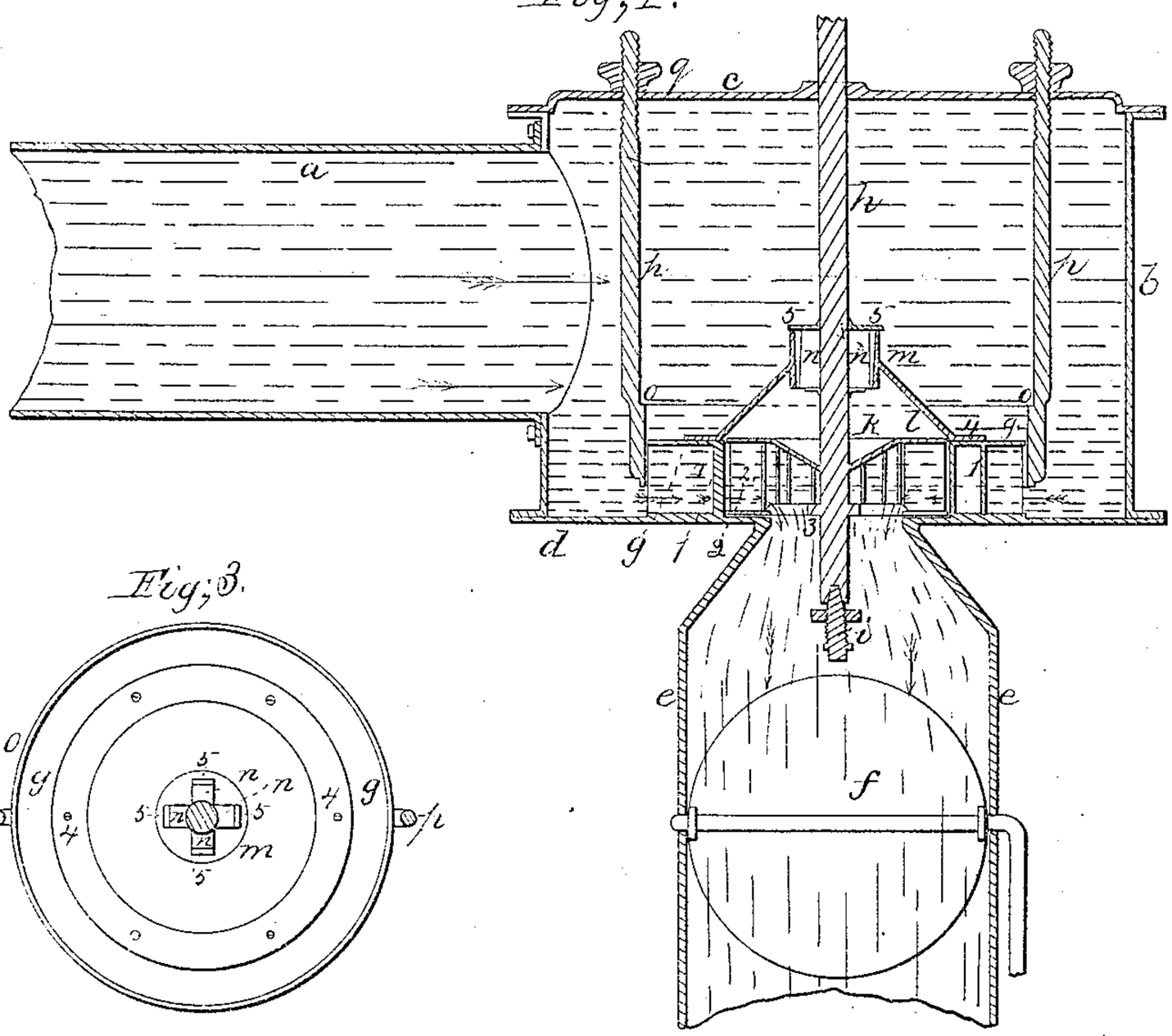
S. Whalen.

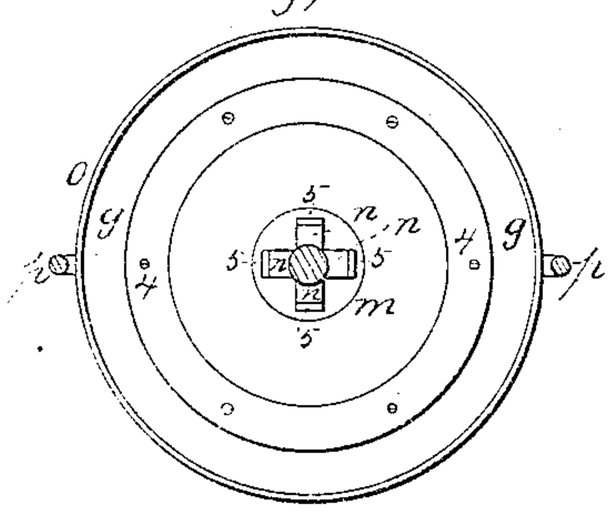
Water Wheel.

No. 40,986. Patented Dec 15, 1863.

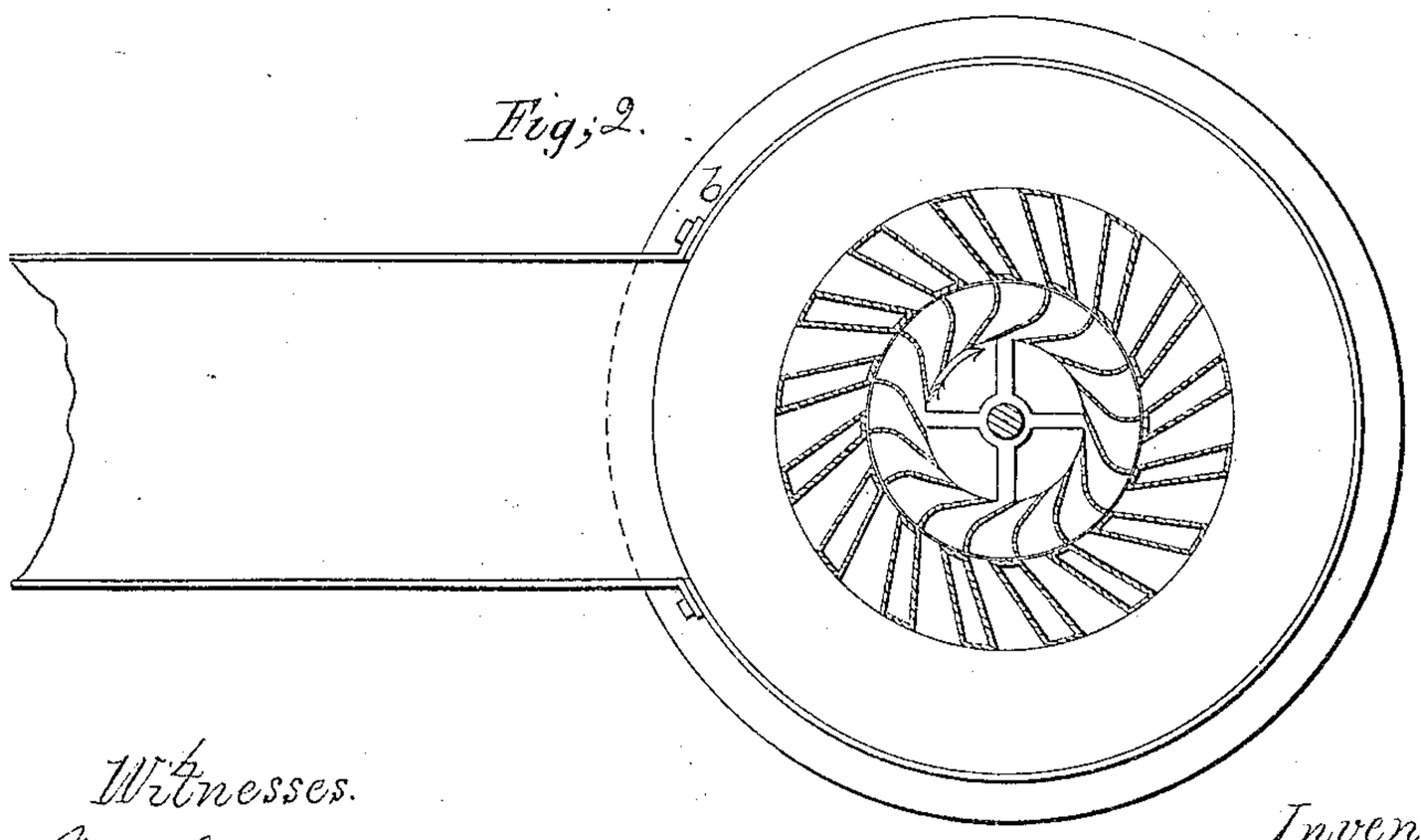
Fig; 1.



Fig; 3.



Fig; 2.



Witnesses.

Jno. J. Odell.

W. McLean.

Inventor.

Sethl Whalen

UNITED STATES PATENT OFFICE.

SETH WHALEN, OF BALSTON SPA, ASSIGNOR TO HIMSELF AND HANNAH WHALEN, OF BURNT HILLS, NEW YORK.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **40,986**, dated December 15, 1863.

To all whom it may concern:

Be it known that I, SETH WHALEN, of Balston Spa, in the county of Saratoga and State of New York, have invented, made, and applied to use a certain new and useful Improvement in Turbine Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the said improvement, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a vertical section of my wheel. Fig. 2 is a sectional plan of the same, and Fig. 3 is a plan of the cap or "stop water" to the wheel.

Similar marks of reference denote the same parts.

Turbine water-wheels have heretofore been constructed with an inclosing case and a central discharge, and also with alternate chutes and water-cushions, as in the patent of D. M. Cummings, December 2, 1862.

The nature of my said invention consists in a peculiarly-shaped bucket, applied to the wheel, having a center discharge, in combination with a surrounding guide-wheel, provided with chutes and with a cap or stop-water, extending from guide-wheel to shaft, whereby I am enabled to get a larger amount of power from a given supply of water than heretofore, in consequence of the buckets receiving the impact of the reacting water near the periphery of the wheel, at the same time that leakage around the wheel is prevented and the pressure of the water on the wheel relieved.

In the drawings, *a* is the supply-pipe; *b*, the cistern or press-head, formed with the bottom *d* and top *c*, and from the bottom *d* the suction-pipe *e* extends to the lower level of the flume. This wheel may be placed at any convenient point relatively to the head of water, as the pipes and cistern cause a solid column of water to pass through the wheel from the higher to the lower level and exert its force on the wheel to propel it.

f is a valve, that may be placed in the tube or pipe *e* to close or partially close the same and thereby regulate the speed of the wheel.

g is what I term the "guide-wheel." This is composed of tapering chutes 1, set diagonally to the radial line, and there should be the same number of these chutes 1 as there are buckets 2 in the wheel *k*—that is, within this guide-wheel *g*. The wheel *k* is on a vertical shaft, *h*, centered in the step *i* and passing up through the head *c*. The top of the wheel *k* is closed and the bottom formed with arms 3 3 to the shaft *h*, leaving a central discharge over the pipe *e*. Each bucket 2 is formed as shown in Fig. 2, and starts from the periphery nearly on the radial line, and curves around to the diagonal and nearly straight portion that comes toward the center of the wheel. The action of the water as the same runs through the chutes 1 is, first, against the bucket near the periphery, whence the water is deflected inward and reacts to propel the wheel *k* in the direction of the arrow, Fig. 2, and in consequence of the water acting and reacting against the buckets near the periphery of the wheel the effectiveness of the wheel is increased.

In order to regulate the amount of water supplied, and consequently the power of the wheel, I close the chutes 1 more or less by a vertical acting gate or gates, closing down from above over the end of said chutes. I have shown the ring *o* surrounding the guide-wheel *g* as the means for effecting this object. Said ring-gate is to be raised or lowered by suitable means. I have shown rods *p* and nuts *q* for this purpose, and it will be evident that this ring-gate might, if preferred, be made in sections adapted to one or more of the chutes.

Almost all turbine-wheels leak considerable water at the joint between the wheel and guide-wheel or case. I prevent this by the use of a cap, *l*, bolted at 4 to the top of the guide-wheel or case and rising in a conical or dome form to the box *m*, in which are vertical openings or mortises, to receive the follower-blocks *n* and keys or wedges 5, that surround and set tightly to the shaft *h*. These follower-blocks *n* should be of wood boiled in tallow, so as not to be affected by the water, and the shaft *h* should be turned true at the point where they come in contact with it. A washer of leather, as at 6, should be applied above and below the box *m* and followers *n*. The action of this cap or stop-water is that there will not be any leakage between the wheel *k* and guide-wheel or case *g*, and the pressure and weight of water is partially removed from

the wheel, so that the step *i* will not wear out so quickly.

What I claim, and desire to secure by Letters Patent, is—

1. The guide-wheel *g*, with the chutes 1 1, and central discharge-wheel, *k*, with the buckets 2 2, substantially as specified, in combination with the stop-water or cap *l*, extending from the guide-wheel *g* to the shaft *h*, as and for the purposes specified.

2. The follower-blocks *n* and keys or wedges 5, in combination with the stop-water or cap *l*, for the purposes and as specified.

In witness whereof I have hereunto set my signature this 20th day of April, 1863

SETH WHALEN.

Witnesses:
WM. T. ODELL,
I. B. MCLEAN.