(No Model.)

L. CHAMBERLIN & A. S. TURNBULL.

ROTARY STEAM ENGINE.

No. 346,531. Patented Aug. 3, 1886.

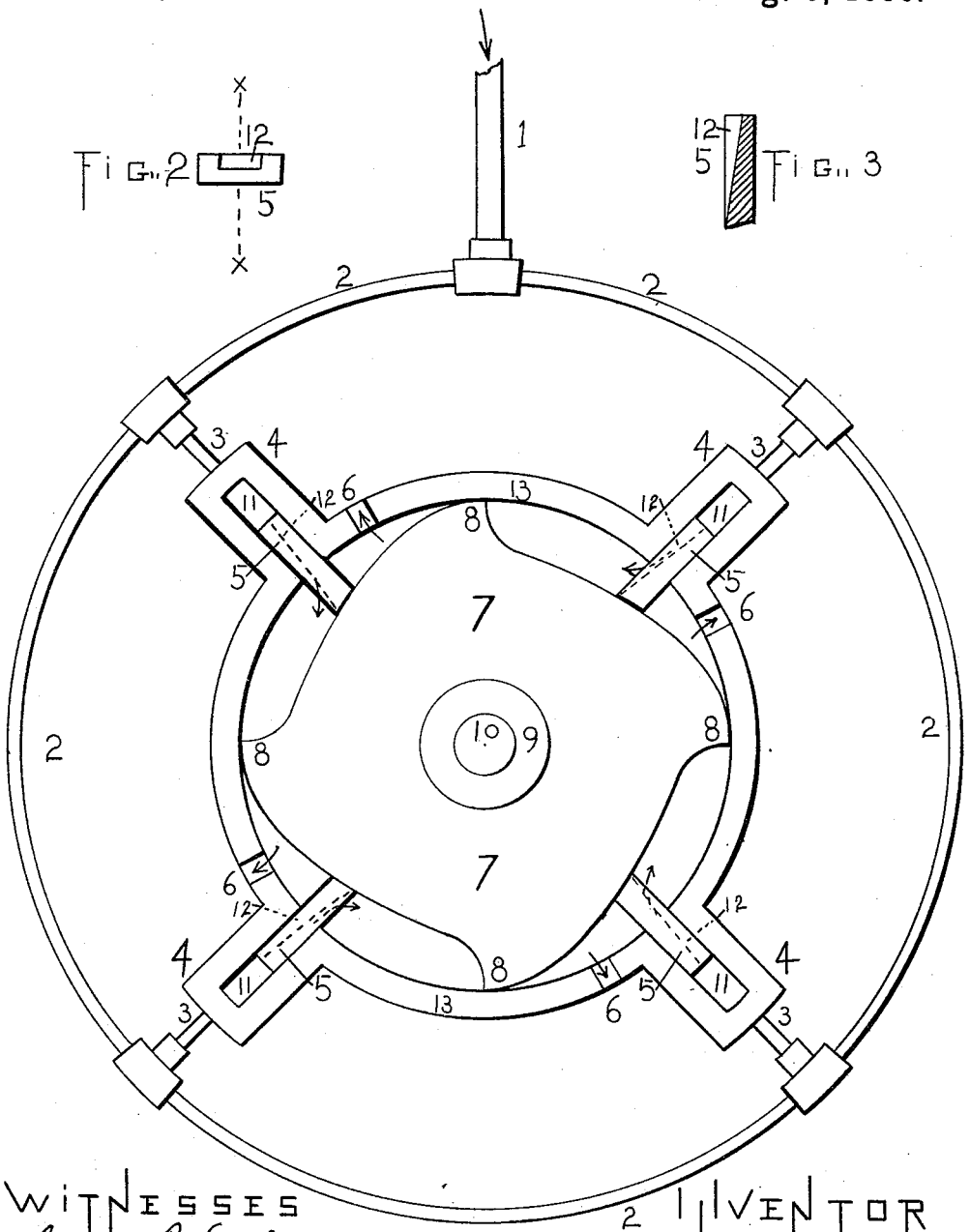

Fig. 2

Fig. 3

Fig. 1

WITNESSES

Charles B. Lothrop

Summer Leslie

INVENTOR

Levi Chamberlin

Adam S. Turnbull

by Geo. N. Lothrop atty.

UNITED STATES PATENT OFFICE.

LEVI CHAMBERLIN AND ADAM S. TURNBULL, OF YPSILANTI, MICHIGAN.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 346,531, dated August 3, 1886.

Application filed December 21, 1885. Serial No. 186,300. (No model.)

To all whom it may concern:

Be it known that we, LEVI CHAMBERLIN and ADAM S. TURNBULL, of Ypsilanti, in the county of Washtenaw and State of Michigan, have invented a new and useful Improvement in Rotary Steam-Engines, of which the following is a specification.

Our invention consists in an improvement in rotary steam-engines hereinafter fully pointed out.

Figure 1 is a side elevation of the engine, one side being removed. Fig. 2 is an end view, and Fig. 3 a vertical central section, of one of the valves.

13 represents a circular cylinder on the periphery of which is formed one or more projections—viz., valve-chambers 4, whose interior 11 communicates with the interior of the cylinder 13. We prefer to have an even number of these projecting valve-chambers 4 placed opposite to each other, and have shown four in the drawings.

7 represents a piston fitting steam-tight within the cylinder 13, and cut on its periphery to form cam projections 8, being a well-known type of rotary-engine pistons, and therefore chosen for purposes of illustration, though other known forms may be used instead. The piston is hung on a central shaft, 10, usually provided with a collar, 9, in a well-known manner. By this means the piston 7 can revolve within the cylinder 13, the cams 8 being at all times in contact with the inner face of the cylinder.

5 5 represent valves adapted to fit closely, but yet to slide in the valve-chambers 4, and the lower end of each valve rests on the face of the piston, and is slightly beveled in the direction of the rotation of the piston. In one side of each valve is cut a slit, 12, which extends partly or wholly along the whole valve, as preferred, and which is made of less depth at the bottom than at the top of the valve, or tapered, as clearly shown in Fig. 3. It is only necessary that slot 12 extend far enough along the side of the valve to connect the interior of the valve-chamber with the interior of the cylinder 13, when the valve at its lower end projects into said cylinder, and by varying either the length or the taper of said slot the motion of the valve will vary the opening between the valve-chamber and the cylinder 13 in an obvious manner.

1 represents a main steam-pipe, from which run branches 2 2 to the various valve-chambers 4, being connected therewith by nipples 3. These steam-pipes are provided with suitable cocks, (not shown,) to regulate the admission of steam to the various valve-chambers.

6 6 represent exhaust-ports in the case 13, there being one near each valve-chamber 4, and placed on that side of the valve-chamber which is opposed to the direction of rotation of the piston, so that as each cam 8 on the piston passes one of the ports the steam-space between said cam and the valve which it has just passed is brought into communication with said exhaust-port, and the steam therein is exhausted.

The operation of our invention is as follows: Steam being admitted through pipes 1 2 to the various valve-chambers, passes through the slots 12 in the valves 5, and, pressing against the cams 8, causes the piston to rotate, carrying with it the shaft. As each cam approaches one of the valves it raises said valve into its chamber 11, and thereby gradually cuts off the supply of steam passing through said valve, as the steam-passage formed by the slot 12 constantly decreases as the valve is raised, thus permitting the steam to act expansively on the piston; or, if the slot 12 does not run the whole length of the valve, the steam will be suddenly cut off instead of gradually. As each cam passes under one of the valves said valve drops to contact with that portion of the periphery of the piston which has been cut away to form the cam and at once admits steam against the face of the cam. The faces of the cams which are against the interior of the cylinder 13 may be packed in any known manner. By putting the valve-chambers opposite each other steam is admitted on both sides of the piston simultaneously, and the piston is thus balanced. The cylinder 13 has the usual side walls, but these are not shown, as they are well known.

We are aware that it has been proposed to construct a rotary engine comprising a revolving cam-piston, a cylinder having a radial

valve-chamber provided at one side with a steam-inlet, and a gravitating slide-valve having a tapering groove in its face terminating adjacent to the outer end of the valve, with the greatest depth of the groove at the inner end thereof. This differs from our invention, however, in that our valve is moved inward by steam-pressure, and the greatest depth of the tapering groove is at the outer end of the valve, in such manner that when the valve is moved outward by the cam-piston it acts to gradually cut off the supply of steam to the cylinder.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with the cylinder 13, having the exhaust-port 6 and radial valve-chamber 4, and the rotating cam-piston 7, of the sliding valve 5, provided in one face with a tapering slot, 12, extending along its length and having its greatest depth at the outer end of the valve, said valve when moved outwardly by the cam-piston acting to gradually cut off the supply of steam passing through said valve, substantially as described.

2. The combination, with the cylinder 13, having therein the piston 7 and the exhaust-ports 6, of the valve-chamber 4, steam-pipes 1 2 3, and valve 5, having therein the tapering slot 12, substantially as shown and described.

3. The combination, with the cylinder 13, having a radial valve-chamber, 4, provided at its outer end with a steam-inlet, and the rotating cam-piston 7, of the sliding valve 5, moved inward by steam-pressure and provided in one face with a tapering slot, 12, extending along its length, and having its greater depth at the outer end of the valve to receive steam from behind the latter, said valve when moved outward by the cam-piston acting to gradually cut off the supply of steam to the cylinder, substantially as described.

LEVI CHAMBERLIN.
ADAM S. TURNBULL.

Witnesses:
BENJAMIN COLLINS,
THOMAS SPOONCER.