

(No Model.)

2 Sheets—Sheet 1.

G. E. TOLIVER, H. W. POUNDSTONE & E. SCHOPF.

ROTARY ENGINE.

No. 344,019.

Patented June 22, 1886.

Fig. 2.

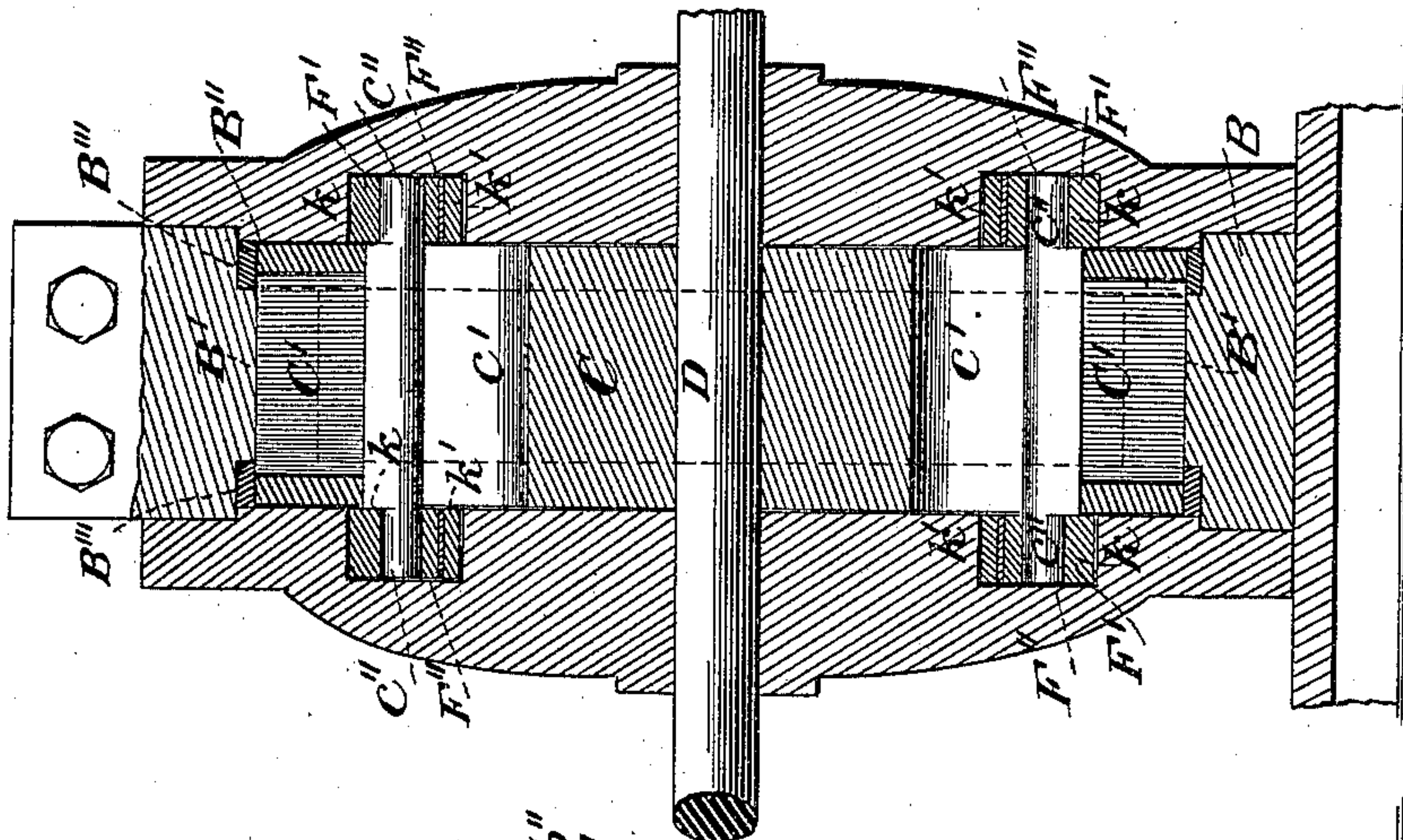
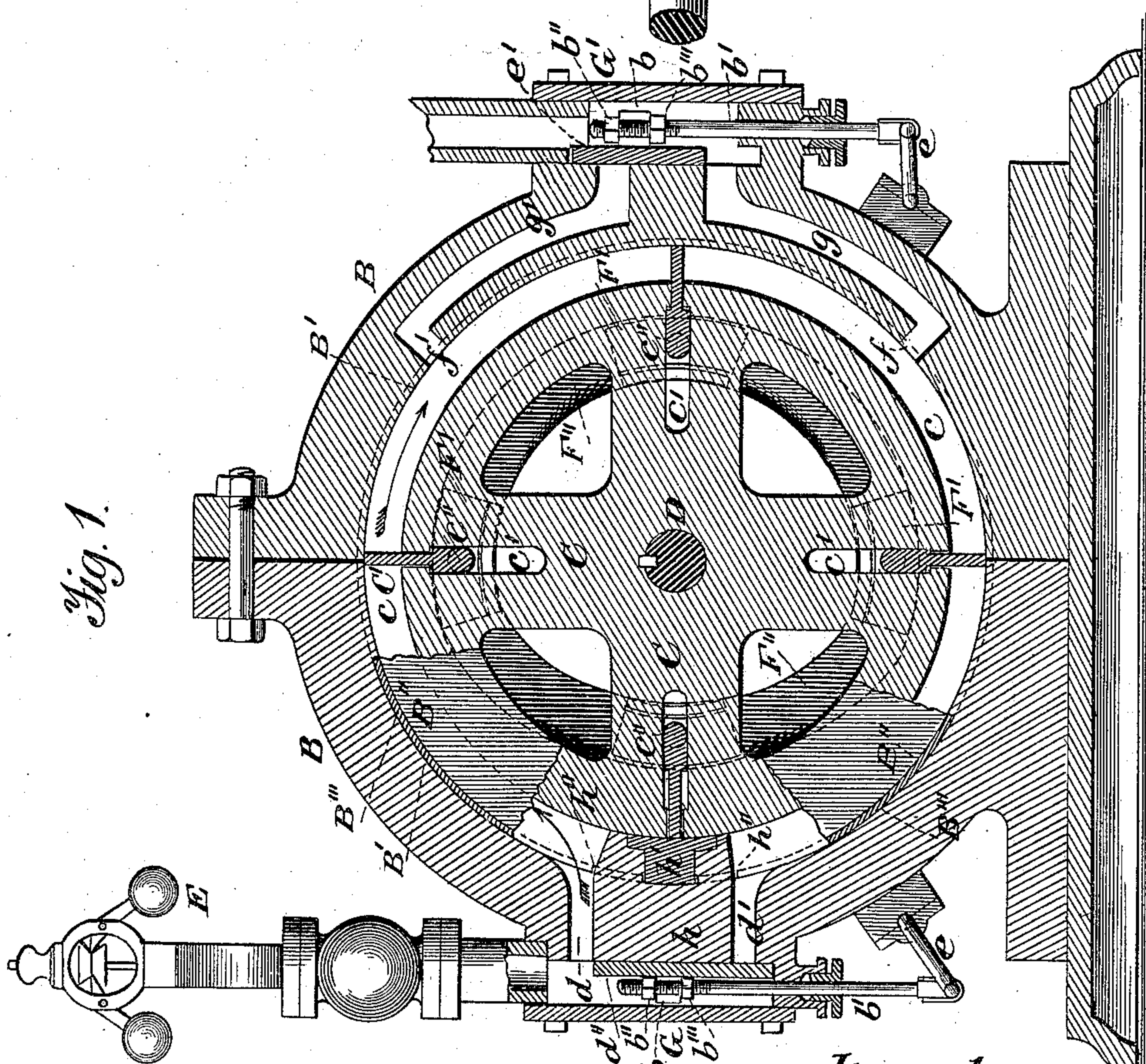


Fig. 1.



Witnesses
A. Ruppert.
Alfred G. Sage

Inventors
George E. Toliver, Henderson W. Poundstone
& Eli Schopf,
by Franklin H. Hough
Att.

(No Model.)

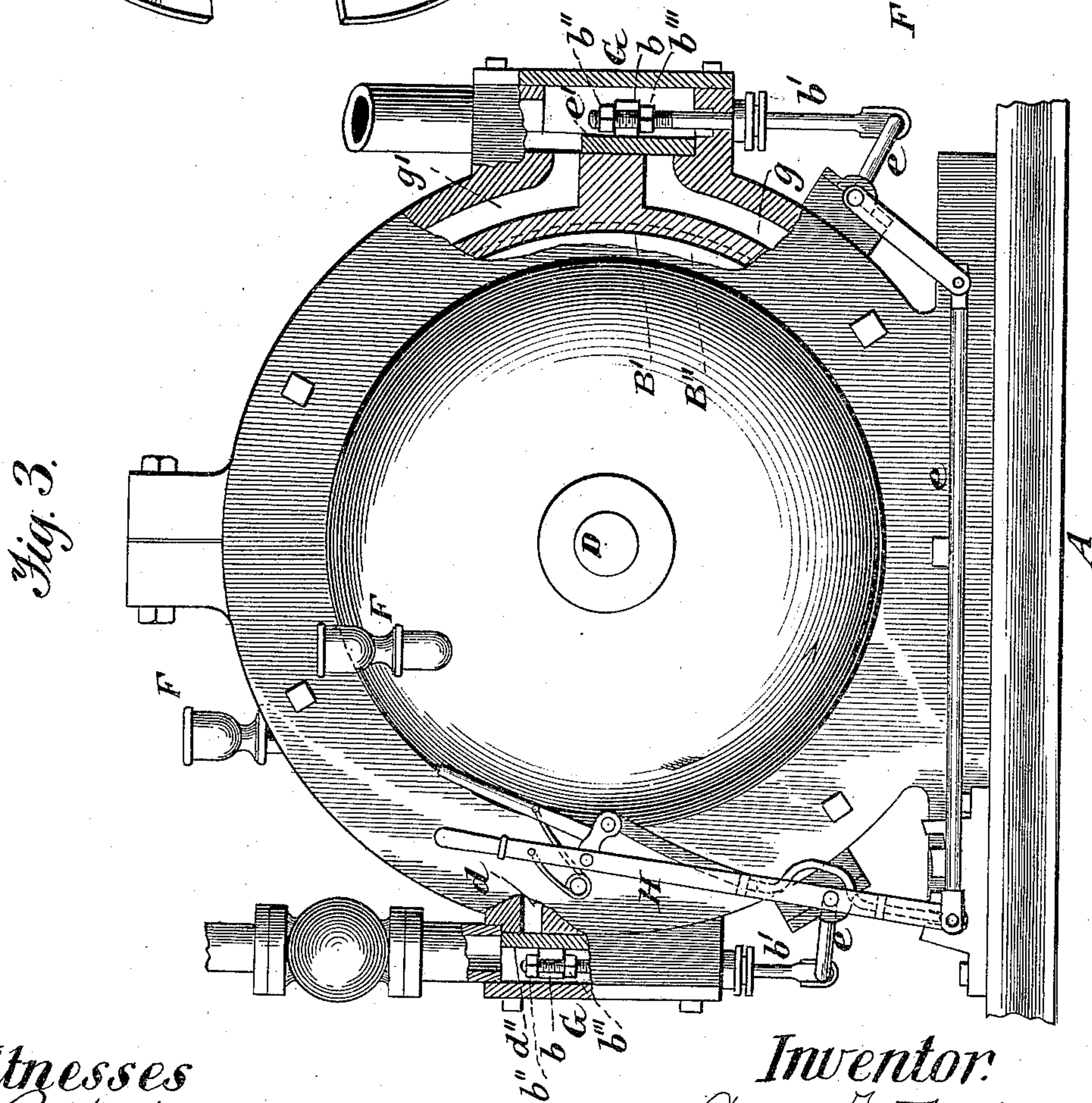
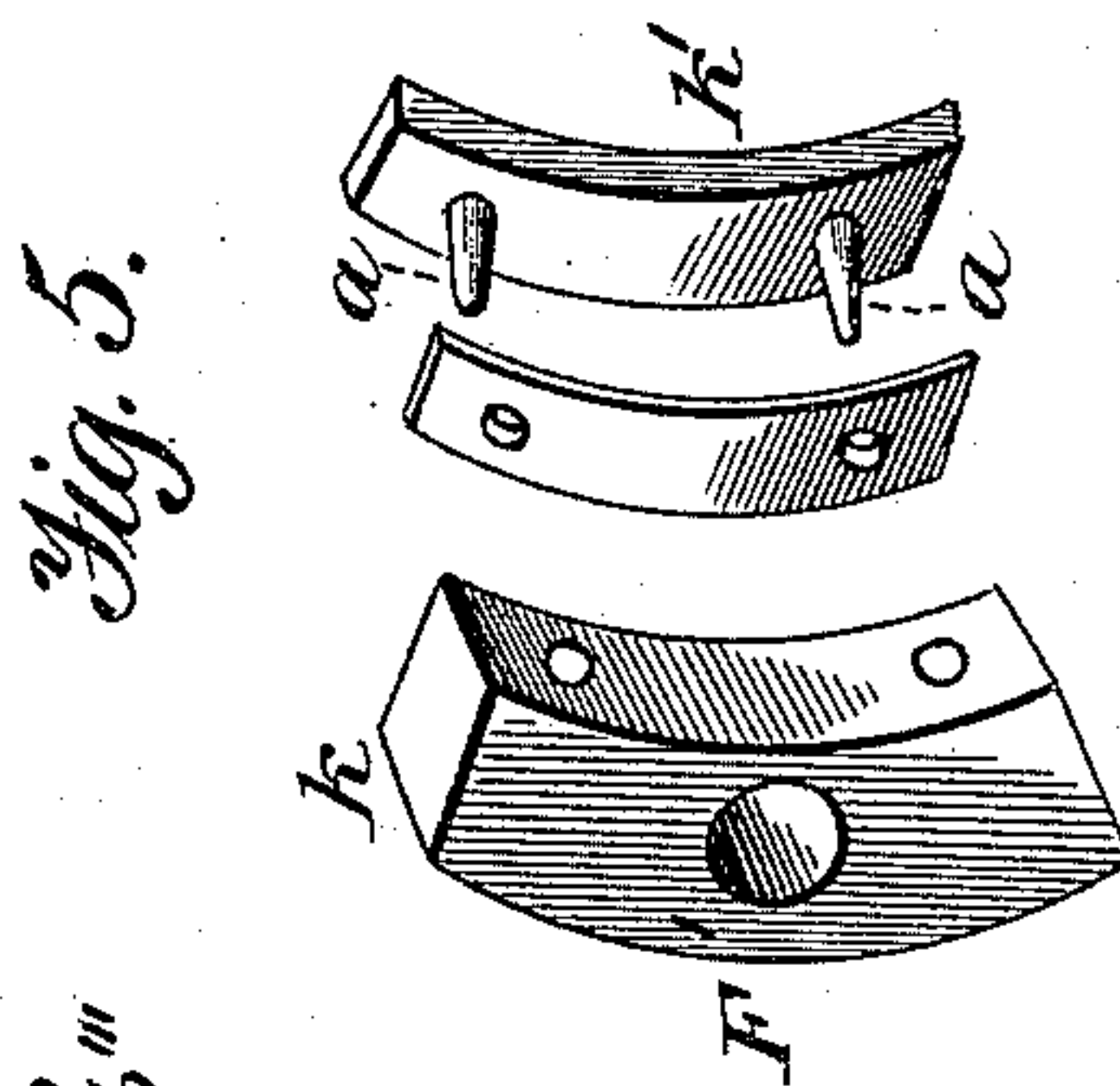
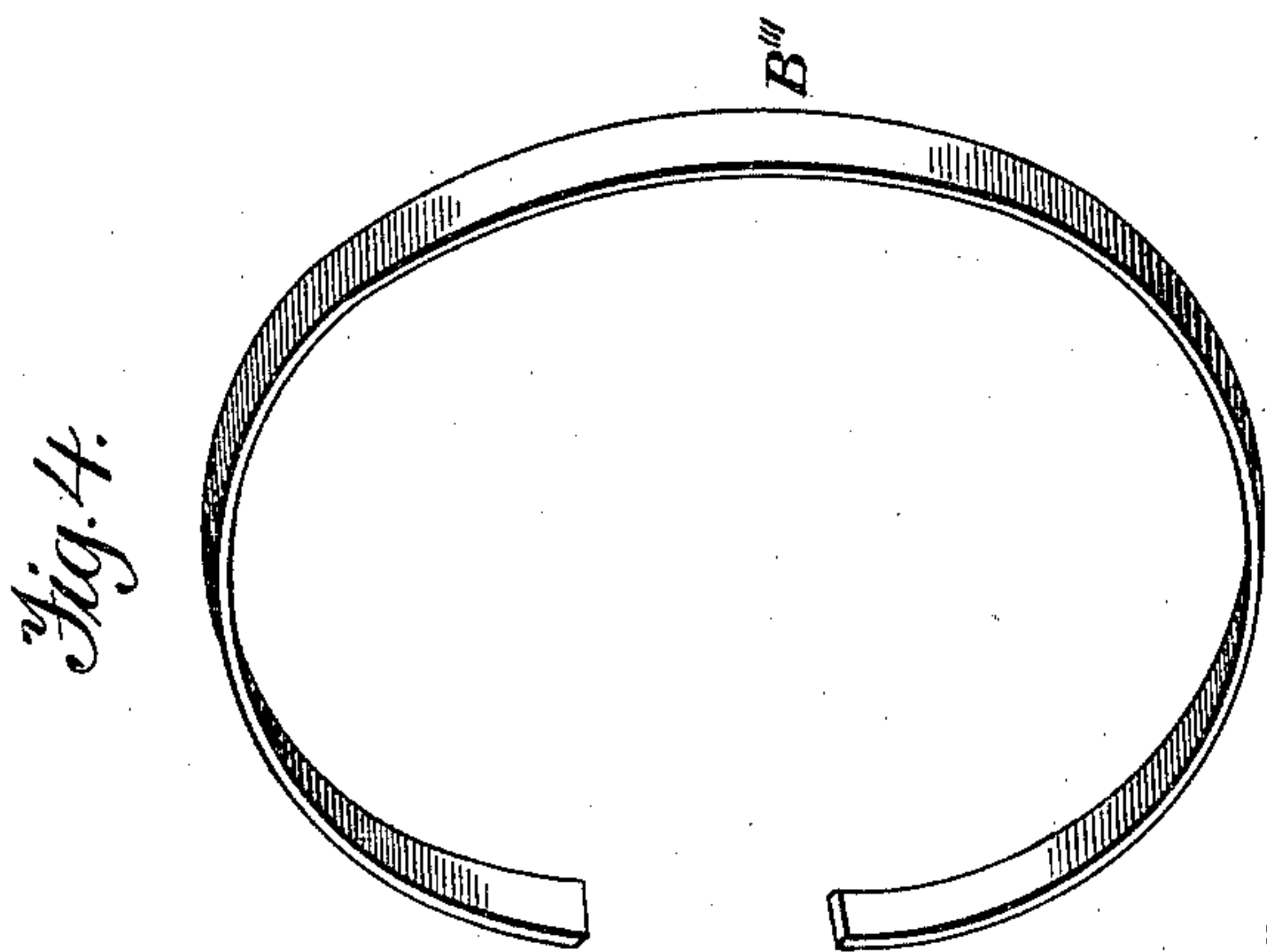
2 Sheets—Sheet 2.

G. E. TOLIVER, H. W. POUNDSTONE & E. SCHOPF.

ROTARY ENGINE.

No. 344,019.

Patented June 22, 1886.



Witnesses
A. Rupert.
Alfred G. Gage

Inventor:
George E. Toliver,
Henderson W. Poundstone and
Eli Schopf, by
Franklin N. Hough att

UNITED STATES PATENT OFFICE.

GEORGE E. TOLIVER, HENDERSON W. POUNDSTONE, AND ELI SCHOPF,
OF NEWPORT, MISSOURI.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 344,019, dated June 22, 1886.

Application filed April 17, 1886. Serial No. 199,164. (No model.)

To all whom it may concern:

Be it known that we, GEORGE E. TOLIVER, HENDERSON W. POUNDSTONE, and ELI SCHOPF, citizens of the United States, residing at Newport, in the county of Barton and State of Missouri, have invented certain new and useful Improvements in Rotary Engines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains, to make and use the same, reference being had to the accompanying drawings and letters of reference marked thereon, which form a part of this specification, and in which—

Figure 1 is a vertical longitudinal section of a rotary engine constructed in accordance with our invention. Fig. 2 is a vertical section of the same at right angles to Fig. 1. Fig. 3 is a side elevation, with parts broken away to better show the construction and arrangement of some of the parts. Fig. 4 is a perspective view of the packing-ring; Fig. 5, perspective details more particularly hereinafter referred to.

This invention relates to rotary engines, and is designed as an improvement upon the device shown and described in Letters Patent No. 327,621, issued October 6, 1885, to George E. Toliver; and it consists in the peculiar combinations and the novel construction, arrangement, and adaptation of parts, all as hereinafter more fully described, shown in the drawings, and particularly pointed out in the claims.

Referring by letter to the said drawings, A indicates a suitable base; B, the case-ring; C, the steam-wheel; D, the shaft, which is provided with a pulley of the ordinary construction (not shown) for communicating power from said shaft.

E is the governor, and F the oil-cups.

All of the above-mentioned parts are of well-known construction, except as hereinafter explained.

The steam-wheel C is provided with a peripheral channel, *c*, and slots *c'*, in which work the valves *C'*, provided with necks or projections *c''*.

F' F' are segmental blocks pivoted upon the

necks or projections *c''* of the valves, and regulating the movement of the valves by means of engagement with the eccentric grooves *F''*, formed in the cylinder-heads, and within which grooves the blocks travel.

In rotary engines of former construction, in which the projections or pins *c''* travel within the eccentric grooves and no blocks have been provided, it has been found that, owing to constant friction, the parts become worn and inoperative. To obviate this objection we have constructed the block *F'* in sections, as shown in Fig. 5 of the drawings, the parts being joined by means of pins *a*, a thin strip of rubber or other suitable packing material being inserted between the sections *k k'*.

A perfect fit of the blocks within the grooves may at all times be maintained by varying the thickness of the strip of packing material as this portion becomes worn.

The case-ring is constructed in two sections, as shown.

G is the steam-chest, provided with an upper and lower opening or steam way or inlet, *d d'*, through which the steam enters the peripheral channel in the wheel. The openings *d d'* are controlled by means of a sliding valve, *d''*, operated by means of the lever H, to which it is connected by means of the crank-lever mechanism *e*, which may be of any suitable construction adapted to such use.

The section of the case-ring which is upon the side of the wheel opposite to the steam-inlets last above described is provided at points above and below the center of the same with openings *f f'*, which communicate by means of channels *g g'*, formed within the body of the case-ring, with an exhaust-steam chest, *G'*, the steam-outlets being controlled by means of a sliding valve, *e'*, in all respects similar in construction and operation to the steam-valve *d''*, described in connection with the steam-chest G.

Each of the slide-valves is provided upon its front face with lugs *b*, between which the valve-rod *b'* passes. This end of the valve-rod is screw-threaded, and is provided upon opposite sides of said lugs with adjusting-nuts *b''* and *b'''*, as shown.

The case-ring B is provided near each edge

with a peripheral channel, B', which, when the parts are in place, is coincident with the peripheral flange B'' of the steam-wheel. In each of these channels is placed a packing-ring, B''', preferably of spring metal. Between the steam-inlet ports *d d'* is a packing-block consisting of the parts *h h' h''*, the part *h''* forming a stop, against which the ends of the packing-ring B''' abut, and the whole serving to close the peripheral channel in the steam-wheel between the two ports *d d'* and prevent the passage of steam in the wrong direction.

In operation, with the valves and ports arranged relatively to each as shown in Fig. 1, the steam enters at *d* into the peripheral channel of the steam-wheel, and exerts its force against the valves therein to force the wheel in the direction of the arrows in Fig. 1. After passing the exhaust-port *f*, the valves are drawn in by means of the engagement of the segmental blocks with the cam-grooves in the cylinder-heads, and the steam exhausts through the port *f* and the channel *g*. By reversing the lever the position of the slide-valves is changed, opening the lower inlet-port and closing the lower exhaust-port, the steam entering at *d'*, and, by means of the packing-block *h h' h''*, being forced to flow in the direction of the arrow in Fig. 3, thus forcing the wheel in the direction of said arrow in said figure, or in the opposite direction to that in which it was traveling before the position of the valves was changed. Thus it will be seen that a mere reversal of the lever reverses the direction of travel of the wheel, simultaneously moving the valves in opposite directions.

We have shown what at the present time we consider the best form of carrying out our invention, but do not wish to confine ourselves to the form shown, as it is evident that the same may be varied to a certain extent without departing from the spirit of our invention.

We are aware that rotary engines have been provided with valves having rollers working in cam-grooves in the cylinder-heads, and we make no claim thereto.

We deem our segmental blocks a decided improvement over rollers, inasmuch as they produce a much steadier motion, and can be easily constructed so as to compensate for wear, as hereinbefore described, and shown in Fig. 5 of the drawings.

Having thus described our invention and set forth its merits, what we claim to be new, and desire to secure by Letters Patent, is—

1. The combination, with the cylinder-heads provided with cam-grooves, of a steam-wheel provided with valves having segmental blocks fitting in said grooves, substantially as described.

2. The combination, with the cylinder-heads provided with cam-grooves, of a steam-wheel, valves carried thereby and provided with necks extending upon opposite sides thereof, and segmental blocks pivoted on said necks and engaging with said cam-grooves in the cylinder-heads, substantially as described.

3. In a rotary engine, the combination, with a valve, of a segmental block on the neck of said valve and made in sections, substantially as described, and for the purpose specified.

4. In a rotary engine, a segmental block composed of the section *k*, having opening to receive the neck of the valve, the section *k'*, provided with pins *a*, and the packing *a'*, inserted between said sections *k k'*, substantially as and for the purpose specified.

5. In a rotary engine, the combination, with the case-ring provided with a peripheral channel, B', and the steam-wheel provided with a peripheral flange, B'', in the ports *d d'*, and a packing-block between said ports, of a spring-metal packing-ring inserted in said channel with its ends abutting against said block, substantially as described.

6. In a rotary engine, the combination, with the case-ring provided with peripheral channels B', and the steam-wheel C, provided with the peripheral flanges B'', forming a peripheral channel, as described, of the packing-block consisting of the parts *h h' h''*, and the packing-ring B''', inserted in the peripheral channel of the case-ring, with its ends abutting against the part *h''* of said packing-block, as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE E. TOLIVER.
HENDERSON W. POUNDSTONE.
ELI SCHOPF.

Witnesses:

JOHN W. WISE,
JOHN H. DOUGLAS.