W. KÜHN.

PISTON ENGINE.

APPLICATION FILED NOV. 20, 1912.

1,083,686. Patented Jan. 6, 1914.

Fig. 1

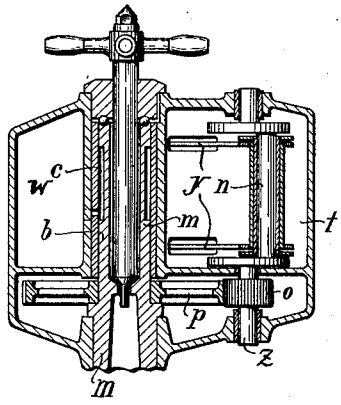


Fig. 3

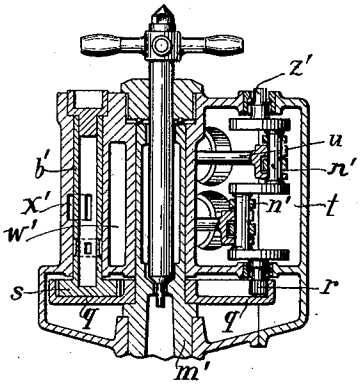


Fig. 2

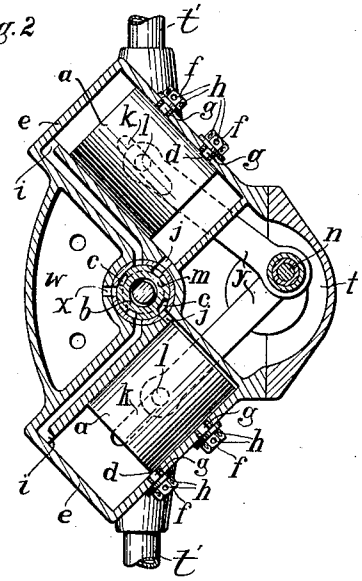
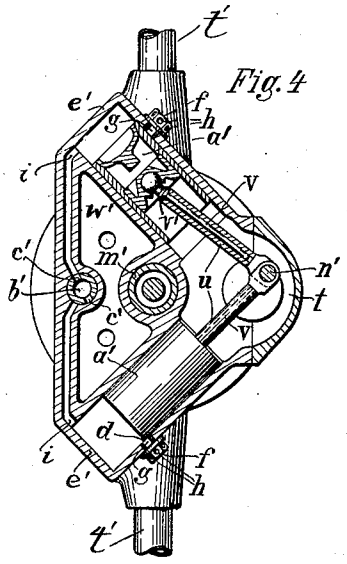


Fig. 4



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PISTON-ENGINE.

1,083,686. Specification of Letters Patent. Patented Jan. 6, 1914.

Application filed November 20, 1912. Serial No. 732,437.

To all whom it may concern:

Be it known that I, WILHELM KÜHN, a subject of the German Emperor, and resident of Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in Piston-Engines, of which the following is a specification.

My present invention relates to piston engines, and particularly to engines of this kind which are provided with a casing having handles for securing the engine in position.

The object of my invention is to construct such an engine with a separable casing so designed that one section of the casing may be removed without disturbing the handles and the other section of the casing, to which said handles are secured.

Two examples of my invention are shown in the accompanying drawings, in which—

Figures 1 and 3 are vertical sections, and Figs. 2 and 4 horizontal sections of two pneumatic engines having their cylinders set at an angle to each other.

Engines of this character may be employed for the operation of drills, of scraping or polishing tools, etc.

The form of my invention illustrated by Figs. 1 and 2 has double-acting pistons *a* arranged to reciprocate in the cylinders *e*. The distributing member *b* (in this case a rotary valve) is provided only with admission channels *c* adapted to place the ports *i*, *j*, at opposite ends of the cylinders in communication alternately with the source of compressed air, as a supply chamber *w* having a port *x* leading through the valve casing. The exhaust is adapted to escape through suitably located outlet ports *d* provided in the cylinder walls and controlled by the pistons *a*. To prevent the entrance of dust or foreign matter, the ports *d* may be protected, for instance by screws *f* having longitudinal channels *g* and transverse channels *h* communicating therewith.

The pistons *a* are shown provided with transverse pins *l* extending through longitudinal slots *k* of the cylinder walls, the outer portions of said pins being connected pivotally with the ends of double or yoke-shaped connecting rods *y*, fitted to the crank *n* on the shaft *z*. The central member of each yoke is in the nature of a sleeve, one of said sleeves surrounding the other, the latter engaging the crank *n*. The axes of the cylinders *e* converge in such a manner as to intersect upon the shaft *z*.

As examples of distributing members, rotary valves have been shown, but I do not wish to be understood as restricting my invention to such. In Figs. 1 and 2 the rotary valve *b* is secured rigidly to a spindle *m*, driven by means of a pinion *o* on the shaft *z* and a meshing gear wheel *p* on the spindle *m*.

In the construction illustrated by Figs. 3 and 4 the distributing valve *b'* is not mounted on the spindle *m'* but rotates about a separate axis, being driven by an internally toothed gear *q* secured to the spindle *m'*, which gear is in mesh with a pinion *r* on the crank shaft *z'* and with a pinion *s* on the valve *b'*. The pistons *a'* are single-acting, the cylinders *e'* having ports (*i*) at one end only, and the valve *b'* has only two ports *c'*. The shaft *z'* has two opposed cranks *n'*, each coöperating with a pair of pistons, this form of engine having four pistons. The casing of the engine is preferably divided, as shown for each of the constructions illustrated, in the plane of the crank shaft, so that upon removing the upper part or cap *t*, (on the side toward which the cylinders *e* or *e'* converge) the crank shaft, pistons, and connecting rods will be readily accessible. The main part of the casing is provided with the two alining handles *t'*, so that removing the cap *t* will not interfere with the normal function and operation of said handles. Figs. 3 and 4 also show a construction which enables the crank shaft, connecting rods and pistons to be withdrawn readily from the engine (after removing the cap *t*). For this purpose, each of the four connecting rods consists of two telescoping members *u*, *v*, one secured to the respective crank *n'* and the other to the corresponding piston *a'*. The inner, rod-like member *v* is provided with a collar *v'* arranged to engage the end of the outer, tubular member *u*, so that the two members will act as one rod to transmit power from the piston to the crank shaft. After removing the cap *t*, the shaft *z'* with the rod members *u* attached thereto may be withdrawn, said members *u* sliding freely on the rod members *v* attached to the pistons *a'*. Thereupon each piston with the rod member *v* attached thereto may be removed from its cylinder. As shown in Fig. 4, the head of each rod member *u* is formed with forked ends of reduced thick-

ness which are curved to embrace the crank n'.

Various modifications may be made without departing from the nature of my invention as set forth in the appended claim.

I claim:

A piston engine comprising a casing portion provided with converging cylinders and with alining handles, pistons arranged to reciprocate in said cylinders, another casing portion separable from the first-named portion and located on the side toward which said cylinders converge, a crank shaft whose axis is located at the intersection of the axes of said cylinders, said shaft being journaled in the casing at the junction of its two portions, and operative connections between said shaft and the pistons.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

WILHELM KÜHN.

Witnesses:
JEAN GRUND,
CARL GRUND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."