

G. WESTINGHOUSE, Jr.

Improvement in Rotary-Valves.

No. 131,985.

Patented Oct. 8, 1872.

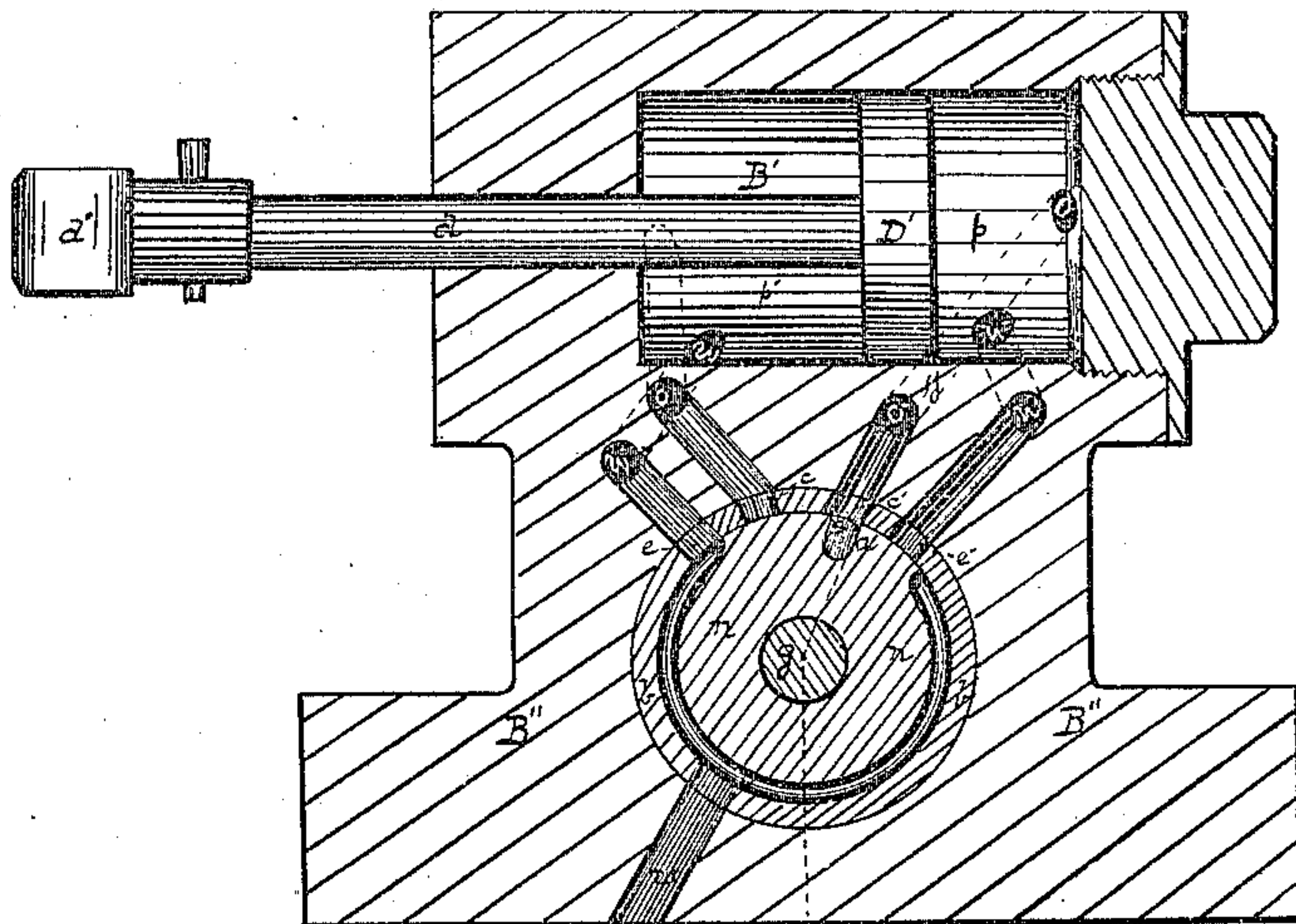


Fig. 1.

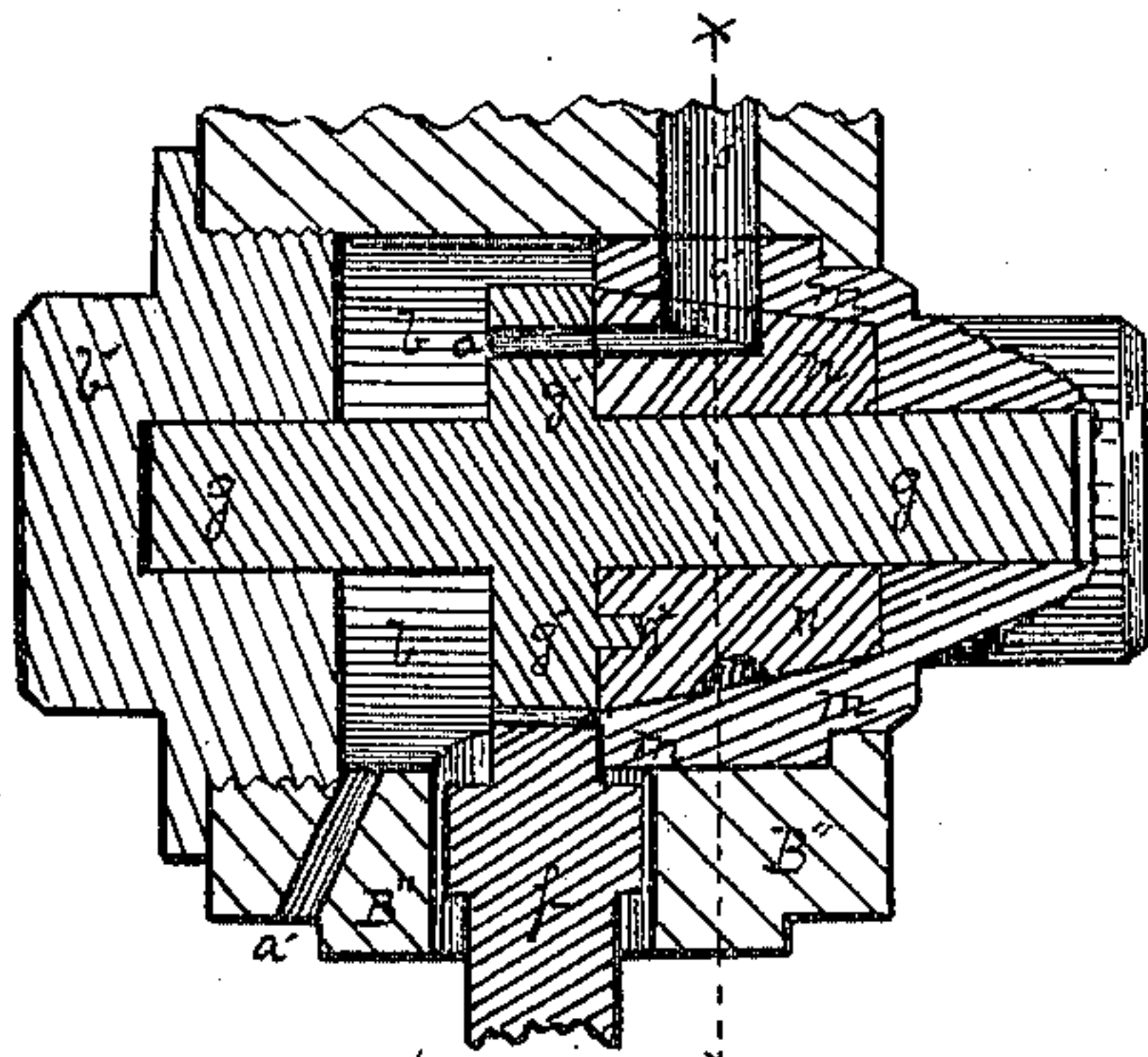


Fig. 2.

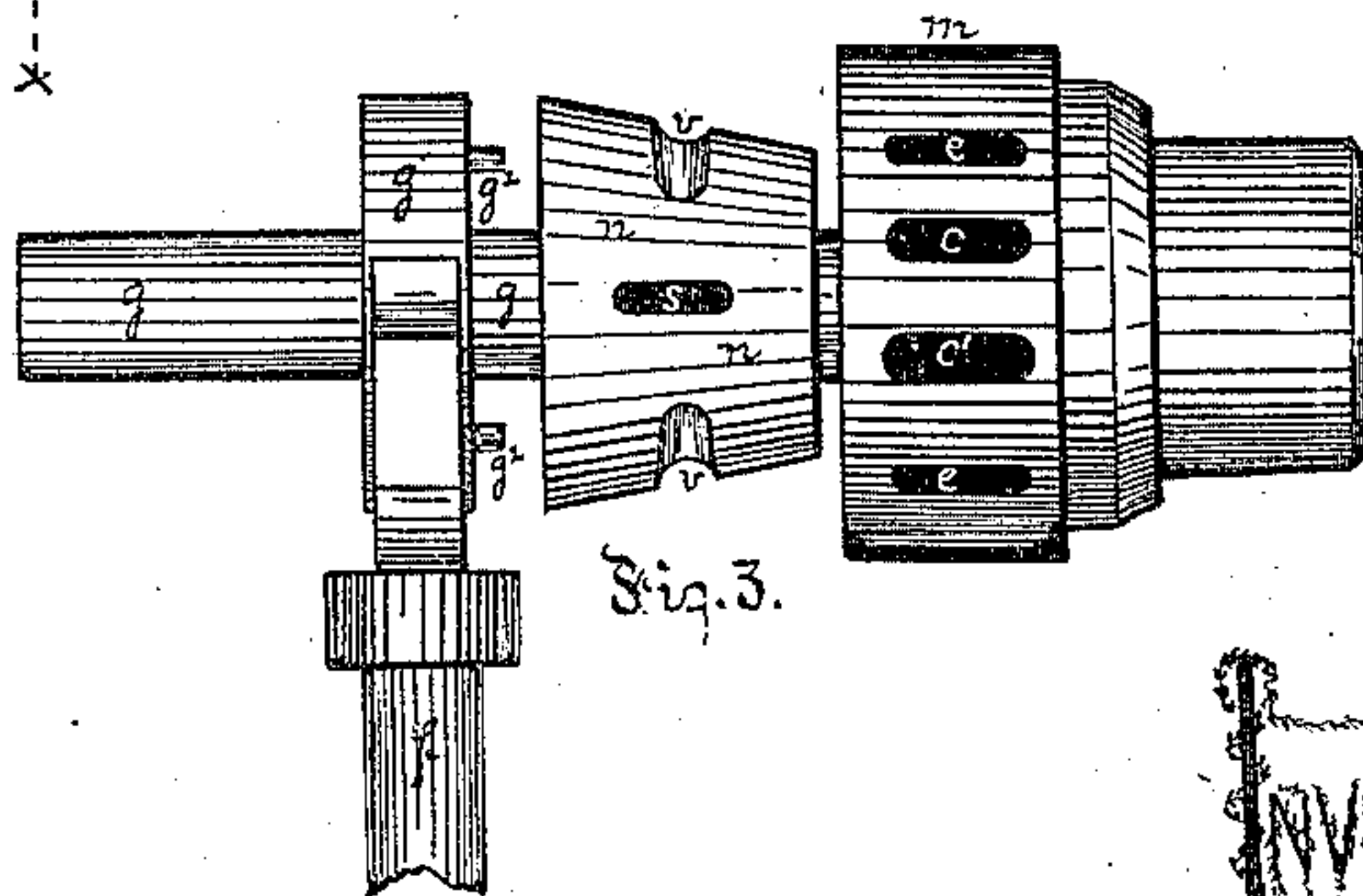


Fig. 3.

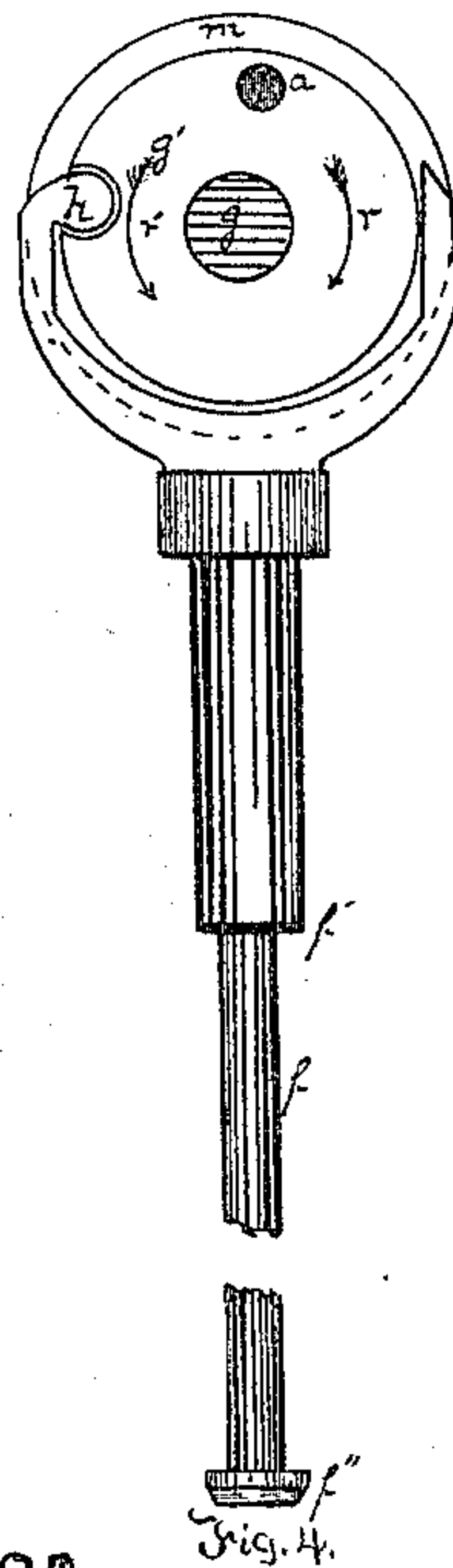


Fig. 4.

WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN ROTARY VALVES.

Specification forming part of Letters Patent No. 131,985, dated October 8, 1872.

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a longitudinal vertical section in the line *xx*, Fig. 2, through the cylinder, valves, and valve-chamber of an ordinary steam-engine employed for reversing the valves of the main engine; Fig. 2 is a sectional view in the line *yy*, Fig. 1; Fig. 3 shows, by a side elevation, the valve devices of Figs. 1 and 2, but drawn out from each other so as to be separately represented; and Fig. 4 is an end elevation of the valve devices of Figs. 2 and 3, looking from the left-hand end of those figures.

Like letters of reference indicate like parts in each.

My present invention relates to improvements in that class of steam-engines described in patents granted to me August 30, 1870, No. 106,899, and June 6, 1871, No. 115,668. In connection with it I use the main engine, main valves, and valve motion described in the former patent; also, the hollow main piston-stem and reversing valve-stem described in the latter patent. In my present invention I change the position and construction of the valves and the arrangement of the ports of the reversing engine.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

The auxiliary or reversing steam-cylinder *B'*, the base-block *B''*, the piston *D'*, piston-stem *d*, eye *d'*, are all of substantially the same construction and operation as the correspondingly-lettered devices of the patent of June 6, 1871, as also is the valve-stem *f*, with its knob *f''*. A shoulder, *f'*, is made on this stem *f* at such point that when the main piston, at its upward stroke, strikes it, the valve above will be shifted, as hereinafter described, at the proper time for the reversing of the main valves. In the base-block *B''* (which rests on the head of the main cylinder) is a

horizontal valve-chamber, *b*, of cylindrical form. In the rear end of this chamber is a valve-seat, *m*, having a conical recess, as shown in Fig. 2, in which is seated a conical valve, *n*. The stem *g* passes through this valve in its axial line, and is centered at one end in the valve-seat *m*, and at the other in the cap *b'*, which closes the front end of the chamber *b*. On this stem is a collar, *g'*, which, when brought against the end of the valve *n*, as in Fig. 2, makes connection therewith by means of one or more dowel-pins, *g''*, or other like device. In the periphery of the collar *g'* is a recess, in which operates a lug or hook, *h*, Fig. 4, which hook is on the upper prolongation of the valve-stem *f*, or one of the arms of its bifurcated upper end. This valve-stem *f* passes down through the base-block *B''* into the main cylinder and piston-stem, as shown in patent of June 6, 1871. From the steam-pipe or main steam-chest, a steam-port leads through the cylinder-head, and, as at *a'*, through the block *B''* into the valve-chamber *b*. A like port, *a*, leads from the open part of the chamber, horizontally through the collar *g'*, and part way through the valve *n*, and then it turns, radially, outward to the periphery of the valve, as at *s*. The valve-case has four ports, *c c' e e'*, extending radially through from its conical cavity. The two middle ports are steam-ports, and the outer are the exhaust-ports. From opposite the ports *c c'* a pair of ports, *o o'*, extend to the opposite ends of the cylinder *B''*, and from the other two or exhaust-ports *e e'*, a pair of exhaust-ports, *u u'*, lead to points at or near the opposite ends of the cylinder, but, preferably, at a little distance from the ends. An exhaust-groove, *v*, extends around the valve *n* a distance, or little less than the distance, from outside port *e* to outside port *e'*. From this groove an exhaust-port, *w*, leads off to the main exhaust, or to the external air, or to a condenser.

Suppose, now, that by the up stroke of the main piston, it striking against the shoulder *f'*, the valve *n* is thrown in the direction indicated by the arrow *r* (Fig. 4) till the port *s* opens into the port *c'*, as in Fig. 1. One end of the groove *v* will then communicate with the exhaust-port *e*, and the opposite end of the groove be cut off. Then the steam entering at the port *a'* will pass through the ports *a s*

c' o' to the end p of the cylinder B'' , and impart to the piston D' the desired throw. At the same time steam in the opposite end p' of the cylinder will be exhausted off by the ports u , e , groove v , and port w . When the main piston, at its down stroke, strikes the knob f'' it gives the valve a throw in the direction indicated by the arrow r , and brings the port s opposite the port c . Steam then passes from the chamber b through the ports a , s , c , and o into the end p' of the cylinder B' , and is exhausted from the end p through the ports u' , e' , groove v , (which is shifted by the same throw of the valve n) and port w . Thus the work goes on alternately and continuously.

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

1. A valve-stem, f , receiving a motion in the direction of its length from the main piston, and operating inside the main piston and stem, with a suitable connection; thence to an oscillatory valve, so as by such motion to shift such valve, substantially as described.

2. An oscillatory valve, n , having a steam-port, s , and an exhaust-groove, v , communicating alternately with the ports u u' , and continuously with the port w , substantially as set forth.

3. The combination of the valve n and valve-seat m , each constructed as set forth, and with ports relatively arranged, substantially as and for the purposes described.

4. The combination of shifting-collar g' , valve n , and valve-seat m , substantially as set forth.

5. The arrangement of the ports s , c , c' , e , e' , o , o' , u u' , and groove v , substantially as described.

In testimony whereof I, the said GEORGE WESTINGHOUSE, Jr., have hereunto set my hand.

GEO. WESTINGHOUSE, JR.

Witnesses:

A. S. NICHOLSON,

G. H. CHRISTY.