

(No Model.)

G. H. CORLISS, Dec'd.

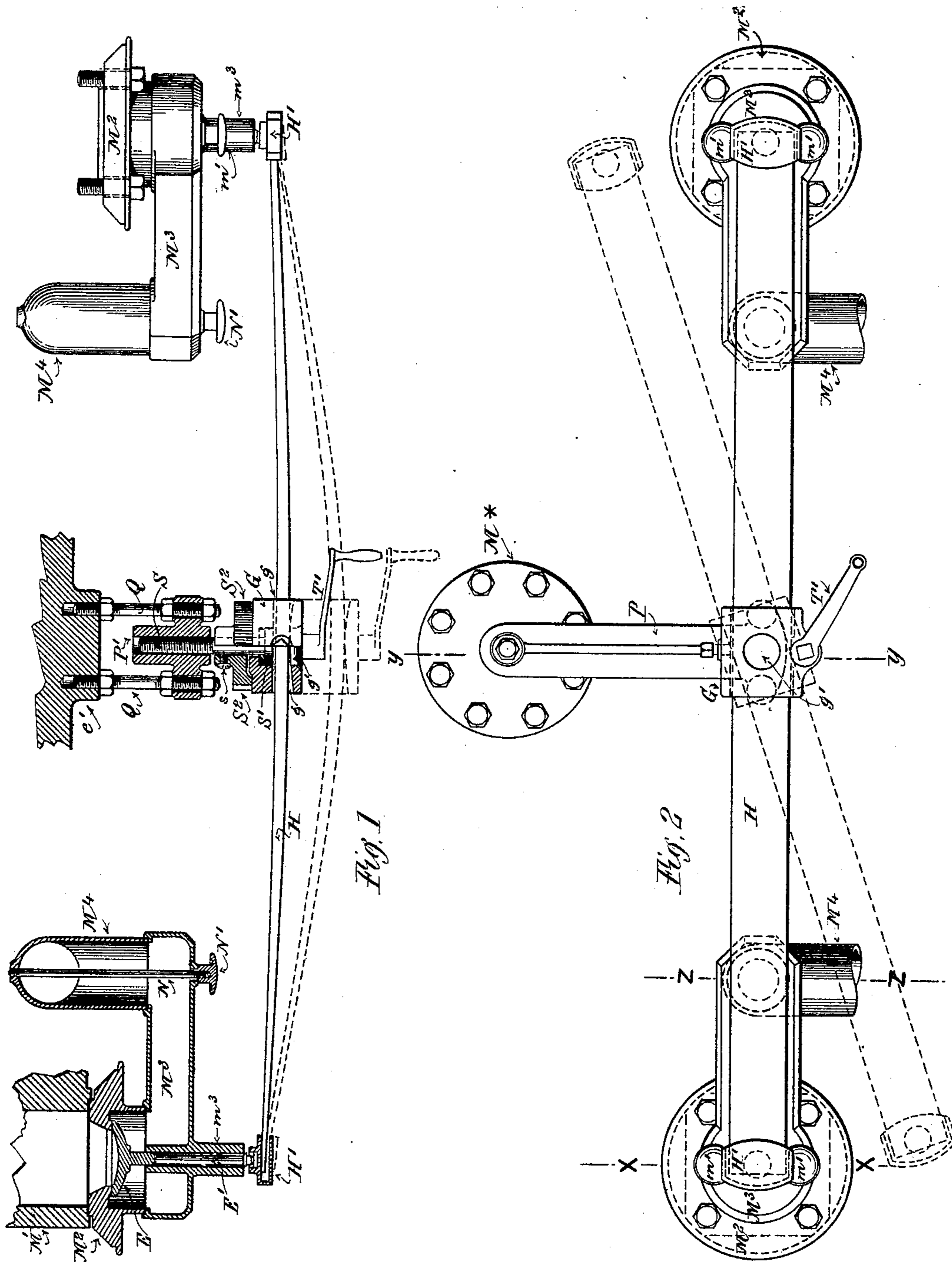
2 Sheets—Sheet 1.

E. A. CORLISS, Administratrix.

CYLINDER RELIEF VALVE.

No. 388;264.

Patented Aug. 21, 1888.



Witnesses.
James Tribe.
Henry Marsh Jr.

Inventor.
George H. Corliss.

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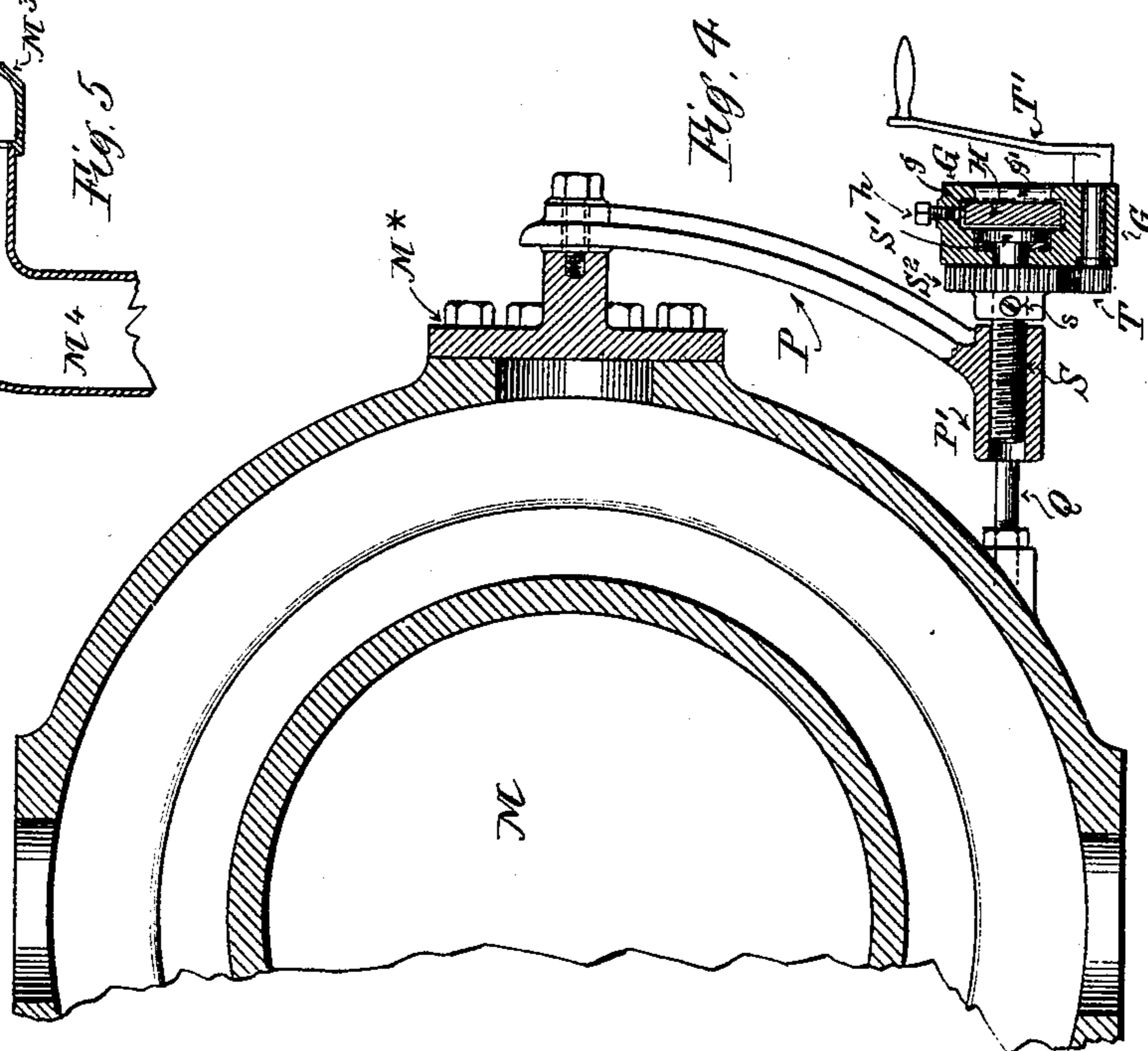
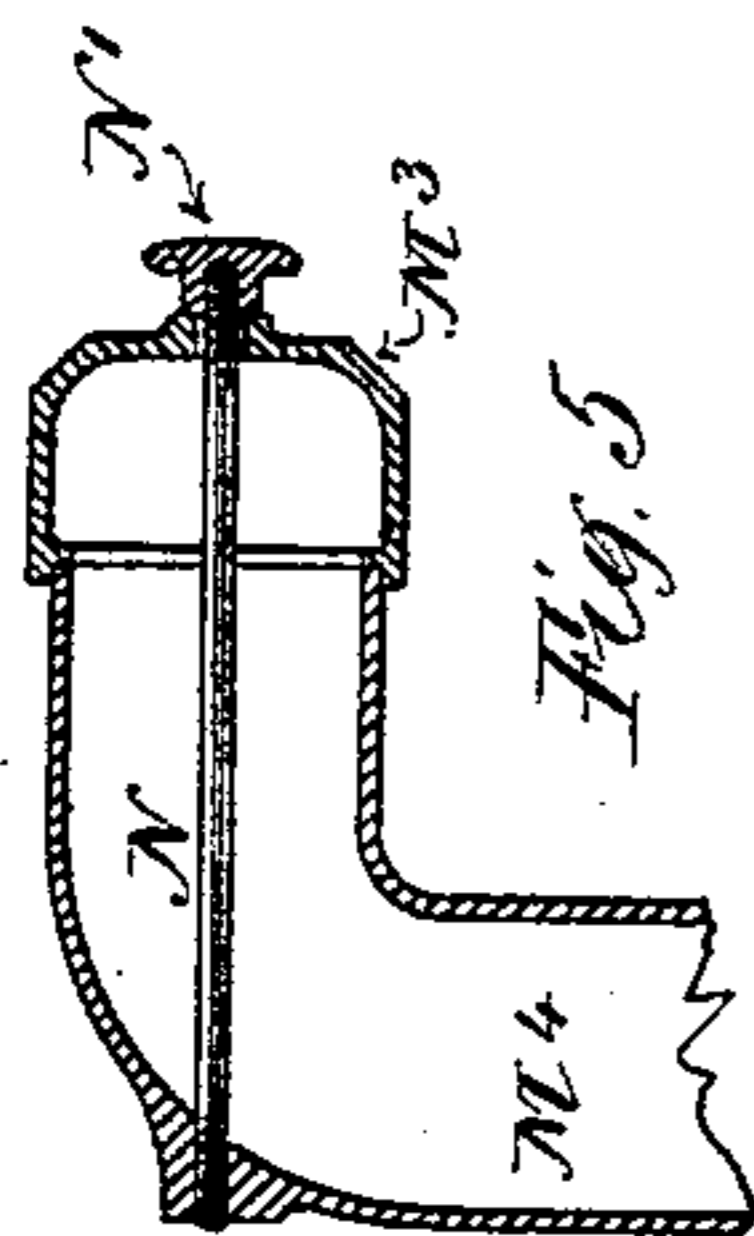
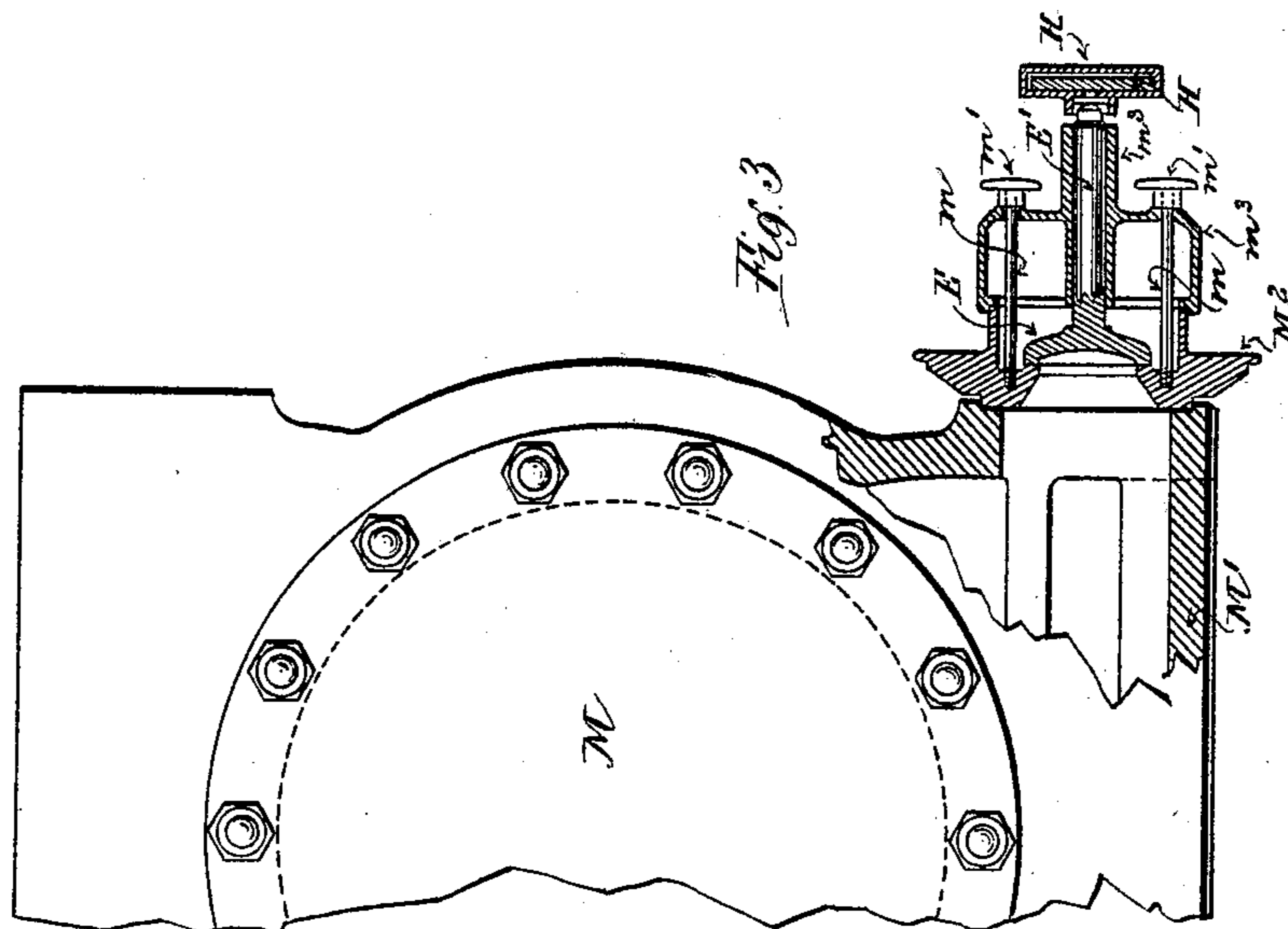
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UNITED STATES PATENT OFFICE.

GEORGE H. CORLISS, OF PROVIDENCE, RHODE ISLAND; EMILY A. CORLISS
ADMINISTRATRIX OF SAID GEORGE H. CORLISS, DECEASED.

CYLINDER RELIEF-VALVE.

SPECIFICATION forming part of Letters Patent No. 388,264, dated August 21, 1888.

Application filed February 4, 1888. Serial No. 262,979. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. CORLISS, a citizen of the United States, and a resident of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Improvement in Cylinder Relief-Valves, of which the following is a specification.

My invention resides in the construction and arrangement of the relief-valves, the discharge-pipes, and an elliptical spring centrally supported, so as to act as an equalizer of the pressure exerted upon said valves, and in the mechanism for applying and adjusting the pressure upon the valves.

The purpose of my invention is to afford a convenient and reliable means for the automatic relief of the cylinders from undue pressure from water which may accumulate therein as the result of condensation or from other sources, with special provision for regulating and equalizing the pressure controlling the movement of the relief-valves. I fit, by a steam-tight joint, to the outside of each exhaust-valve box of a steam-cylinder a bonnet, within which I seat a valve opening outward. Upon each bonnet I secure by bolts, to form a steam-tight joint, a discharge-pipe, which in that portion adjacent to the exhaust-valve box is provided with a sleeve through which operates the relief-valve stem, and at the end farthest removed from the exhaust-valve box is provided with a steam-tight swivel-jointed branch pipe or elbow. At one side of the cylinder I suspend from a bracket-support bolted to the cylinder a clasp carrying a gear and pinion and an elliptical or extended spring, which controls the movement of the relief-valves. This spring I make the required length to reach from one exhaust-valve box to the other on the same side of the cylinder and thickest in its middle section with a gradual taper therefrom to each end. At each extremity the spring engages a shoe, which in turn presses against the end of the valve-stem to hold the valve upon its seat.

In the accompanying drawings, Figure 1 is a top plan of my invention, part being shown in section. Fig. 2 is an elevation of same. Fig. 3 is an end view of the steam-cylinder and a section through line *x x* of Fig. 2. Fig.

4 is a transverse section (on line *y y* of Fig. 2) showing the spring-support and pressure-adjusting mechanism. Fig. 5 is a vertical section (on the line *z z* of Fig. 2) showing detail of swivel-joint.

Similar letters of reference indicate like parts throughout the drawings.

M represents the steam-cylinder; M' M', the exhaust-valve boxes, and M² M² the bonnets securely bolted upon the outside of the exhaust-valve boxes to form a steam-tight joint. M³ is the discharge-pipe, which is bolted upon the bonnet by bolts *m m* passing through it, and tapped into the bonnet and hand-nuts *m'*, as shown in Fig. 3. This discharge-pipe M³ is provided with a sleeve, *m³*, which serves as a complete guide for the stem E' of the relief-valve E, which is seated in the bonnet. At that part of the discharge-pipe M³ farthest removed from the exhaust-valve box M', I attach an elbow or branch pipe, M⁴, by means of a stud-bolt, N, and hand-nuts N', and thereby form a steam-tight swivel-joint.

Upon a hub extending outwardly from the face of the cylinder side flange, M*, I bolt the upper end of a supporting-bracket, P, the lower end being supported by two horizontal rods, Q Q, screwed into the cylinder, as shown in Figs. 1 and 4. The lower end of the bracket P forms a nut, P', having ears on either side which receive and are made secure to the rods Q Q. Adjustment of the lower end of the bracket P is obtained by nuts and check-nuts working on the threaded ends of the rods Q Q. The nut P' is tapped to receive a screw, S, which carries the spring-supporting clasp G, and the operating-gear S², and pinion T. The gear is fastened upon the screw by a set-screw, *s*, and is operated to turn the screw S to move the clasp G by a crank-handle, T', and the pinion T having its bearing in the lower part of the clasp G. The clasp G is bored to receive the screw S and counterbored to form a seat for the head S' of said screw, which is placed in position by passing it through the opening *g'* made for that purpose in the front face of the clasp G. An opening, *g*, extending through said clasp from side to side at right angles to the vertical axial plane of the screw S, receives a spring, H, which I make of elliptical form

and thicker in its middle section than at either end for the purpose of properly distributing the strain throughout its entire length. This spring may be formed of one or more leaves.

5 Each end of this spring H loosely engages a shoe, H', which rests against the end of the valve-stem E', both the shoe and the valve-stem being furnished with hardened-steel bearing-surfaces. The spring H, having the
10 proper "set," is passed endwise through the opening *g* until it is centrally supported by the clasp G. A set-screw, *h*, in the edge of the clasp G holds the spring firmly in place. In this, which I term the "normal position" of
15 the spring H, it exerts no pressure upon the valve-stems. In order to bring the pressure of the spring to bear upon the valve stems, or to increase its pressure to hold the valves to their seats resistingly to the pressure within
20 the cylinder, the clasp G is carried in toward the cylinder, and the crown of the spring H thereby depressed by turning the screw S in the threaded nut P' by means of the crank-handle T' operating the pinion T and gear S².
25 A reverse movement of the crank-handle T' will withdraw the screw S, and, carrying the clasp G outward, will relieve the pressure of the spring upon the valve stems. The dotted lines in Fig. 1 show the normal position of the
30 spring and adjacent connected parts. The full or solid lines in Fig. 1 show the position of the same parts after the spring has been depressed, as described, to apply pressure to the valve-stems. The spring, combined with the clasp
35 and the operating mechanism described, is adapted and intended to apply to the valve-stems a pressure slightly in excess of the maximum legitimate-working-steam-pressure in the cylinder acting against the inner faces of the
40 valves. It is obvious, therefore, that so long as the pressure upon the valve-faces does not exceed that exerted by the springs upon the valve-stems, the valves will remain seated with a steam-tight fit; but if from excess of steam-
45 pressure or accumulation of water within the cylinder from any cause the pressure against the inner faces of the valves exceeds the spring-pressure upon the valve-stems the valves will be thrown open and allow the cylinder to be
50 relieved, after which the spring closes the valves.

It is obvious that the spring H, being centrally poised and engaging the valve-stems at each exhaust-valve box on the same side of
55 the cylinder, will equalize the pressure upon the valve stems and allow each valve to open under equal pressure.

To facilitate access to the relief valves and adjacent parts for inspection I avail myself
60 of the fact that the spring H is centrally pivoted, and swing it in its vertical plane, as indicated by the dotted lines in Fig. 2, to clear the valves and that portion of the cylinder-ports covered by it.

65 My combination of the relief-valves with

the exhaust-valve boxes avoids the necessity for providing other passages for the relief.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, with the exhaust-valve 70 bonnet M², of a relief-valve, E, and means for holding it with yielding force, said relief-valve being arranged and adapted to open outward from the exhaust-valve bonnet against the force of the controlling means. 75

2. In combination with an exhaust-valve box, a bonnet, M², valve E, and means, as a weight or spring, for holding said valve upon its seat with yielding force, said valve being adapted to open outward from said exhaust- 80 valve box against the force of said controlling means.

3. The valve E, operating means H, bonnet M², and discharge-pipe M³, combined with each other and with the exhaust-valve box M' 85 of a steam-engine, all arranged and adapted to serve as and for the purpose specified.

4. The valve E, valve stem E', bonnet M², and pipe M³, provided with a sleeve, *m*³, combined with each other and with means H for 90 applying a yielding force upon said valve-stem to hold the valve upon its seat, all substantially as herein specified.

5. In a cylinder-relief, the combination, with the two exhaust-valve bonnets and two relief- 95 valves and relief-valve stems, of a spring centrally supported and adapted to exert equal pressure upon the two valve-stems on the same side of the cylinder, all substantially as herein specified. 100

6. The elliptical spring H, clasp G, shoes H' H', valves E E, and valve-stems E' E', combined with each other and with means S for depressing said spring to apply pressure to 105 said valve-stems, all substantially as herein specified.

7. The clasp G, screw S, gear S², pinion T, and crank T', combined with each other, as shown, and with a nut, P', the whole arranged and adapted to serve as specified. 110

8. The bracket P, provided with a nut, P', and ears on either side of said nut, combined with rods Q Q, cylinder M, and cylinder side flange, M*, adapted to serve for a support for the clasp G, and spring H, as herein speci- 115 fied.

9. The bonnet M², relief-valve E, means H for holding with yielding force, and discharge-pipe M³, combined with each other and with the stud-bolts *m m* and hand-nuts *m'* to form 120 a steam-tight joint, all substantially as herein specified.

In testimony whereof I have hereunto set my hand, at Providence, Rhode Island, this 3d day of January, 1888, in the presence of two sub- 125 scribing witnesses.

GEORGE H. CORLISS.

Witnesses:

HENRY MARSH, Jr.,
JAMES TRIBE.