

October 18, 1913.

DRAWING

6,456

A careful search has been made this day for the original drawing or a photolithographic copy of the same, for the purpose of reproducing the said drawing to form a part of this book, but at this time nothing can be found from which a reproduction can be made.

Finis D. Morris,

Chief of Division E.

AWK

UNITED STATES PATENT OFFICE.

A. W. CARY, OF BROCKPORT, NEW YORK.

PACKING OF ROTARY PUMPS.

Specification of Letters Patent No. 6,456, dated May 15, 1849.

To all whom it may concern:

Be it known that I, ALBIGENCE W. CARY, of Brockport, in the county of Monroe and State of New York, have invented a new and useful Improvement on a Rotary Engine to be Propelled by Steam, Gas, or Fluids and for Pumping and Forcing Water; and I hereby do declare that the following is a full, clear, and exact description.

1st, the nature of my invention consists in providing a perforated partition or wing between the supply and exhaust tubes, and the chamber in which the pistons revolve, to act as a strainer to prevent sand and other impurities getting into the chamber.

2nd. It further consists in providing the perforated partition with a metallic butt having its interior end packed with spring or other packing, so as to have it fit snug or lie in close contact with the revolving drum and effectually secure a separation between the induction and eduction openings. 3rd, it further consists in providing sliding pistons or valves, which slide in slots in the drum, and in providing said pistons with packing on the outer ends and also on the upper and under or sliding surfaces, and also in providing the said pistons with small side orifices communicating with interior orifices to allow a small amount of steam &c., to get under the packing when the engine is in operation, to expand gently the packing and make the pistons move in the chamber in close contact with all parts of the cylinder. In connection with this part of my invention I provide spring bolts fitted into openings in the back part of the pistons, and having the heads of said bolts press against the periphery of an interior cam so as to press out the pistons against the interior rim of the cylinder so as to have the ends of the pistons always in close contact with the said part of the cylinder.

4th, I also provide circular grooves in the plates of the cylinder or chamber, for the drum to move in, and I provide the said grooves with any kind of packing most suitable, so that the edges of the revolving drum may move in the said grooves and allow no steam, water, &c., to escape into the interior of the drum.

5th, I also provide a small groove, on each side in the slots of the drum in which the pistons slide, and I provide the said grooves with any kind of packing substance most suitable, to prevent the steam, water, &c.,

getting into the interior of the drum from the chamber, and also for the purpose of lessening the friction of the pistons when moving in the said slots of the movable drum.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation reference being had to the accompanying drawings making a part of this specification in which—

Figure 1, is a side section at right angles with axis of the cylinder, and Figs. 2, 3, 4, 5, 6, 7, 8 and 9 are section views. The same letters indicate like parts on all the figures.

Fig. 1, is a circular chamber or as it is termed by some "a concentric cylinder" A, is the chamber, B, is the shaft or axle, and the dotted lines represent a heart shaped cam. This cam is cast along with the stationary part of the circular chamber. This cam is a raised rim. The shaft is riveted or fixed in the most approved manner in the opening left for that purpose in the center of the circular chamber. C, is a revolving drum. It is formed like a band wheel and has a plate on one side and the other side open. The open side is fitted over the cam into a groove in the circular plate or side of the chamber. This groove is packed with suitable packing and the circular edge of the rim of the drum is fitted into said groove and thereby no steam, &c., can escape under the drum into the internal part of the engine. D, D, are pistons or sliding valves; they slide in grooves or slots in the revolving drum and the upper and under surfaces always in close contact with the sides or circular plates of the circular chamber. (I use the expression "upper and under surfaces" in reference to my engine when in a horizontal position, but it can be placed as well vertically.) E, is a perforated partition or wing which separates the supply and exhaust tubes from the chamber A. F', F², are the supply and exhaust ways. G, is a metal butt which separates the supply and exhaust ways. It is packed on the inside end at that part which is in contact with the revolving drum, with spring or other packing fitted into a groove on the said end of the piston. (n) is a screw which fastens the said butt to the outside of the chamber and it may be used to tighten, or slacken the packing on the end of the butt, so as to have the revolving drum always in very

close contact with the said butt and effectually separate the division of the chamber A, when the steam, &c., enters from the division where it escapes into the exhaust tube. As the drum revolves, each piston when it comes in contact with the butt G, is driven full into its slot or groove, and as the pistons move air tight in the chamber, each part of the chamber is thereby a supply and exhaust chamber according as the supply and exhaust tubes are connected with a steam boiler, or a water cistern, and as they communicate with the atmosphere or a condenser to exhaust—when used as a water engine—each division of the chamber has its separate office, the one a supply and the other a discharge chamber. Fig. 5, represents the perforated partition. It has a groove or opening Z commencing at each end, so that when the piston comes to the partition, the steam will commence to exhaust, or the water to be discharged through the said groove at the discharge side. When used as a steam engine, the groove will also have to be on each end of the partition; but when used as a water engine, the groove will only be required on the exhaust end of the partition. The perforations or orifices in this wing or partition are for the purpose of straining water of many impurities when the engine is used as a pump.

Figs. 2 and 4 are different views of the pistons. Fig. 2, is a side view and Fig. 4, is an edge or under surface view, representing the surface of the piston that slides on the stationary plate of the chamber. Each piston is packed as follows and regarding which I desire to be particular. Each piston is made of the form represented in these figures. S', is a small hole communicating with the interior of the piston and with S² another hole under the surfaces of the pistons that slide in contact with the sides of the chamber. S', is therefore in the side of the piston and S² drilled or cast to communicate with the packing on the sliding surfaces. Each of the sliding or upper and lower surfaces of the pistons are cast or forged with grooves to receive any kind of packing most suitable. These grooves are nearly of the form of a T, and the upper or surface strips of packing must be in single pieces to fit into this cross groove to sit very snug and firm in the piston or pistons covering the interior orifices or holes S². The end of each piston (outer end) has also a groove packed with vulcanized india rubber or any other suitable packing. This method of packing is for the purpose of rendering the pistons more durable and the chamber more tight than ever has been by simple metallic pistons, and thus remove the complaint made against metallic revolving pistons, of being "troublesome and expensive." Be it therefore remembered that the ends of

the pistons or sliding valves that press or are in contact with the interior of the rim of the chamber, and also the surfaces of the said pistons that are in contact with the sides or circular plates of the cylinder or circular chamber, are packed with vulcanized india rubber or other suitable packing—the said packing fitted into grooves cast or made in the said pistons. (H) is a butt or bolt, inserted in an opening near the back part of the piston. (K) is that part of the piston which sits and also slides on the rim, or it may be more properly called "the upper edge of the cam." When the piston is in the chamber, the butt head of H slides on the outside or convex part of the cam by the tension of a spring, the piston is pressed or forced toward the concave or interior part of the rim of the circular chamber. Fig. 3, is a representation of the spring butt or bolt. When the engine is in motion either as a pump, or a steam engine, a very small quantity or portion of the water, or steam passes into the interior of the pistons by orifices S' and thus getting under the packing gently expands the same and allows no steam, water &c., to escape between the pistons and the chamber or interior of the circular cylinder. By proper cocks on the supply and exhaust tubes, the motion of the engine may be reversed at pleasure. By the size and form of the perforated partition or wing, before the steam is exhausted from one division of the chamber, it is pressing on the other piston and thus keeps the drum always revolving under a full pressure of steam.

Fig. 6, is a view of the interior of the revolving drum. The grooves or piston slots extend near to the axle or shaft. V, V, V, V, are small grooves cut or cast in the slots of the drum. The slots are in depth the exact thickness of the pistons and the grooves are made of the same depth as the slots. Into each groove I fix or place a strip of suitable packing substance, so as to have the sides of the pistons always in close contact with the sides of the slots, to allow no steam, &c., to get into the interior of the drum through the said slots between the pistons. The rim of the drum seen in Fig. 6, is that which is fitted into the circular groove in the side or stationary plate, represented in Fig. 1.

Fig. 7, represents the movable plate. It is drawn on a smaller scale than Fig. 1, but it represents the improvement made thereon. Y is a groove cast in the plate to receive the edge of the revolving drum. The groove is packed with spring or any other suitable packing and the revolving drum having been placed in the interior of Fig. 1, Fig. 7, the movable plate, is screwed up with screw bolts and the chamber is a tight case fitted for a steam, gas, or water engine. The groove or grooves cast in the circular plates may be packed with two rings of metallic or other

packing and by the said grooves being cast so as to have projections circularly extending around the circular or side plates of the chamber, the tightness and slackness of said
5 packing may be nicely regulated by small screws placed parallel with the circular side plates and fitted into holes in the outside projections of the inside groove or grooves.

Thus having explained my invention, I do
10 not claim the partition or wing to divide the supply and exhaust tubes or ways as it has been used for this purpose long ago, nor do I claim the cam (C), nor the pistons D,

D, moving in slots, as these have also been known before, but

15

I claim—

The pistons packed as described, and with small orifices in the pistons to allow steam, water &c., to be admitted as described, under or inside of the packing when the engine is
20 in operation, for the purpose set forth.

12th July, 1848.

ALBIGENCE W. CARY.

Witnesses:

R. MACFARLANE,
M. McROE.