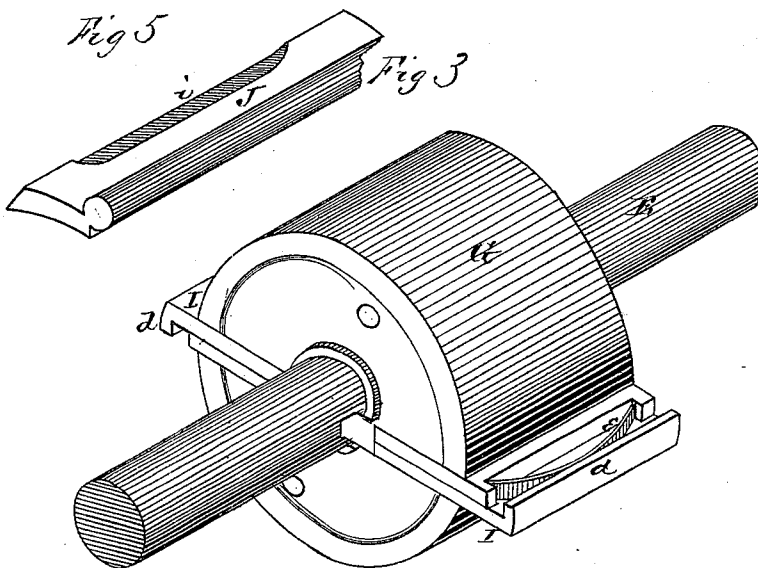
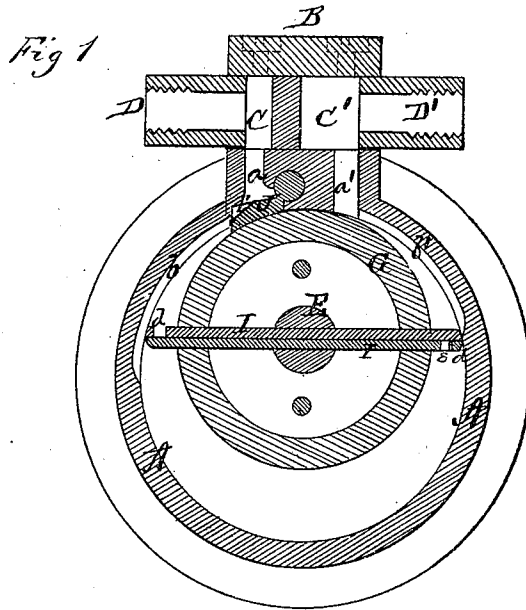


C. GROTZ & D. B. DENNISON.

Rotary Steam-Engines.

No. 133,441

Patented Nov. 26, 1872.



Witness :

Frank L. Curand
C. L. Ewert.

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Fig 2

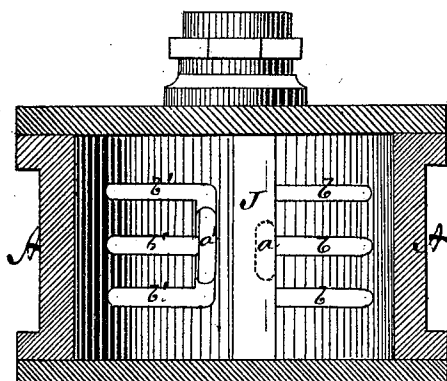
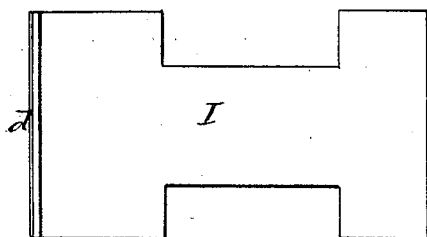


Fig 4



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UNITED STATES PATENT OFFICE.

CHARLES GROTZ AND DAVID B. DENNISON, OF OTTUMWA, IOWA.

IMPROVEMENT IN ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. 133,441, dated November 26, 1872.

To all whom it may concern:

Be it known that we, CHARLES GROTZ and DAVID B. DENNISON, of Ottumwa, in the county of Wapello and in the State of Iowa, have invented certain new and useful Improvements in Rotary Engines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The nature of our invention consists in the construction and arrangement of a rotary engine, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a longitudinal vertical section of our entire engine; Fig. 2 is a horizontal section of the cylinder; Fig. 3 is a perspective view of the entire piston; Fig. 4 shows one of the plates of the piston; and Fig. 5 shows the under side of a valve used in our engine.

A represents a cylinder of any suitable dimensions, provided on the outside with a steam-chest, B. This steam-chest is divided by a partition into two chambers, C and C', both of which communicate with the interior of the cylinder. The steam enters through a pipe, D, into the chamber C, and from thence through the passage *a* into the cylinder, first passing through grooves *b* made in the inside of the cylinder and communicating with the passage *a*. The steam exhausts through similar grooves *b'* and passage *a'* into the chamber C', and from thence through the exhaust-pipe D'. Through the heads of the cylinder A passes a shaft, E, provided with a round piston, G. This shaft is placed to one side of the center line of the cylinder, so that the piston will come in contact with the interior of the cylinder between the passages *a* and *a'*, thus forming a stop for the steam and preventing it from passing around the cylinder in the opposite direction from that intended. The grooves *b* and *b'* are so arranged in connection with the piston G that the steam

will begin to escape from one side as soon as it is fully received on the other. Through the piston G and shaft E are passed two plates, I I, which form sliding valves. One end of each valve is provided with or bent so as to form a flange, *d*, which projects far enough to overlap the other end of the other valve. Between this flange *d* and the end of the other valve is placed a spring, *e*, which springs act to force the plates or valves outward in opposite directions.

When the engine is in operation the plates I I form the abutments against which the steam works, and they thus perform the double purpose or work of the piston and valves in an ordinary steam-engine.

On the inside of the cylinder A, between the inlet-grooves *b b* and the exhaust-grooves *b' b'*, is a movable piece of metal, J, which acts as a valve and forms a packing to prevent the steam passing the point of contact of this piece and the piston. The steam, as it passes inward from the chamber C through the passage *a* to the grooves *b*, passes through a recess, *i*, formed on the inner side of the valve J to said grooves, and thus the inlet steam contributes to form a tight joint just where most needed.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The cylinder A, constructed as described, with steam-chest B, having chambers C C', the passages *a a'*, and grooves *b* and *b'*, all substantially as and for the purposes herein set forth.

2. The combination of the cylinder A with a two-chambered steam-chest, B, passages *a a'*, and grooves *b b'*, the shaft E, piston G, valves I I, springs *e*, and the packing J, all constructed and arranged substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 12th day of September, 1872.

CHARLES GROTZ.
DAVID B. DENNISON.

Witnesses:

J. T. HACKWORTH,
ALLEN JOHNSTON.