W. M. MILLS.

Flumes for Turbine-Wheels.

No. 215,278. Patented May 13, 1879.

Fig. 1.

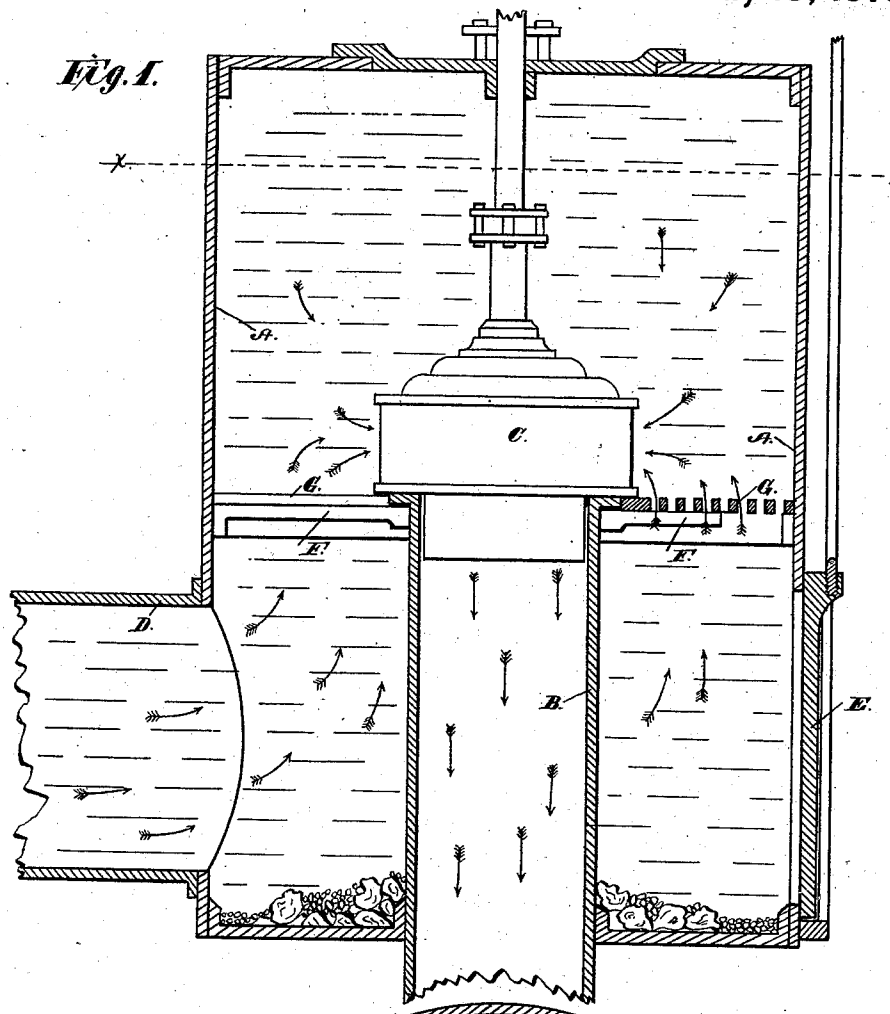
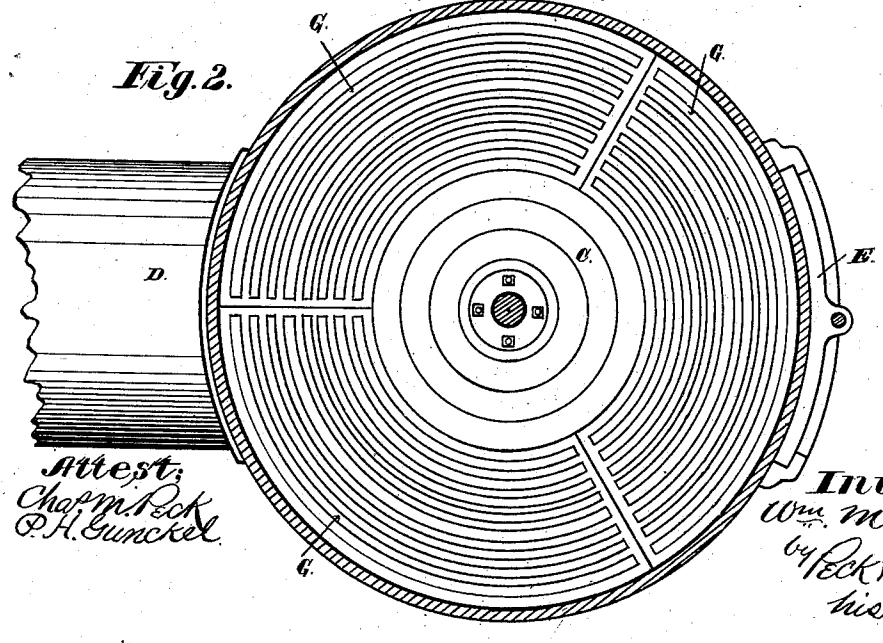


Fig. 2.



Attest:
Chas. M. Peck
P. H. Gunckel

Inventor:
Wm. M. Mills
by Peck & Ritchie
his attys.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM M. MILLS, OF DAYTON, OHIO.

IMPROVEMENT IN FLUMES FOR TURBINE WHEELS.

Specification forming part of Letters Patent No. **215,278**, dated May 13, 1879; application filed March 13, 1879.

To all whom it may concern:

Be it known that I, WILLIAM M. MILLS, of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Flumes for Turbine Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention is an improvement in flumes or pen-stocks for turbine water-wheels.

It has heretofore been a source of much trouble, delay, and expense to keep such wheels free from accidents and obstructions caused by the passage through the wheel and lodgment therein of stones, sand, gravel, sticks, and like obstructions, which not only frequently stop or seriously impede the rotation of the wheel, but also break the floats or otherwise damage the wheel. It is the purpose of my invention to obviate this difficulty by intercepting all such obstructions and preventing their passage through the wheel.

The novelty consists in introducing the head-water at a point in the flume below the level of the ingates of the wheel, so that all heavier foreign bodies, such as sand, gravel, or stones, are deposited in the bottom of the flume and thereby prevented from passing through the wheel.

It also consists in the application to the flume of a grating located between the inlet-opening of the flume and the ingates of the wheel, and below the level of the ingates of the wheel, whereby all floating foreign bodies, such as sticks and the like, are prevented from passing through the wheel.

It finally consists in the construction and arrangement of the parts conducive to the object in view, all as will be herewith set forth and specifically claimed.

In the accompanying drawings, Figure 1 is a central sectional elevation of the pen-stock or flume and contained wheel with my improvements. Fig. 2 is a plan view of the same through the line *x x* of Fig. 1.

A represents the pen-stock or flume, which in this case is an upright cylindrical case made water-tight. B is the tail-discharge or draft-tube, of proper length and capacity to carry off the water in its passage from the wheel. This tube passes up centrally through the bottom of the flume A, and terminates at a point midway between the top and bottom of the flume. Its top is flanged, as represented, and serves as a seat for the wheel C, whose case rests thereon, as shown. At any point below the level of the gates of the wheel I introduce the head-water into the flume through the induction tube or pipe D, which is of proper capacity to furnish all the water required. This tube is provided with a suitable regulating valve or gate and the ordinary or any suitable means of operating it, whereby the water may be in part or in whole shut off from the flume, as the occasion requires. The flume is also provided with an outlet-aperture, of a size sufficient to admit the passage of a man's body, if necessary. This aperture is covered by a suitable water-tight valve or gate, E, which can be opened or closed from above by any suitable mechanism and proper connections. The location of this aperture is immaterial, further than its bottom should be nearly on, or on, a level with the bottom of the flume.

F represents a spider or skeleton frame, fitted around the draft-tube at or near its top, and serving as a support whereon to rest a grating or screen, G, which may be of any suitable construction, though perhaps that shown in Fig. 2 is the best. This grating I preferably make in two, three, or more sections, so that if one of them should by any mischance be broken it can be replaced without the trouble or expense of furnishing and applying an entire new grating.

By this construction and arrangement of the wheel, draft-tube, and inlet, the water, when admitted to the flume, rises in it and fills it, and upon opening the gates of the wheel it escapes through the wheel, which it turns, and passes out through the draft-tube to the tail-race.

By elevating the wheel in the flume above the inlet-opening all the heavier foreign matters, such as stones, gravel, and sand, which are swept into the flume by the influx of the water are deposited upon the bottom of the flume, below the wheel, and cannot possibly get into the wheel to clog or injure it; and, by the employment of the grating or screen, through which the water has to pass before it enters the wheel, all floating rubbish, such

as sticks and the like, are caught and prevented from entering the wheel.

When the accumulation of rubbish in the flume clogs the grating to such an extent as to interfere with the passage of water through it, which fact is ascertained by the diminished power and speed of the wheel-spindle, the gates of the wheel and the gate or valve of the induction-pipe are closed. Now, upon opening the gate E the water in the flume rushes out, carrying with it the rubbish, which, adhering to the under side of the grating, clogged it. This frees the grating, and by leaving open the gate E and opening the induction-gate the water rushes through the lower part of the flume and carries with it nearly if not all of the heavier accumulations, such as stone, gravel, or sand, which had settled on the bottom of the flume. Whenever it is deemed necessary, a man can enter the flume through the gateway E and remove any heavy stones or other substances not carried out by the water.

While I have described and claim the application of the grating or screen in the flume, still it may be dispensed with without affecting the principle which my invention embodies; and

What I claim as new is—

1. A flume or pen-stock for turbine water-wheels, having the wheel elevated within said flume, and having the opening for the inflow of the water at a point below the level of the ingates of the wheel, whereby all sedimentary and foreign matters are deposited in the bottom of the flume and prevented from passing through the wheel, as set forth.

2. In a flume or pen-stock for turbine water-wheels, a screen or grating located between the inlet-opening in said flume and below the level of the ingates of the wheel, whereby the water for running the wheel is caused to pass through said grating in its passage to the wheel, and whereby foreign bodies are caught and prevented from passing through the wheel, as specified.

3. In a penstock or flume for turbine water-wheels, having the wheel elevated therein, and having the opening for the inflow of the water at a point below the level of the ingates of the wheel, a discharge-outlet located at or near the bottom of said pen-stock, whereby the accumulated rubbish may be removed from the pen-stock, as specified.

Witness my hand this 20th day of February, A. D. 1879.

WILLIAM M. MILLS.

Witnesses:
CHAS. M. PECK,
JAMES O. JEFFERYS.