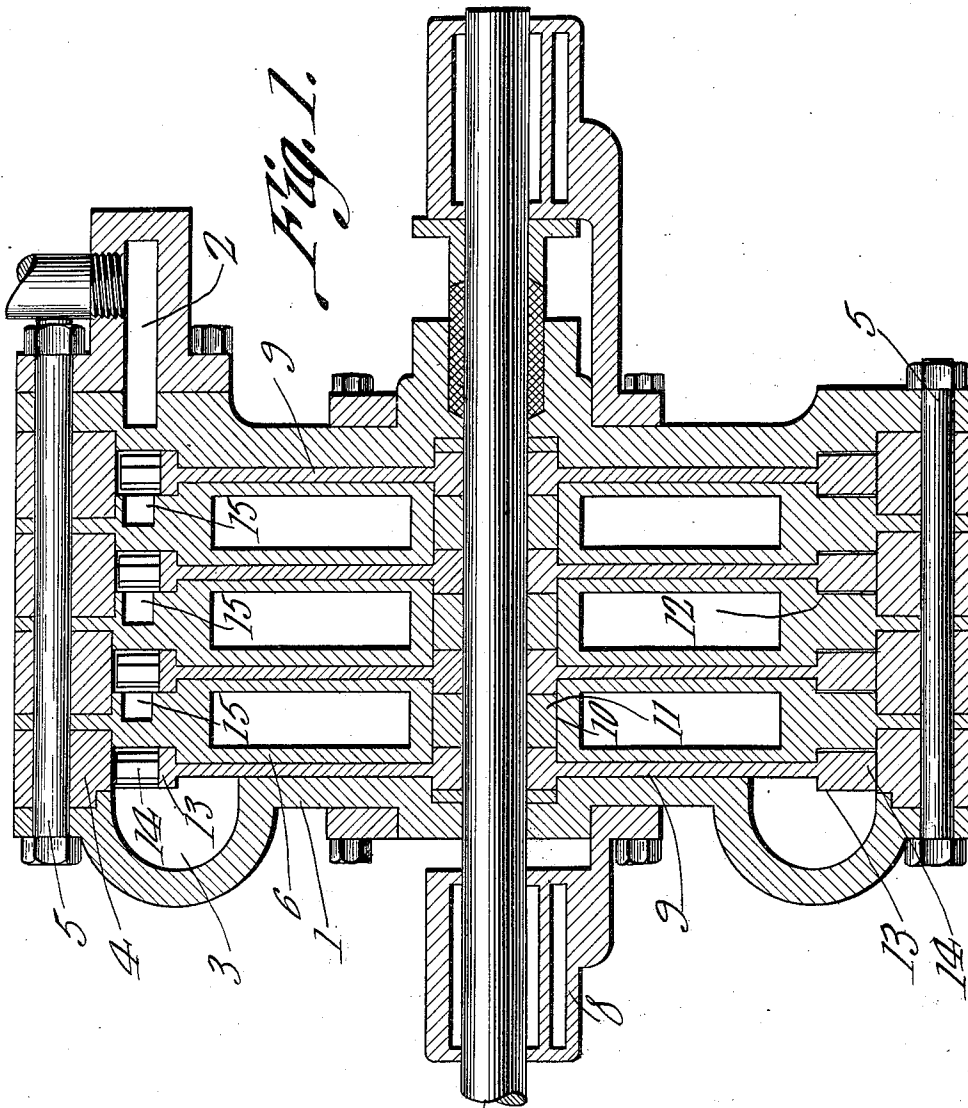


D. P. UPSON.
 ROTARY STEAM ENGINE.
 APPLICATION FILED MAY 29, 1911.

1,022,570.

Patented Apr. 9, 1912.

3 SHEETS—SHEET 1.



Witnesses

J. P. Connelley
L. H. Wilcox

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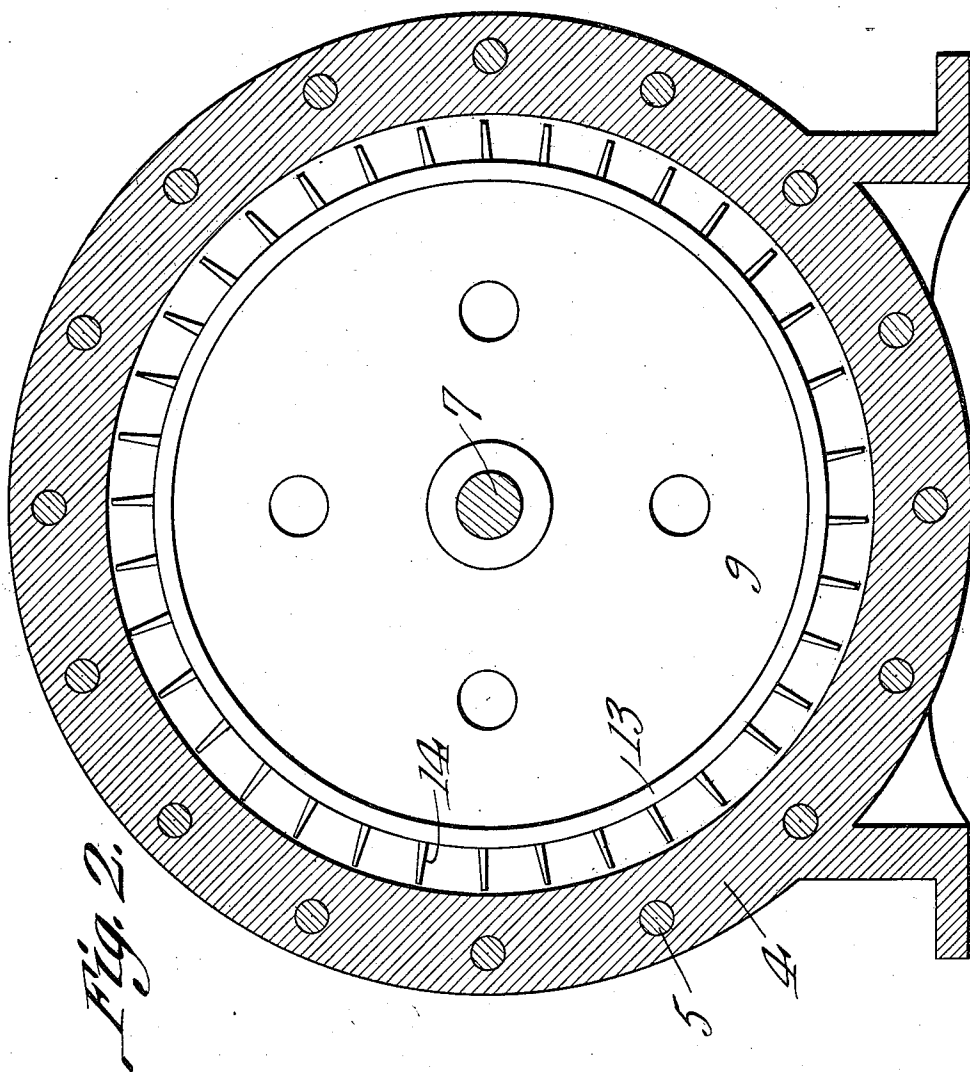
by *C. A. Snow & Co.*
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

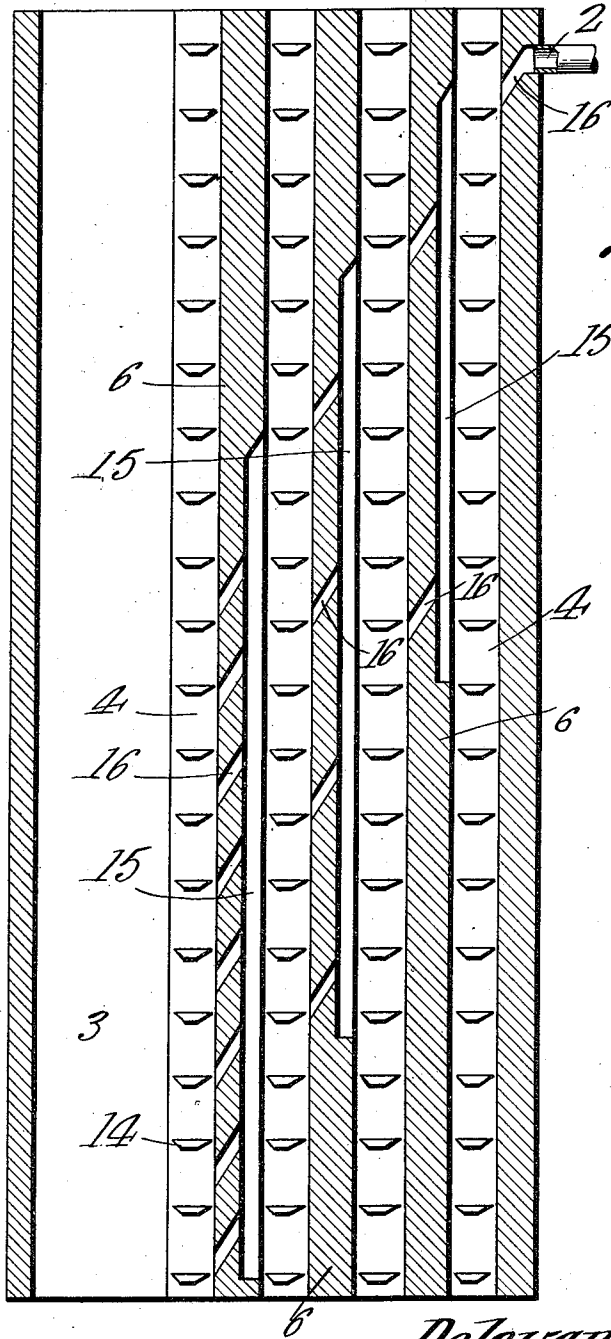


Fig. 3.

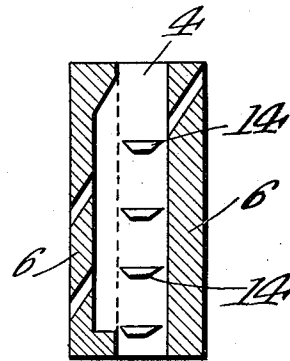


Fig. 4.

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UNITED STATES PATENT OFFICE.

DELEVAN P. UPSON, OF JACKSONVILLE, FLORIDA, ASSIGNOR TO UPSON ROTARY MOTOR CO., OF JACKSONVILLE, FLORIDA.

ROTARY STEAM-ENGINE.

1,022,570.

Specification of Letters Patent.

Patented Apr. 9, 1912.

Application filed May 29, 1911. Serial No. 630,216.

To all whom it may concern:

Be it known that I, DELEVAN P. UPSON, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented a new and useful Rotary Steam-Engine, of which the following is a specification.

This invention has relation to rotary steam engines and consists in the novel construction and arrangement of its parts as hereinafter described and claimed.

The object of the invention is to provide an engine of the type stated in which steam is admitted into one end of a cylinder and exhausted from the other end thereof and during its course of travel from one end of the cylinder to the other is caused to operate or work upon members of a rotor journaled in the cylinder, said members being incased in compartments into which the cylinder is divided. The partitions between the said compartments are provided with transmission ports through which one compartment may exhaust into the next adjacent compartment and so on throughout the length of the cylinder, the transmission portage of the said partitions increasing in transverse sectional area from the admission end of the cylinder toward its exhaust end. The rotor members are provided with peripheral blades and the steam inlet passage and the said transmission ports are so disposed that the steam is presented to the vanes in the general direction in which the said rotor turns but at an angle to the axis of the rotor and at angles to the faces of the vanes upon which the steam is impinged. The edges of the vanes which are disposed toward the discharge ends of the steam admission passages and the steam transmission ports are beveled in the general direction in which the steam passes through the compartments so that the steam resisting surfaces of the said vanes have maximum area but their portions adjacent the ends of the said passages and ports are reduced in thickness to avoid wire drawing of the steam as it is admitted in to the compartments and while the said vanes are passing across the discharge end of the said steam passages and ports.

In the accompanying drawings:—Figure 1 is a vertical longitudinal sectional view of the engine. Fig. 2 is a transverse sectional view of the same. Fig. 3 is a dia-

grammatic plan view of the engine illustrating the steam courses through the same. Fig. 4 is an enlarged detail view illustrating the relative arrangement of the transmission ports in adjacent partitions with the vanes of one of the rotor members located between them.

The engine consists of a cylinder 1 which is provided at one end with a steam inlet passage 2 and at its other end with a steam exhaust area 3. The cylinder 1 is preferably made up of a series of rings 4 which are secured together by clamping bolts 5 with the edge portions of partition members 6 interposed between the adjacent rings 4. A shaft 7 is journaled for rotation in bearings 8 and passes concentrically through the cylinder 1. Disks 9 are fixed to the shaft 7 and are located between the partition members 6, hereinbefore described. The said partition members 6 are centrally bored as at 10 and bushings 11 of relatively soft material are fixed in the bores of the said partition members. The shaft 7 is journaled in the said bushings 11. The partition members 6 are provided in the vicinity of their edge portions and in their sides with recesses 12 which receive peripheral rims 13 carried by the disks 9. Radially disposed vanes 14 are fixed to the rims 13 and extend transversely across the space between the outer portions of the partition members 6 but do not completely close across the transverse sectional area thereof as illustrated in Fig. 1 of the drawings. The outer ends of the said vanes 14 are also slightly spaced from the inner surfaces of the rings 4. The partition members 6 are provided in their sides toward the steam admission end of the cylinder 1 with recesses 15 which are located beyond the peripheries of the disks 9 and directly opposite the paths of movement of the vanes 14. These recesses 15 increase in length gradually from the partition member which is nearest the steam admission end of the cylinder throughout the said partitions toward the exhaust end of the cylinder.

The steam admission end of the cylinder 1 is provided with a single port 16 which communicates the steam passage 2 with the interior of the space between the end of the cylinder and the first partition member 6. The said partition members 6 are also provided with transmission ports 16 which

communicate at their receiving ends with the recesses 15 and which at their discharge ends communicate with the spaces between the partition members 6 but toward the discharge end of the cylinder 1. The number of the transmission ports 16 in the partition members increase gradually at a predetermined ratio from the initial to the final partition members so that there is a gradual increase of transmission portage through the said partition members from the initial members to the final member. The said transmission ports are disposed at acute angles to the axis of the shaft 7 and at obtuse angles to the vertical planes of the disks 9. And inasmuch as the vanes 13 have work bearing surfaces which are parallel with the axis of the shaft 7 and approximately radially disposed with relation to the said shaft, the said work bearing surfaces are carried across the discharge ends of the said transmission ports in such manner that they receive the steam from the same while they are moving in the same general direction as the course of the steam but across which the steam may sweep as it passes toward the recesses and transmission ports of the succeeding partitions and consequently the said vanes are subjected to the force of impact of the steam and force of expansion of the same. By reason of the fact that the edges of the said vanes which are adjacent the delivery ends of the said transmission ports are beveled or sharpened the said vanes will sweep across the discharge ends of the said transmission ports without having a tendency to wire draw the steam and retard the speed at which they are moving. Also by reason of the fact that the partition members 6 are provided with recesses 15 of increasing length throughout the series of partition members and with portage ways of increasing transverse sectional area throughout the series of partition members, there is no

back pressure caused by holding the steam against exhaust as it travels through the cylinder. Therefore it will be seen that there is no back pressure from the steam against the faces of the vanes opposite the work bearing faces thereof. Also it will be seen that the steam in its course through the cylinder is subjected to a succession of stages of work with means for permitting the steam to expand during its course of travel so that volume of the steam is increased as the steam is presented to the succeeding stages of its work.

Having described the invention what I claim as new and desire to secure by Letters Patent is:—

A rotary engine, comprising a cylinder, partitions located therein and dividing the same into compartments, a rotor journaled in the cylinder and provided with peripheral vanes, one to each compartment, said partitions having in their sides and at the edges of the paths of movement of the vanes recesses, which recesses increase in length throughout the series of partitions from the initial partition to the final partition, and have each an inclined shoulder at its inlet end and a right angled shoulder at the other end, said partitions also having steam transmission ports communicating at their receiving ends with the said recesses and having their discharge ends located tangentially and adjacent the edges of the paths of movement of the vanes, the transverse sectional area of the transmission portage throughout the partitions increasing by multiples of two from the initial partition to the final partition.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

DELEVAN P. UPSON.

Witnesses:

FRANK B. OCHSENREITER,
M. F. MARTIN.