

(No Model)

P. A. N. WINAND.
UPRIGHT OR VERTICAL ENGINE.

No. 583,962.

Patented June 8, 1897.

Fig. 2.

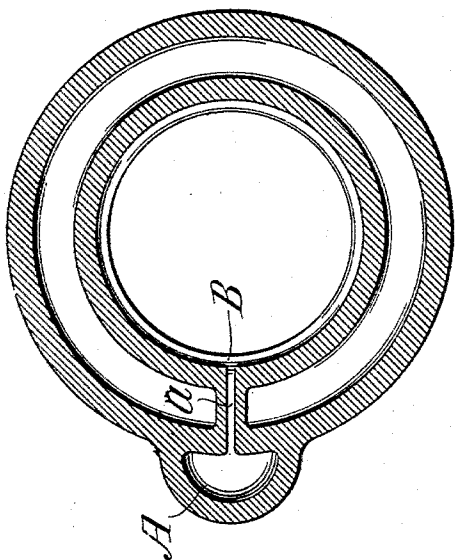


Fig. 5.

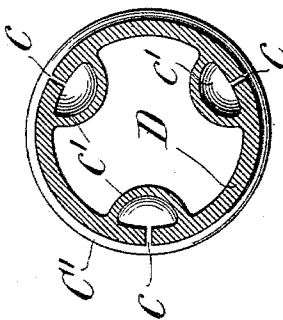


Fig. 4.

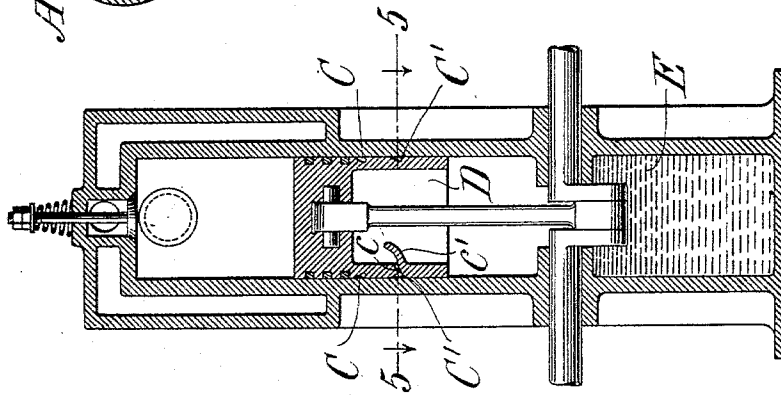


Fig. 1.

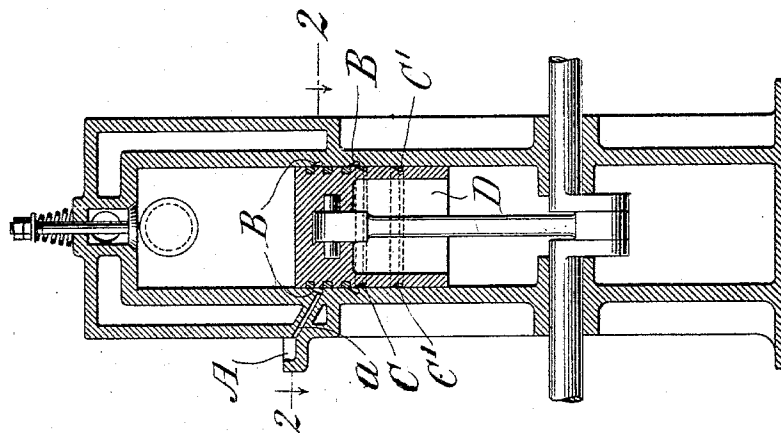
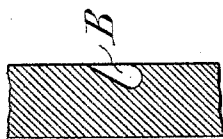


Fig. 3.



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UNITED STATES PATENT OFFICE.

PAUL A. N. WINAND, OF PHILADELPHIA, PENNSYLVANIA.

UPRIGHT OR VERTICAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 583,962, dated June 8, 1897.

Application filed January 13, 1896. Serial No. 575,365. (No model.)

To all whom it may concern:

Be it known that I, PAUL A. N. WINAND, a subject of the King of Belgium, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Upright or Vertical Engines, of which the following is a specification.

My invention relates to that class of engines in which the cylinder is placed above the crank, and is designed more especially for internal-combustion engines.

The object of the invention is to facilitate and improve the lubrication of the cylinder and piston.

In engines in which the cylinder is above the crank it is not always desirable or permissible to introduce the lubricant above the piston, and in internal-combustion engines it is generally not permissible to do so. It is difficult to distribute the lubricant over the entire working surface, and most of the lubricant flows down beyond the stroke of the piston and fails to properly perform its function.

The distinguishing characteristic of my invention is that the oil grooves or pockets in the interior surface of the cylinder or in the exterior surface of the piston, or both, are countersunk in their lower parts, thus forming receptacles in which the oil will be held irrespective of the closure of the groove by the wall of the cylinder or piston, respectively.

In the accompanying drawings, which show a vertical internal-combustion engine, Figure 1 is a vertical sectional view; Fig. 2, an enlarged transverse section therethrough on the line 2 2; Fig. 3, an enlarged detail section showing the oil-groove in either the cylinder or piston; Fig. 4, a vertical sectional view showing an arrangement somewhat different from that illustrated in Fig. 1, and Fig. 5 a transverse section therethrough on the line 5 5.

The general construction comprising the cylinder, piston, crank-shaft, and frame is common and well known, and detailed reference thereto is unnecessary.

An oil-cup A on the exterior of the cylinder communicates by a passage *a* with an oil-groove B in the face of the cylinder, prefer-

ably at a point below the upper face of the piston when the latter is in its lowest position. This groove is countersunk below its lower edge at the cylinder-surface, as plainly indicated in Fig. 3, which shows equally well the shape of all the grooves in the cylinder and piston. A like groove B', Fig. 1, is formed in the cylinder below the groove B, and like grooves C C' may be formed in the piston, as shown in this figure. In Figs. 4 and 5 the cylinder has no oiling-grooves, but the piston has two, C C', as in Fig. 1, and the lower one communicates by passages *c*, respectively leading from the bottom of the groove to cups *c'* on the inner side of the hollow piston-head D. Instead of cups *c'* an annular cup might be formed around the inner wall of the piston-head. In this respect both constructions are old. The crank works in an oil-chamber E in the base of the engine, and oil splashed or thrown up by the crank is caught in the cups *c'* and passes thence to the groove C'.

My invention contemplates that oil-grooves having the characteristic formation described shall be formed in the cylinder alone, in the piston alone, or in both the cylinder and piston.

Oil supplied to the upper cylinder-groove will be distributed to the interior surface of the cylinder, and the oil having become distributed such groove will receive oil from the piston while the latter is moving downward. The grooves in the piston will take up oil from the cylinder-surface and from the grooves therein as the piston moves upward. When the piston is in the lower half of its stroke, the force of inertia due to the reciprocating motion is directed downward and supplements gravity action; thus keeping the oil in the countersunk portions of the grooves in the piston. During the upper half of the stroke the force of inertia is directed upward, and as it will exceed the force of gravity in the ordinary running of the engine the oil is thrown upward and outward against the surface of the cylinder. The oil is thus to a certain extent transferred upward from the lower to the upper surface of the cylinder and to a considerable extent counteracts the gravity tendency of the oil to move downward and insures a more perfect lubrication.

In the construction shown in Fig. 4 the oil

in the cups *c'* and that enters the groove *C'* is thus thrown upwardly, and during the strokes of the piston part of it is caught by and retained in the groove *C*.

- 5 If the cylinder be not exactly vertical, but more or less inclined from the vertical line, the same operation will take place, the grooves in the cylinder and piston still being made to some extent of the characteristic formation
10 described.

I claim as my invention—

1. The combination of an upright cylinder and piston, one of which has formed in its face an annular oil groove or pocket countersunk throughout its lower part to form a receptacle to retain the lubricant, substantially
15 as set forth.

2. An upright engine provided with an annular oil groove or pocket countersunk
20 throughout its lower part to form a receptacle to retain the lubricant for lubricating the cylinder and piston.

3. The combination of an upright cylinder with a piston having formed in its face one or more annular oil grooves or pockets countersunk throughout the lower part thereof to form a receptacle to retain the lubricant, substantially as set forth. 25

4. The combination of the cylinder, the crank placed below the cylinder, an oil-chamber in which the crank works, a piston and a rod connecting the piston and crank, oil-cups on the interior face of the hollow piston-head, and an oil groove or pocket in the exterior surface of the piston communicating there-
30 with, such groove or pocket being countersunk in its lower part to form a receptacle to retain the lubricant, substantially as set forth. 35

In testimony whereof I have hereunto subscribed my name.

PAUL A. N. WINAND.

Witnesses:

R. S. REED,

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