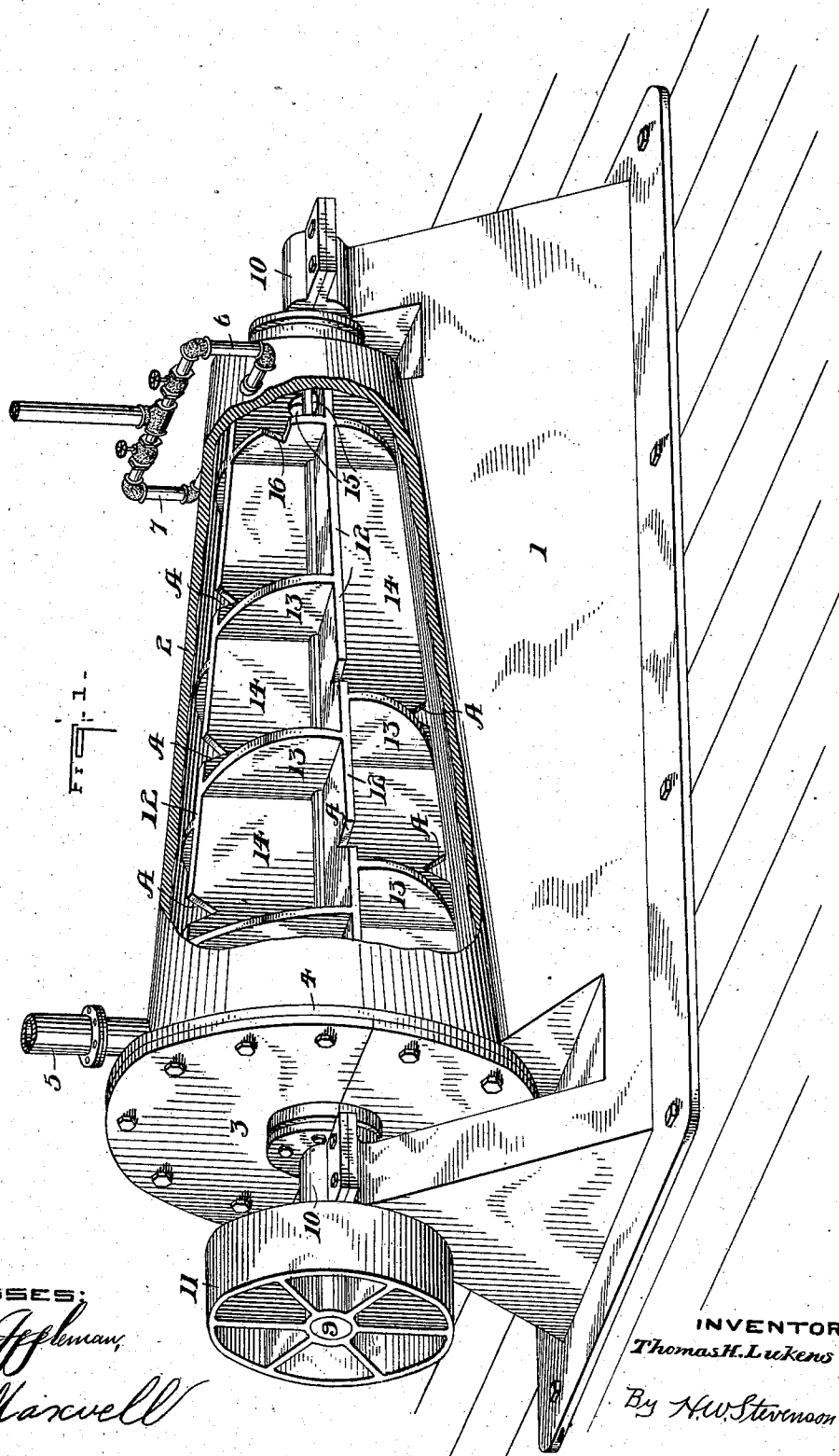


No. 884,984.

T. H. LUKENS.  
ROTARY ENGINE.  
APPLICATION FILED JULY 10, 1907.

PATENTED APR. 14, 1908.

3 SHEETS—SHEET 1.



WITNESSES:

*J. P. Appleman,*  
*J. N. Maxwell*

INVENTOR  
*Thomas H. Lukens*

By *H. W. Stevenson*

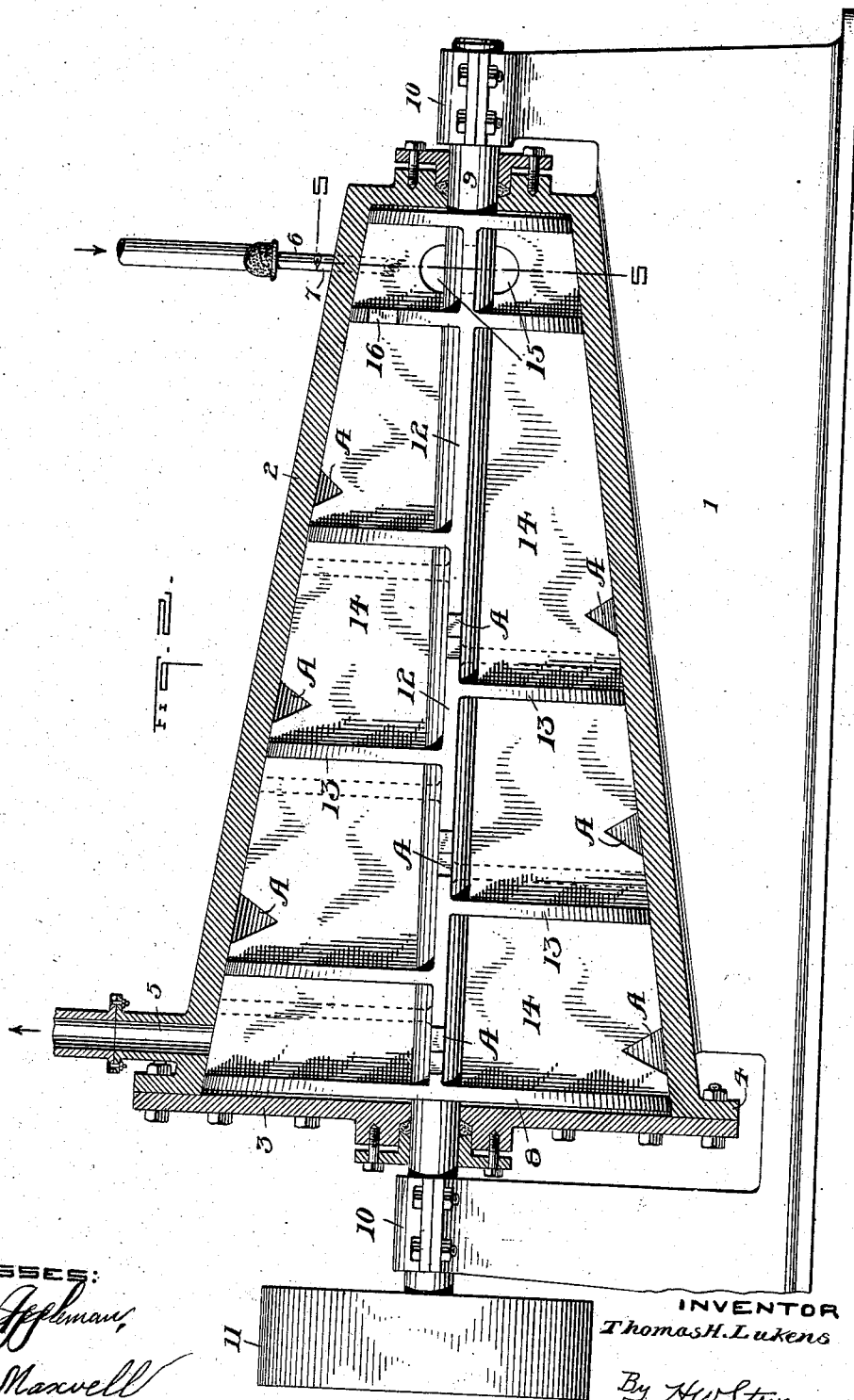
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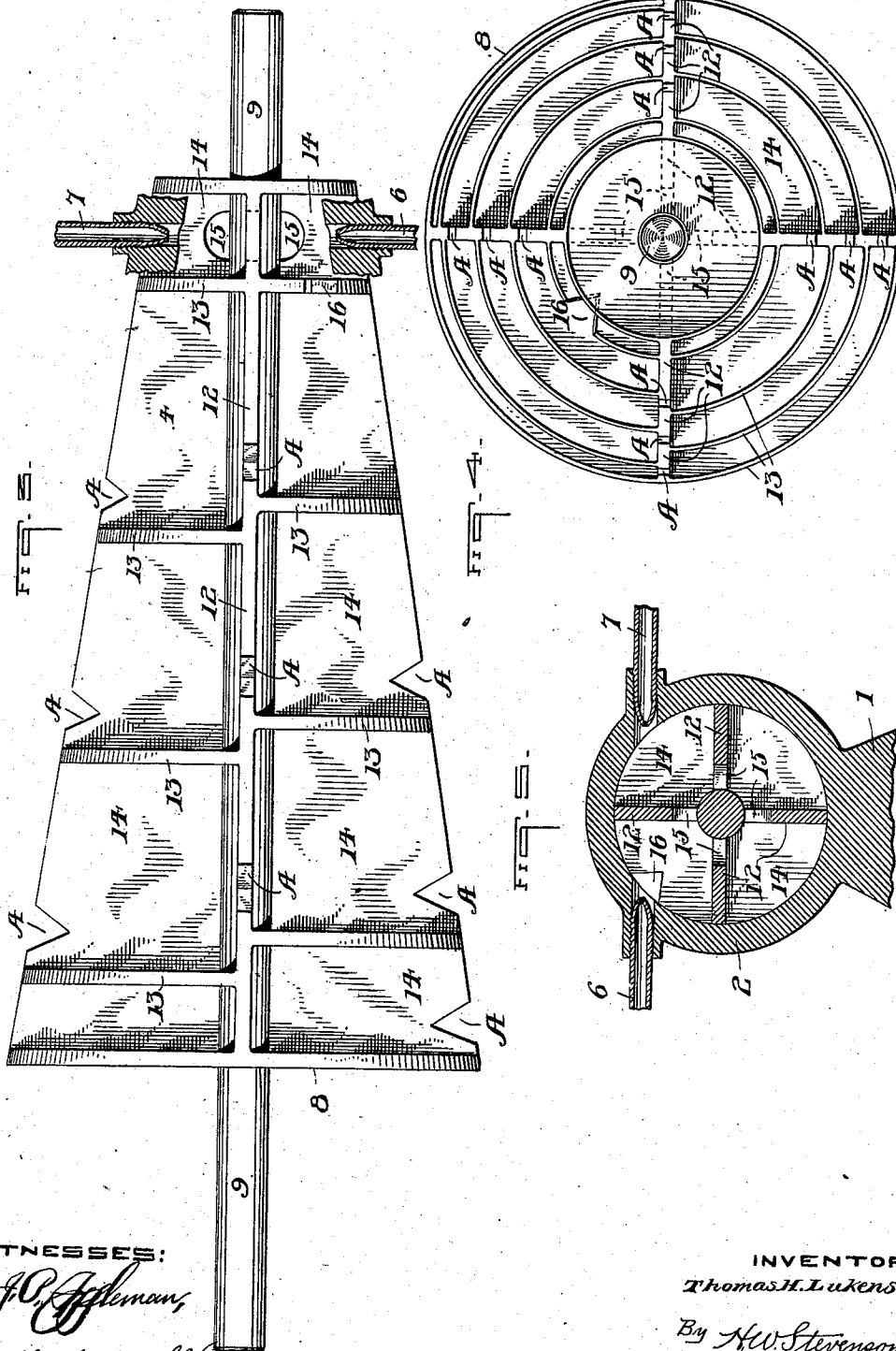
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

THOMAS H. LUKENS, OF ROCHESTER, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN M. GRIM, OF ROCHESTER, PENNSYLVANIA.

## ROTARY ENGINE.

No. 884,984.

Specification of Letters Patent.

Patented April 14, 1908.

Application filed July 10, 1907. Serial No. 383,040.

*To all whom it may concern:*

Be it known that I, THOMAS H. LUKENS, a citizen of the United States, residing at Rochester, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines; and I do 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 to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to a new, practical, and useful improvement in rotary engines in which steam or air is used as a motive power.

The primary object of my invention is the construction of such a type of engine that will be simple in design, reliable during operation, and, by having few working parts, be of a minimum expense for maintenance.

As a further object in view my invention consists of the novel arrangement and construction of parts whereby the steam, or other motive power used in conjunction therewith, is used at a high and gradually expanding pressure throughout the entire length of the cylinder.

In the accompanying drawings, in three sheets; Figure 1 is a perspective view of my improved engine partly broken away. Fig. 2, Sheet 2, is a longitudinal section of the same. Fig. 3, Sheet 3, is a detached view of the turbine portion of my engine. Fig. 4 is an end view of the same, and Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2.

Throughout the different views shown in the drawings, the numeral 1 indicates the supporting bed plate which is of ordinary construction and utility, with the exception that, in the top portion thereof there is formed, as an integral part of said bed plate, or it may be otherwise secured, a cone shaped cylinder 2, the narrow portion thereof being hereinafter designated as the front or admission end and the wide portion as the rear or discharge end. This last named portion of the cylinder is closed by a plate 3 securely bolted to a flange 4 formed at the end of said cylinder, while through the upper shell adjacent to said rear end is provided an escapement orifice 5, and communicating through the said shell at the opposite or front

end are the valve controlled admission pipes 6 and 7. Operatively seated in the cylinder 2, is a cone shaped turbine wheel 8 conforming in cross section to the contour of said cylinder, having a spindle 9—9 at each end thereof, which seat in suitable housings 10—10 formed on the bed plate, and a power wheel 11 secured to one end thereof. This turbine wheel 8 consists of a series of blades 12—12 which extend longitudinally throughout the length thereof, the height of said blades increasing gradually from the front to the rear as seen in Fig. 3.

Formed at right angles with these said blades 12 and connected to the walls thereof are a plurality of partitions 13—13 which, together with the walls of said blades 12, form the compartments 14—14.

At the narrowest or admission end of the turbine these compartments are of uniform size and capacity, and constitute the steam admission chambers, there being suitable openings 15, formed in the lower part of the blades 12, thus providing a communicating means between all of the said chambers. Through the top portion of one of the side partitions 13 is an opening 16 which affords an outlet from one of the steam admission chambers into the adjoining compartment 14 constituting the first of the series of outlet chambers. Each of the succeeding compartments 14 communicates, by means of a suitable opening A, formed in the blades 12, with the one immediately in front thereof, thus an outlet passage for the spent steam is provided, said steam taking a spiral course through the series of compartments until it reaches the opening 5 at which point it escapes out of the cylinder.

It will readily be seen that owing to the gradual taper taken on by the turbine, starting at the steam admission end of the cylinder, these escapement compartments 14 gradually increase in area, until, arriving at the discharge end of said cylinder, where they reach their maximum size and capacity. The communicating openings A, from one compartment into another, also gradually increase in size from the admission to the discharge end in order to accommodate the increase in volume of steam due to expansion.

The primary object of this particular feature heretofore described is to provide a

means for the gradual expansion of the steam, or other motive power, as it travels in its spiral pathway throughout the length of the cylinder, and, as said steam enters each succeeding compartment of the series it exerts a pressure on the blade 12 of the revolving turbine. In this manner the maximum efficiency of the steam is utilized throughout the entire length of the cylinder. Suitable packing glands 15 of ordinary construction and utility are arranged over the spindle at each end of the cylinder.

To operate the engine steam is allowed to pass through the valve controlled pipe 6, the inner end thereof, where it projects through the wall of the cylinder, being preferably of a nozzle formation, and as the steam enters the cylinder it is directed against the upper portion of the blades 12, thus causing the turbine to revolve. Each of the series of blades contained in this admission chamber present faces to the incoming steam which is then deflected through the openings 15 and finds an exit through the port 16 into the first of the series of expansion and exhaust chambers 14. The course of this spent steam from that point on to the exhaust outlet 5 is in a spiral pathway through the gradual increasing ports A formed through the blades 12 in each chamber 14, and while on its course, as shown in Fig. 4 of the drawings, it is exerting a pressure against the blades 12 and therefore assisting in the revolution of the turbine.

I claim that the possibility of "back lash" will be avoided by the construction shown at the admission end of the turbine whereby the steam, after exerting its pressure against the series of blades 12 at that point, will be immediately gotten rid of through the port 16, and then gradually expanded and permitted to escape out of the exhaust opening 5, after having completed its spiral course and in so doing assisted in the revolving of the turbine 8 as heretofore described.

It is understood, and I desire to reserve the right to construct the turbine wheel 8 with as many expansion or escapement compartments as may be found expedient and also reserve the right to make other changes in the detail form of construction without

departing from the original idea and intention.

Having thus fully shown and described my invention, what I claim as new, and desire to secure by Letters Patent is:

1. A rotary engine having a cone shaped cylinder suitably supported, with admission and exhaust ports arranged therethrough; a cone shaped turbine wheel operatively arranged inside of said cylinder and provided with a series of propeller blades extending longitudinally throughout the length of the turbine; a series of partition walls arranged between the blades, thus forming a plurality of compartments, said partition walls being so placed, with respect to the blades, that the motive agency in passing from the admission to the exhaust end of the cylinder will take a spiral course through said compartments; and a discharge port arranged through the propelling blade in each compartment.

2. A rotary engine having a cone shaped cylinder suitably supported, with admission and exhaust ports arranged therethrough, the admission port being provided with a nozzle shaped supply pipe; a cone shaped turbine wheel operatively arranged inside of said cylinder on which, at the narrowest end of the cylinder, is an admission chamber consisting of a plurality of communicating compartments, and having a single exhaust port arranged therein; a series of propeller blades arranged on said turbine wheel extending longitudinally throughout the length thereof; a series of partition walls arranged between the blades, thus forming a plurality of exhaust compartments, increasing in size and capacity as they approach the discharge end of the cylinder, and so placed, with respect to each other, that the motive agency, in passing from the admission chamber, will take a spiral course to the exhaust port; and a discharge port arranged through the propeller blade in each compartment.

In testimony whereof, I affix my signature, in presence of two witnesses.

THOMAS H. LUKENS.

Witnesses:

JOHN A. SPRATLEY,  
J. H. CREESE.