

(No Model.)

J. A. GROSHON.
DIRECT ACTING STEAM ENGINE.

No. 474,775.

Patented May 10, 1892.

Fig. 2.

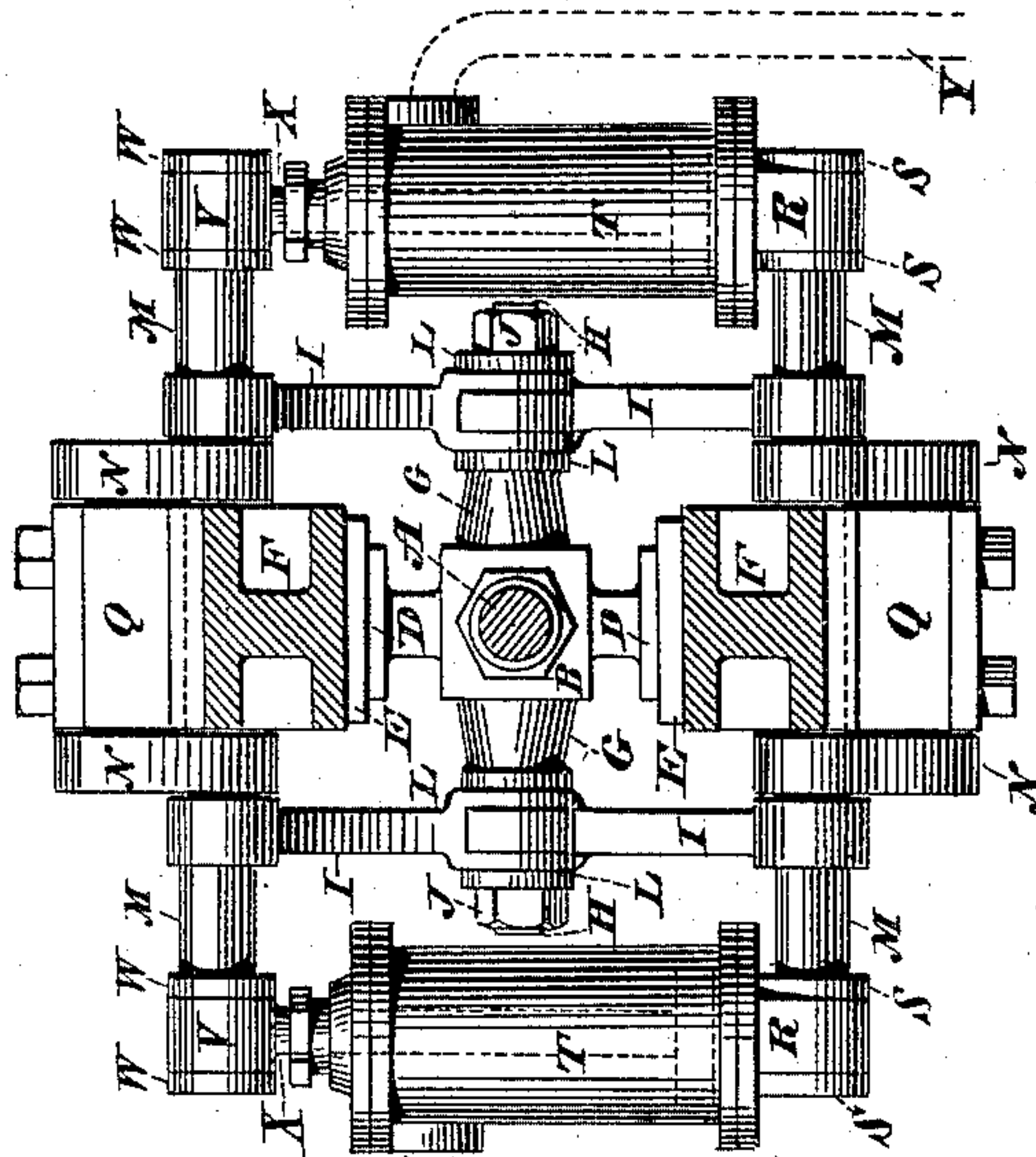
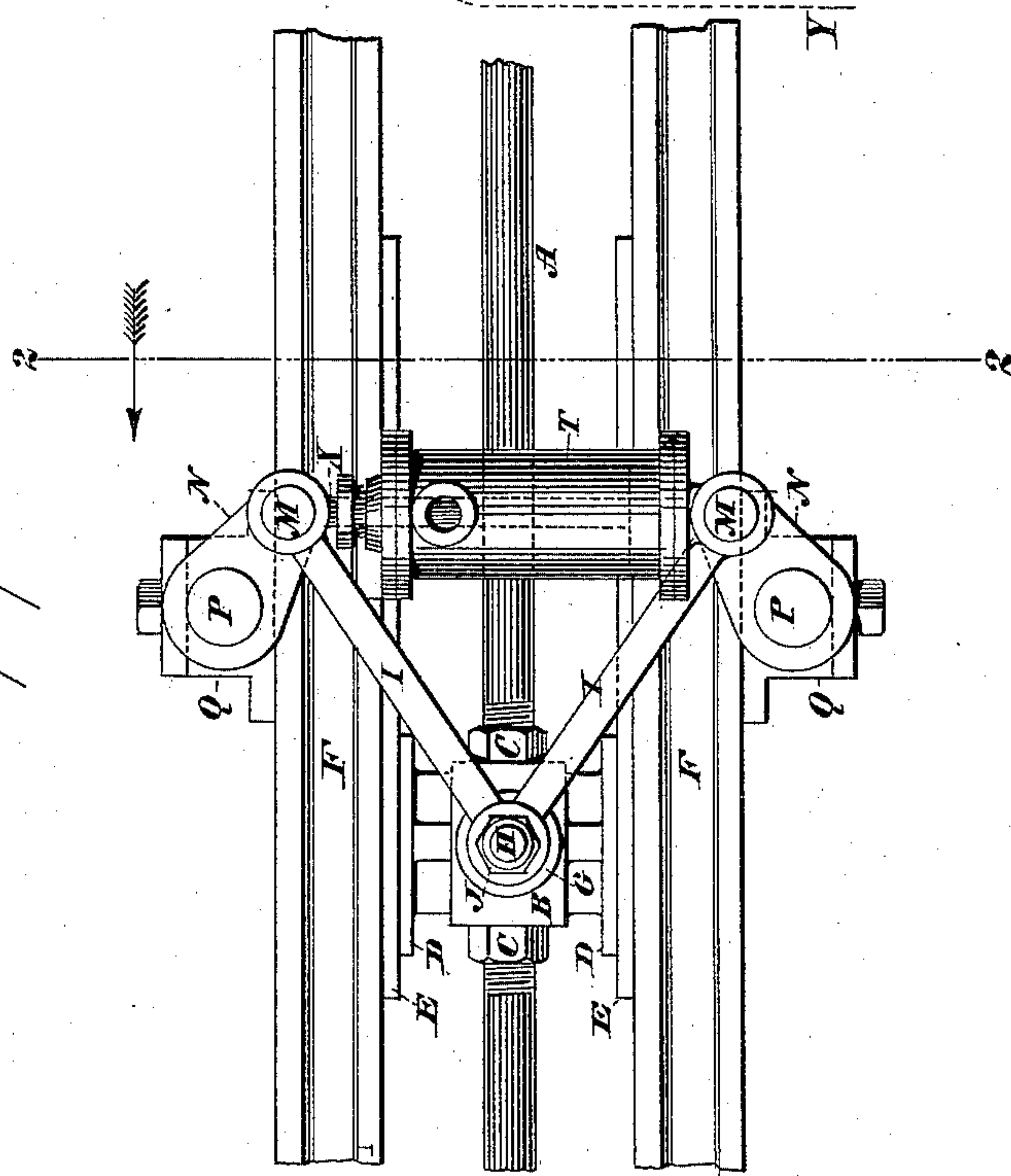


Fig. 1.



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JOHN A. GROSHON, OF NEW YORK, N. Y., ASSIGNOR TO THE GROSHON HIGH DUTY PUMPING ENGINE COMPANY, OF SAME PLACE.

DIRECT-ACTING STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 474,775, dated May 10, 1892.

Application filed February 21, 1890. Renewed December 24, 1890. Again renewed October 12, 1891. Serial No. 408,424. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. GROSHON, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Direct-Acting Steam-Engines, of which the following is a specification.

The invention relates to improvements in direct-acting steam-engines, and particularly to an improvement on the steam-engine described and claimed in Letters Patent of the United States, No. 410,411, granted to me September 3, 1889; and it consists in novel mechanism (hereinafter described and claimed) connected with the piston-rod, whereby said rod may have a force applied to it which will offer a resistance during the first portion of its stroke and assist it during the latter portion of its stroke.

I contemplate employing the invention in connection with compound steam-pumping engines of the "Blake" or other well-known types, and hence these classes of engines may be understood as affording examples of the application of the invention.

In the accompanying drawings the mechanism constituting the invention is represented as applied to the piston-rod of the engine, the steam and pumping cylinders having been omitted.

In the drawings, Figure 1 is a side elevation of a portion of the piston-rod with the mechanism constituting the invention applied thereto and supported by girders, the said mechanism being shown in position to offer a resistance to the piston-rod; and Fig. 2 is a transverse section of same on the dotted line 2 2 of Fig. 1, looking in the direction of the arrow.

A designates the piston-rod, of usual character, having applied thereto the block B, which is held in position upon the rod by the threaded nuts C C and is provided at its upper and lower ends with the plates D D, which have a bearing against the plates or tramways E E, connected with or forming a part of the girders F F. The block B travels with the piston-rod A and has on opposite sides the extensions G G, which receive the stud-

bolts H H, upon which the inner ends of the levers I I have a bearing and are retained by nuts J J. The inner ends of one set of the levers I are bifurcated, as shown in Fig. 2, to receive the adjoining ends of the other set of levers I in order that when said levers are in position on the bolts H H the upper levers may be on the same vertical plane as the lower levers.

Between the nuts J and levers I and between the levers I and the extensions G are washers L. The outer ends of the levers I are collared on the crank-pins M at the outer ends of the arms N, which are mounted on the short shafts P P, sustained in the boxes Q Q, one box being secured to the upper girder F and the other box to the lower girder F. The shafts P extend entirely through the boxes Q, and sustain at their opposite ends the arms N, one of these arms being at each side of the upper girder F and one at each side of the lower girder F, and the pins M, above referred to, extend transversely outward in opposite directions from the outer ends of said arms N, the upper and lower pins being respectively in line with each other and being connected at opposite sides of the girders by the pairs of levers I, above described, which are coupled at their center by the bolts H on opposite sides of the block B, secured to the piston-rod A. Upon the outer ends of the lower pins M are secured by means of sleeves R and collars S the cylinders T T, one cylinder being at each side of the piston-rod, and upon the outer ends of the upper pins M are retained by means of sleeves V and collars W the piston-rods X, which carry pistons and enter the cylinders T, as shown by dotted lines in the drawings. The upper end of each cylinder T is connected by means of a pipe Y with a source of pressure—such as water, air, or steam—which will act upon the upper side of the pistons within the cylinders and exert a force tending to keep the pistons at the lower end of the cylinders and the outer ends of the pairs of levers I close against the ends of said cylinders. The cylinders T and levers I being in the position illustrated in the drawings, the pressure exerted upon the upper sides of the pistons within the cylinders would tend

to keep the outer ends of the levers I close against the ends of the cylinders and resist the movement of the piston-rod A.

The operation of the invention may be fully understood by reference to Fig. 1, in which the piston-rod A is shown in a position about to commence the first portion of its stroke. It will be observed that the movement of the rod A in the direction of the arrow or toward the pumps would cause a pressure through the block B on the levers I, which would have the effect of forcing the outer ends of said levers I apart and turning the arms N and short shafts P correspondingly. The outward movement of the outer ends of the levers I, caused by the piston-rod A, necessitates the force of steam in the main cylinders (not shown) to overcome the pressure on the pistons in the cylinders T, and this pressure to be overcome during the first portion of the stroke of the piston-rod A constitutes the resistance offered to said rod. It will be noted that upon the further movement of the piston-rod A the levers I I upon the turning of the shafts P will come into vertical line with each other and then as soon as the piston-rod A has completed a further portion of its stroke the levers I I will be moved from said vertical line with each other, and the pressure on the pistons will then act through said levers to assist the movement of the piston-rod A. The pressure in the cylinders T acts as a resistance to the movement of the rod A until such time as the rod has moved sufficiently to bring the levers I I into line with each other; but as soon as the rod A has carried the block B a little farther on its stroke, so as to pass the line of center through the levers I I, the pressure on the pistons within the cylinders T operates to force said pistons into the lower ends of the cylinders, thereby bringing the outer ends of the levers I I together and causing as a consequence the inner ends of said levers to aid in the movement of the piston-rod A in the same proportion as the pressure in the

cylinders T resisted the movement of the piston-rod during the first portion of its stroke.

In the drawings I have illustrated a pair of the levers I I and a cylinder T with its connections on each side of the main piston-rod A; but it is to be understood that I do not confine the invention to the employment of levers and cylinders on both sides of the piston-rod, since a more or less satisfactory result may be obtained by the use of a single set of the levers I I, cylinder T, and connecting mechanism.

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

1. In combination with the piston-rod A of the engine, the levers I I, pivotally secured at their inner end to a block connected with said rod, the cylinder in connection with the outer end of one of said levers and a source of pressure, the piston-rod in connection with the outer end of the other of said levers and carrying a piston within said cylinder, the pins M, supporting the outer ends of said levers I, and the arms N, adapted to rotate and carrying said pins M, substantially as set forth.

2. The main piston-rod A, carrying the block B, combined with the levers I at each side thereof, the inner ends of said levers being pivotally secured to said block, the cylinders T, in connection with the outer end of one set of said levers I and with a source of pressure, the piston-rods in connection with the outer end of the other set of said levers I and carrying pistons within said cylinders, and the arms N, mounted on the shafts P and carrying pins M, which support the outer ends of the levers I, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 20th day of February, A. D. 1890.

JOHN A. GROSHON.

Witnesses:

CHAS. C. GILL,
R. A. PORTEOUS.