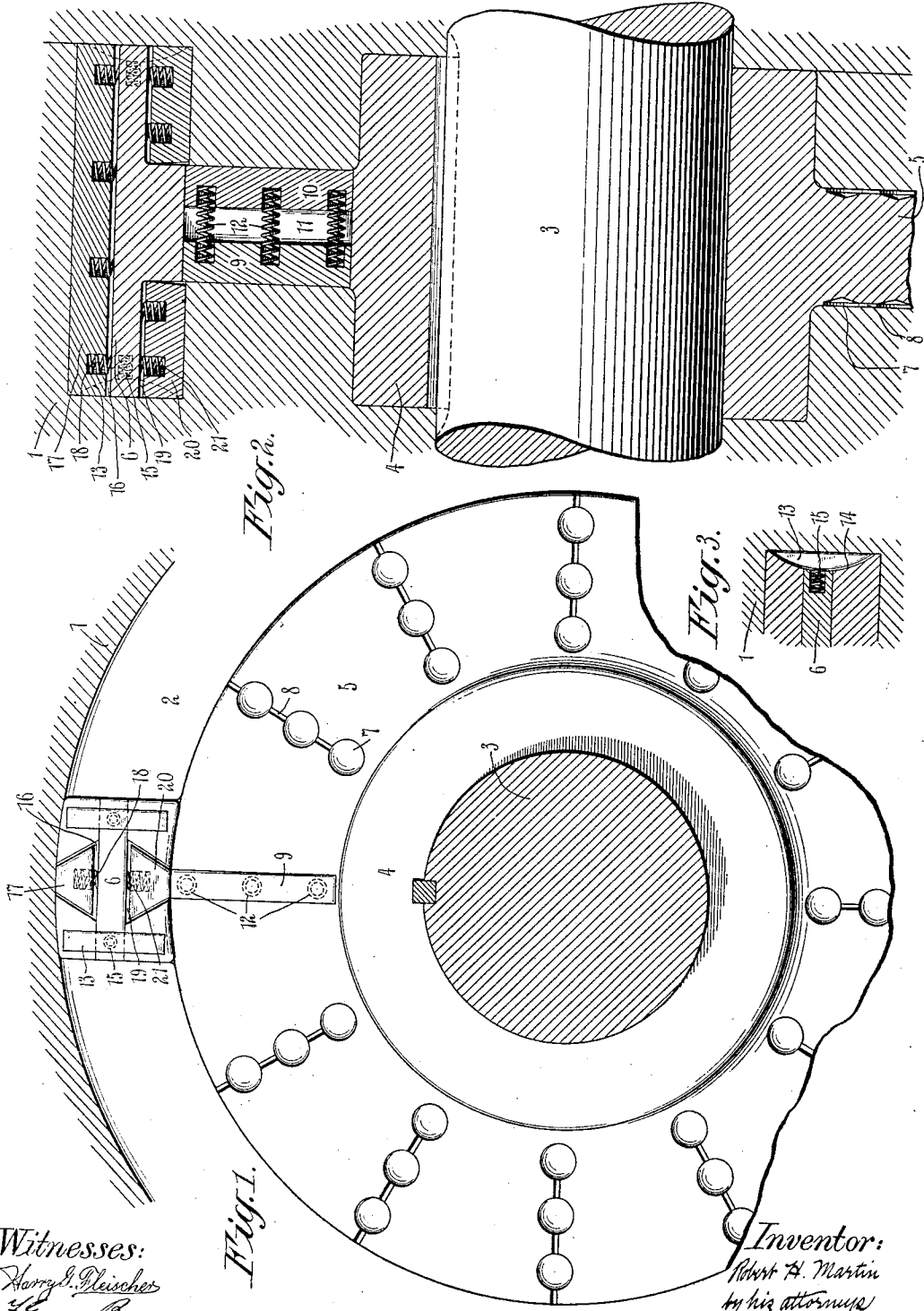


R. H. MARTIN.  
 ROTARY ENGINE.  
 APPLICATION FILED APR. 15, 1911.

1,039,562.

Patented Sept. 24, 1912.



Witnesses:  
 Harry L. Gleicher  
 J. George Rany.

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 by his attorneys  
 Brown & Seward

# UNITED STATES PATENT OFFICE.

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## ROTARY ENGINE.

1,039,562.

Specification of Letters Patent.

Patented Sept. 24, 1912.

Application filed April 15, 1911. Serial No. 621,380.

### *To all whom it may concern:*

Be it known that I, ROBERT H. MARTIN, a citizen of the United States, and resident of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Rotary Engines, of which the following is a specification.

It is extremely difficult to properly pack the moving parts of a rotary engine for the reason that the wear at different points is unequal and problems thus present themselves which are not presented in an ordinary reciprocating engine.

The object of this present invention is to provide a proper packing of the rotary piston and the parts being so arranged that the packing will cause a minimum amount of frictional resistance and will thus last for a considerable longer period of time than where provision is not made for reducing the frictional resistance of the packing.

A further object of my invention is to provide certain improvements in the construction, form and arrangement of the several parts of the packing whereby the insertion and removal of the parts is facilitated.

A practical embodiment of this invention is represented in the accompanying drawings, in which—

Figure 1 represents in transverse section so much of a rotary engine as will give a clear understanding of the invention, Fig. 2 is a longitudinal central section through the same, and Fig. 3 is a detail section taken at one end of the piston head to more clearly illustrate the end packing member.

The cylinder of the engine is denoted by 1 and its annular piston chamber by 2. The rotary engine shaft is denoted by 3 and the piston which is fast thereon comprises a hub 4, a web 5 and a head 6.

In the present instance, the piston chamber 2 is shown as rectangular in cross section and the piston head 6 is shown as of the same cross sectional shape as the piston chamber so that the inner, outer and end walls of the head engage with an easy sliding fit the inner, outer and end walls of the piston chamber. The side walls of the web 5 of the piston have an easy fit between the side walls of the cylinder 1, intermediate the piston chamber 2, and the hub portion of the piston. To reduce the friction between the side walls of the web 5 and the side walls of the cylinder which they engage, I provide a

plurality of series of radially arranged pockets 7 connected to each other and to the piston chamber 2 through ducts 8 for permitting the motive fluid to fill the pockets 7 and from thence to be distributed along between the walls of the web 5 and the walls of the cylinder to form a film of fluid between the said walls.

The side walls of the web 5 of the rotary piston are provided with one or more pairs of radially arranged spring pressed packing strips. In the present instance, one pair is shown extending from the hub 4 to the head 6 of the piston. The two strips of the pair are denoted by 9, 10, and they are situated in a cross slot 11 and are pressed outwardly against the side walls of the cylinder by springs 12. Each end of the head 6 is provided with one or more spring pressed packing strips. In the present instance, two of these strips are shown. These strips are denoted by 13 and are located in recesses 14 and are pressed outwardly against the end walls of the annular piston chamber 2 by springs 15. The outer wall of the piston head 6 is provided with a dove-tailed recess 16 extending from end to end thereof in which recess is loosely fitted a wedge-shaped packing strip 17, the outer face of which is pressed against the outer wall of the annular piston chamber 2 by means of springs 18.

The inner wall of the piston head 6 is provided upon opposite sides of the web 5 with dove-tailed recesses 19 extending from the said web through the ends of the piston head in which recesses are loosely fitted wedge-shaped packing strips 20. The inner faces of these packing strips are pressed against the inner wall of the annular piston chamber 2 by springs 21.

When the piston is started in its rotary movement, the back inclined wall of each of the packing strips 17, 20, is pressed firmly against the undercut back wall of each of the recesses 16, 19, thus preventing any further movement of the packing strips toward the outer and inner walls of the annular piston chamber and thus materially reducing the frictional engagement of the said packing strips with the said walls and also, therefore, materially reducing the wear upon the said packing strips and still further also permitting an easier driving of the piston by the motive fluid. This is accomplished by the co-action of the inclined faces of the

recesses and the packing strips. The moment the piston stops the packing strips 17, 20, are free to be forced against their walls by their springs 18, 21. This action 5 of gripping and holding the packing strips in their adjusted position is accomplished irrespective of the direction in which the piston is rotated. A further reduction of frictional resistance is obtained by the film 10 of motive fluid interposed between the side walls of the piston web 5 and the side walls of the cylinder, as above described. A further advantage of the arrangement of the dovetailed recesses and wedge-shaped strips 15 lies in the rapidity with which the strips may be inserted and replaced when so desired.

The improvements herein described serve to materially reduce the chief objectionable 20 feature to rotary engines, viz; the difficulty of properly packing moving parts, the great wear on said packing, and the great amount of power required to drive the piston when the packing is being constantly pressed 25 against its opposing wall.

What I claim is:—

1. In a rotary engine, a cylinder, a rotary piston comprising a web and a head, said 30 web having a plurality of series of radially disposed motive fluid receiving pockets and ducts in its opposite side walls for supplying a film of fluid between the side walls of the web and adjacent walls of the cylinder.

2. In a rotary engine, a cylinder, a rotary 35 piston comprising a web and a head, said web having a plurality of series of radially disposed motive fluid receiving pockets and ducts in its opposite side walls for supplying a film of fluid between the side walls of the 40 web and adjacent walls of the cylinder, and

radially arranged spring pressed packing strips projecting through the opposite sides of the web into engagement with said adjacent cylinder walls.

3. In a rotary engine, an annular piston 45 chamber, a piston having its head fitted to the cross sectional shape of the chamber, said head having dove-tailed recesses in its inner and outer walls and spring pressed wedge shaped packing strips located in said 50 recesses.

4. In a rotary engine, an annular piston chamber, a piston having its head fitted to the cross sectional shape of the chamber, said head having dove-tailed recesses in its 55 inner and outer walls, spring pressed wedge shaped packing strips located in said recesses, the walls of the packing strips and the walls of the recesses co-acting to hold the strips in their adjusted position during 60 the movement of the piston and for releasing said strips when the piston stops.

5. In a rotary engine, an annular piston chamber, rectangular in cross section, a piston having its head fitted to the cross sectional 65 shape of the chamber, spring pressed packing strips for the outer and inner walls of the piston head, and a pair of spring pressed packing strips for each end wall of the piston head, said last-named packing 70 strips being located upon opposite sides of the outer and inner packing strips.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twenty- 75 seventh day of March 1911.

ROBERT H. MARTIN.

Witnesses:

F. GEORGE BARRY,  
HENRY C. THIEME.