

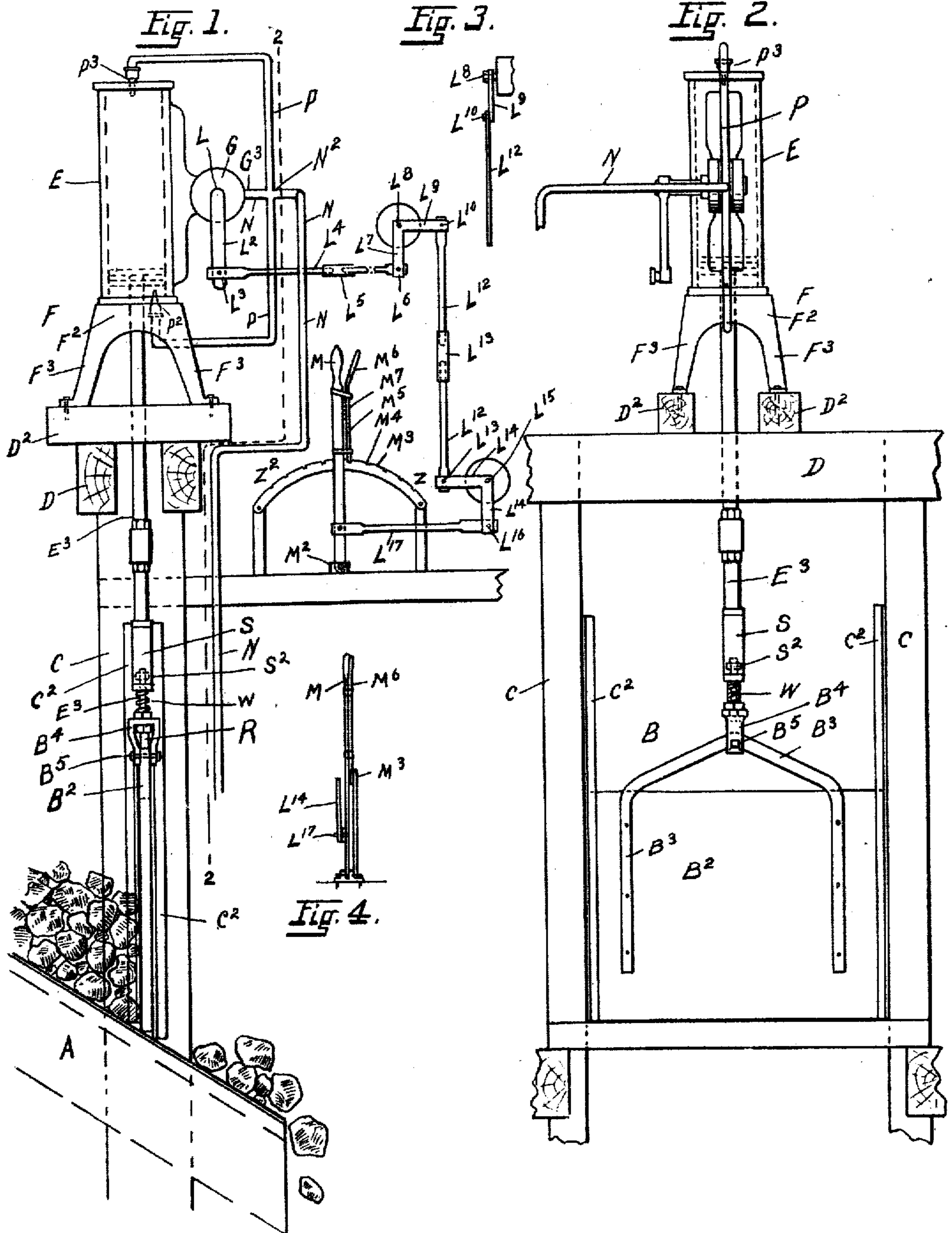
No. 814,009.

PATENTED MAR. 6, 1906.

L. E. ARMENTROUT.
MEANS FOR OPERATING THE GATES OF COAL TIPPLES.

APPLICATION FILED AUG. 4, 1902.

2 SHEETS—SHEET 1.



WITNESSES:
Charles Spiegel,
M. Smith

INVENTOR.
Luther Emanuel Armentrout
BY *Wm Hubbell Fisher*
ATTORNEY.

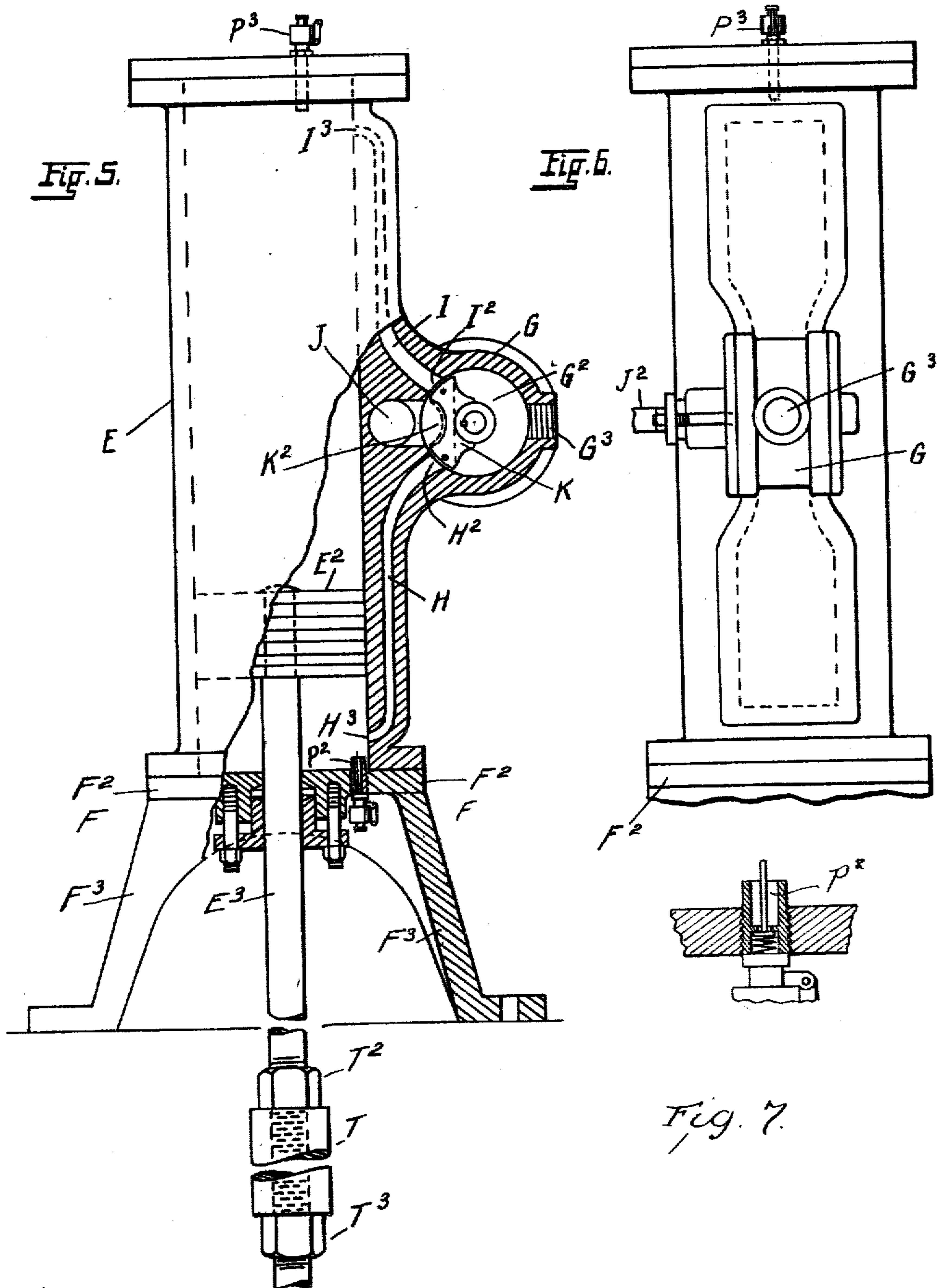
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UNITED STATES PATENT OFFICE.

LUTHER EMANUEL ARMENTROUT, OF COALDALE, WEST VIRGINIA.

MEANS FOR OPERATING THE GATES OF COAL-TIPPLES.

No. 814,009.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed August 4, 1902. Serial No. 118,402.

To all whom it may concern:

Be it known that I, LUTHER EMANUEL ARMENTROUT, a citizen of the United States, and a resident of the town of Coaldale, in the county of Mercer and State of West Virginia, have invented certain new and useful Improvements in Means for Operating the Gates on Coal-Tipples, of which the following is a specification.

The invention relates to the construction, arrangement, and combination of parts hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, making a part of this specification, and in which similar letters of reference indicate corresponding parts, Figure 1, Sheet 1, represents a side elevation of my invention in connection with the gate of a coal-tipple. In this figure that guide of the coal-gate which would be next to the beholder is omitted to better show the construction of the gate and its guides. Fig. 2, Sheet 1, is an elevation of that side of the machine which faces toward the right in Fig.

1. All parts which are to the right of the plane of the dotted line 2 2, Fig. 1, are omitted. Fig. 3, Sheet 1, is a detail, a front elevation of a crank and rod which are a part of the mechanism for operating the valve of the cylinder. Fig. 4, Sheet 1, is a detail, being a view of that edge (or end) of the lever and of its sector-bracket which faces toward the right hand in Fig. 1. Fig. 5, Sheet 2, is a view, partly in elevation, of the side of the preferred kind of cylinder and valve and piston-rod and cylinder-support. A portion of the valve-chamber and its ports and passages and of the cylinder and of the support of the latter are broken away to exhibit the interior construction of the valve-chamber, valve, ports, passages, and cylinder, the valve and piston and its rod being left in elevation. Fig. 6, Sheet 2, is a view of the exterior of that side of the piston and valve chamber which faces toward the right hand in Fig. 5. Fig. 7 is an enlarged detail view of one of the tappet-valves.

I will now proceed to describe in detail my invention and its application to the gate of a coal-tipple.

A indicates the inclined surface or bottom of a chute or similar channel or avenue down which the coal of the requisite coarseness comes on its way to the receptacle into which it is to be dumped. Ordinarily the receptacle into which the coal is to be

dumped is a coal-car. When the coal is to be dumped into a given receptacle until the latter is sufficiently full or loaded and then the flow of coal is to be stopped while that receptacle is removed and an empty receptacle is substituted in its stead in readiness to receive some of the coal held back above, a gate is necessary to shut off, to regulate, and to permit the flow of coal down the chute. B indicates this gate. The latter may be of any suitable form. In the present illustrative instance it consists of a piece or plate B², preferably of sheet-steel. Suitable guides for the gate are present, a preferred construction of which is as follows: Stationary uprights C C each carry angle-irons C² C². These irons serve as guides, the vertical adjacent edge of the gate sliding between the two angle-irons of the upright C on that side, and vice versa. The gate B slides vertically, and for elevating and depressing it a handle is present. A suitable kind of such handle is shown and consists of the metal bail B³, riveted to the sheet-steel gate B².

Located, preferably, above the gate and on a platform D D D² D², supported by the vertical posts C C, already mentioned as utilized as supports for the guides for the gate, is the cylinder E. The immediate support for this cylinder is the iron cylinder-bed F, suitably constructed and here shown as a platform F², fixed to and supported by the legs F³ F³ F³ F³. To this bed the bottom portion of the cylinder is duly connected. Within the cylinder E is a piston E² of any suitable conformation and construction. The engine is operated by compressed air or by any suitable gas. Steam is the preferred agent.

The preferred construction of valve-chamber and valve and passages is shown, to wit: G indicates the valve-chamber, having a cylindrical interior G² and an inlet-aperture G³ thereto. One steam-passage H connects port H² of the valve-chamber with port-opening H³ in one end of the cylinder E, and a similar passage I connects port I² of the valve-chamber with the port-opening I³ in the other end of the cylinder E. There is also present an exhaust-port J, opening into the valve-chamber between and outletting at the side of the valve-bed which is connected with the cylinder, as shown. Within this valve-chamber is a rotary valve K, having a recess or chamber K² and operating in the usual and well-known manner of such valves.

The valve is rotated by a shaft L, which is

duly operated through intermediate means by a suitable handle worked by the operator. The preferred intermediate means enabling the handle to rotate the valve are as follows:

5 The handle M is pivoted at M² and can be oscillated back and forth. In connection with the handle is an arc M³, having notches M⁴, adapted to receive a sliding bolt M⁵, carrying a lever M⁶, pivoted to a fixed link of the handle, and which when brought to the handle M
10 withdraws the bolt from that notch in which it (the bolt) is. A spring M⁷ automatically operates to keep the bolt M⁵ against the arc M³ and into the notch it may reach whenever the bolt is not withheld by keeping the lever M⁶ close to the handle M. This arcal mechanism for setting the handle M is well known in connection with the reverse-lever of a locomotive, &c. To the lower part of
20 the handle is pivotally connected a rod L¹⁷, whose other end is pivoted to the bent lever L¹⁴, pivotally fulcrumed at L¹⁵. The other end of the bent lever L¹⁴ is pivoted at L¹³ to the connecting-rod L¹², capable of being
25 lengthened or shortened by the sleeve L¹³. The latter is screwed to the two sections or lengths of the rod L¹² by right and left hand screw-threads in the well-known manner. The rod L¹² at L¹⁰ is pivoted to the angulated
30 lever L⁹, pivotally fulcrumed at L⁸, and pivoted at L⁶ to the connecting-rod L⁴, made in two parts, secured together by the sleeve L⁵, screwed thereon in the same manner as the sleeve L¹³, engages the two parts of rod L¹².
35 Rod L⁴ can thus be made longer or shorter. This rod L⁴ is pivoted at L³ to lever L². The other end of this lever L² is fixedly connected to the shaft L, which, it will be recollected, moves the valve K.

40 The steam circulation is as follows: N indicates the steam-pipe conveying steam from the boiler and entering the valve-chamber G at G³. At N² this steam-pipe unites and opens into a cross-pipe P. The latter at one
45 end connects with the upper end of the main cylinder E and at the other end connects with the lower end of this main cylinder E. In connection with one end of this pipe P is a puppet-valve P², and with the other end of
50 said pipe P is a puppet-valve P³. The stem of each puppet-valve extends into the cylinder E so far (see Fig. 7) that before the piston E² has made its full stroke at that end of the cylinder where the puppet-valve is it has
55 struck the stem of this puppet-valve, pushed it back, and opened this valve, and thus admitted steam under boiler-pressure into the cylinder between said end and the adjacent face of the piston. This steam thus admitted acts as a cushion and prevents the piston
60 and its rod E³ when the piston has reached the end of its stroke from roughly jerking or pushing the parts in connection with the piston-rod E³.

65 The preferred construction of the connec-

tion between the piston-rod E³ and the gate B² is as follows: The bail B³ is provided with a swivel-link B⁴, pivotally bolted at B⁵ to the bail B³ of the gate B. The upper end of the link B⁴ is perforated, and through it passes a
70 rod R, having an enlarged end (preferably a nut) on it within the link. Thus the rod R cannot be pulled through and out of the link B⁴. This rod R extends upward and through an opening in the sleeve (preferably a skeleton one) S and within the sleeve carries a
75 head or nut S², preferably the latter, and this head or nut S² prevents the sleeve S from being pulled off of the rod R. The upper end of this sleeve is duly secured to the piston-rod E³ or to an extension of the latter. Where
80 the distance between cylinder E and the sleeve S is considerable, the piston-rod E³ is usually provided with an extension connecting it and the sleeve. This connection between the piston-rod and the extension is
85 made by a coupling, as T T² T³, well known in the arts. (See Fig. 5.) Between this sleeve S and the swivel-link B⁴, I locate a spring W, embracing the rod E³ as extended.
90

Having thus described a construction which embodies and illustrates my invention, I will now proceed to describe its mode of operation.

Let us suppose the gate B to be closed and behind it on the incline A a quantity of coal
95 is ready to be dumped as soon as the gate is opened. The car or other receptacle being duly located at and below the bottom of the incline and in readiness to receive the coal, the operator first sees that steam from the
100 boiler at working pressure is present in the steam-pipe N. He then grasps the handle M M⁶ and moves this to the right, Fig. 1—viz, to the point Z. Such movement moves valve K, so as to open port H² to the steam
105 in the steam-chamber G, and steam therefrom entering the cylinder through this port and pipe H and H³ below the piston E² operates to lift the latter and pushes it to the other (the upper) end of the cylinder. As
110 the piston thus moves it moves the piston-rod E³, and the latter draws up the gate B. As the gate is elevated the coal behind it rushes down the incline A of the chute and into the receptacle below. As the piston
115 rises and is near the upper end of the cylinder it strikes the puppet-valve P³. The latter then admits steam into the cylinder above the piston, which steam balances the pressure of steam below the piston and "cushions" the piston, so that it, with its load of
120 the rod and gate under motion, is gently but quickly stopped in its ascent without jar or collision and remains motionless, holding up the elevated gate. The piston and gate will
125 remain in this position; but when that coal on the incline which is to be dumped into that receptacle has been loaded therein and it becomes desirable to lower the gate the operator moves the handle M M⁶ to the left to
130

5 Z^2 , Fig. 1, and thereby moves the valve K, so
 that its recess K^2 spans port H^2 and opens
 communication between the lower end of the
 cylinder E below the piston E^2 (through pas-
 sage H^3 H H^2) and the escape-port J, thereby
 10 exhausting the steam in the cylinder below
 the piston and opening a communication be-
 tween the port I^2 and passage I I^3 and the
 valve-chamber G, thereby admitting steam
 15 into the cylinder above the piston. This
 steam operates to forcibly drive down the
 piston, and with it, descending, moves the pis-
 ton-rod and gate. As the piston nears the
 lower end of its stroke it strikes and opens
 20 the puppet-valve P^2 , and the steam entering
 therethrough into the cylinder below the pis-
 ton cushions the latter and in the manner de-
 scribed relative to the operation of the other
 puppet-valve P^3 checks the rapid descent of
 the piston and gate and permits their further
 ascent in a slow and gentle manner to place.
 The spring W is also an additional aid in pre-
 venting a too sudden collision of the gate with
 25 or masses of coal on the chute directly in the
 path of the descending gate. Such pieces or
 masses of coal may have accidentally slid or
 rolled there.

30 In the drawings, to obtain compactness of
 illustration, I have shown the operating-lever
 in a certain position relative to the cylinder
 and the gate. However, it is to be under-
 stood that the position of this operating-le-
 ver is to be varied and that this lever is to be
 35 located in a position most convenient for the
 operator to view the coal as it runs into the
 car.

I desire it to be understood that the posi-
 tion of the cylinder may be altered as de-
 40 sired, according to the requirement of cir-
 cumstances. Thus, for example, the cylin-
 der may be located so that its axis shall
 be horizontal, or substantially so. In such
 event there may be interposed between the
 45 piston-rod and the cushioning devices at the
 bail of the gate any suitable kind of the well-
 known mechanism for converting a rectilin-
 ear movement into one at an angle there-
 with.

50 If the handle M be not moved so far to the
 right or to the left as already specified, the
 amount of steam admitted to the cylinder
 will be less. Thus the amount of steam ad-
 mitted can be regulated and the power con-
 55 tributed to move the gate can be regulated.

It is to be noted that the valve K is con-
 structed so that when being moved in a given
 direction it gives a lead to the exhaust, as is
 well known in the construction of steam-en-
 gines and the like. It is to be noted that my
 60 combination of puppet-valves with such a
 valve enables me, while giving a lead to the
 exhaust, to use that cushion of steam present
 on the opposite side of the piston to start the
 piston and gate very gradually, so that when
 65 the steam-passage from the valve is opened
 the steam inrushing on the same side of the
 cylinder has less work to do in the initial
 movement of the piston.

My invention contemplates, as indicated 70
 in the opening part of my specification, the
 use of power other than steam.

The construction of the several features of
 my invention gives advantageous results.
 The invention in parts and as a whole is com- 75
 paratively simple. It is economical in con-
 struction and in use. It is durable.

What I claim as new and of my invention,
 and desire to secure by Letters Patent, is—

1. The combination of a chute, a gate, 80
 means for lifting and depressing the gate, a
 sliding and elastic connection between the
 gate and such means, said means being fur-
 ther provided with means for cushioning the
 stroke (movement) of the gate at each end of 85
 its stroke, substantially as and for the pur-
 poses specified.

2. The combination of a chute, a gate,
 means for lifting and depressing the gate,
 means for moving the gate through its stroke, 90
 a sliding elastic connection between the gate
 and such means, said means being provided
 with apparatus adapted to utilize a fluid for
 cushioning the gate at each end of its stroke,
 substantially as and for the purposes speci- 95
 fied.

3. The combination of a chute, a gate,
 means for lifting and depressing the gate,
 means for moving the gate through its stroke,
 a sliding elastic connection between the gate 100
 and such means, said means being an engine
 adapted to be operated by a fluid and pro-
 vided with apparatus adapted to utilize a
 fluid for cushioning the gate at each end of
 its stroke, substantially as and for the pur- 105
 poses specified.

LUTHER EMANUEL ARMENTROUT.

Attest:

B. M. HAGAN,
 CHAS. I. WADE.