

(No Model.)

E. C. KNAPP.
STEAM ENGINE VALVE.

No. 560,803.

Patented May 26, 1896.

FIG. 1

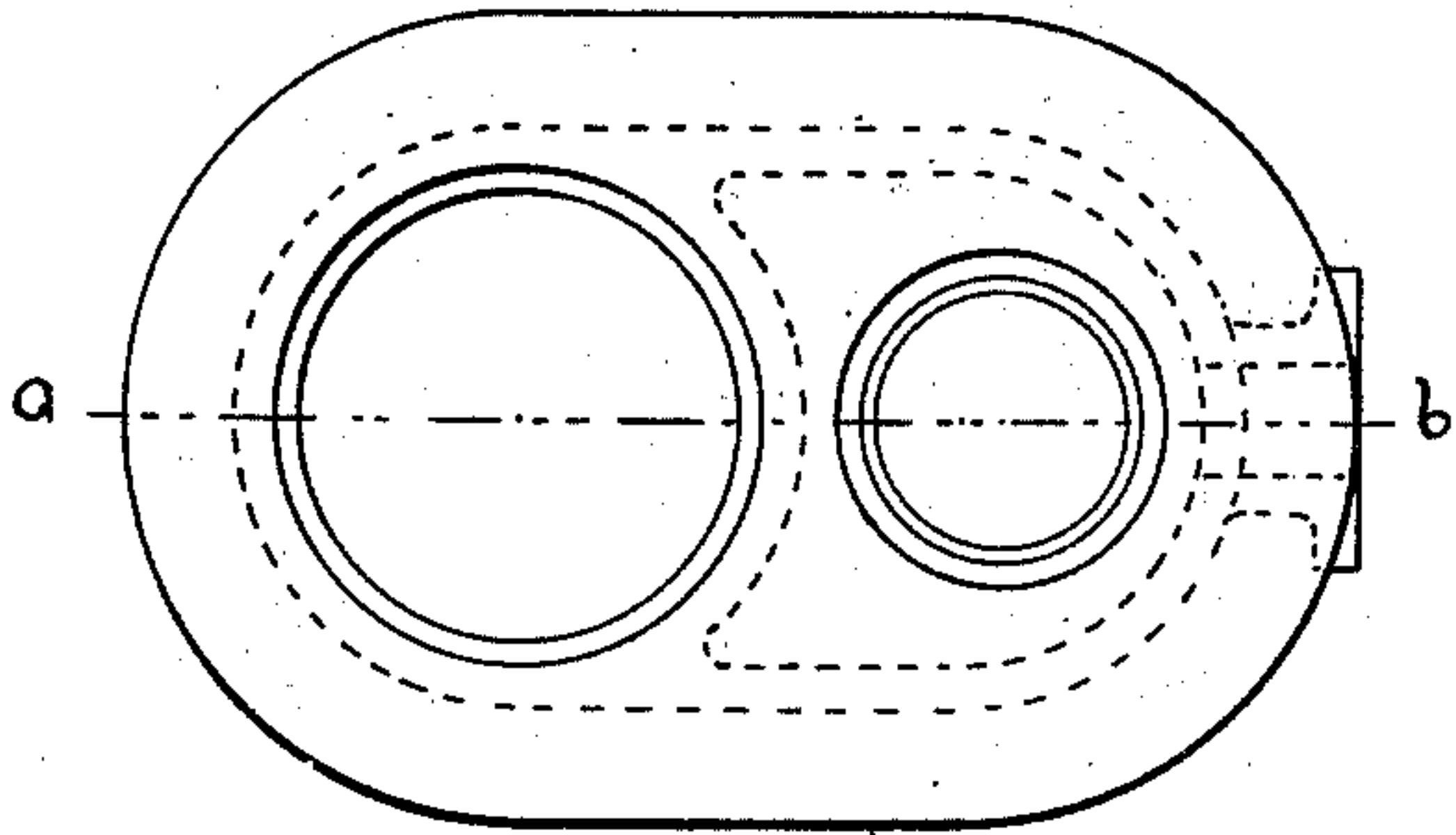


FIG. 3

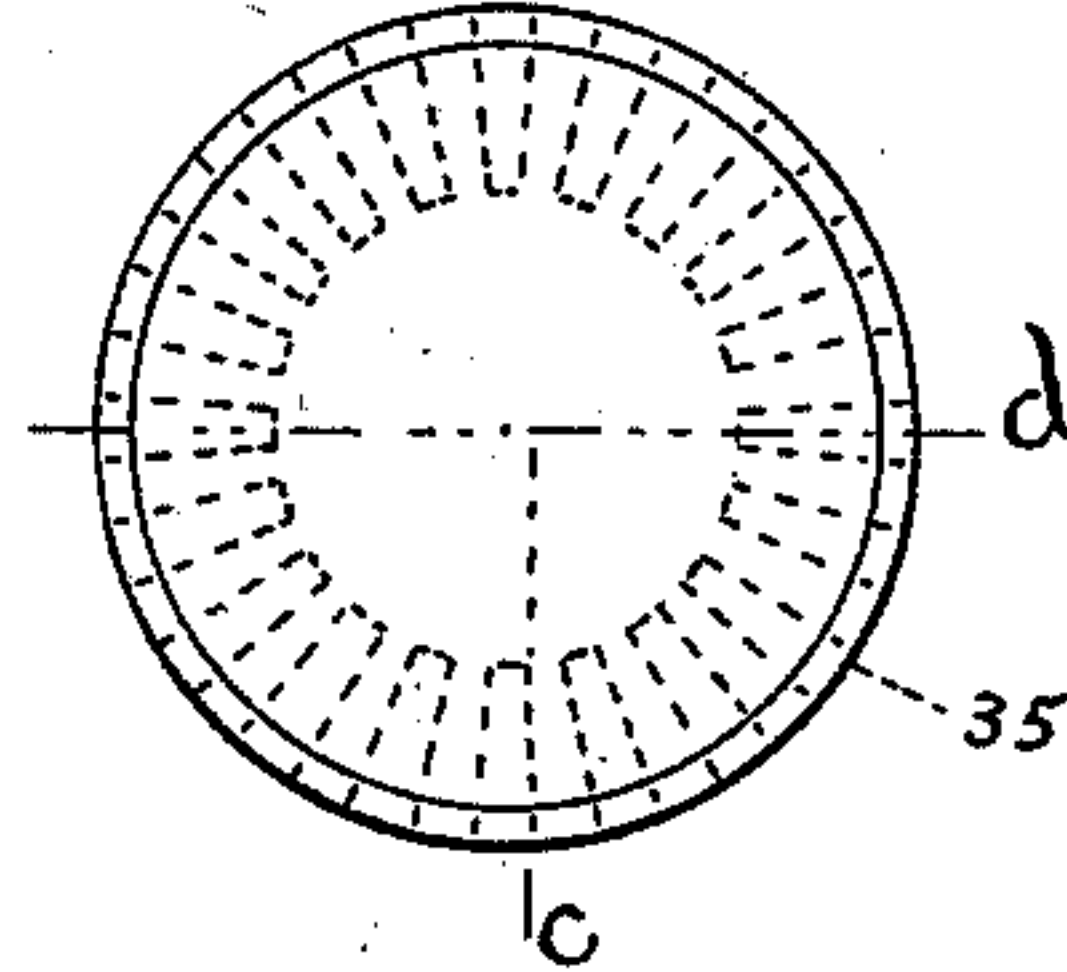


FIG. 2

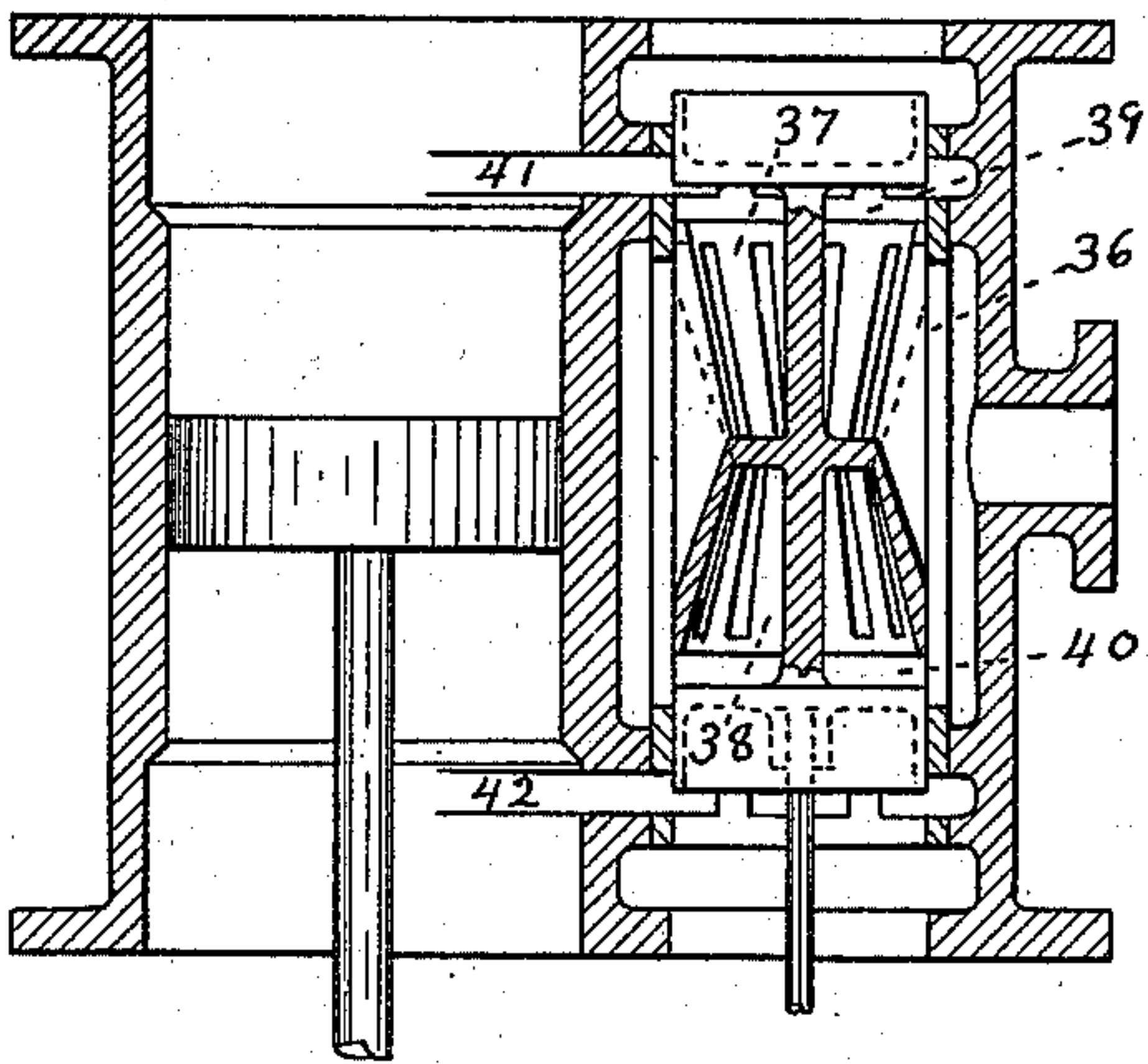


FIG. 4

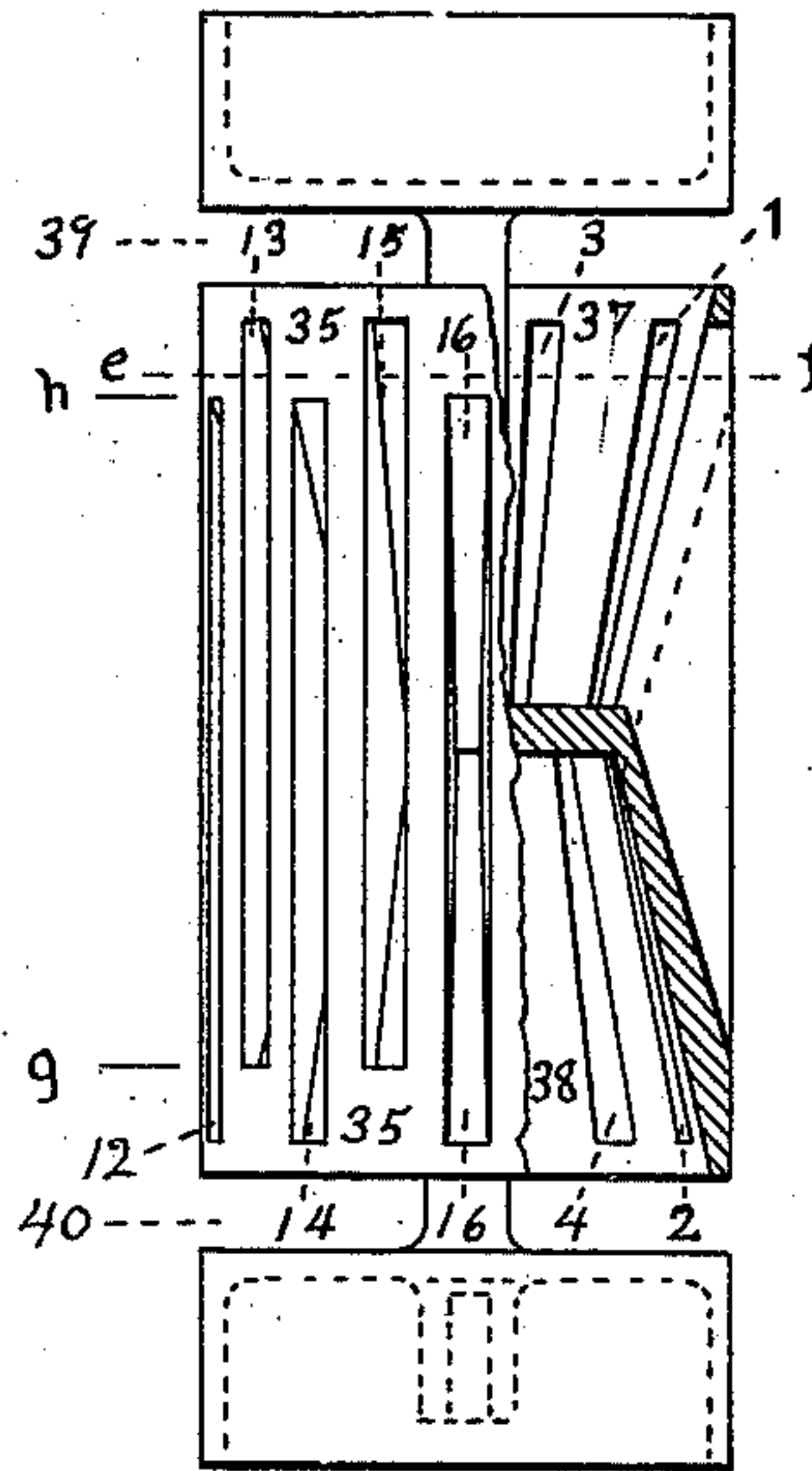
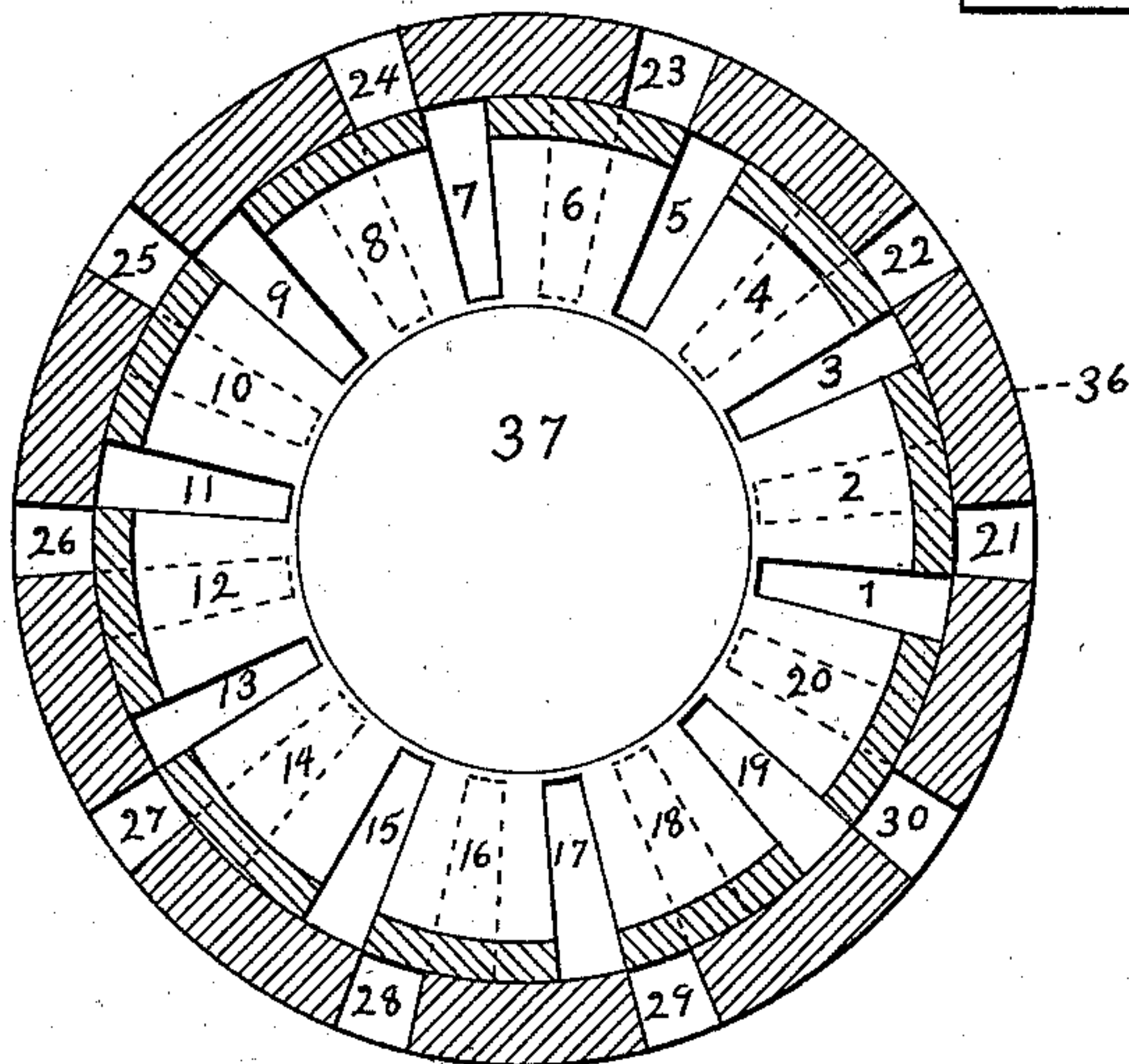


FIG. 5



WITNESSES:

H. C. Nelson.
Chas. A. Pierce

INVENTOR,

Edwin C. Knapp

UNITED STATES PATENT OFFICE.

EDWIN C. KNAPP, OF BOUND BROOK, NEW JERSEY.

STEAM-ENGINE VALVE.

SPECIFICATION forming part of Letters Patent No. 560,803, dated May 26, 1896.

Application filed July 2, 1895. Serial No. 554,774. (No model.)

To all whom it may concern:

Be it known that I, EDWIN C. KNAPP, a citizen of the United States, residing at Bound Brook, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Steam-Engine Valves, of which the following is a specification.

My invention is an improvement in that style of cylindrical valve which has both a reciprocating motion in the direction of its axis and also an oscillating motion about that axis. Its object is to increase the area of the ports or steam-passages, allowing a freer flow of steam to the cylinder, and also by increasing the cutting edge thus obtain a sharper cut-off. I obtain these results by means of a novel arrangement of ports, which, with their method of working, are shown in the accompanying drawings, in which—

Figure 1 is a plan of a cylinder and valve-chest containing the valve. Fig. 2 is a vertical section through the cylinder, valve-chest, and valve upon the line *a b*, Fig. 1. Fig. 3 is a plan of the valve alone. Fig. 4 is a part elevation and a part section on the line *c d*, Fig. 3. Fig. 5 is a section of the valve and seat on the line *e f*, Fig. 4.

Similar figures refer to similar parts throughout the views.

Fig. 4 shows the valve, which has a cylindrical face 35, in which are longitudinal ports 1 2 3, whose sides may be radial or parallel and may be cut at intervals wholly or partly around the circumference, as desired. In the ends of the valve are chambers 37 and 38, to which the alternate longitudinal ports in the valve-face lead, ports 1 3 5 7 (odd numbers) leading to chamber 37 and ports 2 4 6 8 (even numbers) leading to chamber 38. Chambers 37 and 38 are connected with the head and crank ends of the cylinder, respectively, through the valve-ports 39 and 40 and the

cylinder-ports 41 and 42 by the reciprocating longitudinal motion of the valve, while cut-off is effected by the longitudinal ports in the valve and valve-seat, as follows: Fig. 5 shows a section of the valve and seat in which the valve is at mid-travel as regards its oscillating motion about its axis, and the ports leading to chamber 37 appear in full lines, while those leading to chamber 38 are dotted. Surrounding the valve is the seat 36, in which are the ports 21 22 23 30, opening to the steam-chest, which surrounds the seat. Upon each side of a longitudinal port in the seat, as 21, is one of a pair of ports in the valve, as 1 and 2, leading to the opposite chambers 37 and 38. Each of this pair of ports, as 1 and 2, are opened alternately into the port in the seat, as 21, by the oscillating motion, thus alternately admitting and cutting off steam from the chambers 37 and 38. It will be seen that any two alternate ports in the valve, as 12 and 13, overlap each other in a longitudinal direction by same distance *g h*, thus giving a longer port, and consequently more area and a sharper cut-off. This overlapping of ports is the feature which I claim as my invention.

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

A valve having a cylindrical face, 35, cup-shaped chambers, 37 and 38, opening into ports 39 and 40 at opposite ends, and longitudinal ports, 1, 2, 3, 4, alternate ports overlapping one another near the middle of the length of the valve-face, 35, and opening into the opposite chambers, 37 and 38, substantially as and for the purpose described.

EDWIN C. KNAPP.

Witnesses:

CHAS. A. PIERCE,
BENJ. F. CODNER.