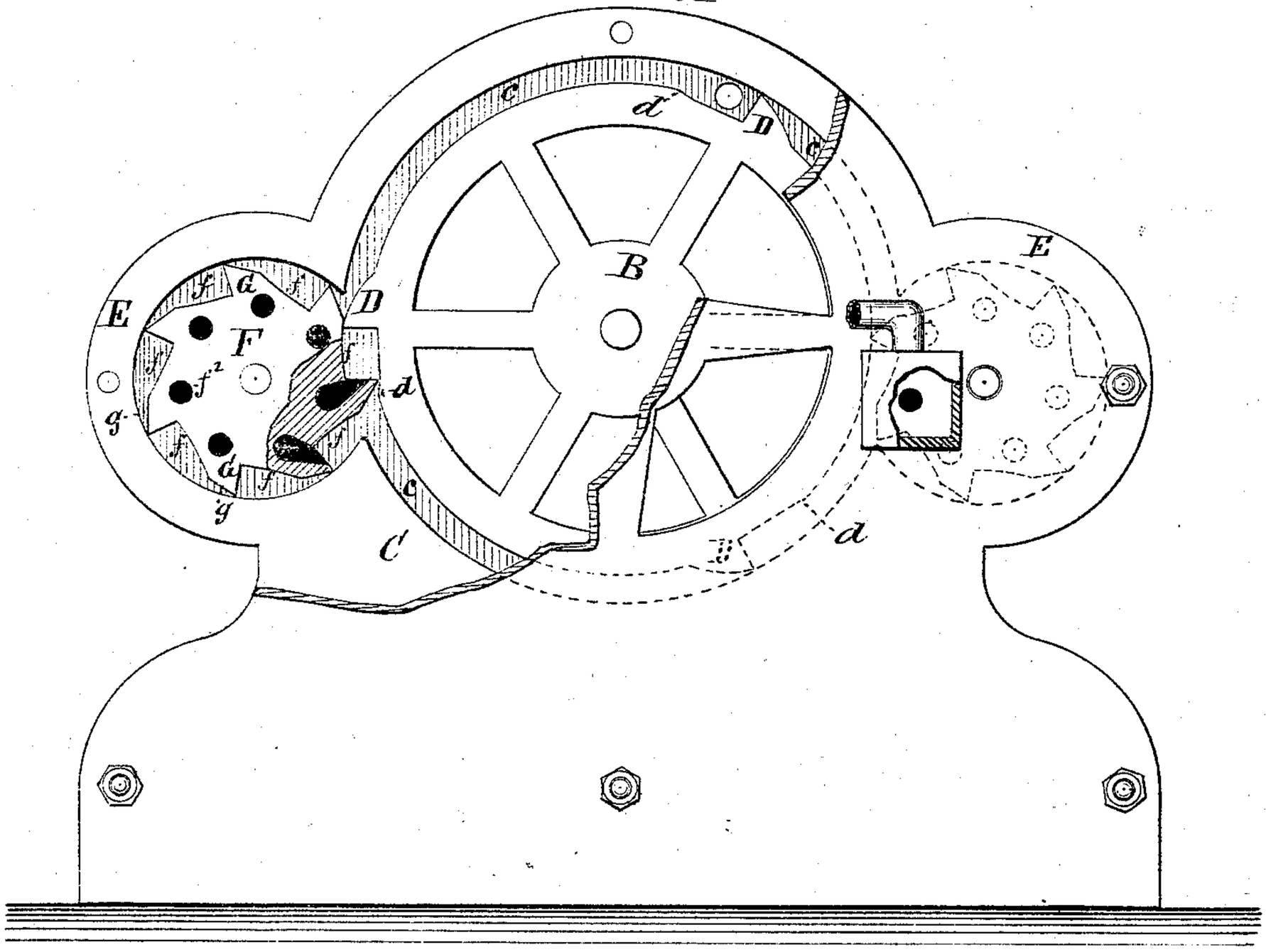
J. F. EARLY.

Rotary Steam-Engines.

No. 135,789. Patented Feb. 11, 1873.

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# UNITED STATES PATENT OFFICE.

JOHN F. EARLY, OF RUCKERSVILLE, VIRGINIA.

## IMPROVEMENT IN ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. **135,789**, dated February 11, 1873.

*To all whom it may concern:*

Be it known that I, Dr. JOHN F. EARLY, of near Ruckersville, in the county of Greene and State of Virginia, have invented a Rotary Steam-Engine, of which the following is a specification:

The invention consists in combining with the piston-wheel of a rotary steam-engine a series of rotary valves, that are brought by pistons into such a position as to admit steam and act as an abutment thereto, while actuated by cams on the piston-wheel to cut off steam at any desired point.

In the drawing, the figure represents a side elevation with parts broken out.

A in the drawing represents the hollow case, in which is placed the wheel B, made fast to a shaft that is intended to drive machinery connected therewith. Between the large circular inner face of the case and the periphery of the wheel is a steam-space, C, and on the said periphery are one or more rigid pistons, D, that divide the steam-space into as many equal parts, *c c c*. To one or more portions of the case is conjoined one or more small circular cases, E, in which is placed a rotary-wheel, F, having notches *f* and valves G. The lower faces *g* of these valves work steam-tight against the periphery of wheel B. On one side of this valve-wheel is a series of apertures, $f^2$, opening into the steam-chest which connects with boiler. These holes extend into each of the valves G, and through the front thereof. This allows the discharge of steam into spaces *c*. The pistons D D are curved or cam-shaped before and behind, preferably though not necessarily perpendicular. In the rear, and at about one-third the distance from one piston to a succeeding piston, rises a cam, *d*, that is sufficiently elevated and elongated to carry a steam-discharging valve, G, far enough forward to cut off steam from the steam-chest.

It will be observed that each valve G on wheel F successively discharges steam into a space, *c*, becomes the steam back or abutment, and cuts off steam. A detent-pawl may work in a ratchet on the outside of valve-wheel shaft, to hold said wheel firmly against the steam.

The operation is as follows: The wheel B being turned so as to bring one of the apertures $f^2$ in register with outlet of steam-chest, the steam rushes into a space, *c*, presses against a piston, D, and causes the wheel B to rotate. When the wheel B has moved one-ninth of a revolution, the steam is cut off by a cam, *d*, that moves a valve, G, out of register with steam-chest. In practice, as this cut-off takes place a similar valve-wheel at another point lets in steam against a piston on the opposite side.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A wheel, B, having the steam-cut-off cams *d* arranged between the pistons D, as described.

2. A notched wheel, F, provided with the series of valves G having channel-ways that receive steam at $f^2$ and discharge it in front thereof, as described.

JNO. F. EARLY.

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