

M. Bell, Water Wheel,

N^o 52,259.

Patented Jan. 30, 1866.

Fig. 2.

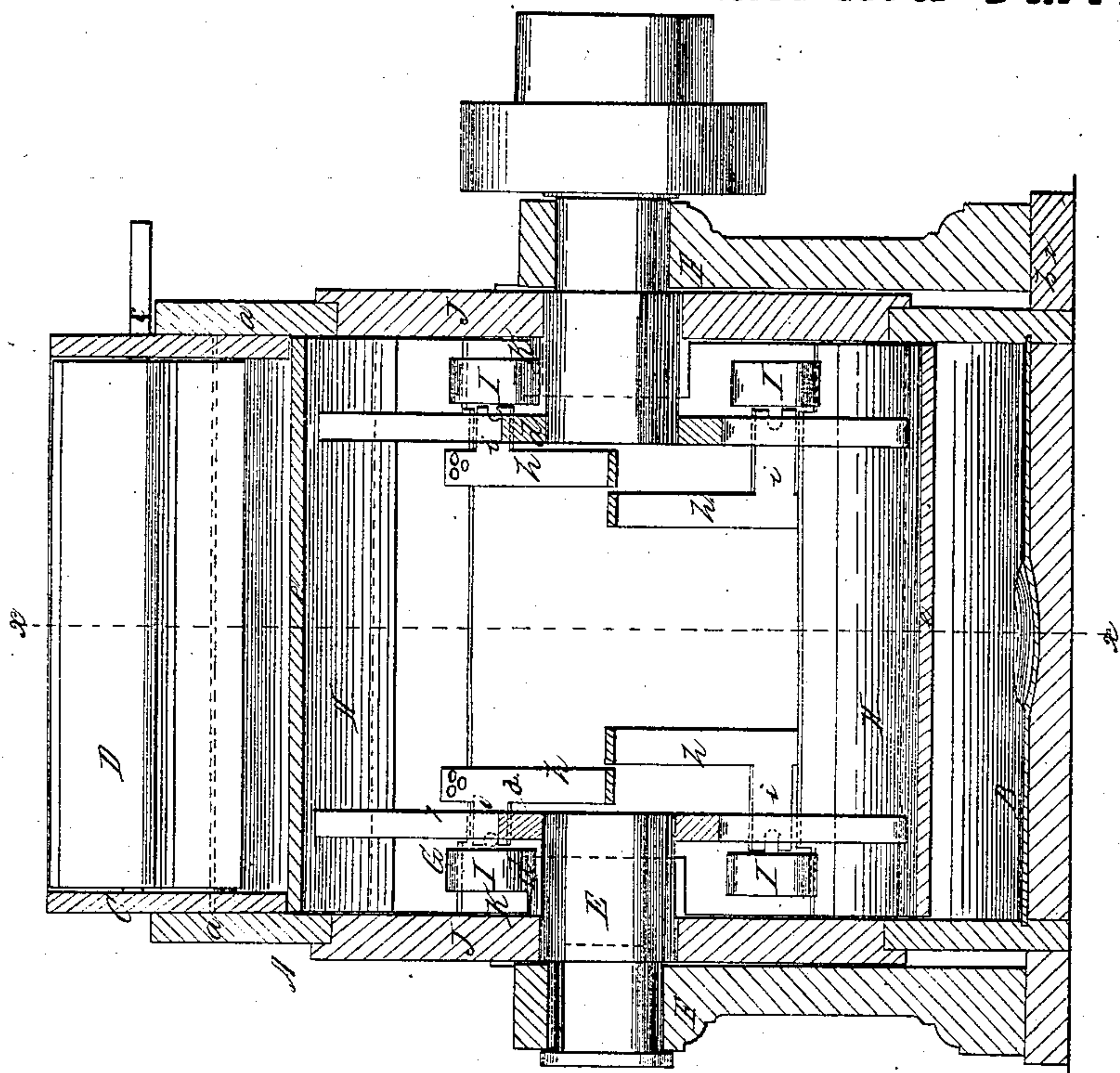
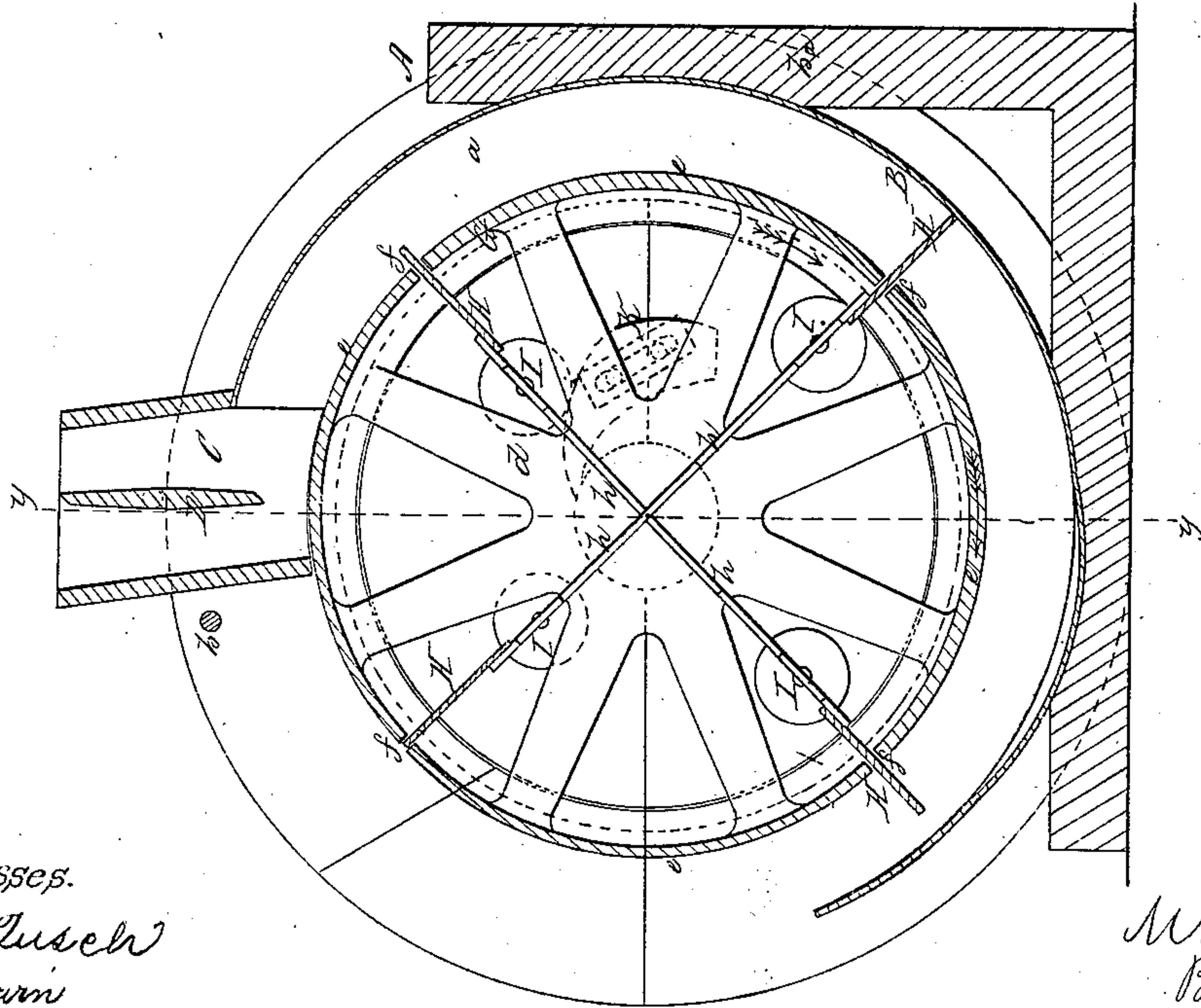


Fig. 1.



Witnesses.
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MARTIN BELL, OF SABBATH REST, PENNSYLVANIA.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 52,259, dated January 30, 1866.

To all whom it may concern:

Be it known that I, MARTIN BELL, of Sabbath Rest, in the county of Blair and State of Pennsylvania, have invented a new and Improved Water-Wheel; and I 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 is a side sectional view of my invention, taken in the line *xx*, Fig. 2; Fig. 2, a front sectional view of the same, taken in the line *yy*, Fig. 1.

Similar letters of reference indicate like parts.

This invention consists in providing a water-wheel with moving or sliding buckets, and partially encompassing the former with an apron, the parts being constructed and arranged in such a manner that the buckets will effectually prevent the water passing through the wheel without acting upon them, the buckets being, in one sense, like gates, and not allowing the water to escape unless the wheel turns.

A represents a casing in which the wheel works, the same being composed of two side pieces, *a a*, connected together by rods *b* and a framing, *b**, the inner surfaces of the side pieces having grooves made in them to receive the edges of an apron, B, which extends around from the top of the casing to about one-third the height of the same at the rising side of the wheel, as shown in Fig. 1.

C represents the penstock, which is at the top of the casing A, and is provided with a gate, D, hung on central journals, *c*, at its ends.

E represents the wheel-shaft, the bearings F of which are at the outer sides of the casing A; and G is the wheel, composed of two heads, *d d*, on the shaft E, with segment-plates *e* at their ends, the heads and plates forming a hollow cylinder, and all cast in one piece. The plates *e*, of which there are four, are of equal dimensions, with a space, *f*, between them, through which the buckets H of the wheel work, the ends of the bucket passing through openings in the heads, and the

buckets connected together in pairs by rods or bars *h*. Each rod or bar *h* is provided with a lateral projecting arm, *i*, and these arms extend through the openings in the head and have friction-rollers I upon them. (Shown more particularly in Fig. 2.)

The side pieces, *a a*, of the casing A have circular openings, which are covered by plates J, the journals of the wheel-shaft E passing centrally through said plates, and to the inner surface of each plate J there is attached a cam, K, at a point shown clearly in Fig. 1.

The buckets H, it will be seen from the above description, slide or work in the wheel, and as the buckets are connected together in pairs one bucket will be drawn within the wheel as its fellow at the opposite side of the wheel is moved out from it.

The buckets are moved out from the wheel just after passing the penstock C, and when fully out are quite close to the inner surface of the apron B, and prevent any water passing down between the segment-plates *e* of the wheel and the apron B, except that which acts against the buckets. In other words, the water can only pass through the wheel as the wheel turns. The water escapes from the wheel over the lower end of the apron B, the free or unobstructed escape of the water being allowed and the obstruction of all back-water prevented by the drawing inward of the buckets just before they reach the lower end of the apron, at a point of course coinciding with that in which the fellow buckets are forced out. The buckets are operated or have this sliding movement given them by means of the rollers I coming in contact with cams K K at the inner sides of the plates J, as will be fully understood by referring to Fig. 1. By this arrangement it will be seen that there is no waste of water except the small amount caused by leakage, and this is unappreciable, as all the water acts upon the wheel in passing through it, the water passing through the wheel only as the wheel turns.

This wheel will work well under any ordinary head, and will be less affected by back-water than the generality of wheels in use, and is designed to be of small size and to rotate rapidly, therefore requiring but little gearing to get up speed for the machinery to be driven

when compared with overshot wheels, can all be made of iron, and is not liable to be affected by ice; and it may be used with a draft-tube like the French Jonval wheel, if desired.

By altering the construction the same principle can be easily applied to a wheel with an upright shaft.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

A water-wheel provided with buckets ar-

ranged or connected in pairs, so as to move or slide in a direction transverse with the wheel-shaft, in combination with friction-rollers and cams, or their equivalents, for operating or sliding the buckets, and an apron which partially encompasses the wheel, substantially as set forth.

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Witnesses:

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