

When, then, one of the rings is turned, the gates with which it is connected will be more or less opened or closed, while the other gates remain unmoved.

Each ring G H is, by means of teeth on its edge, or otherwise, connected with its own upright shaft, J, by turning which the gates are operated. These shafts can be turned automatically by governor-connection, or by hand.

From the lower ring G projects a pin, *k*, through the slotted upper ring H.

This pin *k* is either a set-screw or has a nut, so that the two rings G H can be clamped together to move simultaneously, whenever it is desired to move all the gates at once.

When G H are wheels, they may turn directly on the shaft B; but when they are rings, they can work around the same flange, or friction-roller.

By this arrangement, we can work any portion of the gates, leaving the others shut, and can obtain as much speed with some of the gates drawn as with all.

Having thus described our invention,

We claim as new, and desire to secure by Letters Patent—

1. The top plate *b* and the annular bottom plate *c*, constructed and arranged with the space between them widening toward the centre, all as described, for the purpose specified.

2. The stationary chutes E E, constructed as de-

scribed, and arranged, with relation to the buckets *d*, plates *b c*, and the swinging gates *F*, as herein described, for the purpose specified.

3. The gates *F F* of a water-wheel, connected with two or more wheels, or rings, *G H*, so that they can be separately or simultaneously opened or closed, as set forth.

4. The wheels, or rings *G H*, by which the gates

can be separately moved, with each other, connected by means of a screw, *K*, for the purpose of allowing the simultaneous setting of the gates, as set forth.

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Witnesses:

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