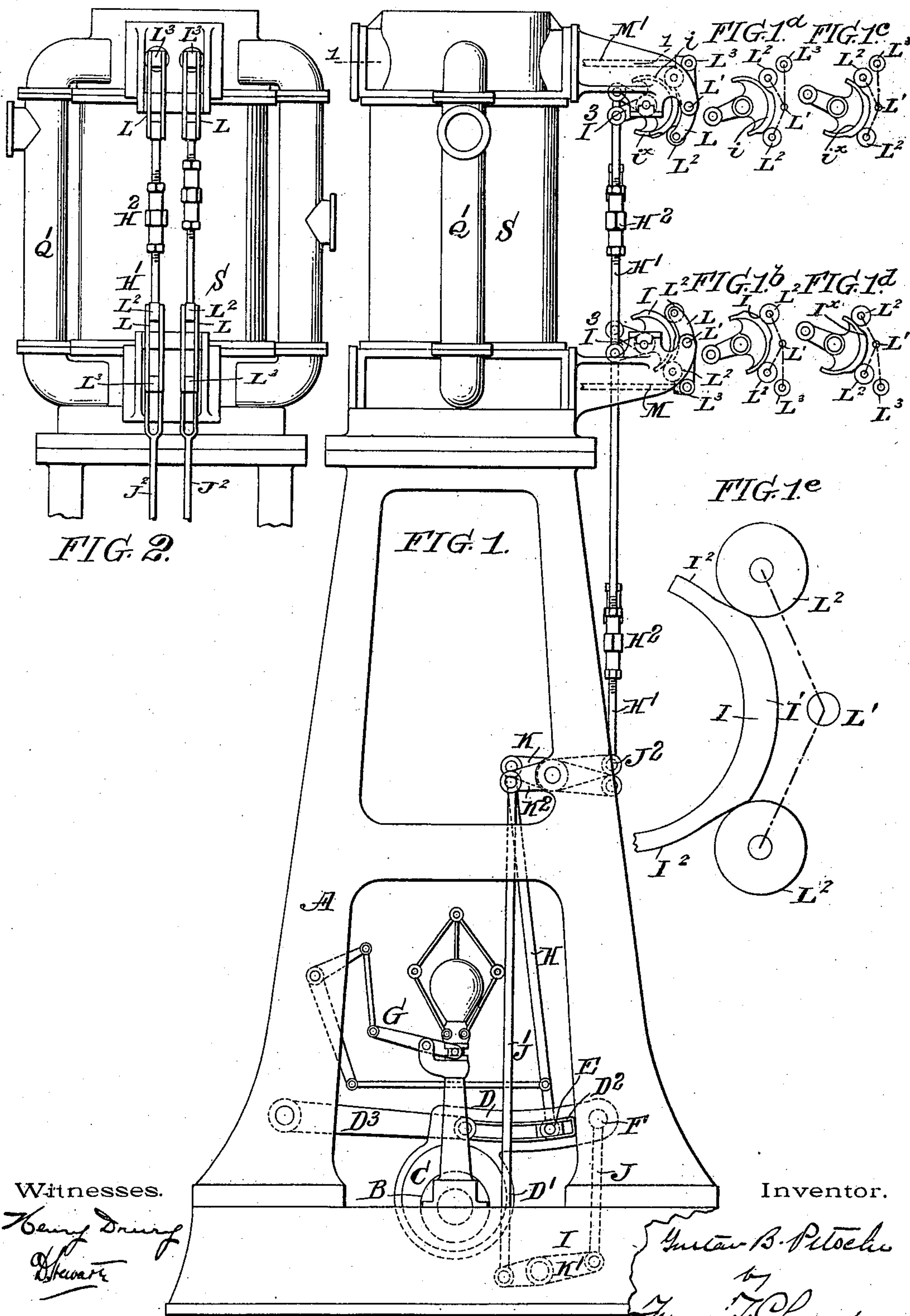


G. B. PETSCHÉ.
VALVE ACTUATING MECHANISM.

(Application filed July 31, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.

Henry Doring
Shaw

Inventor.

Gustav B. Petsche
by
James T. Chambers
his Attorney.

No. 620,171.

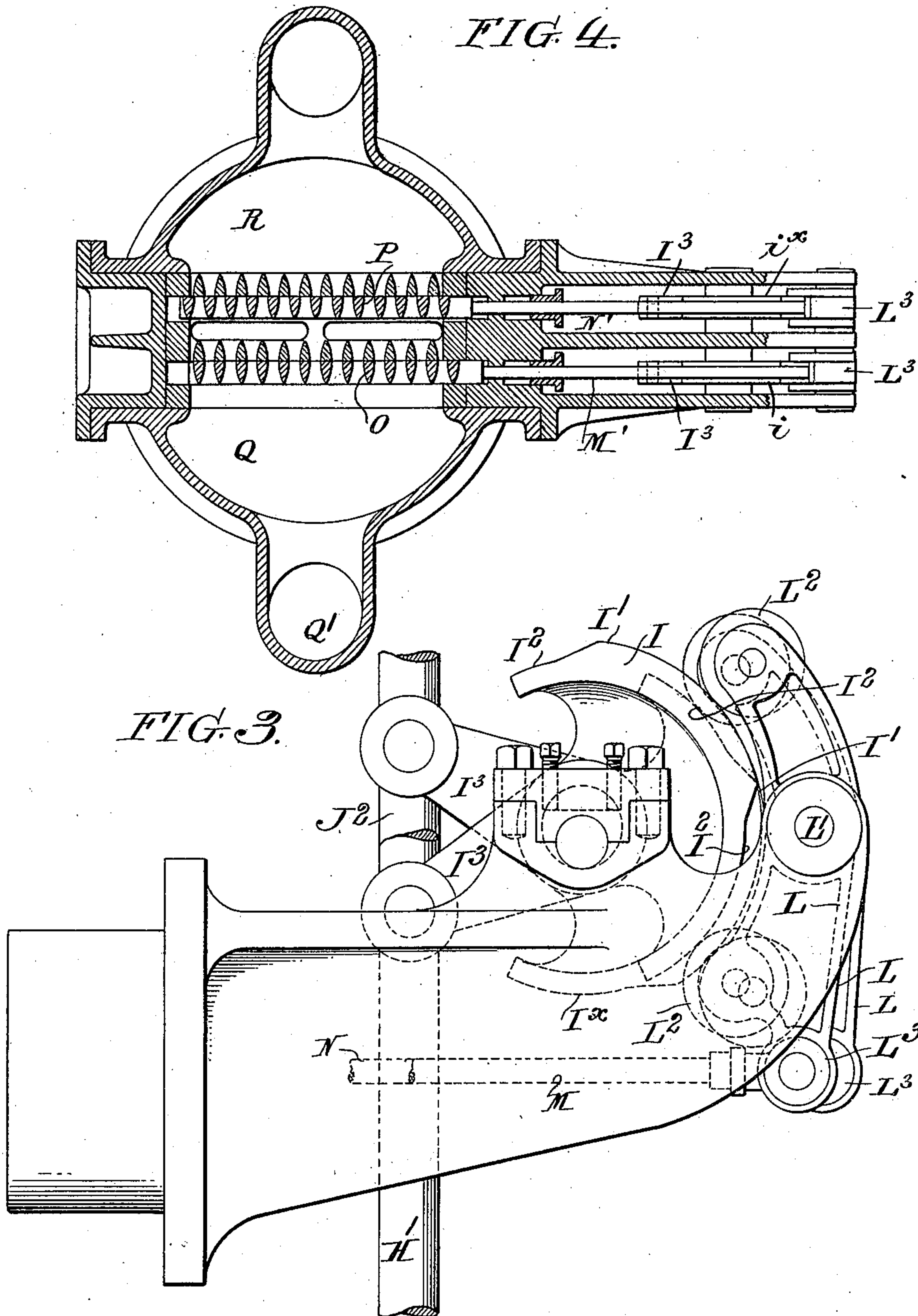
Patented Feb. 28, 1899.

G. B. PETSCHÉ.
VALVE ACTUATING MECHANISM.

(Application filed July 31, 1897.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses.

Henry Dunning
Shaw

Inventor.

Gustav B. Petsch
by
Francis J. Chambers
Attorney.

UNITED STATES PATENT OFFICE.

GUSTAV BERNHARD PETSCHÉ, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE SOUTHWARK FOUNDRY AND MACHINE COMPANY, OF SAME PLACE.

VALVE-ACTUATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 620,171, dated February 28, 1899.

Application filed July 31, 1897. Serial No. 646,635. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV BERNHARD PETSCHÉ, a subject of the Emperor of Germany, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Valve-Actuating Mechanism, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the construction of mechanism for actuating the admission and exhaust valves of steam-engines, and has for its object to provide a simple and efficient mechanism by which the admission-valves may be operated with a variable cut-off and constant lead and at the same time with unusual rapidity in opening and closing and also to operate from the same controlling-link the exhaust-valves with constant release and compression and with the same quick action which I secure in the movement of the admission-valve.

The nature of my improvements will be best understood as described in connection with the drawings in which they are illustrated, and in which—

Figure 1 is a side elevation of a portion of a pumping-engine equipped with my improvement, Figs. 1^a and 1^b being detached views of the admission rock-cams, Figs. 1^c and 1^d similar views of the exhaust rock-cams, and Fig. 1^e an enlarged view showing a rock cam and lever in intermediate position, Fig. 2 being a front elevation of the upper part; Fig. 3, a side elevation, on an enlarged scale, of the rock cams and levers forming an important feature of my construction; and Fig. 4, a cross-sectional view through the head of the engine, taken through the line 1 1 of Fig. 1.

A indicates the framing of the engine; B, the main shaft; C, an eccentric on the shaft; and D a link which, as shown and as I prefer to use it, is familiarly known as the "Finck" link. The link is, as usual, provided with an eccentric-strap D', a slotted arm D², and a pivoted connecting-link D³.

E is a block sliding in the arm D², the position of which is controlled in the usual manner by a governor, (indicated at G.)

F is a point on the outer extremity of the slotted arm of the link, to which connection is made for the actuation of the exhaust-valves of the engine, as will be hereinafter described.

I control the movements of the steam-admission valves of the engine by connections from the sliding block E. Thus, as shown, a link H extends from the said block to a rock-lever K, from which extends a link H', having in it adjusting-screws H² H², as shown, and connecting with the arms I³ I³ of the rock-cams I and i, which are each made with an elevated face I' and depressed faces I² I² on each side of the elevated face and connected therewith by symmetrical inclines, as shown. The two admission rock-cams I and i, operating as they do to open the admission-valves at the opposite ends of the cylinder and both moving simultaneously in the same direction, must have their cam-faces arranged differently and so as to operate their respective admission-valves in reverse directions. The conformation of the cam-faces to effect this purpose is indicated in the small cuts at the right-hand side of Fig. 1, in which 1^a and 1^b indicate the rock-cams I and i, governing the admission, and 1^c and 1^d indicate the rock-cams I^x and i^x, having for their function the control of the exhaust-valves at the opposite ends of the cylinder, and, as shown, they are secured upon the same centers as the rock-cams I i and are operated through their arms I³ by a rod J², which connects, as shown, through a rock-lever K², rod J', rock-lever K', and rod J with the point F on the Finck link. It will be understood, of course, that the rock-cams controlling the exhaust-valves being simultaneously moved in the same direction should have their cam-faces arranged so as to close one exhaust-valve at the time the other exhaust-valve is open, and this conformation of the cams is also indicated in the small views at the right-hand side of Fig. 1.

L L indicate rock-levers, of which there is one provided for each rock-cam. They are centrally pivoted, as indicated at L', and provided with contacting faces or rollers L² L², which rest in contact with the faces of the

respective cams and are so spaced (see Fig. 1^o) that they will both remain at all times in contact with the face of the cam upon which they operate and so that when one is elevated upon the upper cam-face the other will always be depressed, resting upon one of the lower cam-faces. It is important that a close contact should be maintained at all times between the rollers of the rock-levers and the cam-faces, and, the spacing being carefully adjusted to the length of the cam, it is only necessary to provide for the wear of the surfaces, which can be readily done by making the pivot L', upon which the rock-lever turns, an adjustable eccentric or providing in other ways for setting it up toward the cam-face in case of wear.

M M' indicate the valve-rods of the admission-valves, and N N' the valve-rods of the exhaust-valves, said rods being connected to portions L³ of the rock-levers, as indicated, and secured to the admission and exhaust valves (indicated at O and P in Fig. 4) in the usual manner.

Q' indicates the live-steam pipe, Q the steam-chamber, and R the exhaust-chamber of the engine, the cylinder of which is indicated at S.

It will be understood that the throw of the eccentric B and the connections therefrom to the valves are such that the said throw alone will simply move the valve through their lap and lead, assuming that the sliding block E were situated immediately above the eccentric—that is to say, coincident with the point of attachment of the swinging link D³ to the link D. As the sliding block is moved out the rock-cams to which it is connected are moved through their longer arcs and a gradually-increased admission of steam is provided for, the cut-off being proportionately delayed, at the same time an actual motion of the valve is always effected with the same quickness, taking place, of course, when the rock-lever changes its position on the face of the cam. A particular advantage incident to my construction is the utilization of the cam as a means of actuating the valve with entire avoidance of any appreciable lost motion, the connection between the eccentric and the valve being practically as positive as though all parts were actually secured together.

It will be obvious that the motion of the exhaust-valves will be entirely unaffected by the change in the position of the link sliding block and will always take place at the same time, irrespective of the cut-off effected by the admission-valve.

The rock-cam and its coacting rock-lever is in itself, I believe, new with me, and, as it is capable of many other uses than that indicated in the above description and the draw-

ings referred to, I have made it the subject-matter of a separate application for a patent, filed July 31, 1897, Serial No. 646,632, my present invention being limited to its use in connection with and in the way illustrated and described with an oscillating link-motion and as a part of the mechanism for actuating the admission or admission and exhaust valves of a steam-engine.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an engine, the combination of a valve-link as D, actuated by the engine, a sliding block moving in said link and actuated by a governor, a rock-cam, as I, actuated by a connection from said block and having a high face I' between two lower faces I² I² said high and low faces being connected by symmetrical slopes, a centrally-pivoted rock-lever L having cam-contacting faces or rollers L² L² adapted to rest one on the high and the other on the low surface of the cam and to pass from high to low as specified and a valve-actuating rod as M moving with the rock-lever.

2. In an engine the combination of a valve-link as D actuated by the engine, a sliding block moving in said link and actuated by a governor, two rock-cams I¹ actuated by a connection from said block and having a high face I' between two lower faces I² I² said high and low faces being connected by symmetrical slopes and said cams being set as described so that when moved in the same direction they will actuate their coacting devices in opposite directions, centrally-pivoted rock-levers L having cam-contacting faces or rollers L² L² adapted to rest one on the high and the other on the low surface of the cams and to pass from high to low as specified and valve-actuating levers as M M moving with the rock-rods.

3. In an engine the combination of a valve-link as D actuated by the engine, a sliding block moving in said link and actuated by a governor, rock-cams as I I^x one connected to and actuated by the block in the link and the other connected to and actuated by a fixed point on the link said cams having central high faces I' with lower faces I² I² on each side of it and said faces being connected by symmetrical inclines, centrally-pivoted rock-levers L L each having cam-contacting faces or rollers L² L² adapted to rest and work on the faces of the cams as specified the one rock-lever connecting to a steam-inlet valve and the other rock-lever to a corresponding exhaust-valve.

GUSTAV BERNHARD PETSCHÉ.

Witnesses:

CHAS. F. MYERS,
D. STEWART.