No. 877,103. PATENTED JAN. 21, 1908.

J. MARSDEN.

ROTARY ENGINE.

APPLICATION FILED JULY 12, 1907.

Fig. 2.

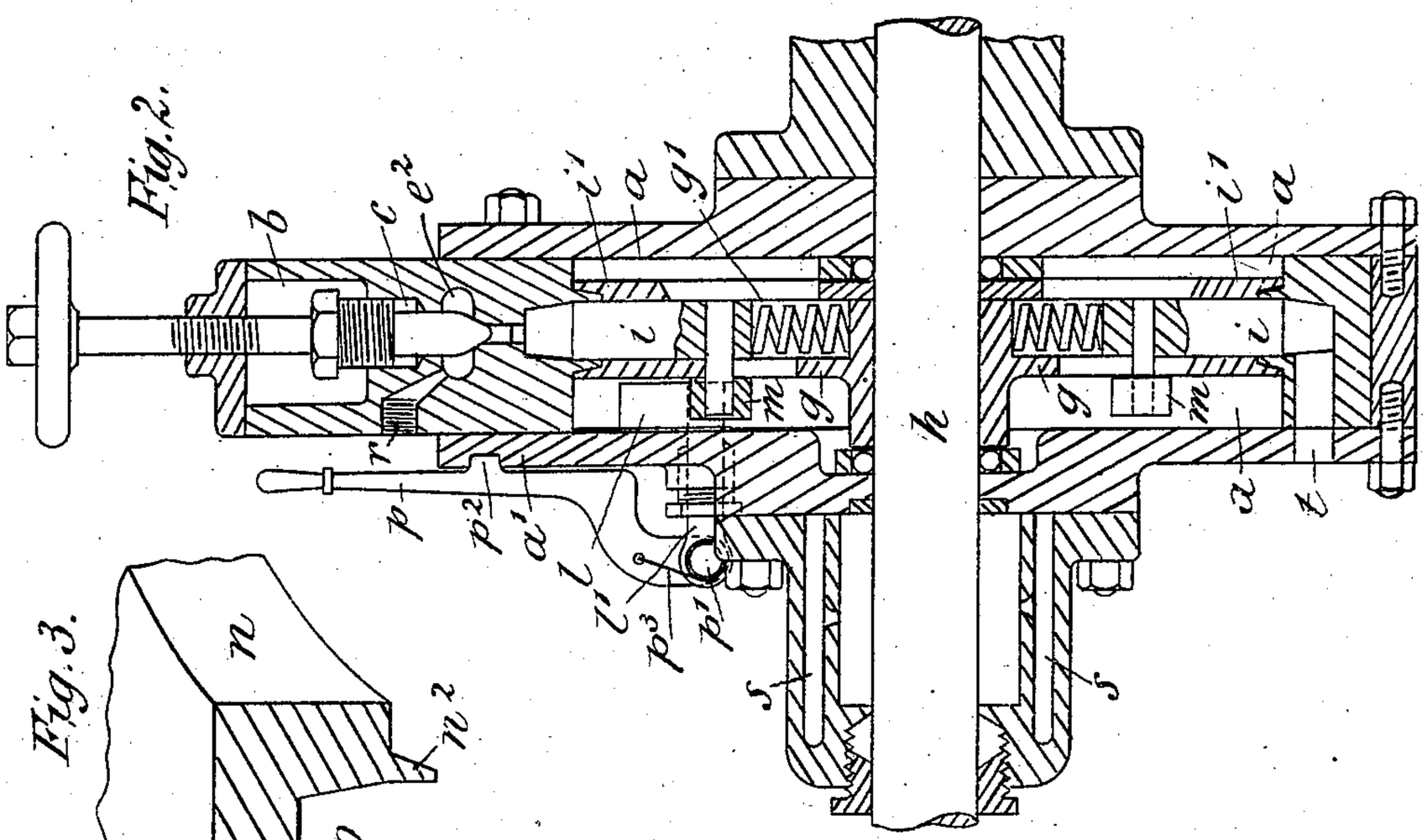
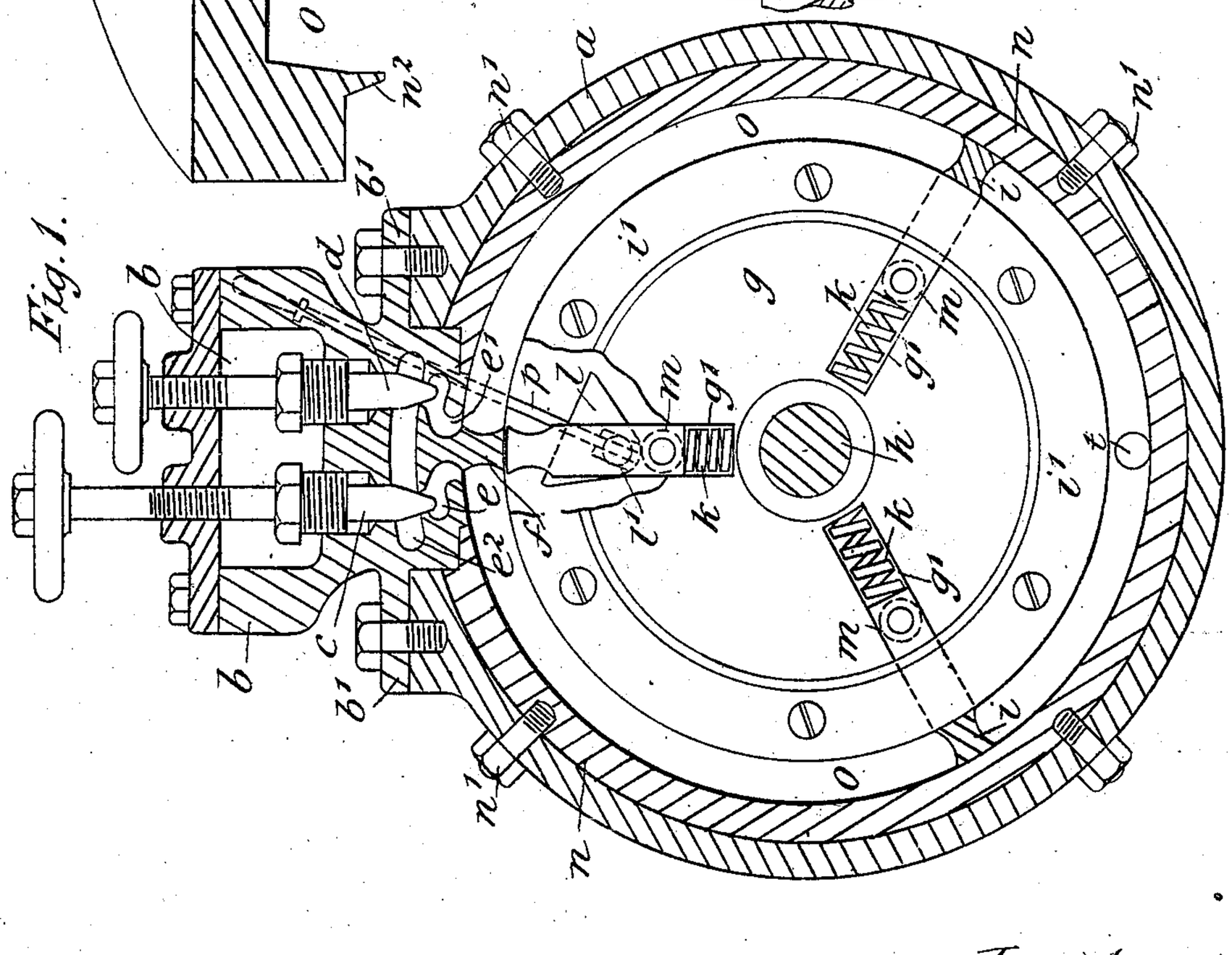


Fig. 3.

Fig. 1.



Witnesses

J. J. Rowley

F. M. Mellor

Inventor

John Marsden

per J. B. Hewett

Attorney.

UNITED STATES PATENT OFFICE.

JOHN MARSDEN, OF GREENHEYS, MANCHESTER, ENGLAND.

ROTARY ENGINE.

No. 877,103. Specification of Letters Patent. Patented Jan. 21, 1908.

Application filed July 12, 1907. Serial No. 383,517.

To all whom it may concern:

Be it known that I, JOHN MARSDEN, land and marine engineer, a subject of the King of Great Britain and Ireland, and residing at 36 Piggott street, Greenheys, Manchester, in the county of Lancashire, England, have invented a Reversible Turbo-Motor or Rotary Engine, of which the following is a specification.

This invention relates to reversible turbo-motors or rotary engines in which radially sliding lever pistons are caused to revolve in a circular or annular chamber receiving the motive fluid acting upon said lever pistons, the said invention having special reference to the means for reversing the engine and the construction of the track or race within which the lever pistons run.

The accompanying drawings illustrate an engine according to my invention, Figure 1 being a side elevation partly in section of the same, and Fig. 2 is a vertical section at right angles to Fig. 1 through two of the lever pistons and the fluid feeding compound valve. Fig. 3 is a perspective view in cross section of a portion of the track or race for the lever pistons.

Referring to the drawings *a* represents the circular chamber for containing the race for receiving the motive fluid, and *b* is a removable valve box or casing fitted to the same by the flanges *b'*. *c* is the valve fitted thereto, for admitting the motive fluid for forward driving, and *d* is the valve for admitting the fluid for driving the engine in a reverse direction. *e*, *e'* are the ports or passages leading respectively from the supply port e^2 to the forward driving and the reversing side of the central or compressing block *f*, the pressure of the motive fluid being exerted against the latter upon one or the other side of the same. *g* is a disk mounted upon the driving shaft *h* and formed with flutes *g'* in which fit the sliding lever pistons *i* kept in position by the plate *i'*. These lever pistons are forced outwards by the springs *k* carried in the inner ends of the flutes.

To enable the pistons to clear the block *f* during their revolution I provide a cam *l* mounted on a pivotal axis *l'* passing through a packing gland in the side or cover *a'* of the chamber *a*. This cam lies in the path of the rollers *m* carried by the pistons *i* so that as the latter revolve they are forced inwards by the said rollers coming into contact with the inclined surface of the cam and being forced underneath the latter as shown in Fig. 1. Upon the rollers moving out of contact with the cam the pistons are forced outwards again by the springs *k* into the track or race *n*, a portion of which is shown separately in Fig. 3 to a larger scale. This track or race is formed of a removable metal ring fixed to the chamber *a* by screws or bolts *n'* passing through holes in the same. The heads of the pistons travel in a conical-shaped recess or track *o* formed in the ring *n*, the said heads or ends of the pistons being coned to fit the recess so that the pressure of the springs *k* on the lever pistons insures the accurate fitting of the same and the wear and tear of the lever pistons is automatically taken up by the recess. The conical shape of the recess also reduces its area and consequently the amount of working fluid used therein. The track *n* is also formed with tapered portions n^2 forming the edges of the recesses *o* for engaging with recesses formed in the edges of the disk *g* and thus insuring a tight joint between the ring *n* and the disk. *r* is the fluid supply inlet to the port e^2 and *s* is a space into which oil is fed for supplying the bearing of the shaft *h*. *t* is the exhaust passage leading from the recess *o*.

In order to reverse the engine the valve *c* is screwed down to its seat thus cutting off the motive fluid from the port *e*. The cam *l* is then turned into its reversed position by means of a lever *p* mounted on the pivotal axis *l'* of the same so as to bring its opposite inclined side or surface in the path of the rollers *m*, the lever *p* being first turned outwards on its axial pin *p'* so as to disengage the projection p^2 thereon from a notch in the cover *a'* and engage it with a second notch in the other position, the lever being kept in its locked position by a spring p^3. The valve *d* is then opened thus admitting the motive fluid through the port *e'* to the other side of the central block *f* and driving the pistons in the reverse direction. As the pistons revolve, their rollers *m* strike against the oppositely inclined surface of the cam *l* thus forcing the rollers and the pistons down for enabling the latter to clear the central block *f* in the manner hereinbefore described when revolving in the contrary direction.

Having now fully described the nature of my said invention, what I claim and desire to secure by Letters Patent is.

1. A turbo-motor or rotary engine consisting of a circular chamber fitted with a cen-

tral driving shaft carrying a disk formed with flutes in which are fitted radially sliding lever pistons acted upon by springs for pressing the same into a track or race removably attached to the said chamber and a compound valve box fitted with forward driving and reverse action valves for the admittance of motive fluid to the said race, substantially as described.

2. In rotary engines the track or race consisting of a metal ring fitted to the circular chamber and formed with a conical-shaped recess for receiving the ends of lever pistons traveling therein, and having tapered edges engaging with recesses in the disk carrying the lever pistons, substantially as described.

3. In rotary engines having radially sliding lever pistons the combination with the latter of an adjustable reversing cam formed with reversely inclined surfaces and pivotally carried by the outer case or chamber of the engine and actuated by a lever on its pivotal axis for changing the position of the said cam and locking it in such position and rollers carried by the lever pistons and acted upon by one or other of the inclined surfaces of the cam in the forward or backward driving of the engine, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHN MARSDEN.

Witnesses:

ARTHUR PAYNE,

EDWARD E. HILL.