2 Sheets--Sheet 1.

D. K. WEST.

Steam-Engine.

No. 165,139. Patented June 29, 1875.

Fig: 1

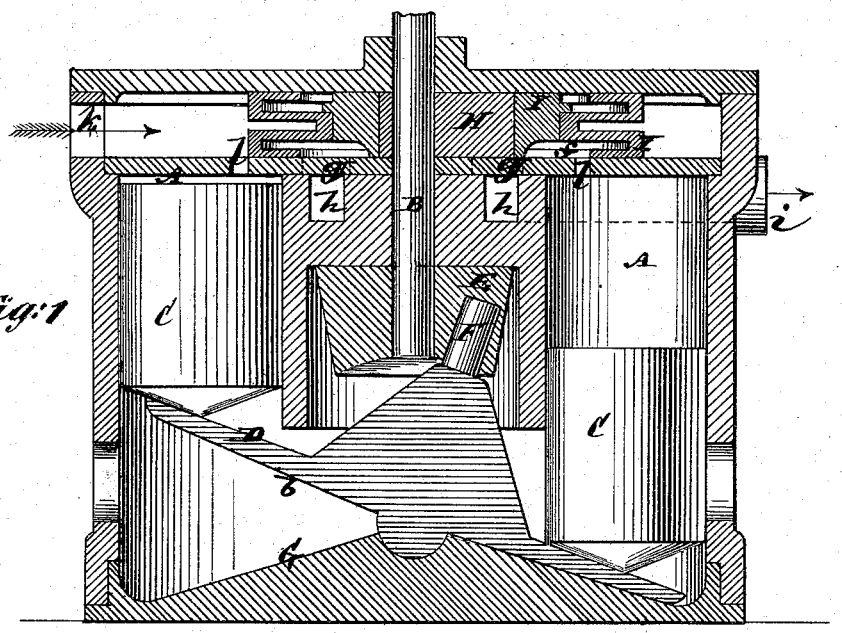
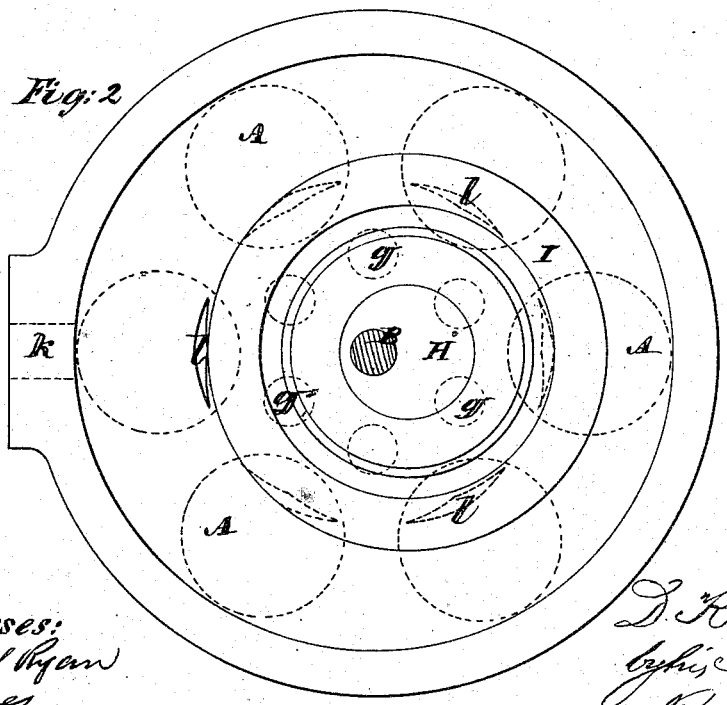


Fig: 2



Witnesses:
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2 Sheets--Sheet 2.

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Fig: 3

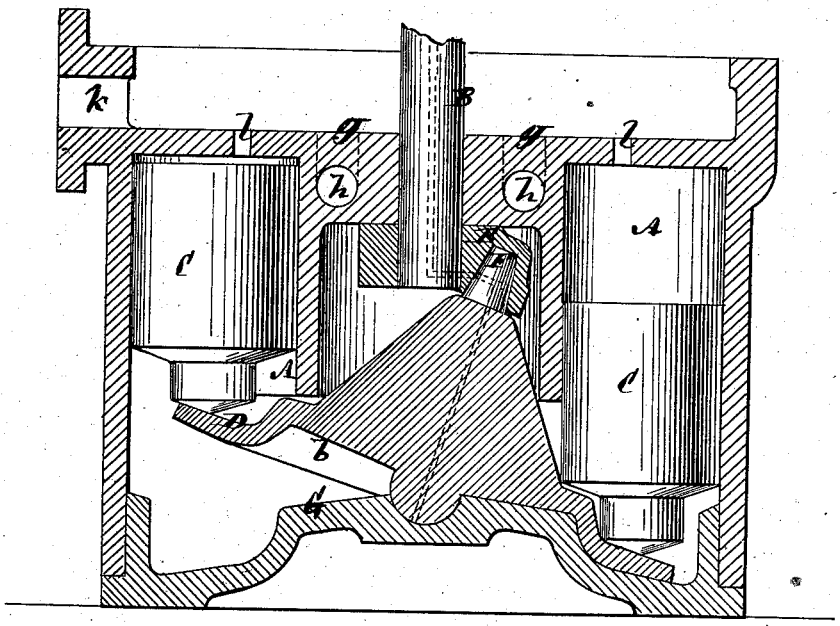
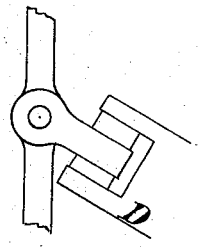


Fig: 4



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UNITED STATES PATENT OFFICE.

DANIEL KEMP WEST, OF CROWN PLACE, KENTISH TOWN, ENGLAND.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **165,139**, dated June 29, 1875; application filed May 8, 1875.

To all whom it may concern:

Be it known that I, DANIEL KEMP WEST, of Crown Place, Kentish Town, in the county of Middlesex, England, engineer, have invented certain new and useful Improvements in Engines to be driven by water, steam, or other fluid; also, applicable to pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings.

My invention has for its object the construction of engines and pumps in a more compact form, and so as to diminish friction in working, and waste of steam and lubricants; and my invention consists in steam-cylinders, having pistons constructed with conical-shaped lower ends, in combination with a pivoted disk upon which the said pistons successively operate for the purpose of rocking the same. The rocking disk is constructed with a conical under surface, and the base on which the said disk is pivoted is also constructed with a conical upper bearing for the disk, all of which will be fully hereinafter described.

In the accompanying drawing, Figure 1 is a vertical section of an engine constructed in accordance with my invention; Fig. 2, a plan of the same; Fig. 3, a further vertical section, showing a modified construction of the disk. Fig. 4 is a detail view of a mode of connecting the pistons with the rolling conical disk, applicable to double-acting engines.

Referring, in the first instance, more particularly to Figs. 1 and 2 of the drawing, A A are the cylinders of the engine, of which there may be any number, having their axes parallel to the crank-shaft B, and having pistons C working in them, the ends of which bear upon the flat surface of the disk D. The cylinders are arranged in a circle, of which the shaft B is the center, said shaft carrying a crank, E, in which the stem F of the disk works as a crank-pin. The conical surface *b* of the disk has its bearing in the base-plate G, its apex being steadied by a ball-and-socket joint or pivot. The pistons, acting alternately or in rotation on the outer portion of the disk, force it down in such a manner as to keep its conical surface in constant contact, at the lowest points during its motion, with the conical surface on the base-plate G.

By this means a rolling motion is communicated to the disk D without revolving on its axis, the connection of the stem F with the crank E giving motion to the latter.

In Figs. 1 and 3 the pistons are shown single-acting, and free from any positive attachment with the disk D, the ends of the pistons being coned to correspond with the action of the disk.

In Fig. 3 the conical disk is represented as having its bearing-surface for the pistons to work upon, as lowered to the plane of the apex of the cone, and the conical bearing *b* is reduced.

In Fig. 4 is shown a method of connecting the rods of the pistons in a positive manner with the rolling conical disk, where such connection is necessary, as in double-acting engines. Thus on the circumference of the rolling disk is a guide in which a slide works, and is free to move in any direction within the guide. A pin, which is free to turn in a hole in the slide, is jointed to the piston-rod. Any other suitable form of universal joint, however, may be used. This modification, however, it is not necessary here further to describe.

When increased power is required, a set of cylinders with their pistons (either single or double acting) in addition to those represented in the drawing, may be arranged for operation on the opposite side of the disk.

In Figs. 1 and 2 is shown a valve and valve motion for the purpose of admitting the fluid under pressure to the cylinders. For this purpose the shaft B carries an eccentric, H, which works in a ring, I. This ring is free to be moved by the eccentric, and forms a movable partition or block within and throughout the depth of the valve chest or box, and is formed with a cavity, *f*, on its under face, which communicates by openings *g* with an exhaust-passage, *h*, from which *i* is the outlet. The steam or other propelling fluid is admitted by an inlet, *k*. The ring I, in its motion as derived from the eccentric, passes alternately or successively over the ports *l*, thereby placing them alternately or successively in communication with the inlet and exhaust. Said ring or valve I may be variously constructed to give it a free but close fit against the top and bottom surfaces of the chest or box, and

to make it self-packing, either by the pressure of the fluid in a balancing manner, or otherwise.

The motion of the rolling-cone of the disk D upon the fixed base causes the air or fluid lying between such surfaces to be driven round with the engine, and the centrifugal force thus generated may be used for pumping, by making suitable openings for the admission of the fluid at the center and its discharge from the outside of the space below the disk.

To lubricate the engine, the lubricating fluid may be admitted below in the center of the pivot, and be forced through the disk, stem, crank, and shaft, by centrifugal force, and ultimately be discharged from an orifice on the outside of the shaft above, radial holes in the shaft and pins serving to distribute the fluid during its upward passage, all as represented in Fig. 3 of the drawing, and the bearings being packed to prevent too rapid escape of the lubricant.

I claim—

1. The combination of the cylinders A, the pistons C, provided with cone-shaped lower ends, and the pivoted disk D, constructed to be successively operated upon by the conical headed pistons for rocking the same, substantially as described, for the object specified.

2. The pivoted rocking disk D, constructed with the conical under surface *b*, in combination with the base-plate G, having the conical upper bearing for the disk, and the piston C for successively operating upon the said disk, substantially as and for the purpose described.

D. K. WEST.

Witnesses:

WILLIAM SPENCE,

W. A. JACKSON.