3 Sheets—Sheet 1.

H. I. WILLSON.

ROTARY ENGINE.

No. 187,208. Patented Feb. 6, 1877.

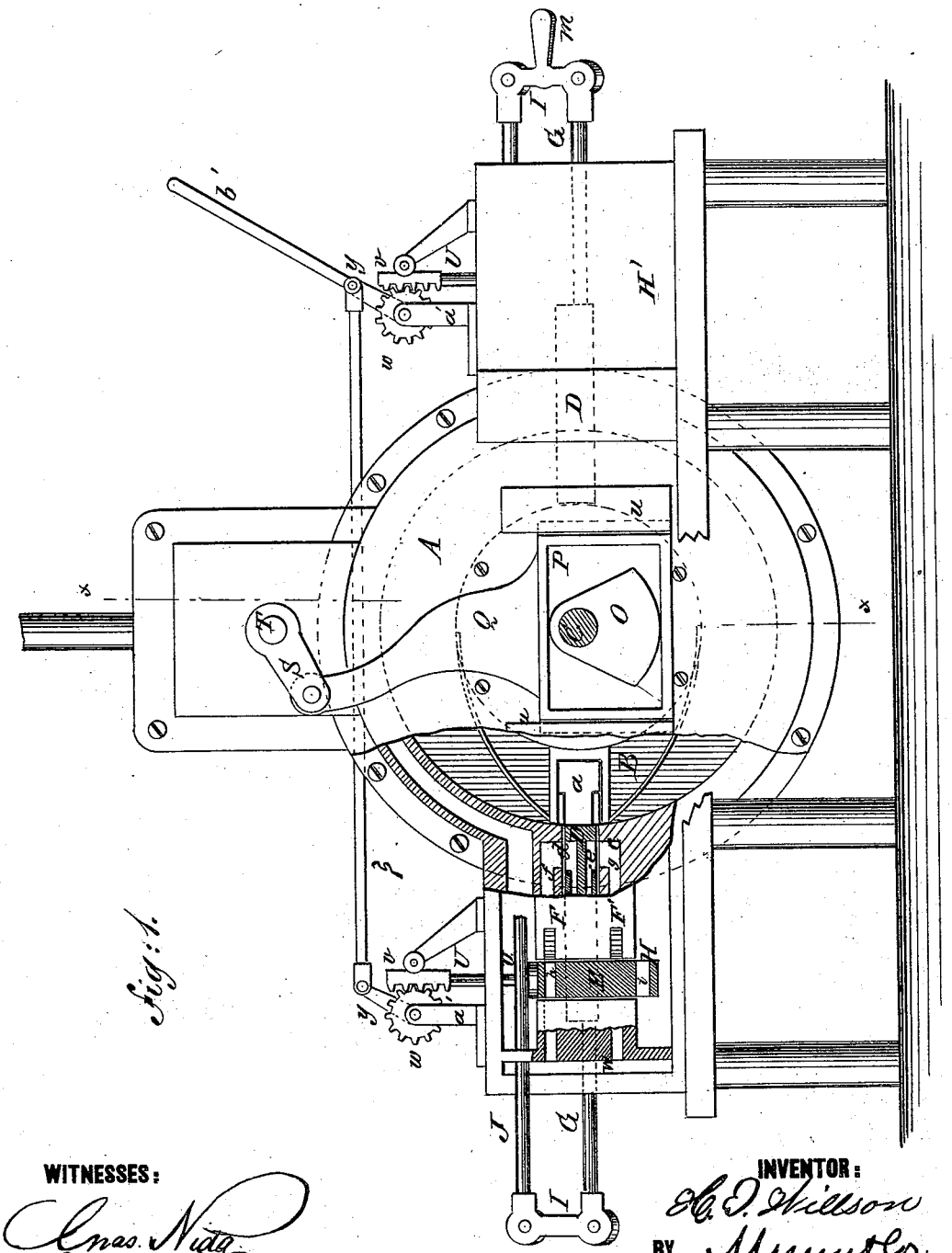


Fig: 1.

WITNESSES:

Chas. Neide

John Southals.

INVENTOR:

H. I. Willson

BY Munn & Co.

ATTORNEYS.

3 Sheets—Sheet 2.

H. I. WILLSON.

ROTARY ENGINE.

No. 187,208. Patented Feb. 6, 1877.

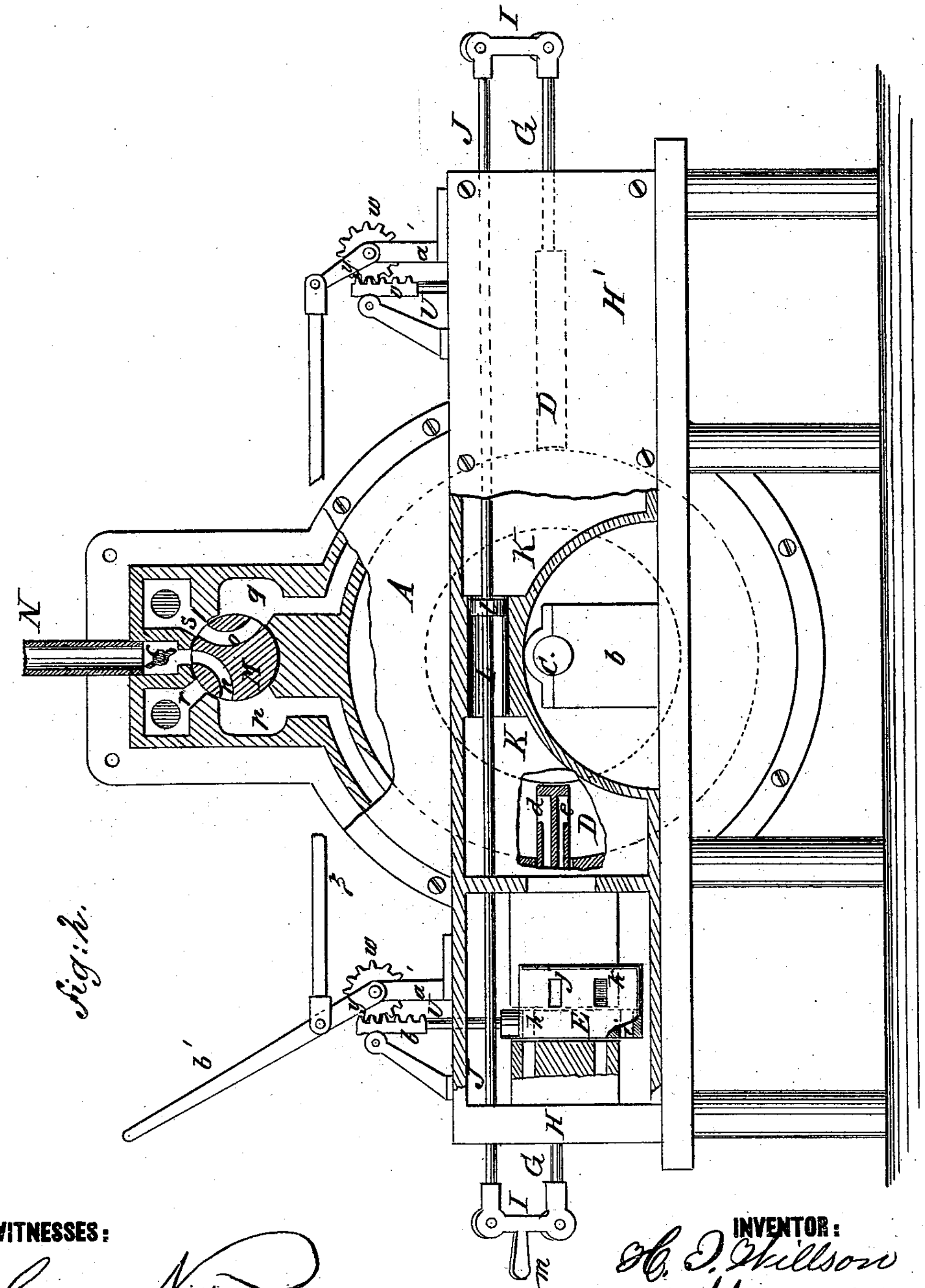


Fig: 2.

WITNESSES:

Chas Nida

John Goethals.

INVENTOR:

H. I. Willson

BY Munn & Co

ATTORNEYS.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3 Sheets—Sheet 3.

H. I. WILLSON.

ROTARY ENGINE.

No. 187,208. Patented Feb. 6, 1877.

Fig. 4.

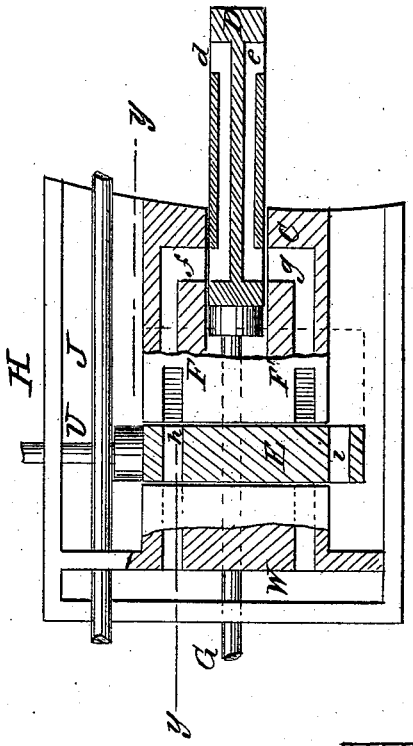


Fig. 5

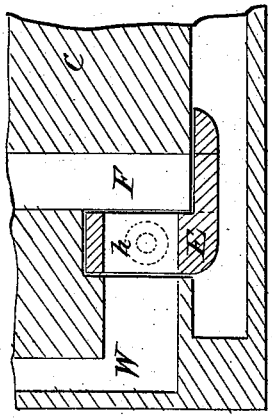
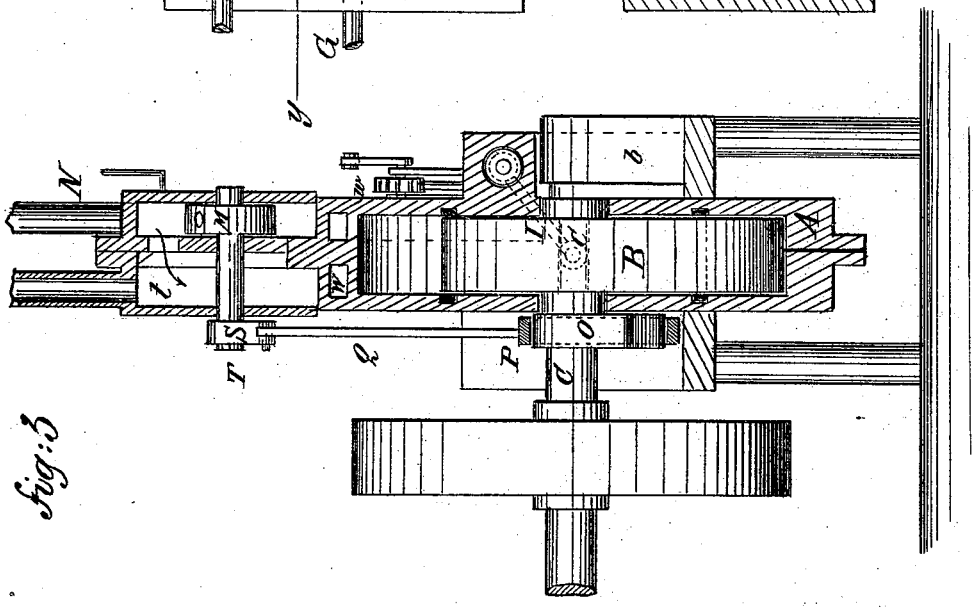


Fig. 3



WITNESSES:

Chas. Note.

John Boettals.

INVENTOR:

H. I. Willson.

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

HODGEN I. WILLSON, OF HARRISVILLE, TEXAS, ASSIGNOR TO HIMSELF AND L. J. RUSSELL, OF SAME PLACE.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **187,208**, dated February 6, 1877; application filed August 21, 1876.

To all whom it may concern:

Be it known that I, HODGEN I. WILLSON, of Harrisville, in the county of Bell and State of Texas, have invented a new and Improved Rotary Engine, of which the following is a specification:

Figure 1 is a side elevation, with a portion broken away to show the internal construction. Fig. 2 is a side elevation, partly in section, showing the arrangement of the valves. Fig. 3 is a transverse section on line *x x* in Fig. 1. Fig. 4 is a detail view of the sliding abutment and reversing-valve. Fig. 5 is a detail view of the reversing valve, taken on line *y y* in Fig. 4.

Similar letters of reference indicate corresponding parts.

The invention will first be described in connection with the drawing, and then pointed out in the claims.

Referring to the drawings, A is a cylinder containing the rotating piston B, the outer extremity of which is packed with sectional packing *a*, thrown against the interior surface of the cylinder by springs. The sides of the circular portion of the piston are packed with rings in the usual way. The piston B is secured to a shaft, C, that is provided with stuffing-boxes in the sides of the cylinder, and with journal-boxes *b*, attached to the frame that supports the cylinder. D D are sliding abutments, that fit the sides of the cylinder and the guides *c* accurately. The ends of the abutments are cored or hollowed out to fit the cylindrical portion of the piston B. Steam-passages *d* and *e* are made in the abutments, the passage *d* being on the upper side of a central web or partition in the abutment, and the passage *e* being below it. The guides *c* are provided with steam-passages *f* and *g*, that are controlled by the valve E. F F′ are supply-ports in the sides of the passages *f* and *g*. The valve E is formed at a right angle, and is provided with ports *h i j k*, arranged so that when the valve is placed so as to admit steam to one side of the piston it allows it to exhaust from the other. In other words, when the valve E is adjusted to admit steam, through the port *i*, into the supply-port F′ and passage *g*, the port *h* comes opposite the passage *f*, permitting the escape of the exhaust through the passage *f* and port *h*; at the same time the passage *g* and port F are closed by the valve.

When the supply-port F is opened by the valve the port *i* will come opposite the passage *g*, and the passage *f* and port F will be closed. This valve is used only in reversing the engine. Two similar abutments, valves, and sets of steam-passages are arranged diametrically on the cylinder.

Rods G are attached to the outer ends of the abutments D, and project outward through the steam-chests H H′, and are each connected by a cross-bar, I, to a rod, J. The steam-chests H H′ inclose the valves E and guides *c*, and are connected by a steam-passage, K, that is formed into a cylinder at L. The rod J passes through the chests H H′ and passage K, and is provided with a piston, *l*, that is fitted to the cylinder L. A handle, *m*, is attached to one of the cross-bars I, for moving the abutments by hand. A rocking valve, M, works in a seat formed at the upper side of the cylinder. It is provided with two passages, *n o*, which are capable of directing the steam from the supply-pipe N into either of the passages *p q*, and also of letting the steam out of the passages *p q* into the exhaust-passages *r s*, which lead into the exhaust-chamber *t*. O is a sectoral cam, fixed to the shaft C, and working in a rectangular frame, P, that moves in the vertical guide *u u*. A connecting-rod, Q, is attached to the frame P, and is pivoted to the arm S, that moves the rocker-shaft T, to which the valve M is attached. The valves E are provided with rods U, that have a short section of rack, *v*, attached to them. *w w* are pinions, placed on short shafts that are provided with the arms *y y*. These arms are connected by a rod, *z*, which causes both arms and pinions to move alike. The pinions are supported by posts *a′* in position to engage with the racks *v*. One of the arms *y* is elongated, forming a handle, *b′*. W is a passage, leading from the passages *f* and *g* to the exhaust-chamber *t*.

The operation of my improved rotary engine is as follows: Steam is admitted through the pipe N by opening an ordinary throttle-valve. It passes through the passage *n* in the valve

M, and through the passage *p* into the steam-chest; thence through the port *k* in the valve E, and through the passage *g* in the guide *c*, and into the cylinder by way of the passage *e* in abutment D. When the piston has moved through a half-revolution, the cam O quickly shifts the valve M, so that steam is admitted through the port *o* to the passage *q*. The steam entering the chest H′ also enters the passage K, and acts upon the piston *l*, shifting the abutment D, and admitting steam to the cylinder, forcing the piston through the remainder of the stroke. While this takes place the steam from the passage *p* is allowed to pass out through the port *n* into the exhaust *r* and the main volume of the exhaust passes through the port *h* and passage W to the exhaust-chamber *t*.

When it is desired to reverse the engine, the position of the valves E is changed by moving the lever *b′*, admitting steam where before it was exhasted, and exhausting through what were the supply-passages.

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

1. The combination of a sliding abutment working in guide C, the passages *d e f g* W, valve E, and ports F F, all arranged substantially as shown and described.

2. The combination, with valve E, of rods U, racks *v*, pinions *w*, arms *y*, and rod *z*, as and for the purpose specified.

HODGEN I. WILLSON.

Witnesses:
C. A. LEECRAFT,
W. W. SPOONTZ.