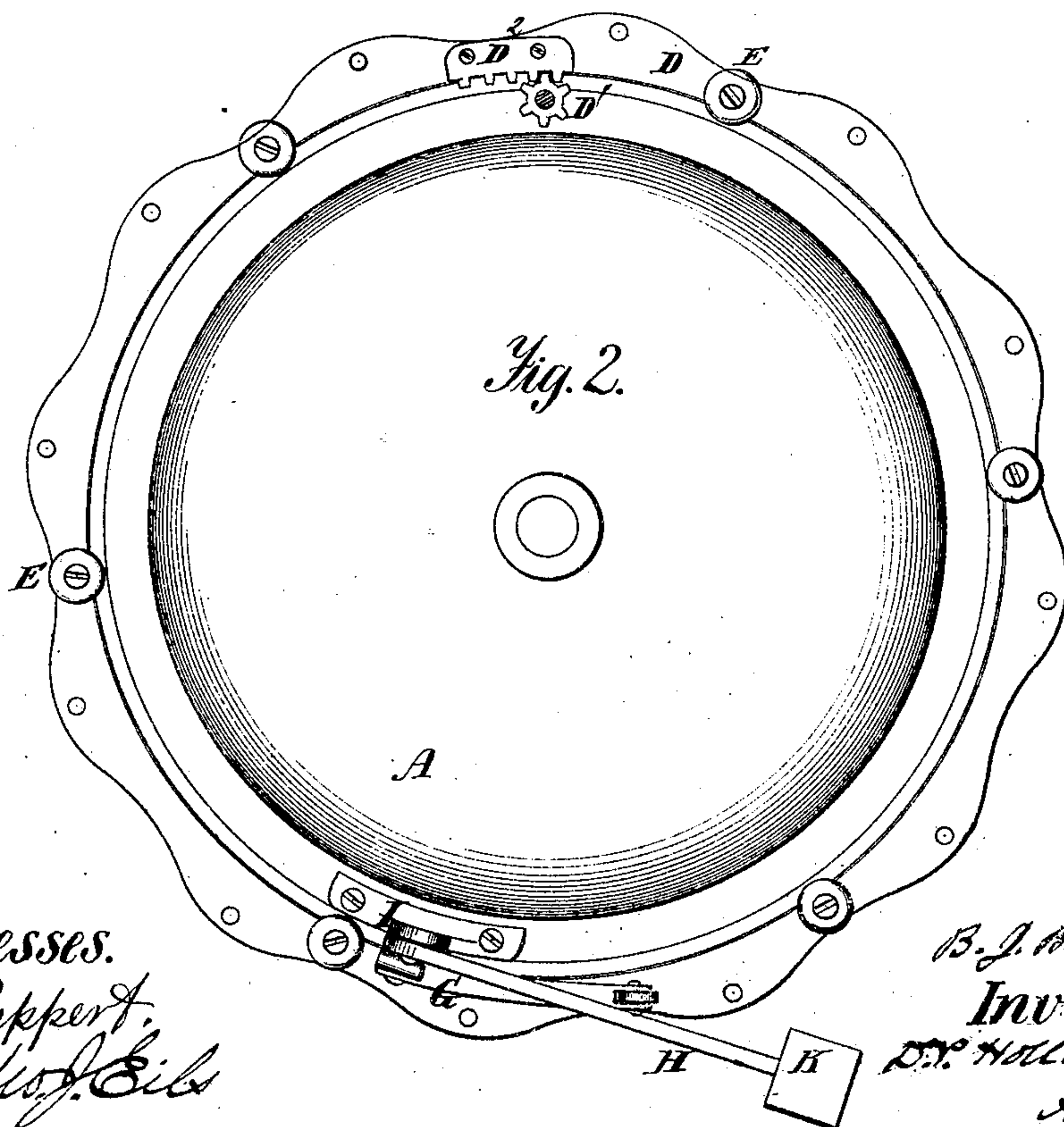
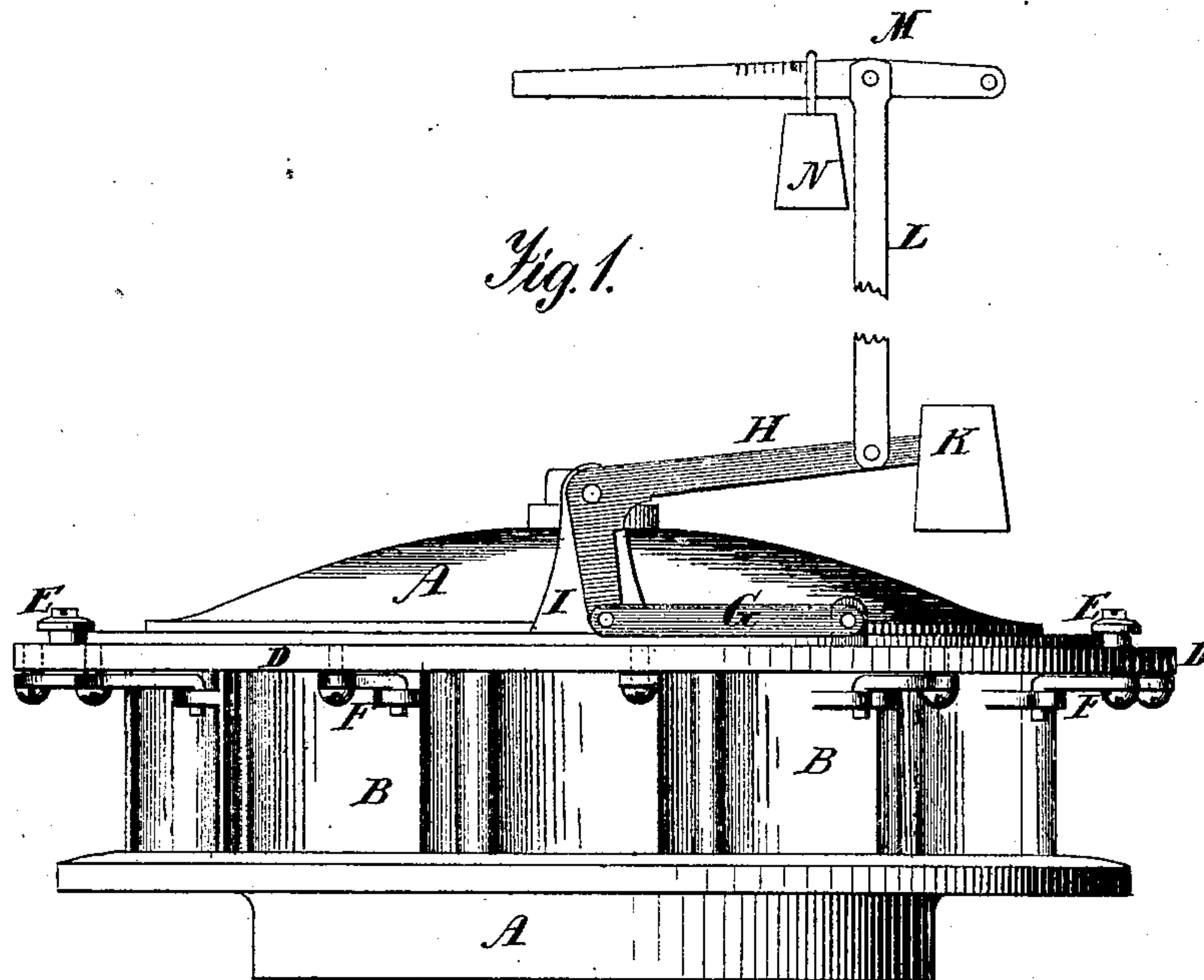


**B. J. BARBER.**  
**Water-Wheels.**

No. 144,944.

Patented Nov. 25, 1873.



*Witnesses.*  
*A. Ruppert.*  
*P. E. J. Eile*

*B. J. Barber*  
*Inventor.*  
*D. P. Holloway & Co.*  
*Attys*

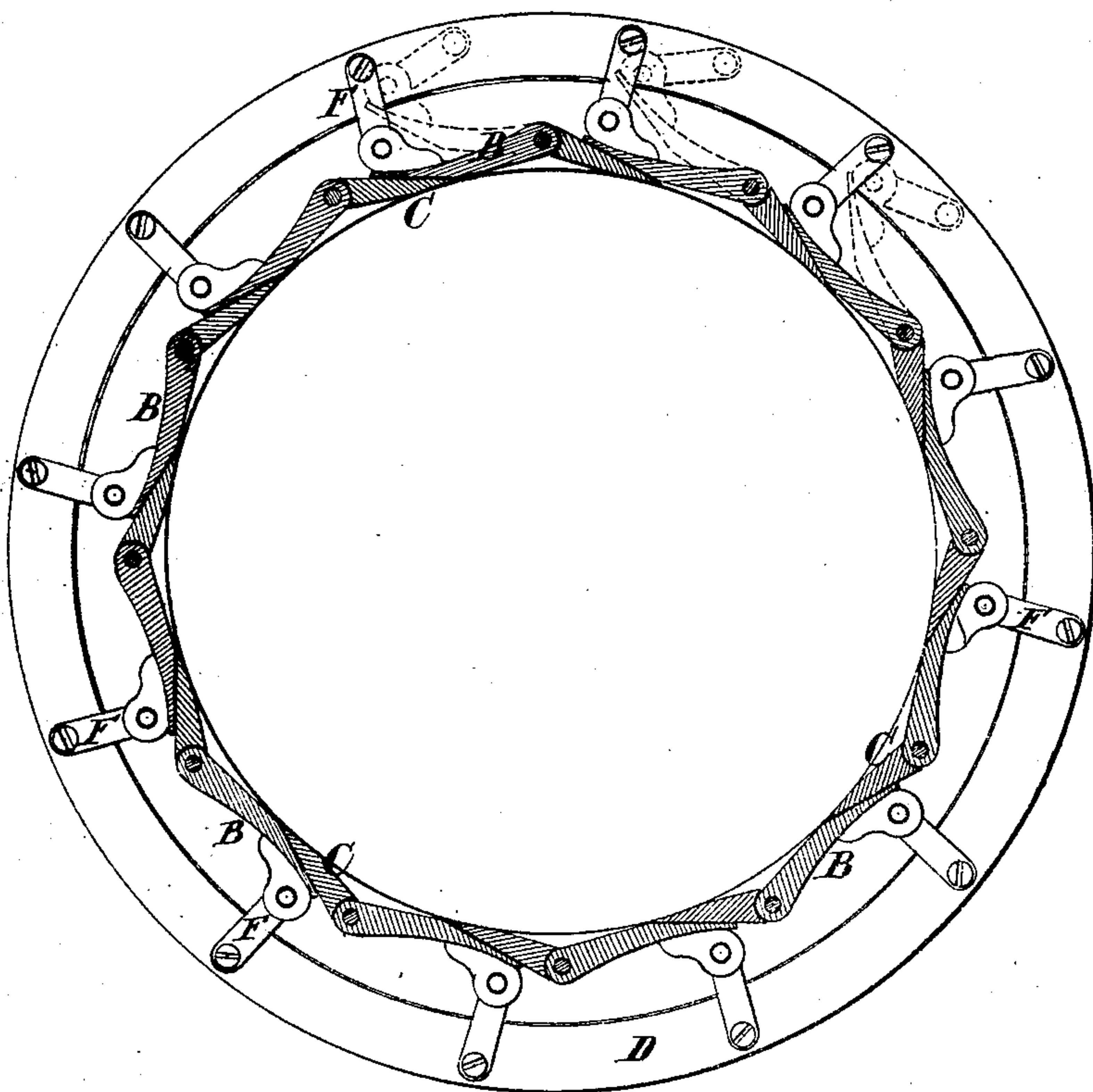
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

BENJAMIN J. BARBER, OF BALLSTON SPA, NEW YORK.

## IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **144,944**, dated November 25, 1873; application filed November 13, 1873.

*To all whom it may concern:*

Be it known that I, BENJAMIN J. BARBER, of Ballston Spa, in the county of Saratoga and State of New York, have invented a new and useful Improvement in Water-Wheels, of which the following is a specification:

This invention relates more particularly to the mechanism for operating the gates of the improved water-wheel patented by me November 8, A. D. 1870; and consists in attaching to the ring by which the gates are opened and closed a counter-balance for relieving the gates from the pressure due to the weight of the column of water resting against them when the gates are closed.

In the annexed drawings, Figure 1 is an elevation of the casing and gates, showing the mode of applying the counter-balance. Fig. 2 is a plan of the same. Fig. 3 is a horizontal section, showing the gates and mechanism for operating them.

The same letters are employed in all the figures in the designation of identical parts.

In the drawings, A is the casing, made in two parts, viz., a dome-formed cap and two parallel flanges, connected by the stationary guides C, to which the gates B are hinged. D is a ring surrounding the upper flange, and turned by the pinion D<sup>1</sup>, meshing into the cogs of a rack, D<sup>2</sup>. It is hung upon flanged friction-wheels E, and connected with the gates by links F. These links are, when the gates are closed against the fixed guides, nearly at right angles to the plane of the gates, so that when the ring is turned to open the gates they shall draw directly outward, nearly radially to the wheel. The resistance of the water diminishes greatly the instant it is admitted, so as to bear against both faces of the gates, and, consequently, the links may form an acute angle to the plane of the gates when open, as shown in dotted lines in Fig. 3, without increasing the resistance to the force applied on the ring. As these gates are not themselves so formed as to counterbalance the pressure of the column of water, as in case of those pivoted at or near their middle, it is desirable to relieve them from the resistance of that pressure, in order to facilitate their opening, and also to check their tendency to slam

violently in closing. This I accomplish by fastening, by a bolt, a rod, G, to a lug on the ring D. To the fore end of this rod is fastened, in like manner, the short arm of a bell-crank lever, H, the fulcrum of which is on a standard, I, on the upper flange of the case. A weight, K, on the long arm of the lever H, is so adjusted as nearly to counterbalance the weight of the column of water. If the head is constant, this will alone suffice to relieve the gates sufficiently from pressure to make them open by the application of a small amount of force to the pinion D<sup>1</sup>.

It is obvious that a spiral spring might be substituted for the lever and weight; and I do not therefore wish to confine my claim to the employment of the particular means for counterbalancing the pressure of the water shown herein.

If the head is variable, it will be desirable to attach, for more convenient adjustment, a rod, L, to the long arm of lever H, which shall extend above the surface of the water, and support the steelyard-beam M, on which is a weight, N, which may be moved to such distance from the fulcrum as to give just the requisite amount of pressure. As this, however, is a mere matter of convenience, the weight K being capable of the same adjustment, the addition of these parts will make no difference in the true scope of this invention.

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

1. In combination with the oscillating gates of a water-wheel, a counter-balance attached thereto for relieving the gates from the pressure of the column of water, substantially as set forth.

2. In combination with the gates B and links and ring for operating the same, the weighted lever for adjusting the action of the counter-balance, substantially in the manner set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

B. J. BARBER.

Witnesses:

D. P. HOLLOWAY,  
B. EDW. J. EILS.