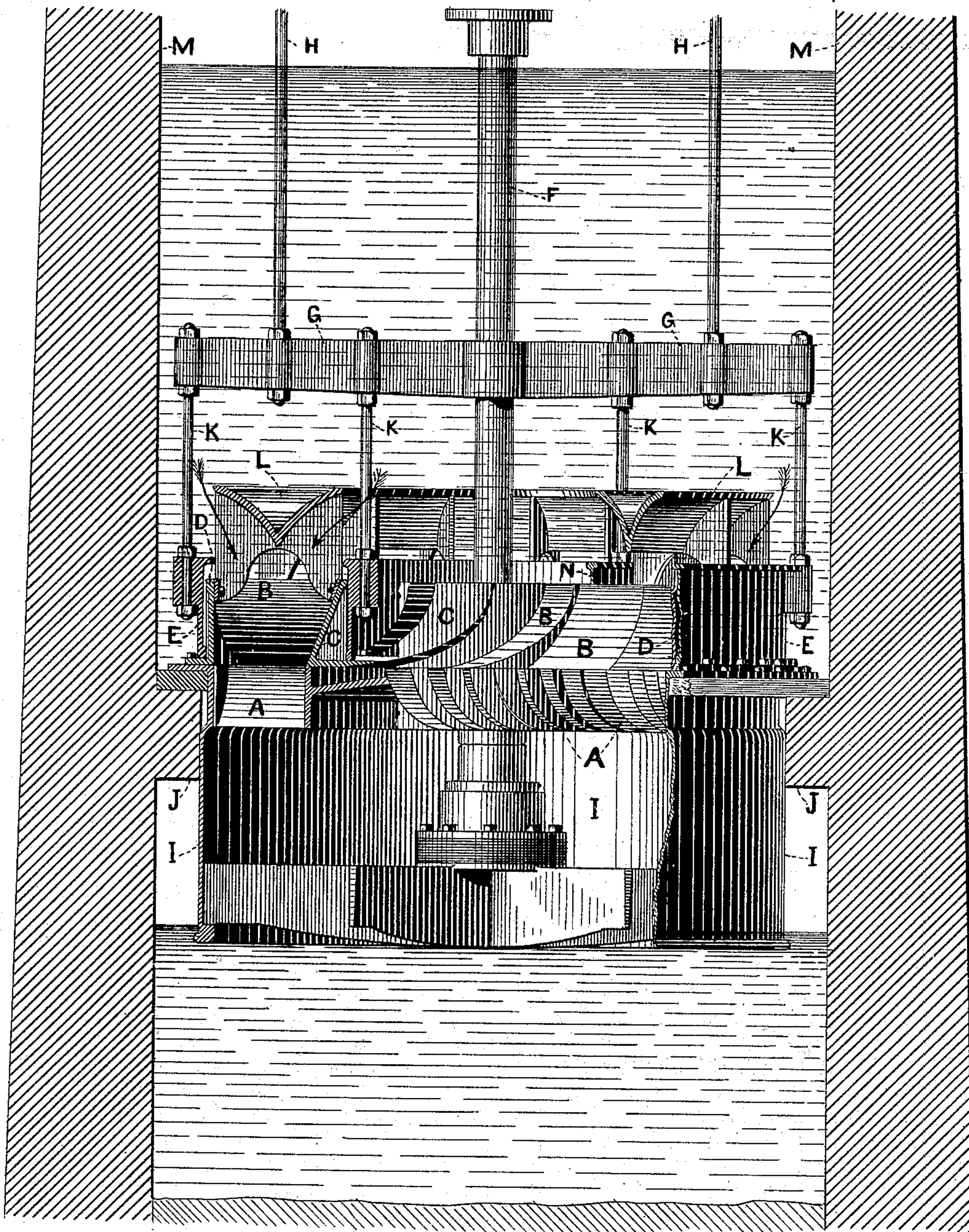


(No Model.)

E. C. GEYELIN.
GATE FOR TURBINE WHEELS.

No. 331,051.

Patented Nov. 24, 1885.



WITNESSES:

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GATE FOR TURBINE WHEELS.

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To all whom it may concern:

Be it known that I, EMILE C. GEYELIN, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Gates for Turbine Wheels, whereof the following is a specification, reference being had to the accompanying drawing, which represents a partial vertical section through the wheel and its casing with my improvement applied thereto.

As originally constructed, the Jonval turbine was provided with a gate beneath the movable wheel, the whole upper portion of the stationary or guide wheel being at all times open to the water. Experience proved, however, that greater sensitiveness and a better duty, when the wheel was working to less than its maximum capacity, could be maintained by placing the gate directly upon the guide-wheel itself, so as to modify the access of the water into the apparatus, instead of controlling its exit therefrom. Accordingly, gates acting directly upon the guide-wheels have been heretofore used; but in every instance, so far as I am aware, the casing of the guide-wheel was externally flared outward from bottom to top, and the hood, which is necessarily used with such gates, extended over the outwardly-flaring casing to a very considerable distance beyond the extreme periphery of the movable wheel. While, therefore, the application of a gate directly to a guide-wheel gave the advantages before referred to, it necessitated an increase of area in the wheel pit and casings, which was disadvantageous both in economy of space and cost of construction.

The object of the present invention is to provide the turbine with a gate which shall combine the advantages of direct application to the guide-wheel and also the economy of space and cheapness of construction which were found in the use of gates below the movable wheel.

In the accompanying drawing, M represents the wheel-pit, in which the apparatus is supported in the usual manner upon the annular ledge J.

The buckets of the movable wheel are represented by A, and those of the stationary guide-wheel by B. The guide-wheel has a cylindrical outer casing, D, and an inner casing, C, inclined or flaring, as shown in the sec-

tional lines upon the left-hand side of the drawing.

I is the casing of the movable wheel, which forms the draft-tube, and is substantially in line with the outer casing, D, of the guide-wheel, so that the same diameter of pit will accommodate both parts. Above the guide-wheel is suspended the hood L, which is annular in form, so as to leave an opening for admission of water on both the inner and outer sides of its periphery. In cross-section the hood is somewhat V-shaped, with curved sides, however, as shown upon the left-hand side of the drawing, so as to afford the best outline for the free entrance of the water on both sides of the stationary or guide wheel. The extreme outer periphery of the hood L is vertically above the outer periphery of the outer casing, D, and the inner periphery of the hood is also vertically above the innermost portion of the periphery of the inner casing, C, of the guide-wheel.

E is the outer gate, which is a ring of sufficient vertical height to reach from the top of the hood L to a point below the top of the outer casing, D, and is preferably provided with internal flanges from top to bottom, as shown, so as to avoid unnecessary contact and friction with the casing D. The inner gate, N, is similar in form, and adapted to extend from the top of the hood L, on the inside, to the top of the inner casing, C. Both gates are suspended by rods K from a cross-head, G, which slides vertically upon the shaft F of the turbine, and is raised and lowered by means of the rods H, which may be attached to any suitable actuating device. In the position shown in the drawing the gates are open, and the ingress of the water is indicated by the arrows. It will be seen that inasmuch as the water is admitted to the single guide-wheel both from within and without the vertical height of the openings may be much less than where, as has heretofore been the case, the water is admitted only upon one side, and the outward flaring of the outer casing is dispensed with, since the combined areas of the inner and outer openings are utilized in such a way that the water does not meet with obstruction in its entrance. Thus not only the height but also the diameter of the hood is

much reduced, so that, as before stated, the pit need only be of the diameter necessary to accommodate the movable wheel. The gates are closed by raising them from the position shown in the drawing until their tops reach the outer and inner peripheries of the hood L.

Having thus described my invention, I desire to state that I do not broadly claim in this application the use of an inner gate and an outer gate, since I myself have heretofore patented a duplex wheel in which each member of the wheel was provided with its own hood and gate; but in such former use of the gates the object and advantages of the present invention were not attained, since the hoods were of such size and the casings of the duplex wheel were of such configuration as to project outwardly much beyond the periphery of the turbine, and in so far as the gates were concerned there was no combined action between the two, each one acting alone upon its respective portion of the apparatus. My present improvement,

however, is designed to attain all the above-stated advantages by the combined action of a hood and a double gate upon a single guide-wheel; and

I therefore claim—

The combination, in a turbine wheel having a single stationary or guide wheel, of a substantially vertical casing around the exterior of said guide-wheel and inclined casing around the interior of said guide-wheel, an annular hood whose inner and outer peripheries are respectively vertically above the outer and inner peripheries of said casings, and a double gate of sufficient vertical height to close the outer and inner openings between the hood and the guide-wheel casing, said gate being provided with suitable raising and lowering devices, substantially as set forth.

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Witnesses:

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