

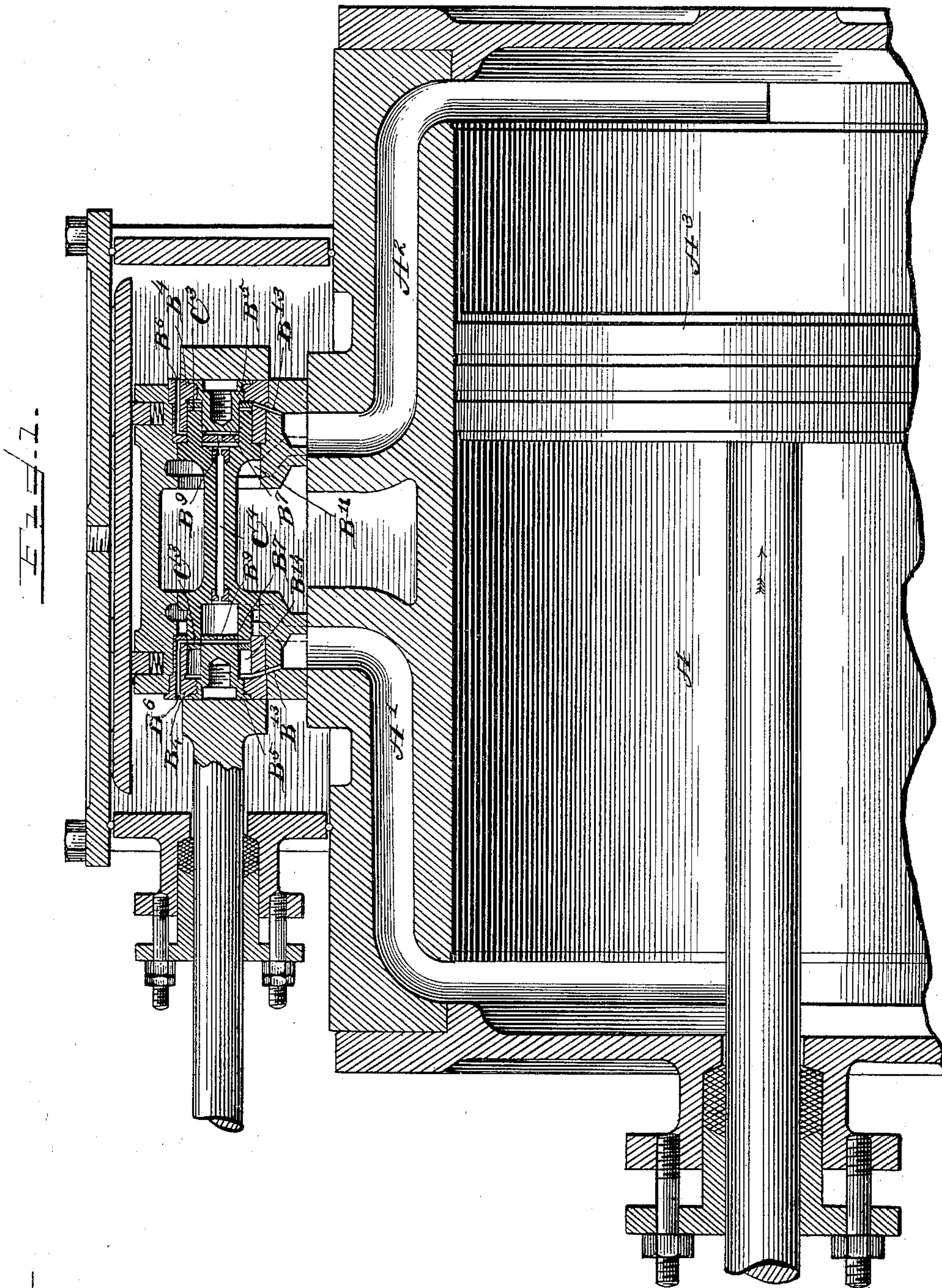
No. 701,420.

Patented June 3, 1902.

A. TANDLER.
STEAM ENGINE VALVE.
(Application filed Sept. 26, 1901.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES

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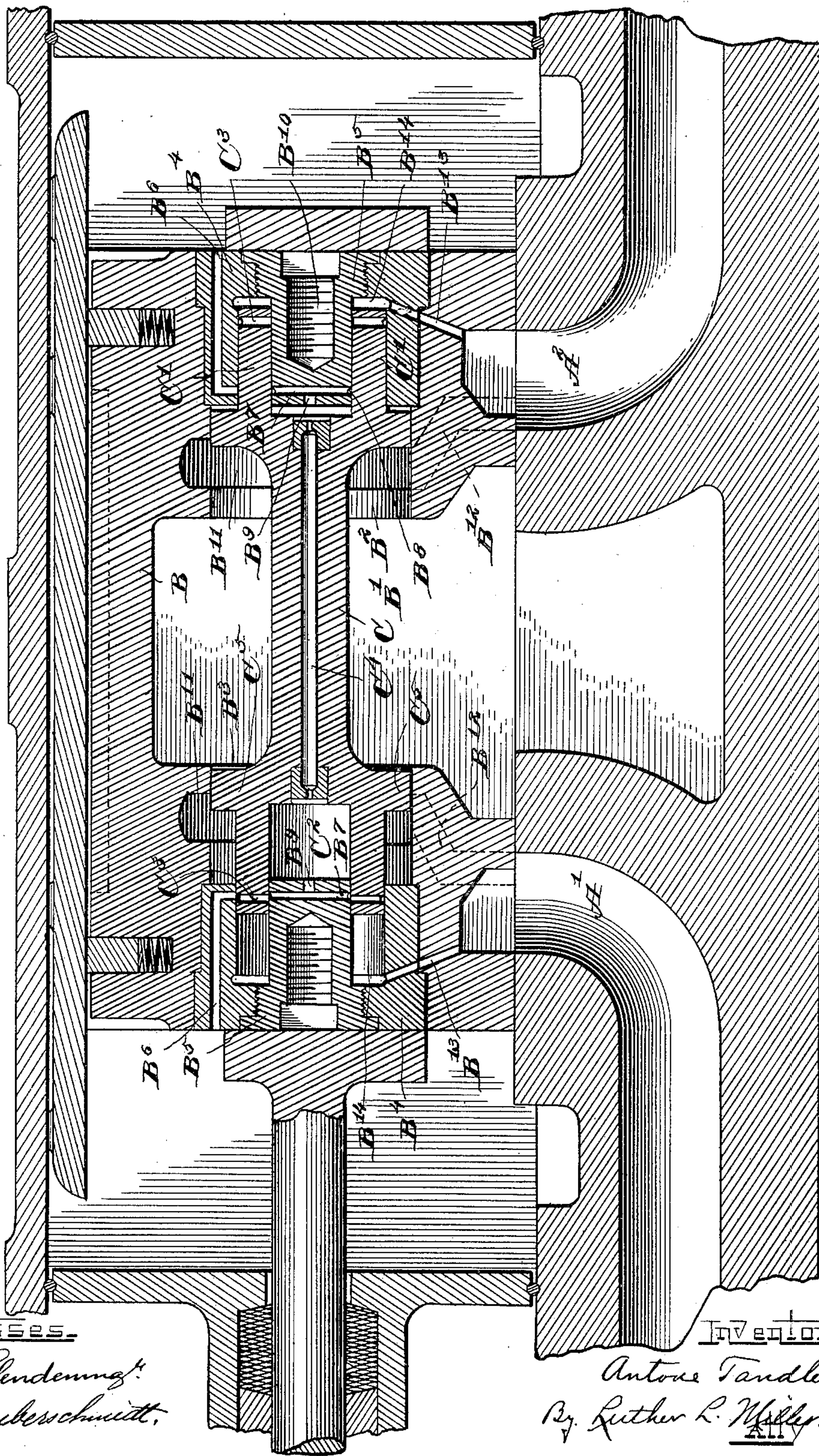
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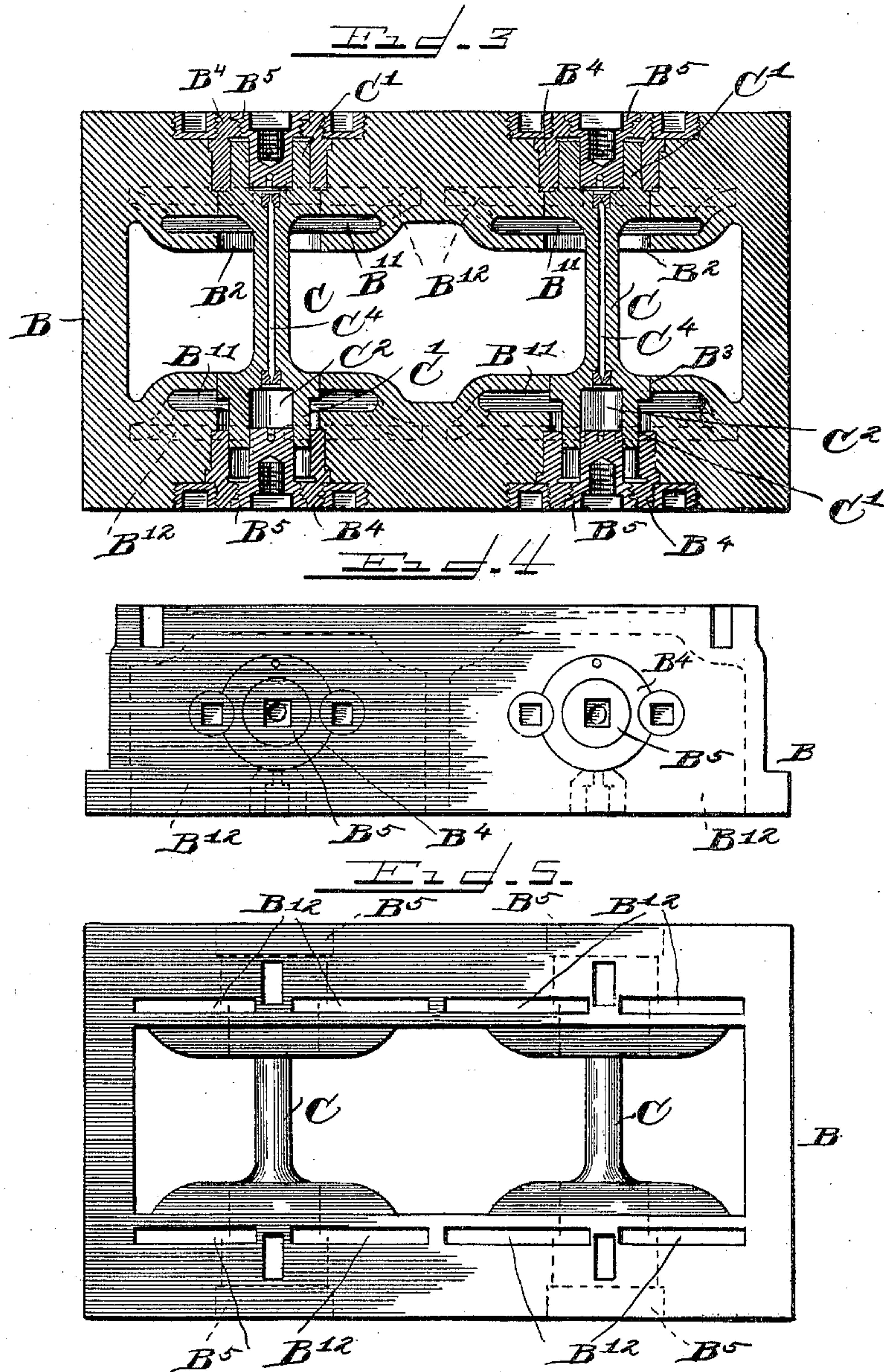
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WITNESSES.

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UNITED STATES PATENT OFFICE.

ANTONE TANDLER, OF CHICAGO, ILLINOIS.

STEAM-ENGINE VALVE.

SPECIFICATION forming part of Letters Patent No. 701,420, dated June 3, 1902.

Application filed September 26, 1901. Serial No. 76,674. (No model.)

To all whom it may concern:

Be it known that I, ANTONE TANDLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Engine Valves, of which the following is a specification.

One of the objects of this invention is the production of an improved slide-valve, for steam-engines.

A further object is to provide a closed chamber in a steam-valve to cushion endwise movement of the piston exhaust-valve therein.

A further object is to provide means adapted to open said chamber periodically to admit live steam thereto, and thereby to maintain the pressure within the chamber substantially at boiler-pressure.

A further object is to connect two of said chambers (one at each end of the piston exhaust-valve) so as to permit the passage of steam from one chamber to the other.

A further object is to supply a simple means for securely retaining the piston exhaust-valves within the slide-valve and for readily removing them therefrom for cleaning or repair.

In the accompanying drawings, Figure 1 is a longitudinal vertical central section through a slide-valve embodying the features of my invention, showing also a steam-cylinder in central section and the piston-head therein, though it will be understood that the sectional plane of the steam-valve is not the same as that of the cylinder. The parts are represented to be in their initial or starting position—that position which they assume before the steam-cushions at one end of the piston exhaust-valves have been formed. Fig. 2 is an enlarged view somewhat similar to the preceding one, but representing the parts in an operative position. Fig. 3 is a longitudinal horizontal central section through the slide-valve proper, showing two piston exhaust-valves in place therein. Fig. 4 is an end view of the slide-valve proper, showing the means for securing the piston exhaust-valves in said slide-valve. Fig. 5 is a bottom plan view of the slide-valve proper.

Like letters of reference indicate corresponding parts throughout the several views.

In the steam-valve illustrated in the draw-

ings, A designates the steam-cylinder, A' and A² the steam-ports, and A³ the piston-head.

B is the slide-valve proper, having a central exhaust-port B' and two each of the longitudinal alined openings B² and B³, communicating with said exhaust-port and forming two longitudinal bores for said slide-valve. The outer ends of the alined openings B² and B³ are closed by the inserted bushings B⁴, frictionally held within their seats in the openings B² and B³ and internally screw-threaded to receive the guide-plugs B⁵. The annular walls of the bushings B⁴ are provided with inlet-openings B⁶ for live steam, and the plugs B⁵ each have a coinciding opening B⁷ extending transversely therethrough, also a circumferential groove B⁸ and an axial opening B⁹, communicating between the transverse opening B⁷ and the inner end of each of the plugs B⁵. The plugs B⁵ are also provided with central screw-threaded depressions B¹⁰ for receiving a screw-threaded rod (not shown) to permit the withdrawal of said bushings. Near their inner ends the alined openings B² and B³ are counterbored at B¹¹, and these counterbored recesses communicate with the steam-ports A' and A², respectively, by means of the exhaust-ports B¹². Ducts B¹³ also place the annular chamber B¹⁴ about each of the guide-plugs B⁵ in communication with said steam-ports A' and A², respectively.

The piston exhaust-valves C of spool form are provided at their ends with the projecting annular walls C', forming a chamber C² in each end of said valves. These chambers C² are adapted to receive the guide-plugs B⁵, the thickness of their surrounding walls C' being just sufficient to fill the space between the bushings B⁴ and the guide-plugs B⁵. The annular walls C', surrounding the chambers C², are perforated at diametrically opposite sides by the ducts C³, (connected by a circular groove on the periphery of the walls C',) and when the piston exhaust-valve is at the end of its stroke the ports C³ coincide with the ports B⁶ of the bushings B⁴, and the axial opening B⁹ in each of the plugs B⁵ permits the live steam to enter the chambers C², two of which latter at one side of the slide-valve are thereby supplied with live steam at every movement of the slide-valve. An axial duct C⁴ extends longitudinally through each of

said exhaust-valves and forms a communication between the chambers C^2 at the opposite ends of said valves. The peripheral flanges C^5 at either end of the piston exhaust-valves C fit closely within the alined openings B^2 and B^3 , opening and closing the exhaust-ports B^{12} in communication with the steam-ports A' and A^2 , respectively, by the movement of said piston-valves.

10 In operation the quick reciprocation of the slide-valve B throws the piston exhaust-valves C , by reason of the inertia of the latter, forward and backward within the alined openings B^2 and B^3 . The valves C are guided
15 upon the plugs B^5 , and their movement is cushioned by the steam-chambers C^2 at their opposite ends. When both of the valves C are in the position shown in Fig. 2 of the drawings, the exhaust-ports B^{12} are in com-
20 munication with the steam-port A^2 , and the exhaust-steam is free to escape from this end of the cylinder. In said Fig. 2 the slide-valve is represented as moving from right to left, the exhaust-port B^{12} being in communication
25 with the steam-ports A^2 and the steam-chambers C^2 at the left-hand ends of the two piston exhaust-valves in communication with live steam in the slide-valve casing through the openings B^6 , B^7 , and B^9 . As soon as the
30 movement of the slide-valve is reversed the steam within the chambers C^2 at the left-hand end of said valves C is compressed and forced out through the axial ducts C^4 into the corresponding chambers C^2 at the right-hand end
35 of said exhaust-valves. The communication between the chambers C^2 and the live-steam openings B^6 is interrupted. The exhaust-valves C instantly are thrown to the extreme left, Fig. 2, opening the exhaust-ports B^{12} ,
40 which will be placed into coincidence with the steam-ports A' by the continued movement of the slide-valve B . During the movement of the slide-valve from left to right the valves C are caused to move (relatively) from right to
45 left, and at the extremity of the stroke of the slide-valve the exhaust-valves occupy such a position that the live-steam openings B^6 are in coincidence with the steam-ducts B^7 , whereby the chambers C^2 are for an instant under direct boiler-pressure. The ducts B^{13} maintain
50 the annular chambers B^{14} under the pressure of that end of the steam-cylinder with which they are connected.

The slide-valve B operates to open and close the steam-ports A' and A^2 in the usual manner.

While I have herein shown and described two piston exhaust-valves, it is clear that any number may be used, depending upon the size of the cylinder.

60 I claim as my invention—

1. In a valve for steam-engines, in combination, a slide-valve proper, having a steam-port and an exhaust-port; a piston exhaust-valve loosely mounted in said slide-valve and
65 adapted to open and close the exhaust, said piston-valve being provided with a chamber at one of its ends; a duct in said valve for

conveying live steam to said chamber; and a duct in said piston exhaust-valve adapted to be brought into coincidence with said first-mentioned duct by the movement of said piston-valve. 70

2. In a valve for steam-engines, in combination, a slide-valve proper, having steam-ports, an exhaust-port, and a longitudinal opening; a piston exhaust-valve free to move longitudinally in said opening and adapted to open and close the exhaust by its said movement, said piston-valve being provided with a chamber at one of its ends; a closure for one end of said longitudinal opening; a duct in said closure for conveying live steam to said chamber; and a duct in said piston exhaust-valve adapted to be brought into coincidence with the duct in said closure by the movement of said piston-valve. 80 85

3. In a valve for steam-engines, in combination, a slide-valve proper, having a steam-port and an exhaust-port; a piston exhaust-valve loosely mounted in said slide-valve and adapted to open and close the exhaust, said piston-valve being provided with a chamber at one of its ends; means of communication between said chamber and the boiler-pressure within the valve; means for opening and closing said communication; and a means of escape for the steam within said chamber. 90 95

4. In a valve for steam-engines, in combination, a slide-valve proper, having a steam-port and an exhaust-port; a piston exhaust-valve loosely mounted in said slide-valve and adapted to open and close the exhaust, said piston-valve being provided with a chamber at one of its ends; a duct in said valve for conveying live steam to said chamber; a duct in said piston exhaust-valve adapted to be brought into coincidence with said first-mentioned duct by the movement of said piston-valve; and a second duct in said piston-valve for the escape of the steam within said chamber. 100 105 110

5. In a valve for steam-engines, in combination, a slide-valve proper, having steam-ports, an exhaust-port, and a longitudinal opening; a piston exhaust-valve free to move longitudinally in said opening and adapted to open and close the exhaust by its said movement, said piston-valve being provided with a chamber at one of its ends; a closure for one end of said longitudinal opening; a duct in said closure for conveying live steam to said chamber; a duct in said piston exhaust-valve adapted to be brought into coincidence with the duct in said closure by the movement of said piston-valve; and a second duct in said piston-valve for the escape of the steam within said chamber. 115 120 125

6. In a valve for steam-engines, in combination, a slide-valve proper, having a steam-port and an exhaust-port; a piston exhaust-valve loosely mounted in said slide-valve and adapted to open and close the exhaust, said piston-valve being provided with a chamber at each of its ends; means of communication 130

between each of said chambers and the boiler-pressure within the valve; means for opening and closing said communication; and a means of communication between said chambers.

5 7. In a valve for steam-engines, in combination, a slide-valve proper, having a steam-port and an exhaust-port; a piston exhaust-valve loosely mounted in said slide-valve and adapted to open and close the exhaust, said
10 piston-valve being provided with a chamber at each of its ends; a duct in said valve for each of the chambers, for conveying live steam to said chambers; a duct in each end of said piston-valve adapted to be brought into coincidence with one of said first-mentioned
15 ducts by the movement of said piston-valve; and a means of communication between said chambers.

8. In a valve for steam-engines, in combination, a slide-valve proper, having steam-
20 ports, an exhaust-port, and a longitudinal opening; a piston exhaust-valve free to move longitudinally in said opening and adapted to open and close the exhaust by its said movement, said piston-valve being provided with
25 a chamber at each of its ends; a closure for each end of said longitudinal opening; a duct in each end of said piston-valve adapted to be brought into coincidence with the duct in
30 one of said closures by the movement of said piston-valve; and a means of communication between said chambers.

9. In a valve for steam-engines, in combination, a slide-valve proper having steam-
35 ports, an exhaust-port and a longitudinal opening; a piston exhaust-valve free to move longitudinally in said opening and adapted to open and close the exhaust by its said movement; a closure for each end of said longitudinal
40 opening, said piston exhaust-valve being provided at its opposite ends with steam-chambers adapted to cushion the endwise movement of said exhaust-valve, and a connecting-duct between said chambers; and a
45 projection extending from each of said closures for entering one of the said steam-chambers in the piston exhaust-valve.

10. In a valve for steam-engines, in combination, a slide-valve proper having steam-
50 ports, an exhaust-port and a longitudinal opening; a piston exhaust-valve free to move longitudinally in said opening and adapted to open and close the exhaust by its said movement, said piston exhaust-valve being
55 provided in its opposite ends with steam-chambers; means of communication between said steam-chambers and the boiler-pressure within said valve; closures for the ends of said longitudinal opening, each of said clo-
60 sures being provided with a guide-plug adapted to enter the adjacent steam-cham-

ber in the piston exhaust-valve and a duct in said piston-valve communicating between said chambers.

11. In a valve for steam-engines, in combination, a slide-valve proper having two
65 steam-ports, an exhaust-port and a longitudinal opening; a piston exhaust-valve of spool form, free to move in said longitudinal opening and adapted to open and close the
70 exhaust by its said movement, said piston exhaust-valve being provided at its opposite ends with projecting annular walls to form chambers to cushion the endwise movement of said exhaust-valve; a closure adapted to
75 enter said chambers; and a duct in said piston-valve communicating between said chambers.

12. In a valve for steam-engines, in combination, a slide-valve proper having two steam-
80 ports, an exhaust-port and a longitudinal opening, said longitudinal opening being counterbored on opposite sides of the exhaust-port and provided with means of communication with each of said steam-ports; a
85 piston exhaust-valve free to move longitudinally in said opening and adapted to open and close the exhaust by its said movement, said piston exhaust-valve having at its opposite ends annular walls to form steam-cham-
90 bers in each end of said piston-valve; means of communication between each of said chambers and the boiler-pressure in the steam-chest; closures for the opposite ends of said longitudinal opening, said closures being pro-
95 vided with guide-plugs adapted to enter said steam-chambers in the piston exhaust-valve and a duct in said piston-valve communicating between said chambers.

13. In a valve for steam-engines, in combination, a slide-valve proper having steam-
100 ports, an exhaust-port, and two longitudinal openings communicating with the exhaust-port; closures for the opposite ends of said openings; a piston exhaust-valve free to
105 move longitudinally in each of said openings and adapted to open and close the exhaust by its said movement, each of said piston exhaust-valves being provided at its opposite ends with steam-chambers adapted to cushion the endwise movement of said exhaust-
110 valves; a guide-plug extending from each of said closures adapted to enter the chamber in one of said piston exhaust-valves; and a connecting-duct in each piston-valve for connecting the chambers in the opposite ends
115 thereof.

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Witnesses:

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