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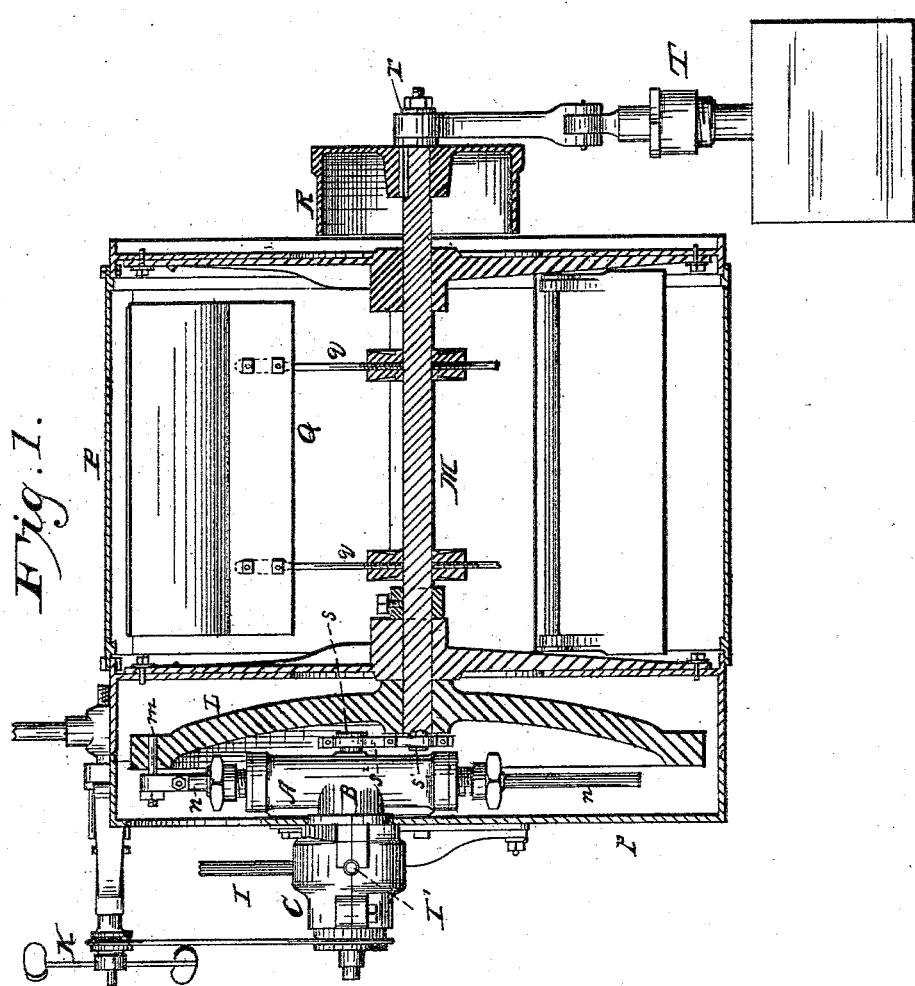
3 Sheets—Sheet 1.

S. MALTBY.

REVOLVING CYLINDER ENGINE.

No. 301,379.

Patented July 1, 1884.



*Witnesses:*

*J. M. Burnham*

*Harry V. Davis*

*Inventor:*

*Samuel Maltby*

*by W. B. Hale,*

*Att'y.*

(No Model.)

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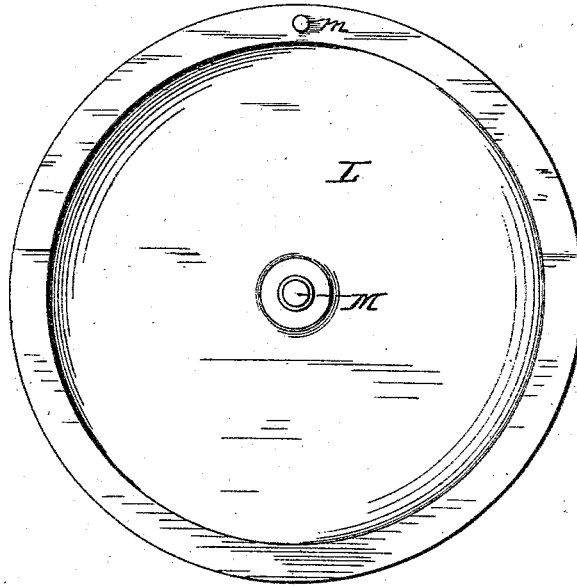
S. MALTBY.

REVOLVING CYLINDER ENGINE.

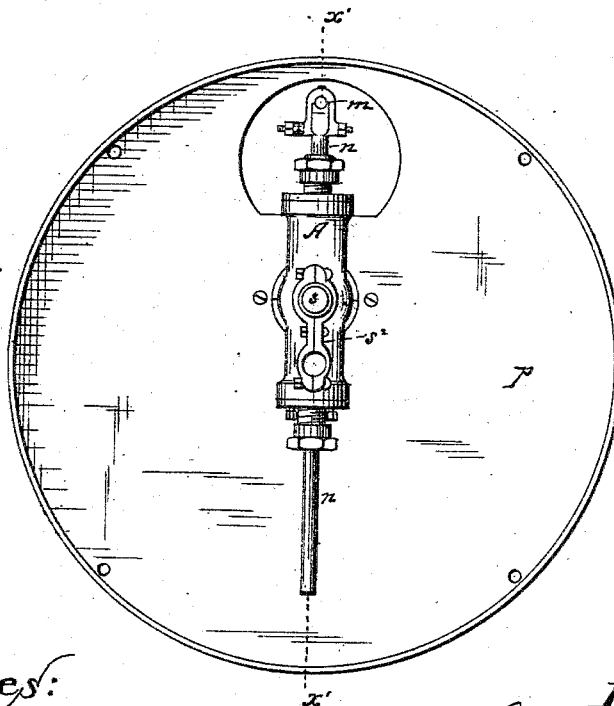
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*Fig. 2.*



*Fig. 3.*



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*Harry V. Davis*

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*Sidney Maltby*  
*by W. B. Hale*  
*Att'y.*

(No Model.)

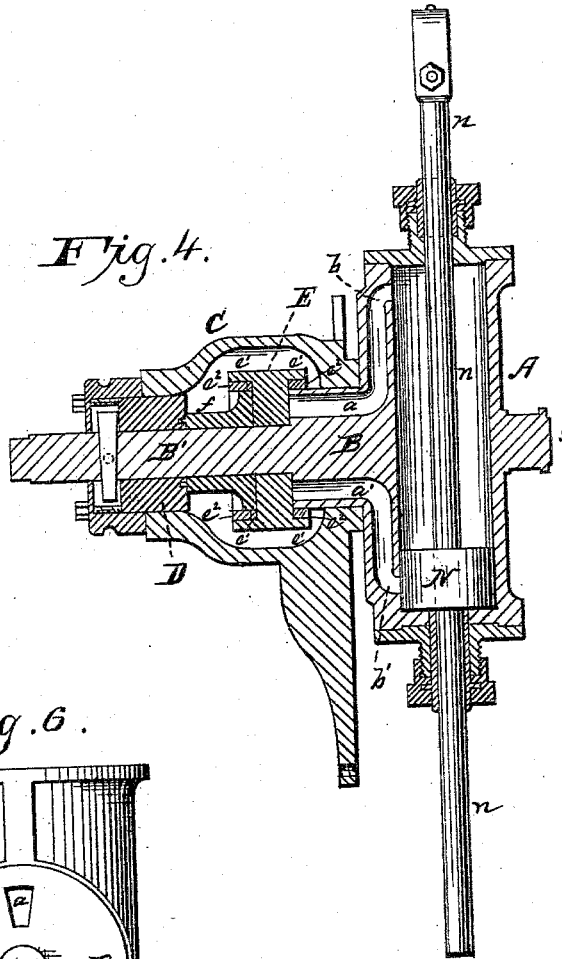
3 Sheets—Sheet 3.

S. MALTBY.  
REVOLVING CYLINDER ENGINE.

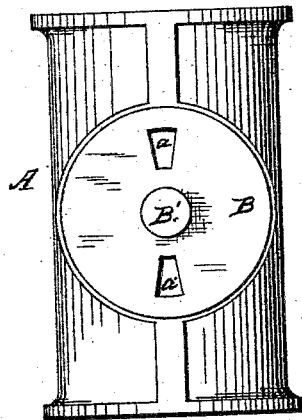
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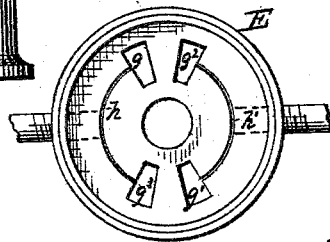
*Fig. 4.*



*Fig. 6.*



*Fig. 5.*



Witnesses:  
J. M. Burnham  
Harry J. Davis

Inventor:  
Sidney Maltby  
by W. B. Hale,  
Att'y.

# UNITED STATES PATENT OFFICE.

SIDNEY MALTBY, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR,  
BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO EDWARD L.  
LAMBIE AND SAMUEL R. BOND, BOTH OF SAME PLACE.

## REVOLVING-CYLINDER ENGINE.

SPECIFICATION forming part of Letters Patent No. 301,379, dated July 1, 1884.

Application filed June 16, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, SIDNEY MALTBY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Revolving-Cylinder Steam-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a steam-engine in which a reciprocating piston plays in a cylinder which revolves on a transverse axis eccentric to the axis of a fly-wheel to a wrist-pin of which the piston-rod is connected, the main object of the invention being to construct an engine having great power and high speed of motion, while at the same time being of simple, compact, and comparatively inexpensive construction.

My improved engine is adapted to the same uses as other steam-engines, but is especially intended for driving fans and similar rotary machines, which may have a shaft coupled with or forming an extension or prolongation of the fly-wheel shaft of the engine.

The invention consists in certain novel combinations, constructions, and arrangements of parts, which will be fully understood from the following particular description, in connection with the accompanying drawings, in which—

Figure 1 is a side view of my improved engine applied to a fan, the fly-wheel and the fan being shown in vertical diametric section. Fig. 2 is a view of the fly-wheel detached. Fig. 3 is a view of the inner side of the cylinder and one wall of the casing in which the cylinder-trunnion has its bearing. Fig. 4 is a section of the cylinder and valve and the casing which incloses the valve in a plane indicated by the line  $x' x'$  of Fig. 5. Fig. 5 is a face view of the valve. Fig. 6 is a side view of the cylinder detached, showing also a face view of the trunnion.

The letter A indicates a steam-cylinder provided on one side with a trunnion, B, in which are formed steam-passages  $a a'$ , which connect with passages  $b b'$ , leading to opposite end of the cylinder in the usual manner. This trunnion has its bearing in one end of a casing, C,

which incloses the valve, (to be hereinafter described,) and is secured to a plate,  $p$ , which forms one wall of a casing which incloses the cylinder and fly-wheel. From the center of the trunnion B projects a spindle,  $B'$ , which has a bearing in an adjustable block, D, which closes, and is firmly secured in the outer end of the casing C.

The letter E indicates the stationary valve, having a central opening,  $e$ , which fits over the spindle  $B'$ , so as to bring one face of said valve against the end of the trunnion B, while against its outer face is placed the face of a bearing-piece,  $f$ , through which the spindle  $B'$  passes, and which is secured to the block D. Outside of this block D the spindle  $B'$  is slotted, and provided with a key,  $d$ , by means of which the block D may be adjusted to cause the bearing-piece  $f$  to have greater or less frictional pressure against the valve, as desired. The valve E is provided with flanges or rims  $e' e'$ , between which and the trunnion, and between which and the edge of the bearing-piece  $f$ , are arranged packing-rings  $e^2 e^2$ . The valve E is provided on one side of its central opening with two through-ports,  $g g^2$ , and on the other side with two similar ports,  $g' g^3$ , the ports  $g$  and  $g^2$  being connected by a passage,  $h$ , and the ports  $g^2 g'$  connected by a passage,  $h'$ . The steam-supply pipe I is connected with the passage  $h$ , and the exhaust-pipe I' is connected with the passage  $h'$ . The flow of steam through the pipe I is controlled by a throttle-valve operated by a governor, K. Any suitable governor may be used; but I prefer to use the special form of governor which is shown in the drawings, but will not be here particularly described, as it will form the subject of a separate application for patent.

The operation of the valve E will be hereinafter described in connection with the operation of the complete apparatus.

The letter L indicates the fly-wheel, which, it will be observed, is fixed upon a shaft, M, which is not concentric or in line with the axis about which the cylinder A revolves, but is in a different and parallel plane. The piston N of the cylinder A is fixed upon a piston-rod,  $n$ , which plays through two stuffing-boxes in

opposite ends of the cylinder, and the rod *n* has its outer end connected to a wrist-pin, *m*, projecting from the fly-wheel. The shaft *M* has its bearings in the opposite end walls of a casing, *P*, which incloses a fan, *Q*, the fan-arms *q q* of which project radially from said shaft, so that while, in the present instance, the said shaft *M* is the main driving-shaft of the engine, it is also the fan-shaft. Upon the inner side of the cylinder is a stud, *S*, and upon the inner end of the shaft *M* is a stud, *S'*, and these two studs are connected by a link, *S''*, which, as the cylinder and shaft revolve, serves as an inner support for the cylinder, and to a great extent relieves the bearings of the cylinder-trunnion, and of the shaft *M* of lateral strain, so that the axes of the fly-wheel and cylinder will not be forced out of parallelism.

Upon the outer end of the shaft *M*, which projects through the casing *P*, is fixed a pulley, *R*, which may serve to carry a power-transmitting belt when required. Upon the outer face of this pulley is a wrist-pin, *r*, to which is connected one end of a link, *r'*, the other end of which is connected to the plunger of a feed-pump, *T*, which may be connected for supplying the boiler with feed-water.

The special construction of the pump will not here be particularly described, as it will form the subject of a separate application for patent, as will also an automatic valve, indicated by the letter *X*, and intended to regulate the supply of feed-water to the boiler.

The constructions of the fan and its regulating devices and of the feed-pump are not here particularly described, as a description thereof is not essential to an understanding of my present improvement in steam-engines.

The operation of the invention is as follows: When steam is admitted to the valve-passage *h* through the steam-pipe, it passes through either the port *g* or *g'*, and thence to one end of the cylinder, driving the piston and causing the exhaust to take place through the port, which is radially opposite the one through which it enters, and it then passes off through the passage *h'* and exhaust-pipe. In the meantime the movement of the piston-rod drives the wheel, which, in turning, carries the cyl-

inder around, so that the trunnion-passage which had been receiving steam is carried to an exhaust-port of the valve, and the passage which had been exhausting is at the same time brought to a supply-port. This operation continues as long as the steam is supplied.

A steam-engine has heretofore been constructed with a cylinder arranged to revolve upon a transverse axis, and having its piston-rod connected with a wrist-pin of a fly-wheel, the shaft of which is in a plane parallel to the axis of the cylinder; and I of course lay no claim to such an engine, broadly.

What I claim is—

1. The combination, with the cylinder having its piston-rod connected to a wrist-pin of an eccentrically-mounted fly-wheel, and provided with the trunnion having steam-passages connected with opposite ends of the said cylinder, of the valve *E*, provided with the through-ports connected in pairs by passages, as described, and the bearing-piece *f*, placed against the outer face of said valve, substantially as described.

2. The combination, with the cylinder having the suitably-mounted trunnion *B*, provided with steam-passages connected with its opposite ends, the spindle projecting from said trunnion and provided with a suitable bearing, and the piston having its rod connected to a revolving element, of the stationary valve *E*, provided with the ports connected in pairs, said pairs being connected, respectively, to supply and exhaust pipes, and the bearing *f*, the whole constructed and arranged to operate substantially as described.

3. The combination, with the steam-cylinder arranged to revolve upon a transverse axis, and the shaft of the fly-wheel which is in a plane parallel to that of said axis, of the link having one end pivoted upon the fly-wheel shaft and the other pivoted upon a stud projecting axially from the cylinder, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SIDNEY MALTBY.

Witnesses:

E. L. LAMBIE,  
W. B. HALE.