F. B. Sterens,

Steam-Boiler Condenser.

No. 39,430. Patented Aug. 4, 1863.

Fig. 2.

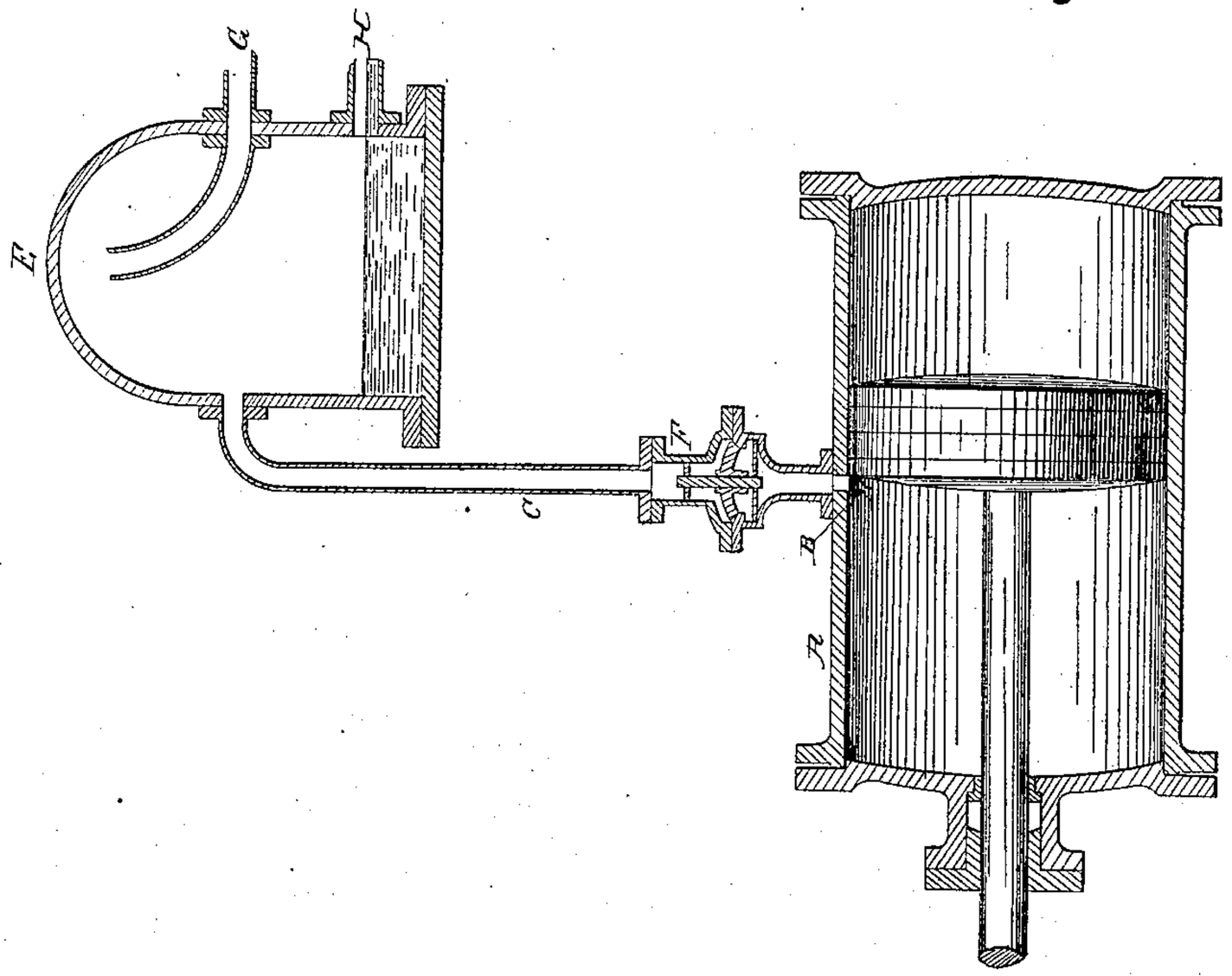
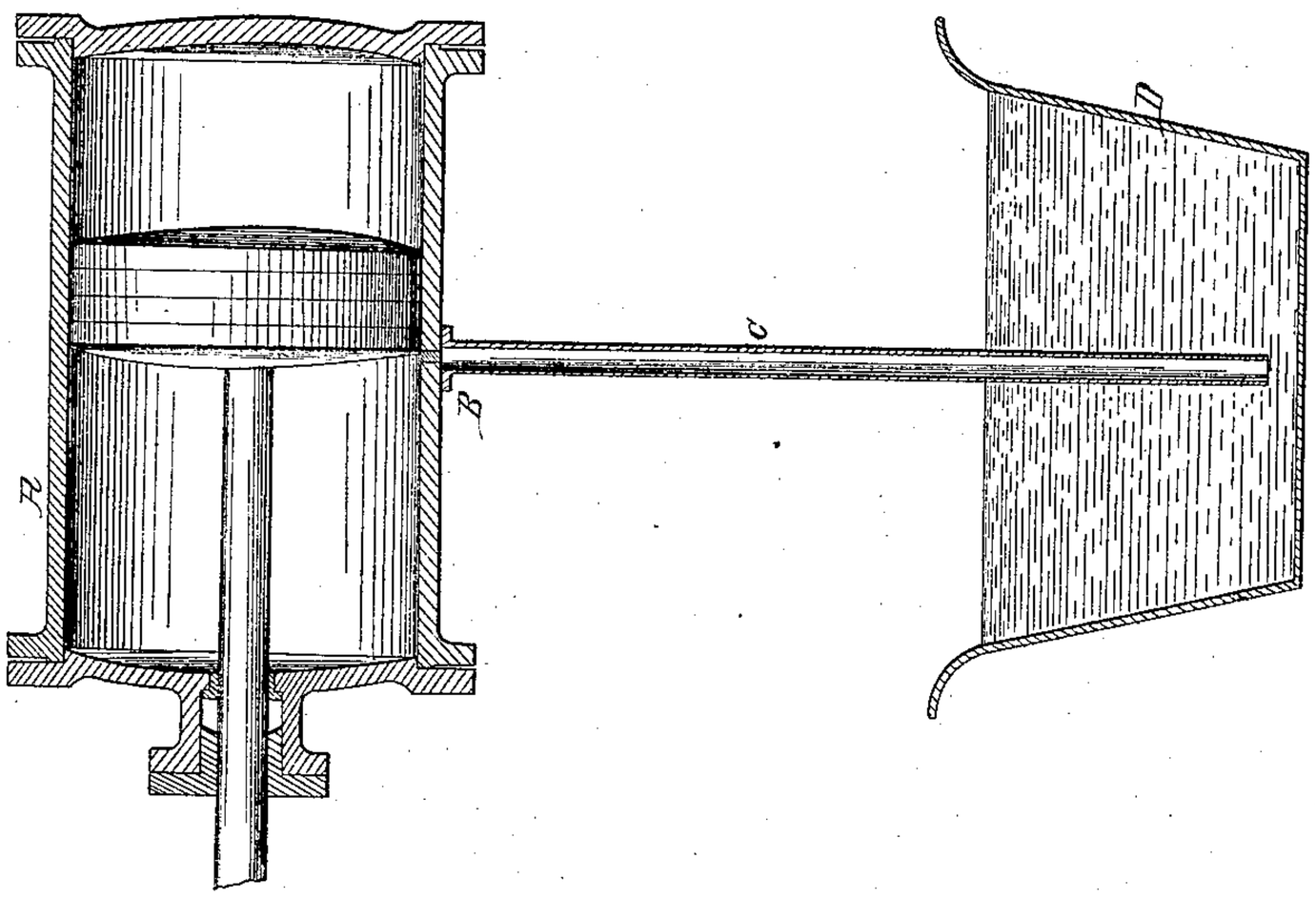


Fig. 1.



Witnesses
Alex Martin
Julius Ringer

Inventor:
Francis B Sterens

UNITED STATES PATENT OFFICE.

FRANCIS B. STEVENS, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **39,430,** dated August 4, 1863.

CASE 3.

To all whom it may concern:

Be it known that I, FRANCIS B. STEVENS, of the city, county, and State of New York, have invented a new and useful Improvement on the Steam-Engine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

It has heretofore been proposed to withdraw the steam discharged from the cylinder of a steam-engine by the first eduction by means of a valve so moved by the mechanism of the engine as to open and close a port made midway in the length of the cylinder at the intervals of time desired. I refer to an engine described at page 169 of the Practical Mechanic's Journal, published in London, A. D. 1850 and 1851, and to a valve described in the specification of a patent granted to Francis B. Stevens on the 1st day of July, A. D. 1862, and numbered 35,788, as examples of this method of discharging steam by the first eduction. In the first example referred to, the discharge by the first induction commences on the induction side of the piston and terminates on the eduction side. In the second example the discharge by the first eduction takes place wholly on the induction or steam side of the piston, the induction-valves being supposed to be closed or nearly closed before the eduction-valves begin to open.

My improvement consists in simplifying the machinery for discharging the steam by the first eduction from a port made midway in the length of the cylinder, and from the steam or induction side of the piston by dispensing with the valve moved by the mechanism of the engine to open and close this port. I do this by so arranging the relative proportions of the length of the stroke of the piston, and of the depth of the piston and its packing, and of the width of the port made midway in the length of the cylinder, that this port shall not be uncovered by the piston until that part of the stroke is attained at which it is desired to withdraw the steam through the port, thus making the piston act as the valve to open this port. By the term "width of the port," I mean the measurement of the port in the direction parallel to the axis of the cylinder.

Figure 1 is a vertical sectional drawing made on a scale of three sixteenths of an inch to an inch of an application of my improvement to a non-condensing engine to heat water by steam withdrawn by the first eduction.

A is the cylinder of the engine, the piston of which is supposed to be moving in a direction from left to right, or from the stuffing-box end of the cylinder, and represented as having performed about six-tenths of its stroke, and as having just uncovered the port B, made midway in the length of the cylinder, and thus allowing the steam from the induction side of the piston to pass through the pipe C and to enter the vessel D below the surface of the water, and to heat this water. The stroke of the piston is supposed to be twenty-two inches, and the depth of the rubbing-surface of the piston and its packing is represented to be four and a half inches, and the width of the port B is represented to be one-half of an inch. If the relative proportions of the length of the stroke and of the depth of the piston and its packing, and of the width of the port are varied, then the time at which the first eduction commences will also vary. If the relative proportion of the stroke is greater than above given, then the first eduction will commence sooner. If the relative proportion of the depth of the rubbing-surface of the piston and its packing is made greater than above given, then the first eduction will commence later. If the relative proportion of the width of the port is made greater than above given, then the first eduction will commence sooner. As the port B is placed midway in the length of the cylinder, the operation on the return-stroke of the piston will be the same. If the steam is discharged into a vessel in which the pressure is at any time greater than that in the cylinder, I then interpose a check-valve between the port and this vessel.

Fig. 2 is a vertical sectional drawing of my improvement, in which a check-valve, F, is interposed between the opening B and the vessel E. This vessel is supposed to be closed against the atmosphere, and the water delivered by the pipe C is heated by the steam while falling to the level of the pipe H, by which it is drawn off. In this application the steam discharged by the first eduction from

the cylinder of a non-condensing engine can heat water above 212° Fahrenheit, or the steam discharged by the first eduction from the cyl inder of a condensing-engine can be condensed.

In both Figs. 1 and 2 a cock or valve can be placed in the pipe C to arrest the operation of the first eduction without interfering with the operation of the second eduction.

What I claim as my invention is—

Taking the steam from the cylinder by the first eduction on the induction side of the piston without the intervention of a valve moved by the mechanism of the engine, as herein set forth and described.

New York, May 8, 1863.

FRANCIS B. STEVENS.

Witnesses:

JAMES A. STEVENS,

ALBERT S. EASUM.