

O. J. Bollinger,

Water Wheel.

No. 104,697.

Patented June 28, 1870.

Fig. 1.

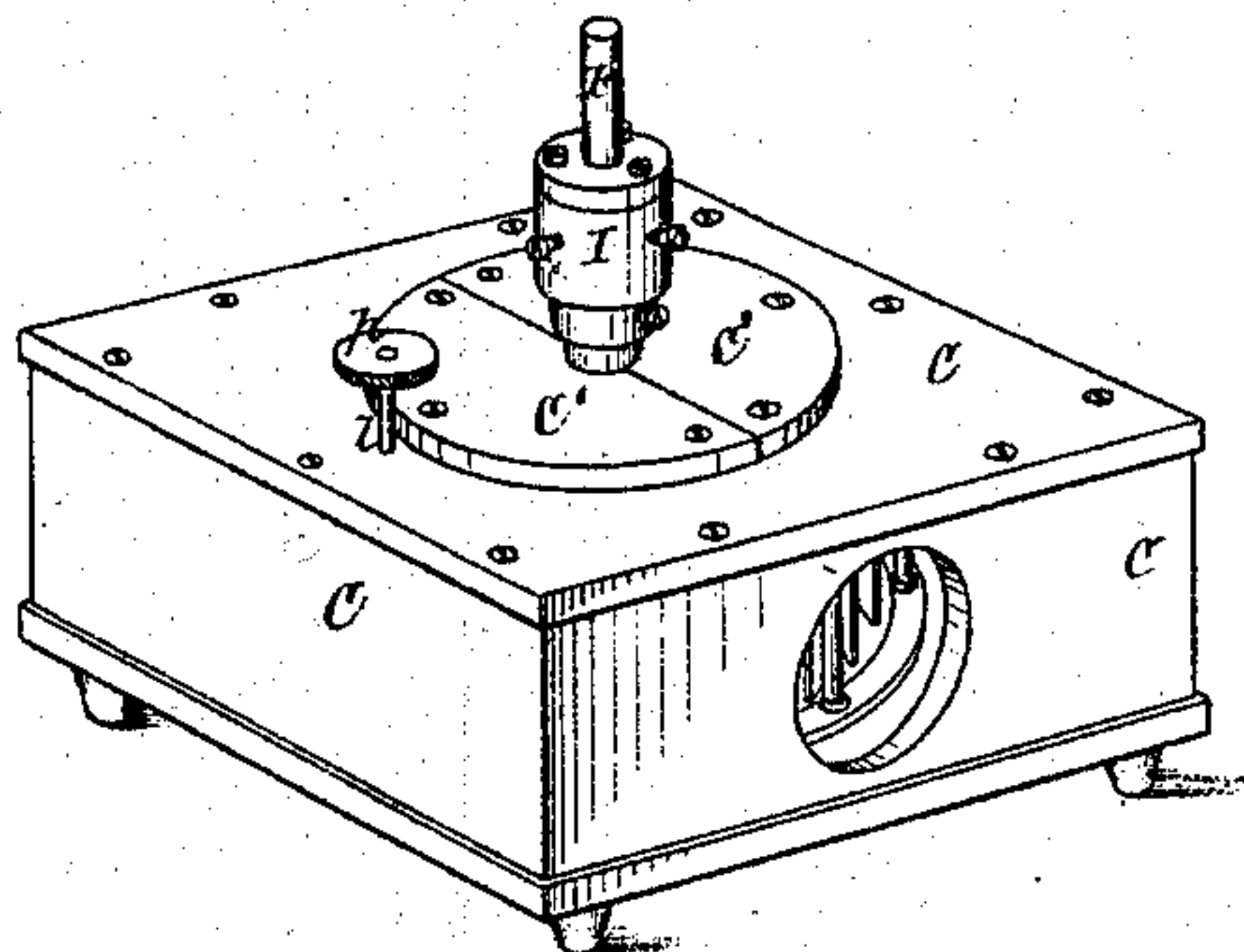


Fig. 3.

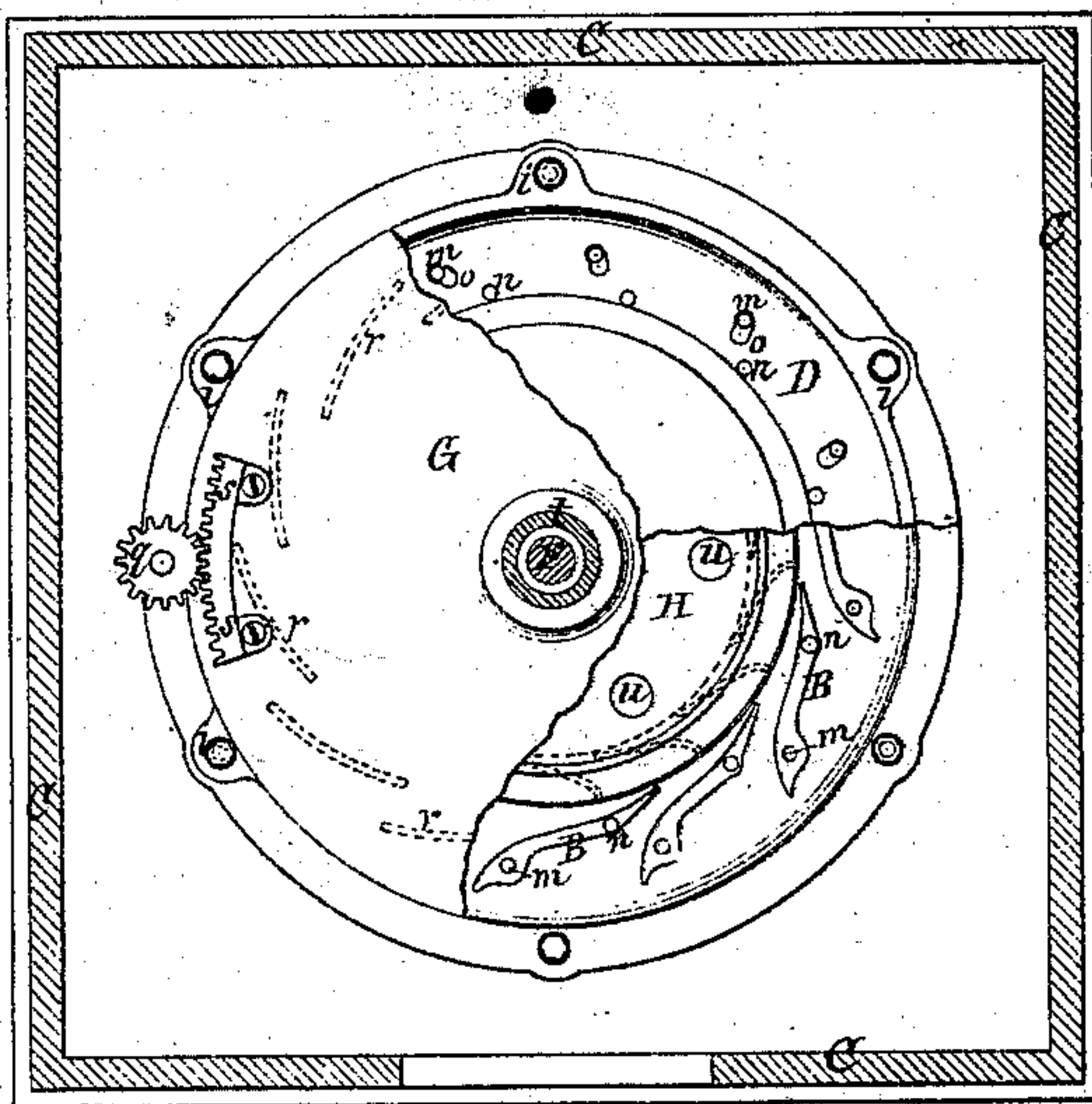


Fig. 2.

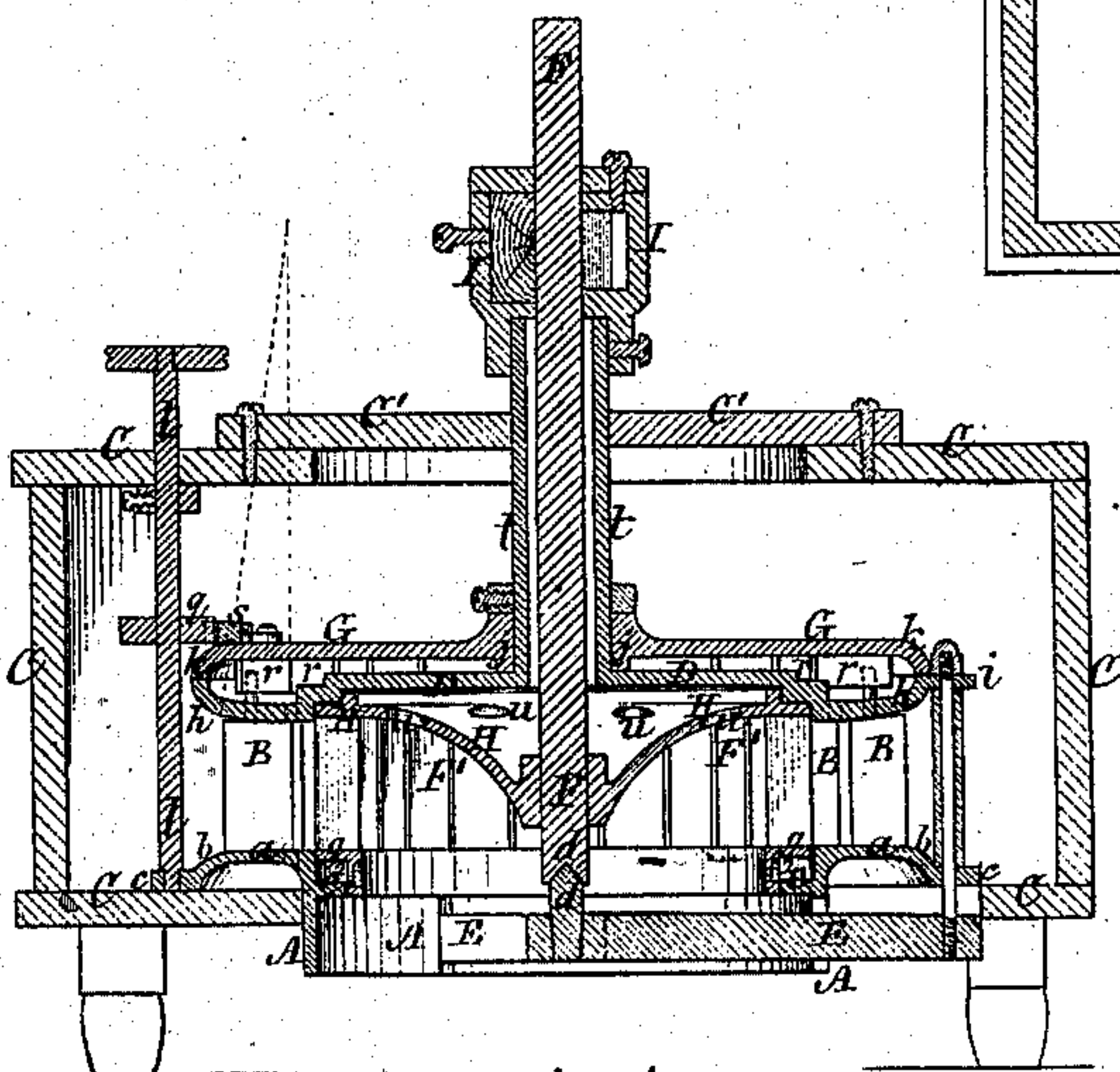


Fig. 4.

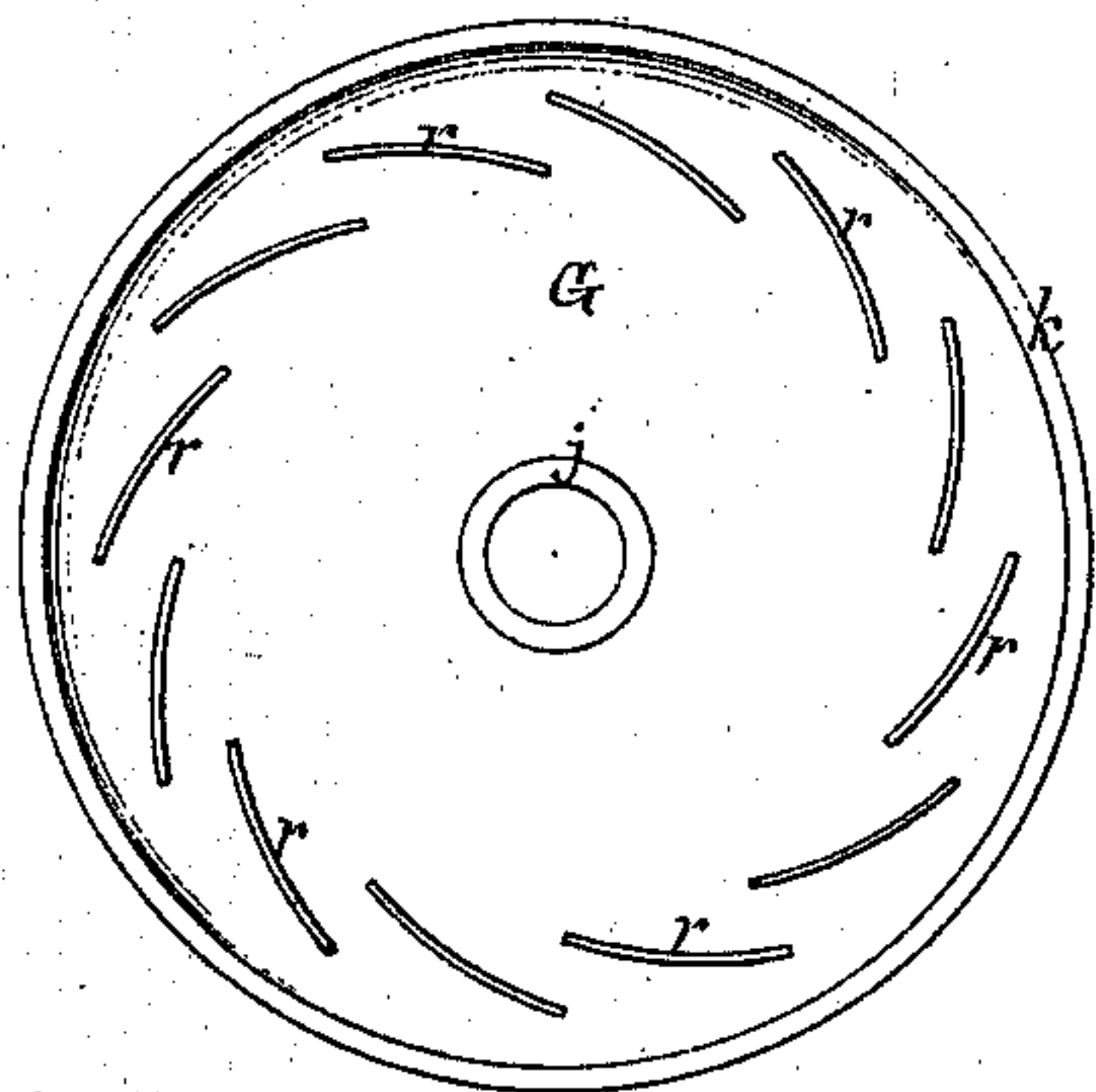
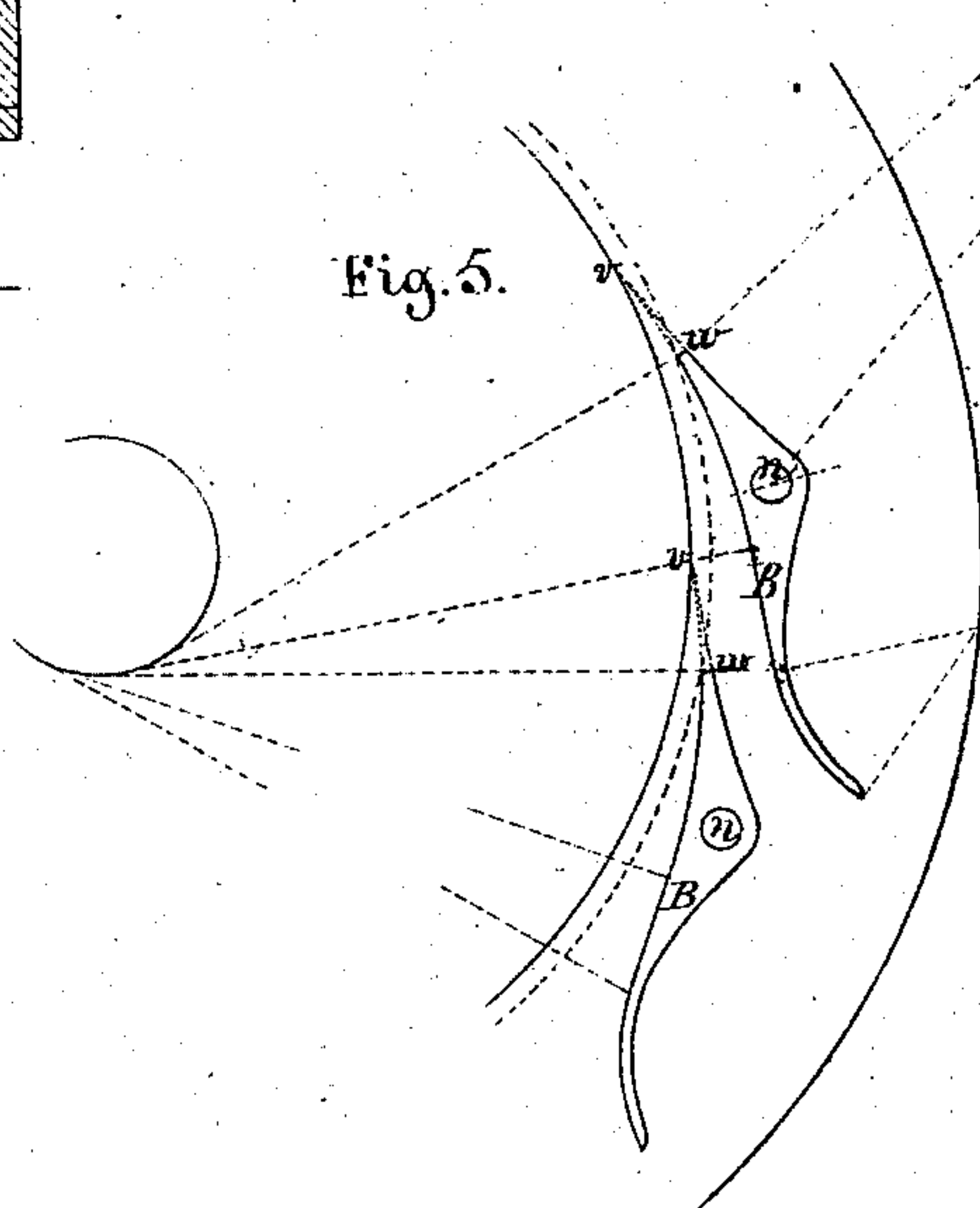


Fig. 5.



Witnesses.

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OLIVER J. BOLLINGER, OF YORK, PENNSYLVANIA.

Letters Patent No. 104,697, dated June 28, 1870.

IMPROVEMENT IN WATER-WHEELS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, OLIVER J. BOLLINGER, of York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 represents, in perspective, the penstock for containing the water-wheel, or in which the wheel is placed.

Figure 2 represents, on an enlarged scale, a vertical section through the penstock, water-wheel, and gates.

Figure 3 represents a horizontal section through the penstock, and with portions of the wheel broken away to show parts underneath them.

Figure 4 represents a view of the under side of the top plate, showing the cams thereon for moving the gates.

Figure 5 represents a diagram showing the centers from which the curves of the buckets or gates are ascertained or obtained.

Similar letters of reference, where they occur in the several separate figures, denote like parts of the wheel and its co-operative parts in all of the drawings.

My invention relates to that class of water-wheels wherein a series of pivoted gates is used to open, regulate, or close the inlet issues, and so regulate the amount of water to be let onto the wheel; and

My invention consists, first, in curving the flanges of the upper and under plates, or crown-plate, and cylinder, outside of the gates, so as to make the water-way at this point of greater area than where it strikes the buckets, and thus increase its force, by diminishing its volume area where it strikes the gates.

It further consists in combining with a crown-plate whose exterior flange curves outward and upward, a deck-plate, with an outward and downward curved flange, to fit that of the crown or top plate.

It further consists in combining with an upper and an under plate, and a series of pivoted gates between them, with studs thereon projecting through slots in said upper plate, a deck-plate furnished with a series of cams, by which said gates may be operated.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

The under plate or part of the wheel consists of a cylinder, A, which is vertical, and which has projecting from its upper edge a flange, which is first horizontal, as at *a*, to a point or line outside of the gates B; thence said flange curves downward, as at *b*, and thence horizontal, as at *c*, where it is supported by the penstock C, and through which flange *c* the bolts that unite this under part with the crown-plate D also

pass, as well as those which hold and adjust the spider E, that supports the water-wheel shaft F, as at *d*.

On the inside of the cylinder A, and below its top portion a short distance, there is an inwardly-projecting horizontal flange, *e*, against the perimeter of which and the inner edge of the cylinder A the vertical and horizontal flanges *f g* of the water-wheel F run, leaving an annular space, 2, between the wheel and the under plate, into which the water finds its way, and aids to raise the wheel on its step or support.

The crown-plate D is recessed and shouldered, as seen in fig. 2, to receive the flanges upon the top H of the water-wheel.

Outside of or beyond these shoulders and recesses the crown-plate is horizontal, to a point as far out as the gates B move or act, or nearly so, and thence it curves upward, as seen at *h h*, and lugs *i i* project beyond the curve *h*, to receive the bolts that unite it to the under part or plate, and that support the spider, and through it the wheel itself.

The gates B, of the form and construction shown in figs. 3 and 5, are pivoted, as at *n*, to the top and bottom plates of the wheel, and upon the upper edge of each gate there is a stud, *m*, which projects through a slot, *o*, in the top plate, D, there being a stud and slot for each gate.

Over the top plate D there is a deck-plate, G, which rests upon said top or crown-plate, by means of its hub *j* and its downwardly-curved exterior flange *k*, leaving a space or chamber between said crown and deck-plates for a series of eccentric flanges or cams, *r r*, which are made on the under side of the deck-plate G, to project and operate in, as will be explained.

A shaft, *l*, is supported in the top and bottom plates of the wheel, and extends up vertically through the penstock C, and has at its upper end a hand-wheel, *p*, or other device by which it can be turned. On this shaft there is a pinion, *q*, which works into a segmental rack, *s*, attached to the deck-plate G, so that said deck-plate may be moved to open the gates B, which is done by the cams *r* taking against the studs *m*, and turning the gates on their pivots. The gates are closed by the action of the water against them, as the portions of them that are beyond their pivots and next the intruding water are much longer than the other portions between said pivots and the wheel proper, so that the pressure of the water upon these longer portions constantly tends to close the gates, while they are opened and held open by the cams *r*. Each gate being independent of the other in closing, one or more of the gates may be clogged by anything getting in and there remaining, while the others may all close, which would not be the case if they were closed by a positive or arbitrary movement of the disk or deck-wheel G. But while these buckets are

individually self-closing by the pressure of the water upon their longer ends, yet by an extended or continued movement of the deck-plate they may be closed by said deck-plate.

It will be perceived that the curving of the two flanges, *h k*, of the crown and deck-plates, allows these plates to unite by a horizontal joint. But the more particular object of this rounded union of the plates is, in connection with the under rounded flange *b*, to form a flaring water-way or inlet passage, unbroken by angular or square corners, which, however obtuse, will "break up" the regular inflow of water, and detract from its normal force, which rounded surfaces will not do to so great an extent.

On the crown-plate *D* of the wheel there is a hollow shaft or tube, *t*, which extends up through the penstock *O*, and has on its upper end an adjustable bearing and oil-box, *I*, for supporting and truing the upper part of the wheel-shaft *F*.

The deck-pieces *C' C'* of the penstock are divided or sectional, so that access may be had through the opening that they cover to the wheel; and for the purpose of getting at or into the wheel, to clean it out or otherwise, an opening may be made through the case or cover, so as to draw out the pivots and stud of one of the buckets, and thus remove said bucket, which makes an avenue to the wheel, and any part of the wheel may be turned round to this avenue. The openings for drawing out the pivots, &c., can be closed by a screw, cap, or otherwise.

The holes *u* in the top plate of the water-wheel, as shown at *H*, are for allowing the water that leaks

through the joint between the wheel and the gate or crown-plate to pass out, otherwise it would be forced up through the tube *t*.

If the gates *B*, as seen in fig. 5, were extended to a point, they would touch the wheel at a point marked *v*, but they are cut off at a point, *w*, so that all the columns of water, as they come through between the gates, unite into one before they strike the wheel, and do not act singly.

The wheel *F'* is of that kind known as a "center-discharge wheel."

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

The upper and under plates, curved beyond the gates, as at *b h*, for the purpose of making a flaring and rounded inlet for the water, as and for the purpose described.

Also, in combination with the crown-plate and its flange *h*, the deck-plate and its flange *k*, for rounding off the junction of said plates, as and for the purpose described.

Also, in combination with the series of gates and their studs *m*, (said gates being arranged between the stationary plates and the studs *m* projecting through the upper plate of the two,) the movable deck-plate *G* and its cams *r*, for opening said gates, substantially as described and represented.

OLIVER J. BOLLINGER.

Witnesses:

A. B. STOUGHTON,
EDMUND MASSON.