

George Shale.  
Oscillating Steam Engine.

PATENTED

Fig. 2. DEC 10 1867

Fig. 1.

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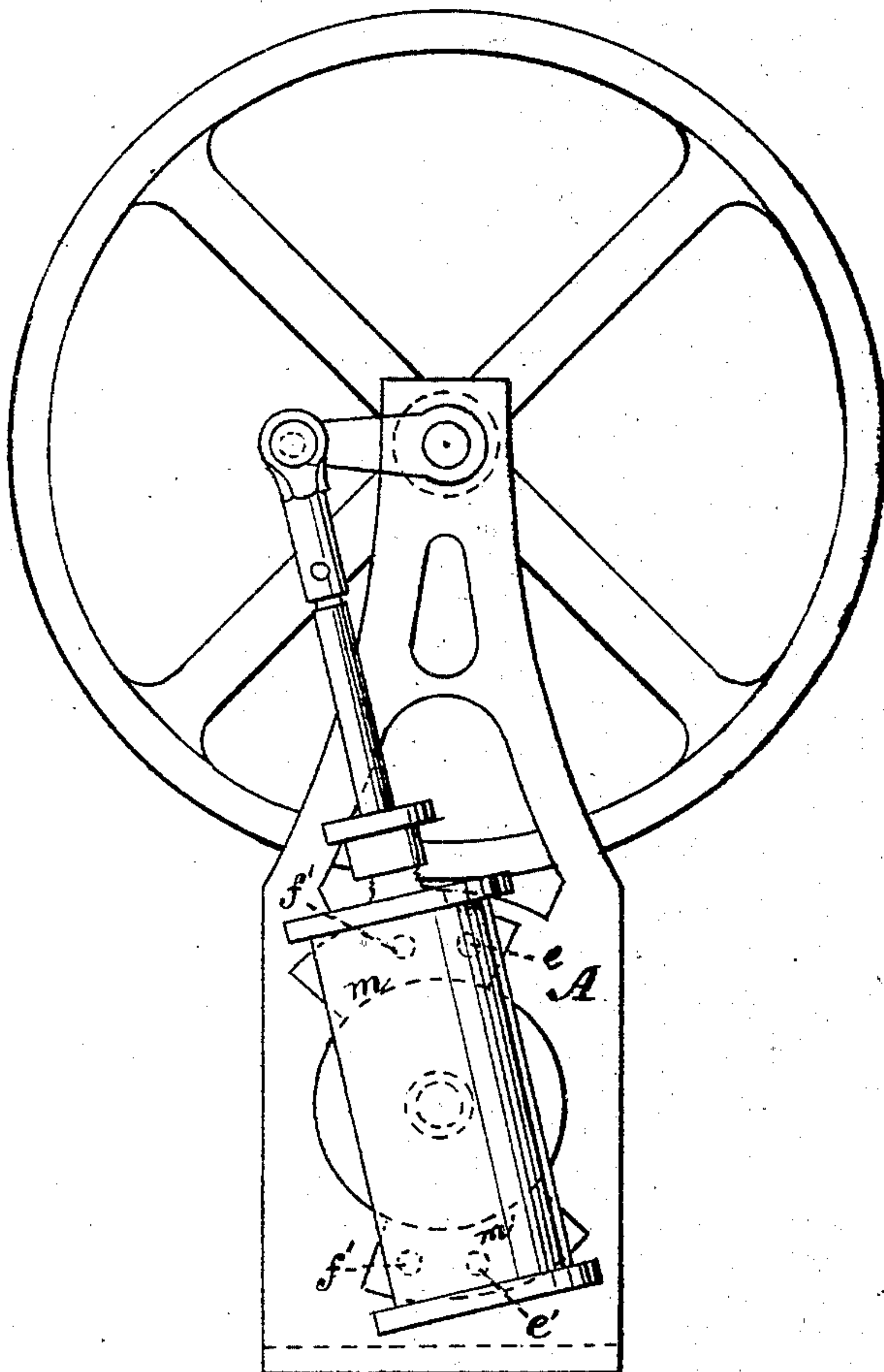
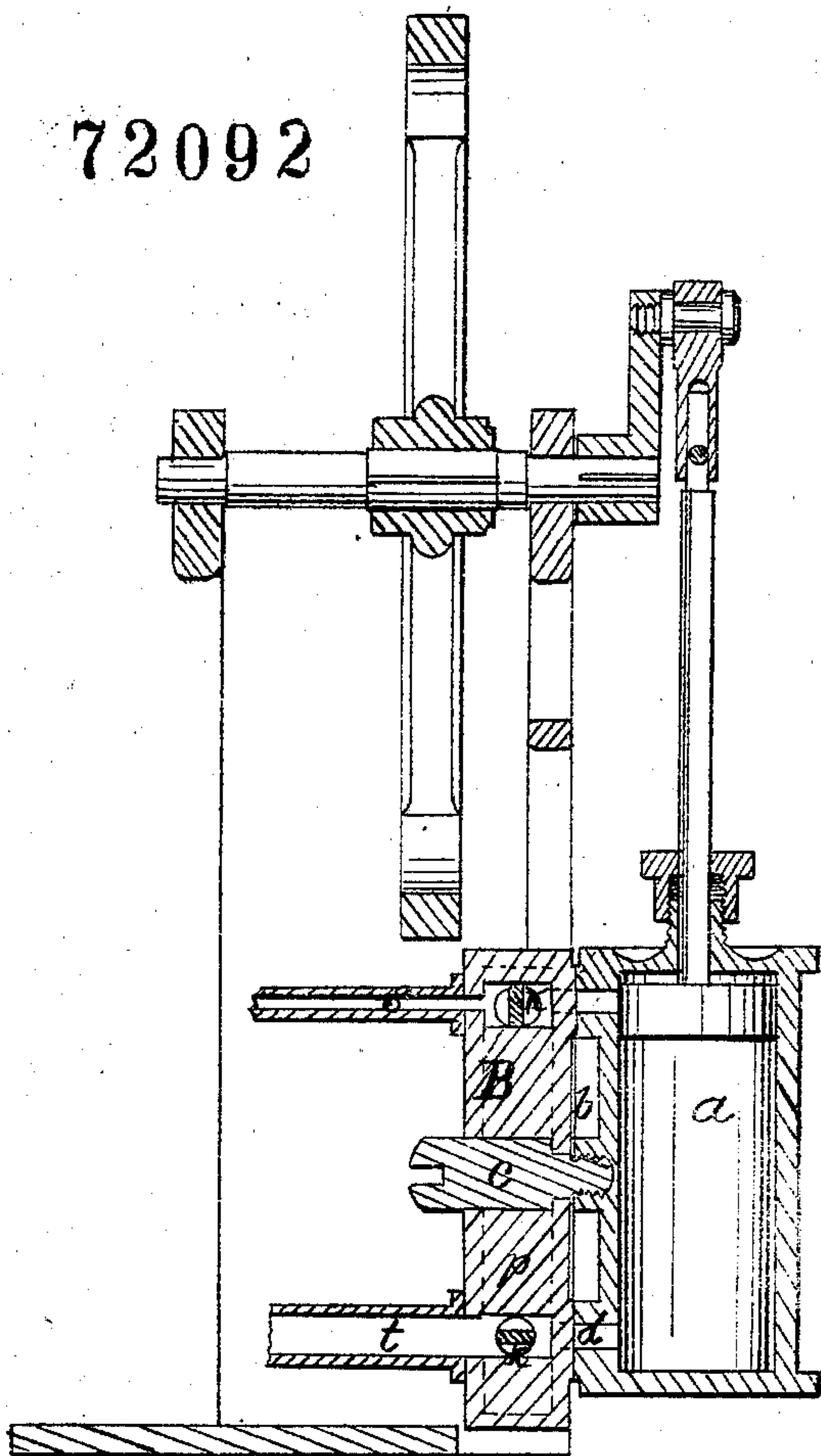
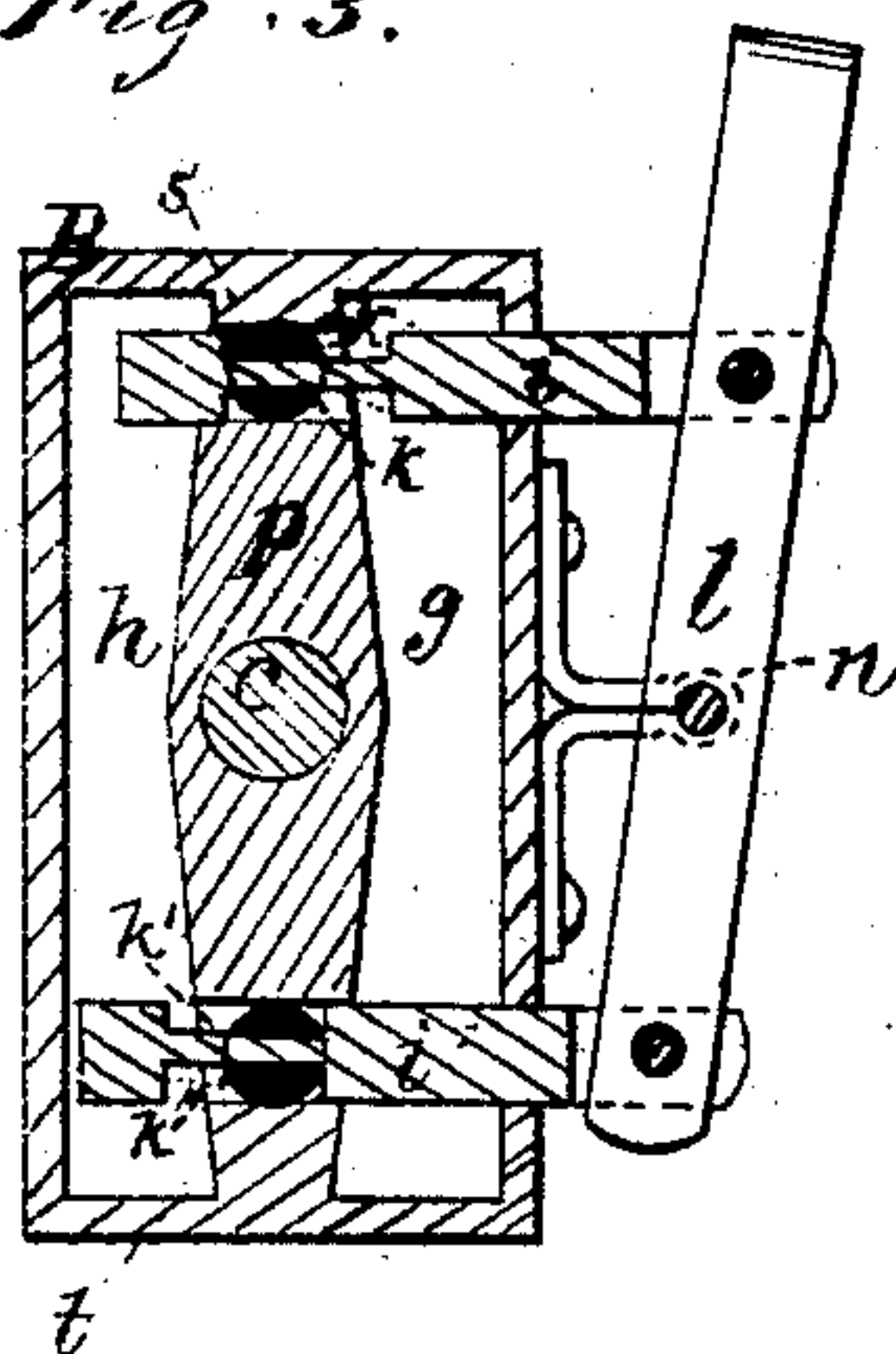


Fig. 3.



Witnesses.  
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# United States Patent Office.

GEORGE SHALE, OF TAUNTON, MASSACHUSETTS.

Letters Patent No. 72,092, dated December 10, 1867.

## IMPROVEMENT IN STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, GEORGE SHALE, of Taunton, in the county of Bristol, and State of Massachusetts, have invented a new and useful Improvement in "Oscillating Steam-Engines;" and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of the specification, in which—

Figure 1 represents a vertical longitudinal section of the steam-engine.

Figure 2 represents an end view of the same.

Figure 3 represents a transverse section of the steam-chest and reversing-gear.

The same letters refer to the same parts in the separate figures.

The object of my invention is to produce a simple, cheap, and effective steam-engine, to economize the power expended in moving the steam-valve, and to construct a reversing-gear which can be easily managed by hand, even in the most powerful engines; and my invention consists in so constructing the steam-chest as to dispense entirely with the steam-valves, (either slide or poppet-valves,) by dividing it by a partition into two chambers, each communicating by two apertures with the ports of the cylinder, and are also connected with the induction and eduction-pipes respectively; it further consists in constructing and arranging the reversing-gear, by passing the valve-stems or rods of the reverse-lever transversely through the steam and exhaust-pipes, in such a manner that when one of the valve-rods opens a communication between the steam-pipe and one of the chambers of the steam-chest, the other valve-rod will open communication between the exhaust-pipe and the other chamber, and by shifting the reverse-lever, the position of the two valve-rods will be reversed; and my invention consists further in hanging the cylinder to the frame in such a manner that the central line of the cylinder will swing in a plane which is parallel to the ports and the steam-chest.

Referring to the drawings, A represents the supporting-frame, containing the steam-chest B in its lower portion. Through the centre of the lower portion of the frame passes a pin or bar, *c*, provided with a screw on its outer end, which screw fits in a corresponding hub or socket on the cylinder *a*, as shown, upon which the cylinder oscillates. The cylinder may, when required, be supported in bearings on both sides. *d d'* are the two ports of the cylinder which extend through the two flanges or segments *m m'*, attached to or forming part of the cylinder and sliding against the steam-chest. The steam-chest B is divided by a partition, *p*, into two chambers, *g h*, the partition being connected with the induction-pipe *s* and the exhaust-pipe *t*. Each chamber is also connected with the said pipes, and communicates with the cylinder by two apertures. The chamber *g* thus communicates by means of the apertures *e e'* with the ports *d d'*, and the chamber *h* by the openings *f f'* with the ports *d d'*. The valve-rods *i i'* are formed with chambers or recesses *k k'*, as shown in fig. 3, and pass transversely through the ends of the pipes *s* and *t* respectively, within the steam-chest; the chambers or recesses being so arranged that while the communication is open from the pipes *s* to the chamber *g* of the steam-chest, it is closed from the chamber *h*, and *vice versa*. The valve-rods *i i'* are attached each at their outer ends to a lever, *l*, by which they are reversed.

The operation of the engine is as follows: By setting the lever *l*, as shown in fig. 3, steam is admitted through the steam-pipes *s*, and passes through the recess *k* of the valve-rod *i*, into the chamber *g* of the steam-chest, and from there through the passages *e e'*, fig. 2, into the cylinder *a*, as the ports *d d'* of the cylinder pass across the passages *e e'*. When the ports *d d'* of the cylinder pass over the openings *f f'*, the steam in the cylinder is exhausted into the chamber *h*, and passes through the recess *k'* into the exhaust-pipe *t*. By reversing the lever *l*, the motion of the valve-rod *i* effects, by means of recess *k*, communication with chamber *h*, thus allowing the steam to enter from the pipe *s*, when the valve-rod *i'*, by means of recess *k'*, allows the exhaust steam in chamber *g* to enter the exhaust-pipe *t*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The steam-chest B, constructed with the chambers *g h*, and partition *p*, in combination with the steam and exhaust-pipes, and cylinder *a*, substantially as described.
2. The valve-rods *i i'*, provided with the recesses or chambers *k k'*, in combination with partition *p*, constructed as described, and operated by the lever *l*, as and for the purpose set forth.

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

GEORGE SHALE.

Witnesses:

J. H. ADAMS,

M. S. G. WILDE.