W. REAVELL AND H. HAERLE.

ROTARY ENGINE, COMPRESSOR, AND EXHAUSTER.

APPLICATION FILED DEC. 8, 1919.

1,345,955. Patented July 6, 1920.

Fig. 1

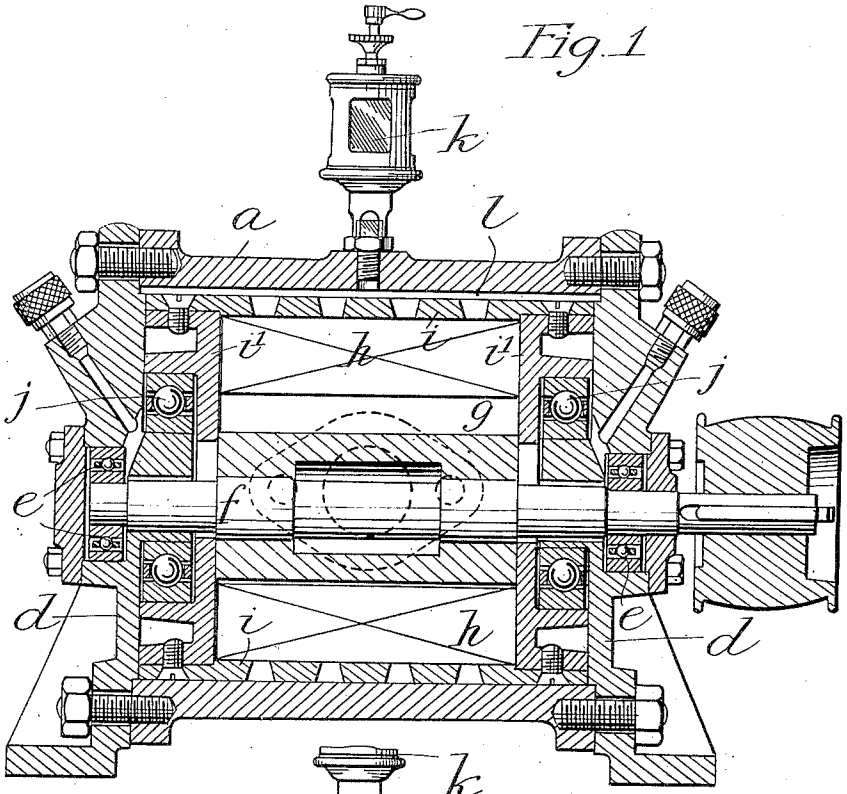
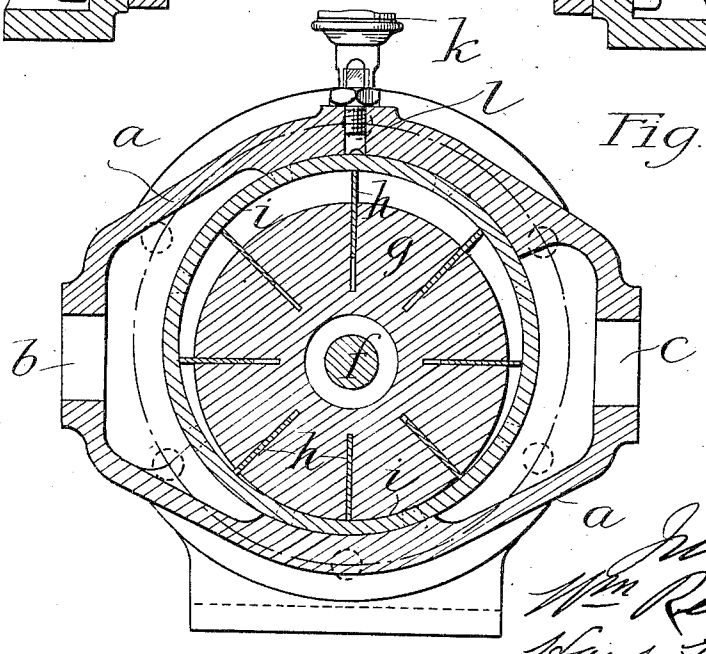


Fig. 2



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UNITED STATES PATENT OFFICE.

WILLIAM REAVELL AND HANS HAERLE, OF IPSWICH, ENGLAND.

ROTARY ENGINE, COMPRESSOR, AND EXHAUSTER.

1,345,955. Specification of Letters Patent. Patented July 6, 1920.

Application filed December 8, 1919. Serial No. 343,399.

To all whom it may concern:

Be it known that we, WILLIAM REAVELL and HANS HAERLE, a subject of the King of Great Britain and Ireland, and a citizen of the Republic of Switzerland, respectively, residing, respectively, at Ipswich, in the county of Suffolk, England, have invented Improvements in Rotary Engines, Compressors, and Exhausters, of which the following is a specification.

This invention has reference to rotary engines, compressors and exhausters of the crescent shaped chamber type in which a stationary casing has eccentrically mounted in it a rotary piston with radially sliding blades, the axes of the blade piston and the casing being parallel.

When engines, compressors or exhausters of this type are running at high speeds, the blades are driven by centrifugal force against the inner surface of the casing, wear of the contacting surfaces of the blades and casing and noise quickly arising.

To overcome this disadvantage it has been proposed to fit a pair of rings in annular recesses in the casing, the said rings being arranged to take up the outward thrust of the blades and being free to be rolled or turned in their recesses by the friction of the blades, but, in practice, there is always some motion of the blades against the rings because of their different axes of rotation, and also considerable frictional resistance to the rolling or turning of the rings in their recesses, with the result that slight indentations are soon worn in the blades which then rub against the casing as in the simpler arrangement referred to. It has also been proposed that the outward thrust of the blades, which may be fitted with enlarged tips, should be taken by flanges concentric with the stationary casing and carried by or formed in one with freely rotatable end disks mounted on journals or ball or similar bearings, coaxial with the casing. Now according to the present invention the outward thrust of the blades is distributed over a considerable area of one or more rotatable rings concentric with the casing and carried by end disks mounted on bearings coaxial with the casing, the blades in one arrangement bearing directly against the ring throughout their length.

In the one case, the blades bear directly throughout their length against the interior of a perforated drum which closely fits the casing and the perforations in which permit air to pass from the suction port of the casing to spaces between the blades and from such spaces to the delivery port as the piston rotates, leakage from the delivery port to the suction port around the outside of the drum being prevented by the intermediate segmental surfaces in the casing fitting the drum.

Referring to the accompanying drawings Figures 1 and 2 are respectively a longitudinal section and a cross section of such a construction of air compressor. The stationary casing of the compressor comprises a cylindrical portion *a* formed with an inlet port *b* and an outlet port *c*, and two end covers *d* provided with eccentrically disposed ball bearings *e* for the driving spindle *f* on which is keyed the piston *g* carrying the radially sliding blades *h*. Within the casing is fitted a perforated drum *i* having end disks i^1 which extend beyond the inner edges of the blade recesses in the piston; the drum *i* is mounted on ball bearings *j* the smaller races of which are fitted to inwardly projecting bosses on the end covers *d* of the casing and the larger ones in hollow external bosses on the end disks i^1 of the drum, the said bearings being concentric with the drum and casing and serving to maintain their concentricity. Lubricant is supplied to the drum from an external lubricator *k* connected with an internal longitudinal groove *l* at the top of the casing.

The outer edges of the blades *h* bear against the inner surface of the cylindrical portion *i* of the drum throughout their length thus affording a substantial bearing surface against a part which is freely rotatable about its bearings, thus obviating rapid wear of the edges of the blades; the ends of the blades contact with the end disks of the drum as shown.

What we claim is:—

1. In a rotary engine, compressor or exhauster of the character described, the combination of a stationary casing, a perforated ring or rings within said casing mounted on bearings for maintaining the same concentric with said casing and arranged to rotate freely therein, and radially movable blades arranged to bear throughout their length against the inner surface of said ring or rings.

2. A rotary engine compressor or ex-

hauster of the character described, comprising a stationary casing, a perforated drum arranged to rotate freely within said casing, concentric therewith, bearings for maintaining said drum concentric with said casing, and a piston carrying outwardly radially movable blades whose outer edges bear against the interior of said drum throughout their length, the perforations in the drum permitting air to pass from the suction port of the casing to spaces between the blades and from such spaces to the delivery port as the piston rotates, substantially as described.

3. A rotary engine, compressor or exhauster comprising a cylindrical casing having a suction port and a delivery port, end covers to the casing provided with eccentrically disposed bearings, a driving spindle mounted in said bearings, a blade carrying piston carried by said spindle eccentrically within the casing, a hollow cylindrical perforated drum fitting said casing and surrounding said blade carrying piston, disks connected to the ends of said drum and located between the ends of the piston and the end covers, bearings concentric with the casing on which said disks are mounted, substantially as described.

4. In a rotary engine, compressor or exhauster of the character described, the combination of a stationary cylindrical casing, a perforated drum concentric with said casing and freely revoluble therein, end-disks supporting said drum and having exterior bearing members adapted to maintain said drum concentric with said casing, and radially movable blades arranged to bear against the inner surface of said drum throughout their length, whereby the outward thrust of said blades is distributed over an area of contact co-extensive with the length of said blades.

5. In a rotary engine, compressor or exhauster of the character described, the combination of a stationary cylindrical casing, a perforated drum concentric with said casing and freely revoluble therein; end-disks supporting said drum having laterally projecting annular flanges and ball bearing members adapted to maintain said drum concentric with said casing, and a piston carrying radially movable blades arranged to bear against the inner surface of said drum throughout their length.

Signed at Ipswich, Suffolk, England, this 11th day of Nov., 1919.

WILLIAM REAVELL.
HANS HAERLE.

Witness:
CHAS. R. STEWARD.