

W. G. Savage.

Steam Engine.

N<sup>o</sup> 87,073.

Patented Feb. 16, 1869

Fig: 1.

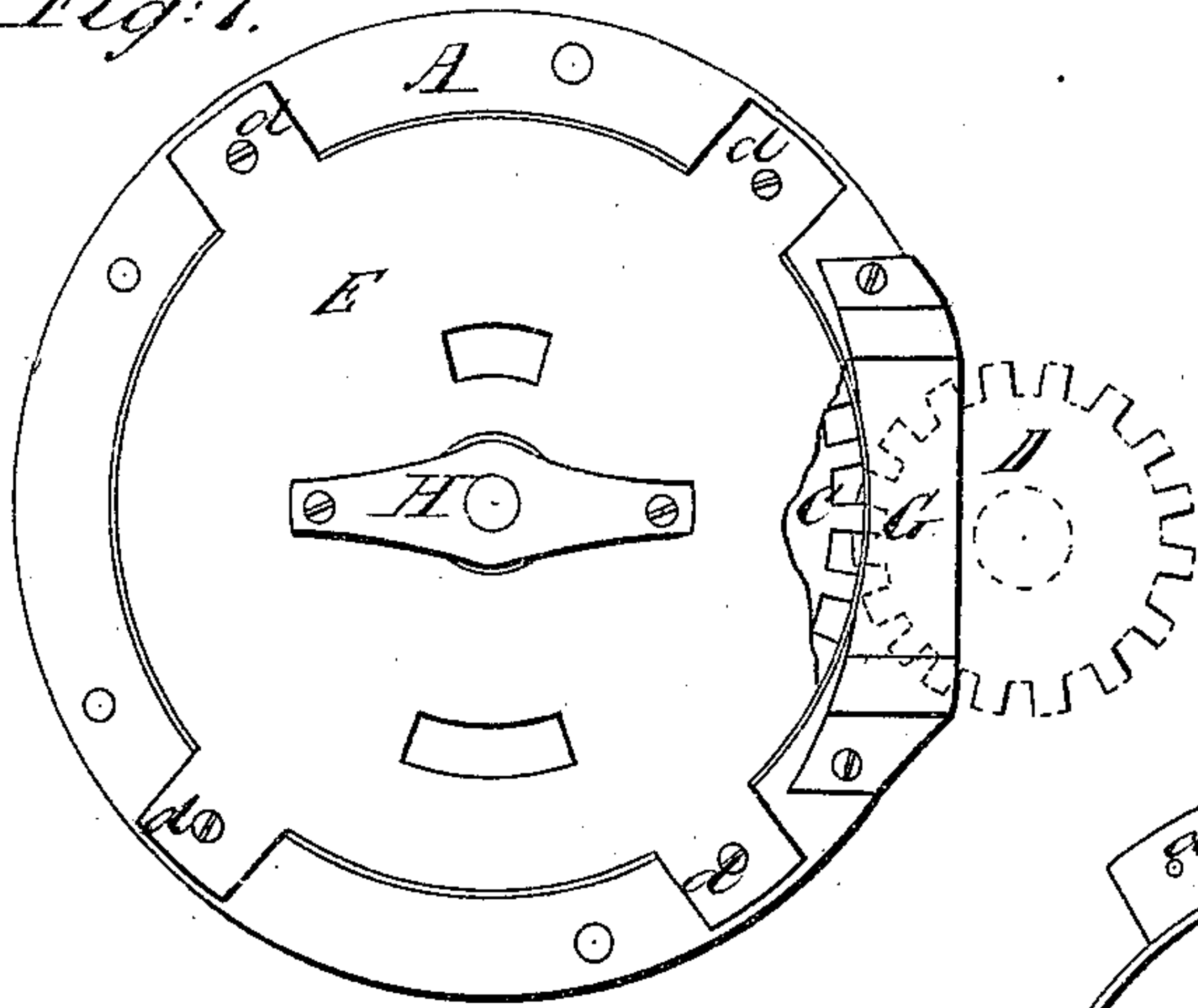


Fig: 2

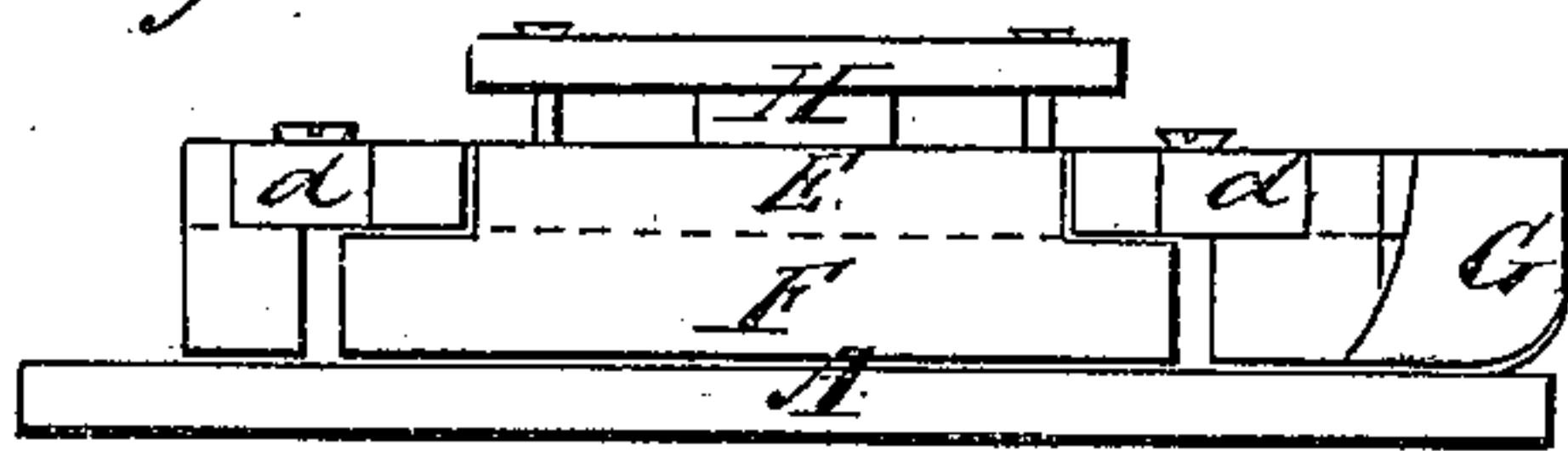


Fig: 4

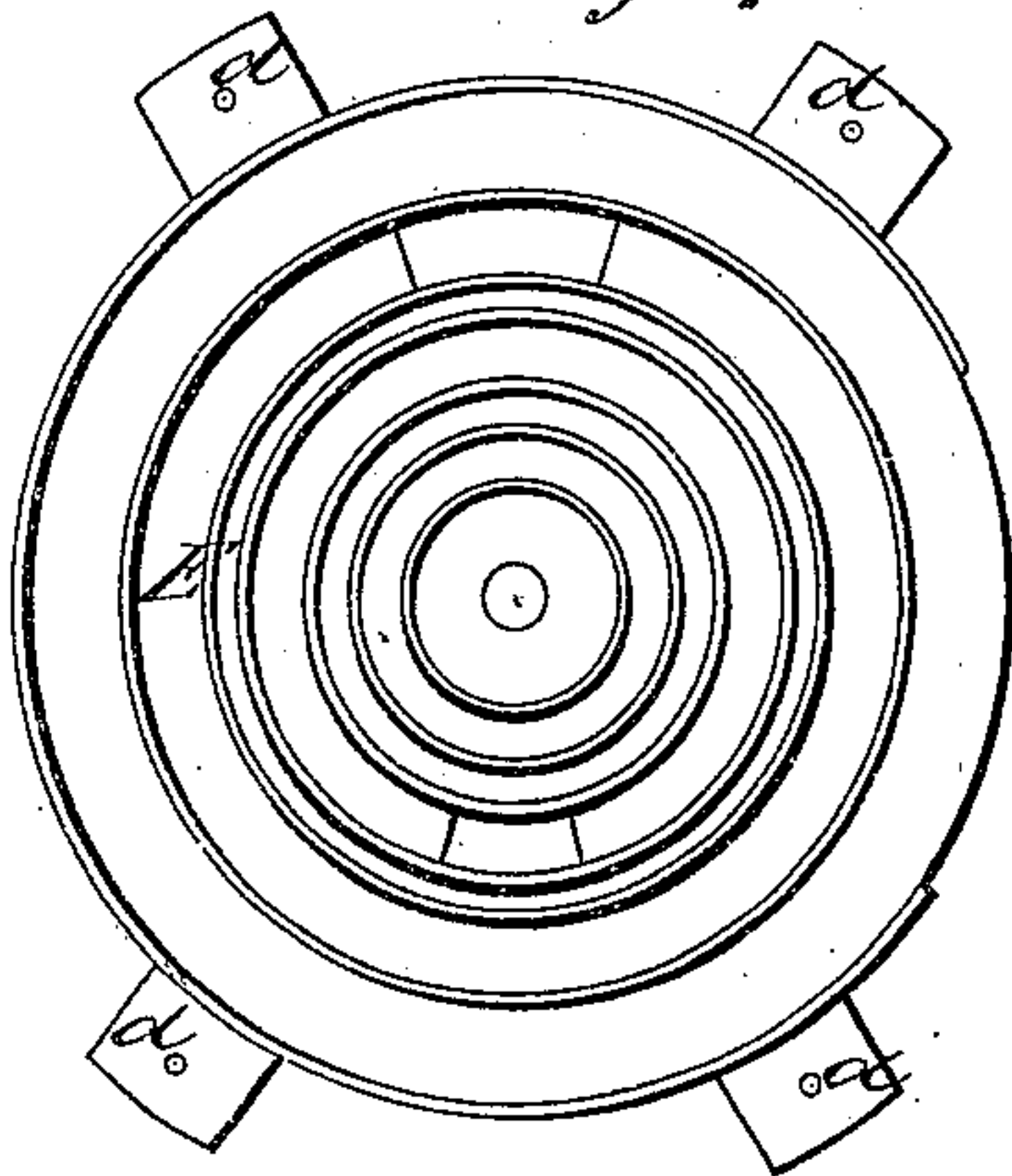
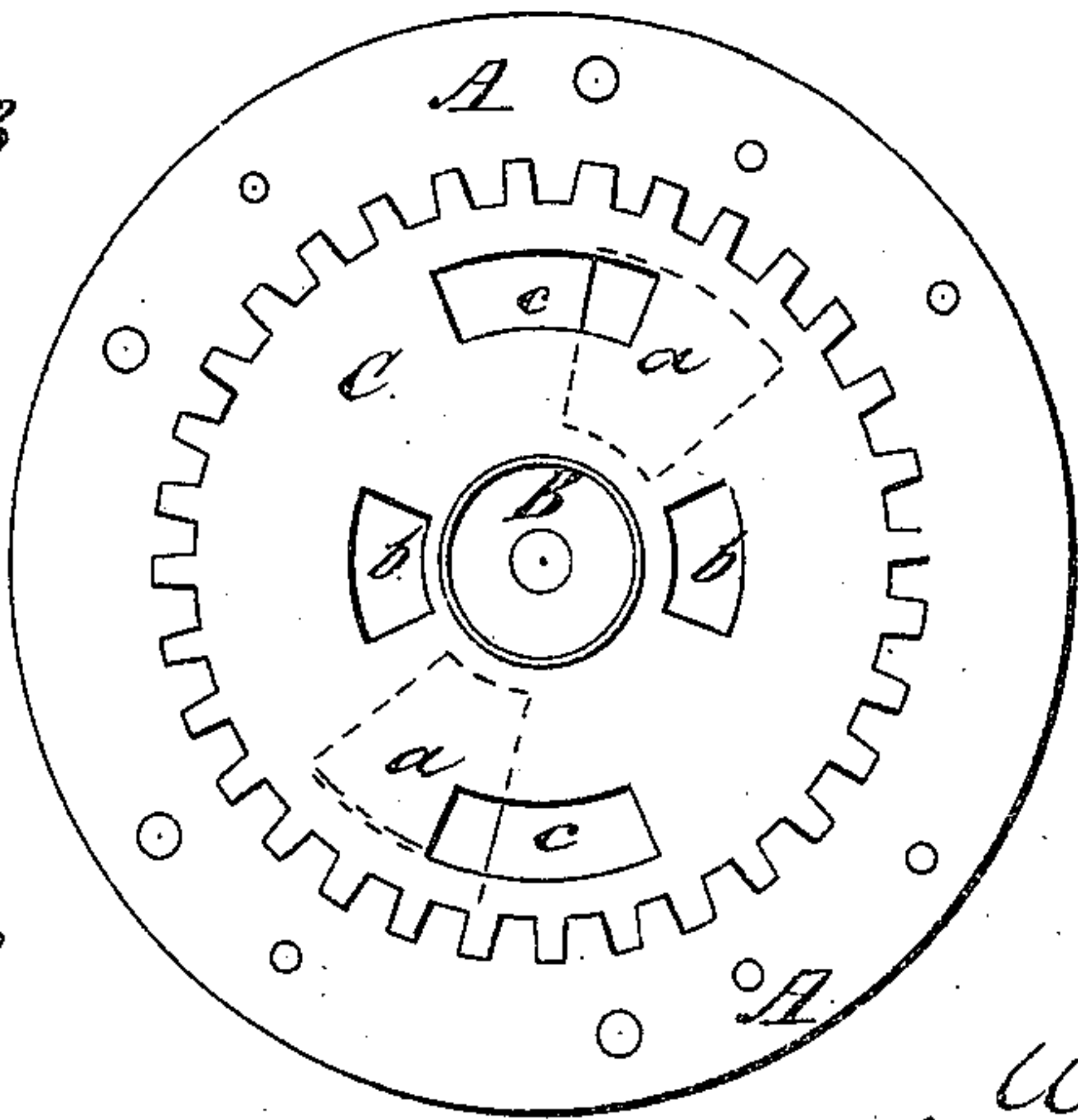


Fig: 3



Witnesses  
Harry King  
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Inventor  
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Attys.



# United States Patent Office.

W. G. SAVAGE, OF KNOXVILLE, IOWA.

Letters Patent No. 87,073, dated February 16, 1869.

## IMPROVEMENT IN STEAM-ENGINES.

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

### To all whom it may concern:

Be it known that I, W. G. SAVAGE, of Knoxville, in the county of Marion, and in the State of Iowa, have invented certain new and useful Improvements in Cylinder for Steam-Engines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement on my "steam-engine," patented July 14, 1868; and

Its nature consists in the arrangement of a valve, of similar construction to the one in the patent referred to, on the opposite end of the same cylinder, and with reference to the head of the said cylinder, through which the piston-rod passes, and so arranged, with reference to the valve of my said patent, as to have two ports of a different kind open at the same time in each head.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, referring to the annexed drawings, which form a part of this specification, and in which—

Figure 1 is a plan view of the steam-chest and head of cylinder;

Figure 2, a side view of the same;

Figure 3 is a plan view of the head of the cylinder, with the valve, the steam-chest being removed; and

Figure 4 is a bottom view of the steam-chest.

A represents the head of the cylinder, provided at its centre with a hub, B, around which the valve revolves.

The head A has two ports, *a a*, as seen in fig. 3.

The valve C, which fits around the hub B, ground on both sides, so as to make a perfect steam-fit between the head and chest, has two sets of ports—two receiving-ports, *b b*, and two exhaust-ports, *c c*, the ports of the same kind being opposite each other.

The valve, when provided with that number of ports, is driven by a gear, D, of one-half the size of the valve, as shown in fig. 1.

The valve is turned by the gear-wheel D, in the manner set forth in my patent above mentioned.

The head A, valve C, and steam-chest E, which latter covers the valve, are to be exactly alike on both ends of the cylinder, with the exception of the hole for the piston-rod and stuffing-box, which is only on one of them.

The chests and valves, on both heads of the cylinder,

are to be held firmly by bolts passing through four ears, *d d*, on the outer periphery of the steam-chest.

In setting the valves in connection with the running-gear, the receiving-ports *b b* on one valve must connect with the exhaust-ports *c c* on the other, thus making the working-arrangement complete.

The steam-chest E is provided with a guard or flange, F, which protects the teeth on the valve C; and another guard, G, is also placed on the head of the cylinder, which protects the joint between the gear-wheel D and valve C.

The stuffing-box H is attached to the steam-chest by two bolts, in the usual form of attachment to cylinder-head, the hub B, on which the valve C revolves, forming the bottom of the stuffing-box, as well as hub through which the piston-rod works, and a hole is cut through the centre of the steam-chest, forming the packing-space in which the stuffing-box enters.

The valves may be provided with more or less ports than herein set forth, only so that ports of the same kind are opposite to each other.

The advantages of applying the valve to both heads of the cylinder is, in the first place, an entire saving of all the steam, as none can exhaust but what has been used for direct pressure in the cylinder; the thickness of the head only being the length of port, more steam by far is saved than is necessary to drive both the valves.

It is also easily seen that my double ports, with so free an access to the cylinder in receiving and exhausting the steam, are superior in direct action in pressure and direct freedom of exhaust.

A long-stroke engine can be used with equal economy of steam as a short-stroke, as there is no long port from centre to end to be exhausted without use.

Having thus fully described my invention,

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

The arrangement of the valves, constructed as herein described, with reference to the cylinder-head of a steam-engine, through which the piston-rod passes, substantially as herein set forth.

In testimony that I claim the foregoing, I have hereunto set my hand, this 5th day of August, 1868.

W. G. SAVAGE.

Witnesses:

JOSEPH BROBST,

GEO. W. MARTIN.