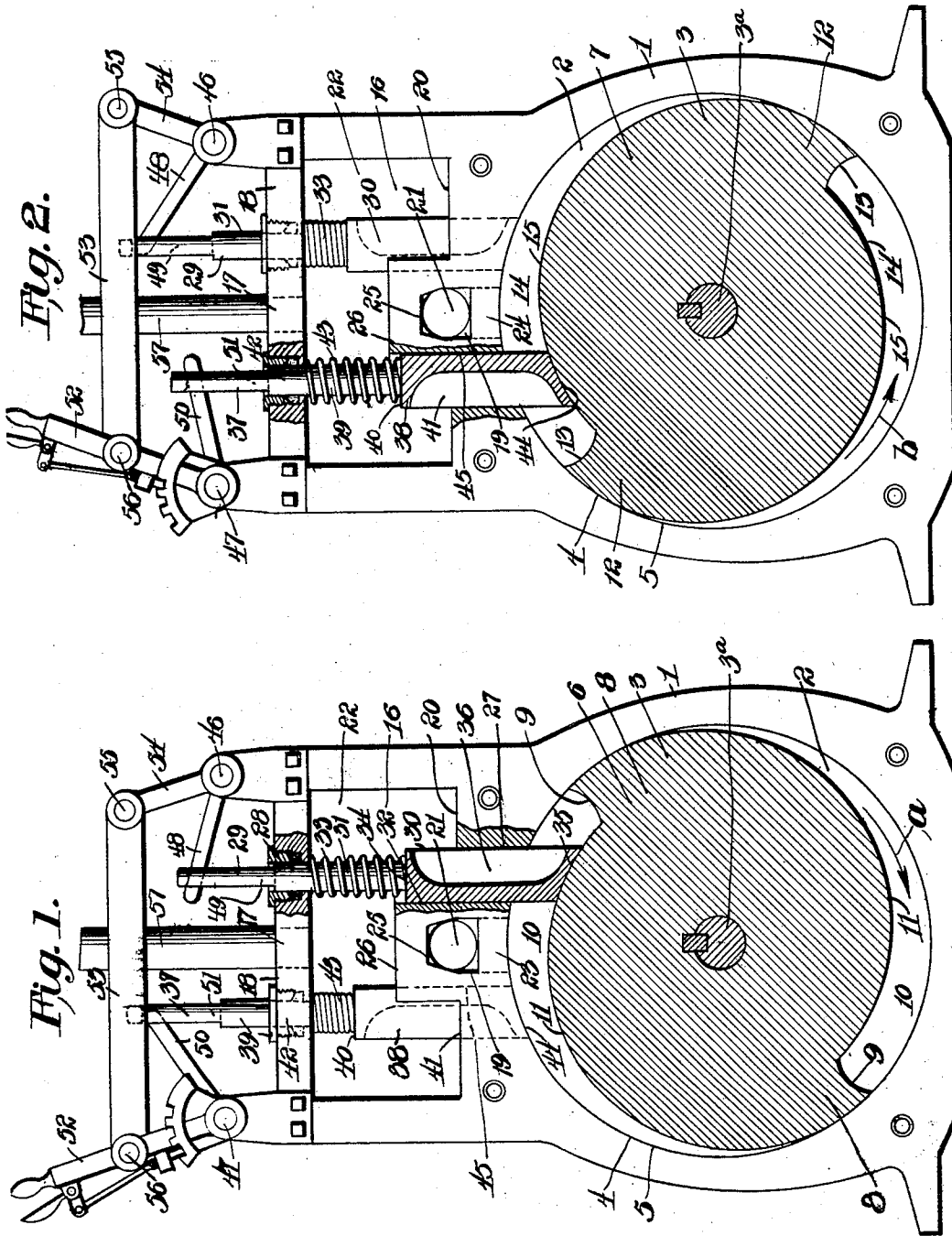


W. S. TRIGGS, JR.
 ROTARY STEAM ENGINE.
 APPLICATION FILED SEPT. 10, 1912.

1,057,900.

Patented Apr. 1, 1913.

2 SHEETS—SHEET 1.



Inventor
 William Stance Triggs Jr.

Witnesses
 Wm. H. Mulligan.
 Dudley B. Howard

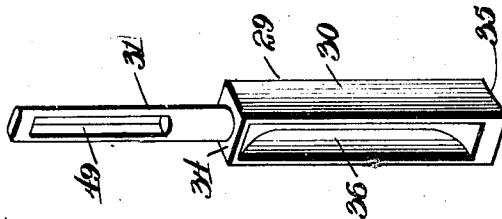
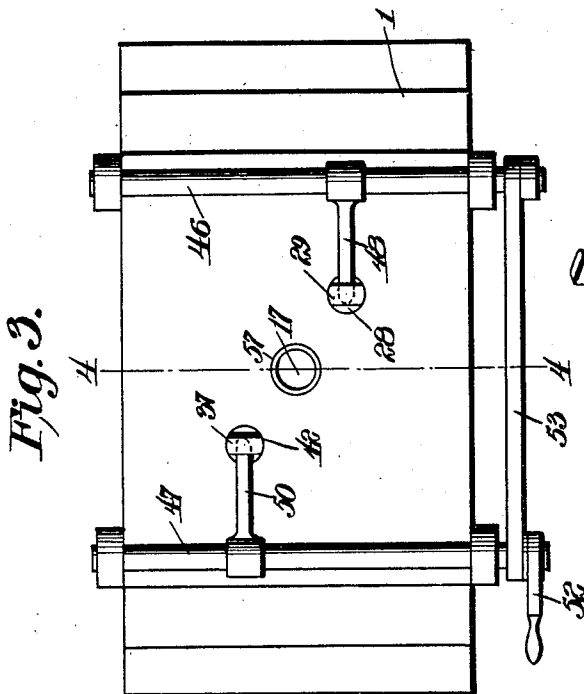
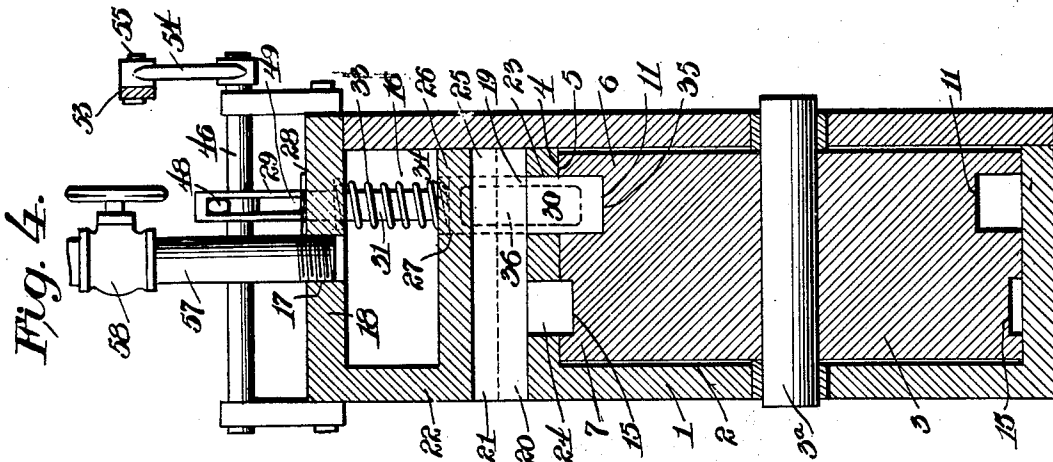
By Victor J. Evans
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UNITED STATES PATENT OFFICE.

WILLIAM STANCE TRIGGS, JR., OF CLARA, MISSISSIPPI.

ROTARY STEAM-ENGINE.

1,057,900.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed September 10, 1912. Serial No. 719,611.

To all whom it may concern:

Be it known that I, WILLIAM STANCE TRIGGS, Jr., a citizen of the United States, residing at Clara, in the county of Wayne and State of Mississippi, have invented new and useful Improvements in Rotary Steam-Engines, of which the following is a specification.

This invention relates to a rotary steam engine, the main object being to reduce the amount of valve mechanism necessary to the operation of the engine.

A further object is the provision of a rotary piston and means for applying steam or other expansible fluid to the said piston so that it may be rotated in reverse directions at the will of the operator.

A still further object is to provide valves adapted to be operated by direct engagement with the rotary piston rotor so that positive action of the valve is obtained and wherein the simplicity of the structure is a notable feature.

Another object is to provide readily operable means for rendering said valves either operative or inoperative in order to determine the direction of rotation of the rotor.

A still further object of the invention is to provide valves adapted to admit steam to the expansion chambers of the rotor in sudden puffs which impinge directly against the active faces of the impact heads provided therein.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a front elevation of the device with the front cover removed, and showing the rotor in section and one of the valve plungers operative. Fig. 2 is a similar view, a section being taken through a different portion of the rotor, and the other valve plunger being in operative position. Fig. 3 is a top plan view of the device. Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 3. Fig. 5 is a detail perspective view of one of the valve plungers.

Referring to the drawings, it will be seen that I have provided a steam-tight casing 1 having a cylindrical chamber 2 therein in which the piston or rotor 3 mounted upon a shaft 3^a is adapted to rotate, the outer periphery 4 of the said rotor being adapted to

bear evenly against the inner periphery 5 of the said chamber. The rotor 3 is divided into two transverse sections 6 and 7. In the section 6 of the rotor diametrically opposite, and oppositely facing impact heads 8 are formed, their active faces 9 being slightly concaved so as to be more forcibly engaged by the steam upon its impact therewith. Expansion chambers 10 are formed in the section 6 in communication with the active faces 9 by providing semi-circumferential grooves whose inner faces are inclined outwardly toward the outer periphery of said section of the rotor and intersect the same at points adjacent the intersection of the active faces of the impact heads therewith. By providing these inclined faces in the expansion chambers, operating cam faces 11 are provided for a purpose which will be more fully described hereinafter. The other section 7 of the rotor is provided with the oppositely facing impact heads 12 which are each arranged adjacent one of the impact heads of the other section and face oppositely to the same, the active faces 13 being thus provided. Expansion chambers 14 are formed likewise in section 7 and provide the operating cam faces 15.

A steam chest 16 is mounted upon the casing 1 and has an intake port 17 provided in its top wall 18 for the admission of steam into the same. A longitudinal groove 19 extends across the bottom of the wall 20 of the steam chest and communicates with an exhaust port 21 in the rear wall 22 of the said chest. A pair of vertical port openings 23 and 24 are provided in the said bottom wall in communication with the continuation of the port 21 provided by the said groove 19 and a parallel groove 25 in the bridge member 26 secured within the steam chest upon the bottom wall thereof. The port openings 23 and 24 are adapted to register with the expansion chambers 10 and 14, in the rotor sections 6 and 7, respectively. A rectangular vertically extending valve opening 27 is provided in the bottom wall of the steam chest near the front end thereof and opens into the rotor chamber 2, a cylindrical opening 28 is provided in the top wall of the steam chest in alinement with the opening 27. A valve plunger 29 having a rectangular lower portion 30 and a reduced, cylindrical upper portion 31 is mounted within the steam chest so that its rectangular por-

tion is movable within the openings 27 and a vertical guideway 32 provided in the corresponding face of the bridge member 26, and its reduced portion is movable within the opening 28 in the top of the steam chest.

A helical spring 33 encircles the reduced portion of the plunger and is interposed between the shoulder 34, provided between the same and the rectangular portion, and the top wall of the steam chest, the said spring adapted normally to hold the beveled active face 35 formed on the lower end of the plunger in engagement with the operating cam faces 11 of the rotor section 6. A longitudinal groove or portway 36 is provided in the side face of the rectangular portion 30 of the plunger so as to face the active faces of the active heads of rotor section 6 upon rotation of the rotor in the direction of the arrow *a* in Fig. 1 of the drawing.

A second valve plunger 37 having a rectangular lower portion 38, a cylindrical upper portion 39, and a shoulder 40 provided at the juncture thereof is adapted for vertical sliding movement within the steam chest, its lower portion being received by a rectangular opening 41 in the bottom wall of the steam chest and its upper cylindrical portion being movable within a cylindrical opening 42 in the top wall thereof. A helical spring 43 surrounds the reduced portion of the plunger and is imposed between the shoulder 40 and the top wall so as to normally hold the plunger in its lowermost position with its downwardly and outwardly beveled active face 44 in engagement with the operating cam faces 15 of the rotor section 7. A vertical portway or groove 45 is provided in the outer side face of the rectangular portion of the valve plunger 37 on the opposite side from the portway in the other valve plunger.

A pair of parallel, horizontally extending operating shafts 46 and 47 are journaled in suitable bearings mounted upon the top of the steam chest. A lift finger 48 is attached to the shaft 46 at one side of the opening 27 in the top of the steam chest and is received by a vertical slot 49 provided in the protruding upper portion of the valve plunger 29, and a second lift finger 50 is secured to the shaft 47 adjacent the opening 42 in the top wall of the steam chest for engagement within a vertical slot 51 provided in the protruding upper portion of the plunger 37. A hand lever or crank 52 is fixed to one end of the shaft 47 and is intermediately connected by means of a connecting rod 53 to a shorter crank arm 54 attached to the corresponding end of the shaft 46, the said connecting rod being pivoted to the respective cranks by means of the pivoted pins 55 and 56.

The steam to be used in my improved engine is conducted from a suitable source to the steam chest through a pipe 57 which is

connected to the intake portion 17 and has a regulating valve 58 connected therewith and positioned at an accessible point.

In the operation of the engine, the hand lever or crank 52 is thrown to the left, as shown in Fig. 1, in order to operate the rotor in the direction of the arrow *a*, lift fingers 50 thus serving to elevate the valve plunger 37 so that its active face is out of engagement with the rotor and communication is closed between the steam chest and the expansion chambers 14 in the section 7 of the rotor. The valve 58 is then opened so as to admit steam to the steam chest, and the said steam will pass down through the portway 36 in the plunger to one of the expansion chambers 10 in the section 6 of the rotor where it will impinge against the corresponding active face 9 of one of the impact heads 8 in the form of sudden puffs. The impact of the steam will cause the rotor to rotate in the direction of the arrow *a* and as it rotates the cam face 11 will force the plunger outwardly until it reaches the outer surface of the other impact head 8 where the valve will be completely closed. Further rotation will cause the plunger to drop into the deep portion of the other expansion chamber, thus admitting another puff of steam to the same by the consequent opening of the valve. It will be seen that steam will be admitted through the portway provided in the valve plunger into that portion of one of the expansion chambers which is disposed in advance of the said plunger, the steam within the portion of the expansion chamber disposed at the opposite side of the valve plunger will be simultaneously exhausted through the port opening 23 and the port 21. This operation will continue without interruption until the steam is cut off.

In order to reverse the direction of the rotor, the hand lever 52 is drawn to the right, in which event the valve plunger 29 will be elevated into inoperative position and the other valve plunger 37 will drop into operative position. The regulating valve 58 is then opened and the steam will be admitted to the steam chest and pass therefrom through the portway in the plunger 37 during the intervals when it is in open communication with the expansion chambers 14 in the section 7 of the rotor, the rotor being thus turned in the reverse direction as shown by the arrow *b* due to the impact of steam against the active faces 13 of the impact heads 12.

From the above description it will be seen that I have provided a simple and readily operable construction of rotor and valve mechanism.

What is claimed is:

1. In an engine of the class described, the combination of a hollow casing, a rotor journaled in said casing, said rotor being pro-

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vided with a pair of sections provided with expansion chambers and oppositely disposed impact heads, a valve chamber provided upon said casing and having an exhaust compartment communicating with both rotor sections, said chamber being provided with relatively spaced valve openings disposed on opposite sides of the exhaust compartment and establishing communication between the intake compartment of the chamber and the respective rotor sections within the casing, and a valve plunger mounted for reciprocation within each of said openings, each valve being provided with means for directing steam into the expansion chambers of the corresponding rotor section on the opposite side of the said plunger from the exhaust compartment when the plunger is in open position.

2. In an engine of the class described, the combination of a hollow casing, a rotor journaled in said casing, said rotor being divided into a pair of sections having oppositely disposed impact heads, a valve chamber formed on said casing, valve plungers movable within said chamber, each plunger being adapted to operatively engage one of the rotor sections, means tending normally to maintain each plunger in engagement with its respective rotor section, a lift finger pivoted to the valve casing and engageable with each valve plunger, and means by which said fingers may be oppositely oscillated to release one plunger and render the same operative and to draw the other outwardly into inoperative position.

3. In an engine of the class described, the combination of a hollow casing, a rotor journaled in said casing, said rotor being divided into a pair of sections having oppositely disposed impact heads, a valve chamber formed on said casing, valve plungers movable within said chamber, each plunger being adapted to operatively engage one of the rotor sections, means tending normally to maintain each plunger in engagement with its respective rotor section, a lift finger pivoted to the valve casing and engageable with each valve plunger, means by which said finger may be oppositely oscillated to release one plunger and render the same operative and to draw the other outwardly into inoperative position, and means for securing the said lift fingers in their different, oppositely adjusted positions.

4. In an engine of the class described, the combination of a hollow casing, a rotor journaled in said casing, said rotor being divided into a pair of sections having oppositely disposed impact heads, a valve cham-

ber formed on said casing, valve plungers movable within said chamber, each plunger being adapted to operatively engage one of the rotor sections, means tending normally to maintain each plunger in engagement with its respective rotor section, a lift finger pivoted to the valve casing and engageable with each valve plunger, means by which one of said fingers may be operated, and means connecting said finger with the companion finger to cause opposite movement of the latter.

5. In an engine of the class described, the combination of a hollow casing, a rotor journaled in said casing, said rotor being divided into a pair of sections having oppositely disposed impact heads, a valve chamber formed on said casing, valve plungers movable within said chamber, each plunger being adapted to operatively engage one of the rotor sections, means tending normally to maintain each plunger in engagement with its respective rotor section, a lift finger pivoted to the valve casing and engageable with each valve plunger, means by which one of said fingers may be operated, means connecting said finger with the companion finger to cause opposite movement of the latter, and means for securing the operating means in its adjusted positions.

6. In an engine of the class described, the combination of a hollow casing, a rotor journaled in said casing, said rotor being divided into a pair of sections having oppositely disposed impact heads, a valve chamber formed on said casing, valve plungers movable within said chamber, each plunger being adapted to operatively engage one of the rotor sections, means tending normally to maintain each plunger in engagement with its respective rotor section, a lift finger pivoted to the valve casing and engageable with each valve plunger, each of said plungers being provided with longitudinal slots, a lift finger pivoted to the valve casing exteriorly thereof and engageable in the slot of each valve plunger, and means by which either finger may be moved outwardly in engagement with the outer end of the corresponding plunger slot and the other finger will be moved inwardly into inoperative position.

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

WILLIAM STANCE TRIGGS, JR.

Witnesses:

W. D. AINSWORTH,
E. W. VICK.