

(No Model.)

A. L. IDE.
STEAM ENGINE FRAME.

No. 314,381.

Patented Mar. 24, 1885.

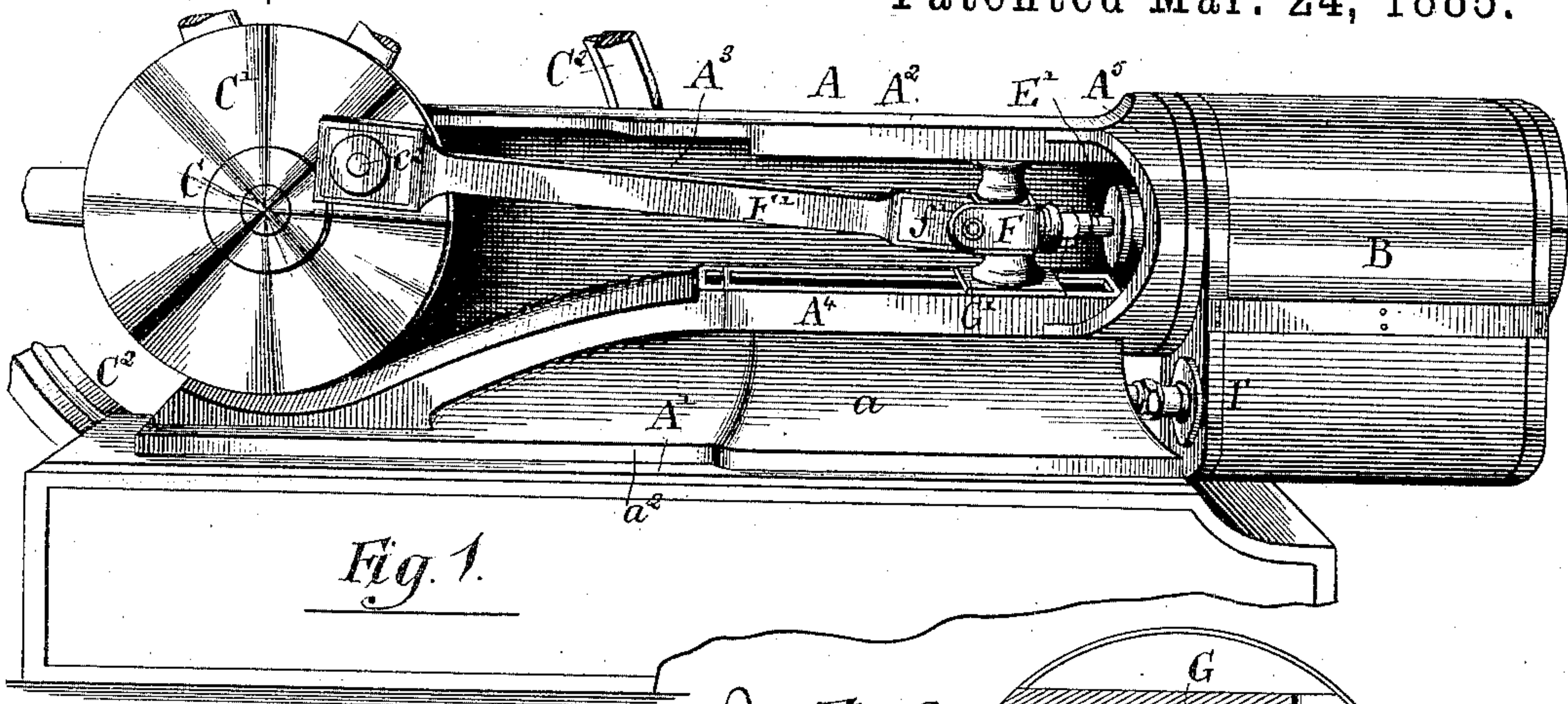


Fig. 1.

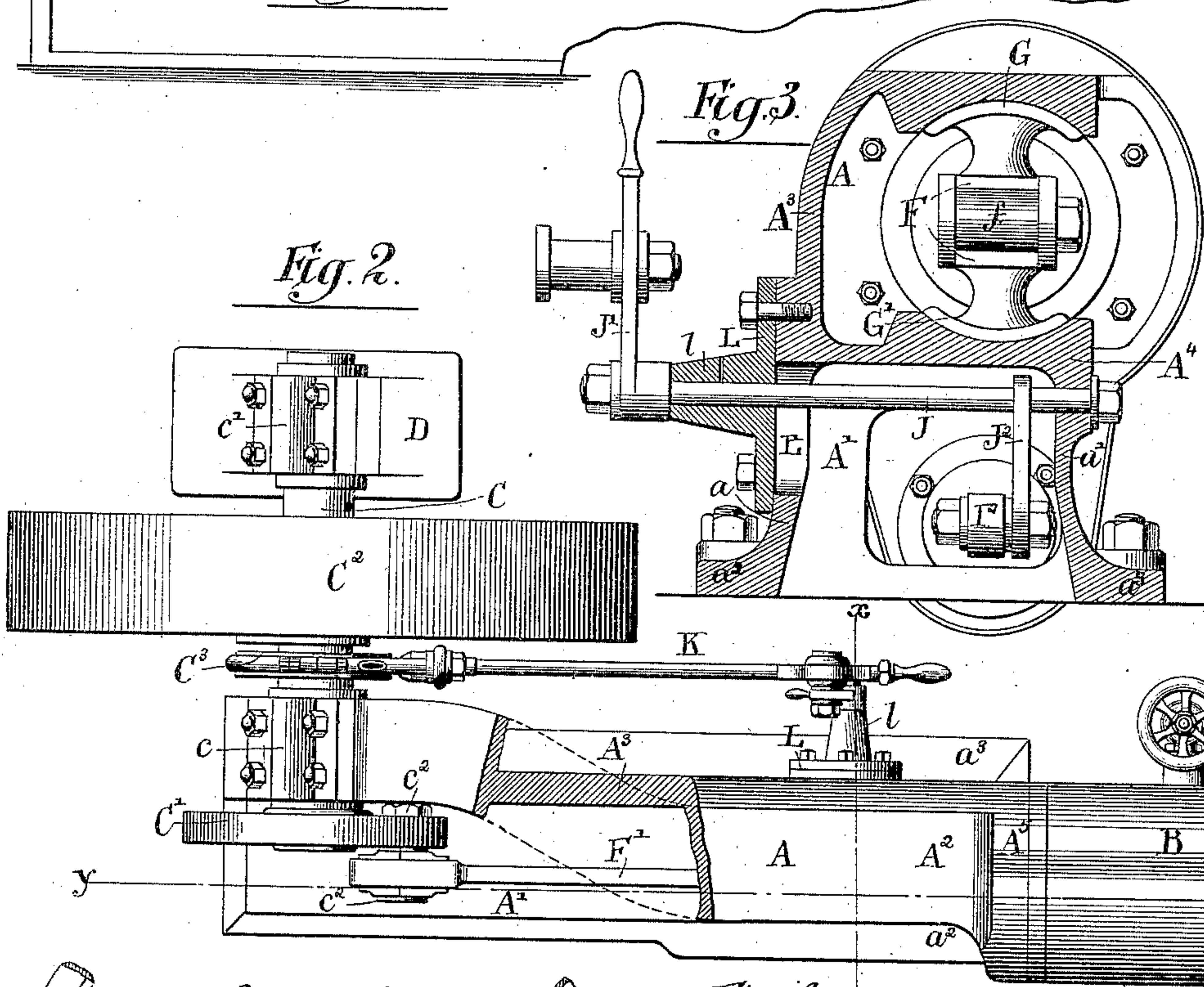


Fig. 2.

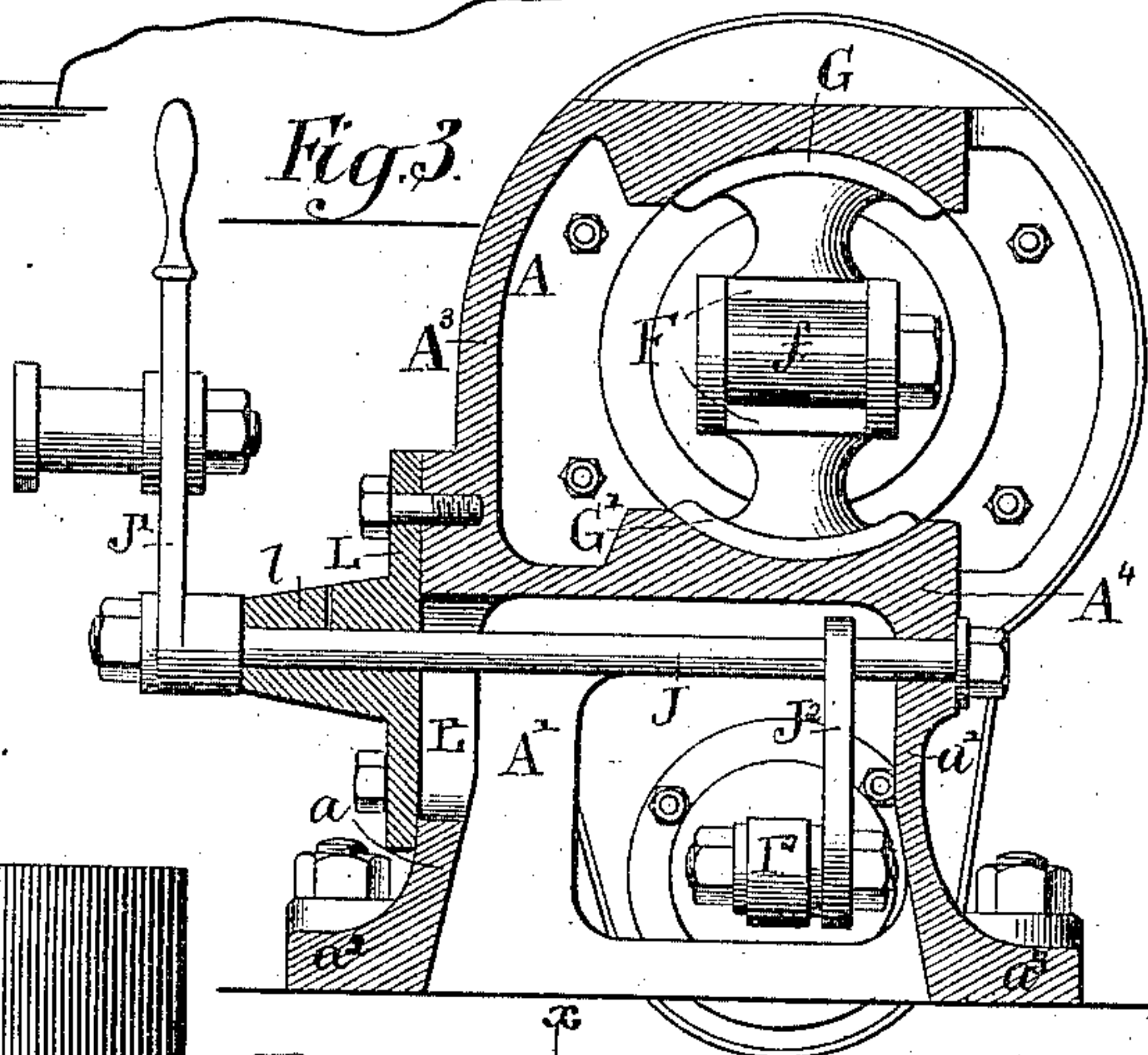


Fig. 3.

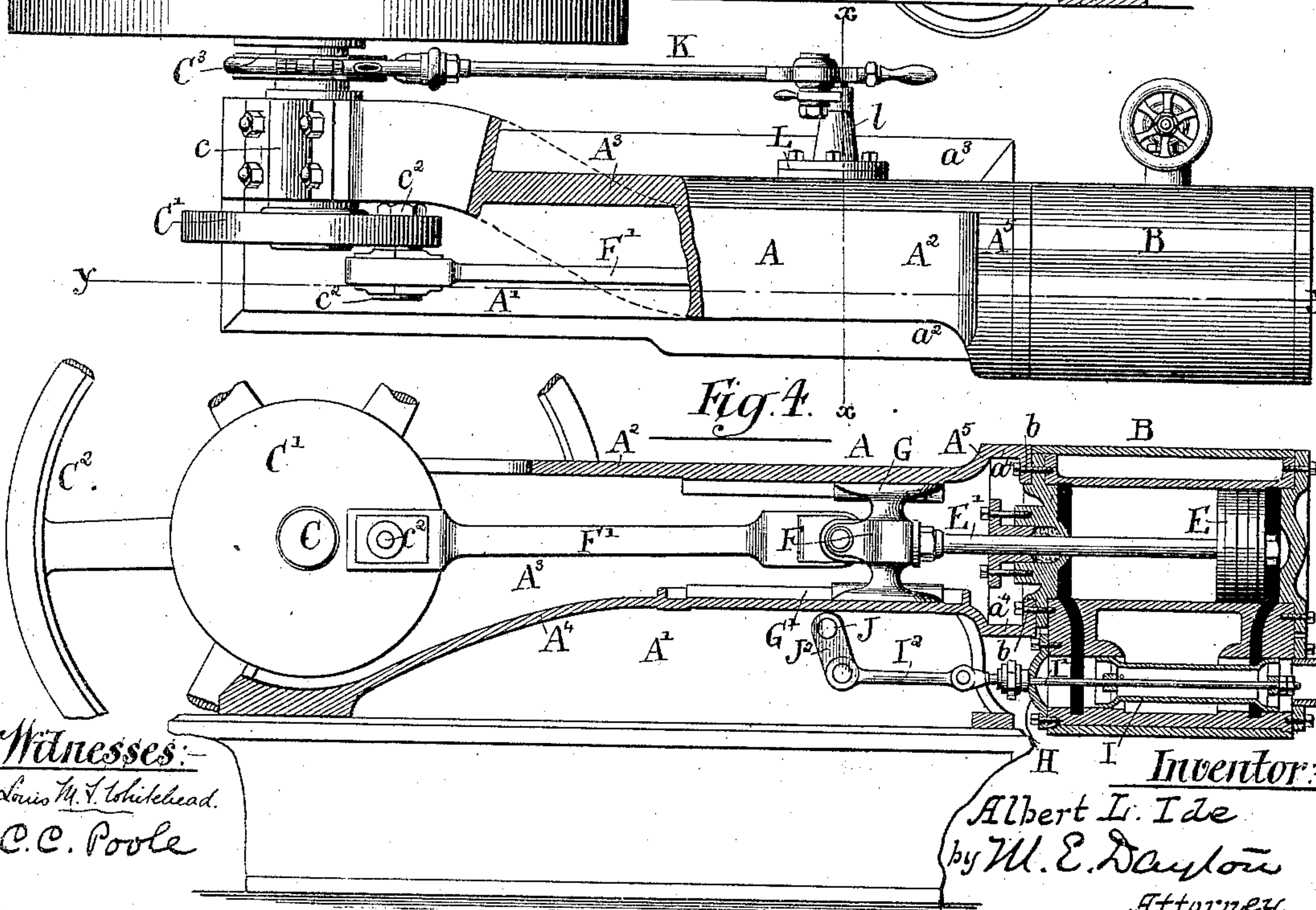


Fig. 4.

Witnesses:
Louis M. V. Whitehead.
C. C. Poole

Inventor:
Albert L. Ide
by W. E. Dayton
Attorney.

UNITED STATES PATENT OFFICE.

ALBERT L. IDE, OF CHICAGO, ILLINOIS.

STEAM-ENGINE FRAME.

SPECIFICATION forming part of Letters Patent No. 314,381, dated March 24, 1885.

Application filed March 27, 1884. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. IDE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in steam-engine frames; and it consists in the several matters hereinafter set forth, and pointed out in the claims.

The invention is herein illustrated in connection with a stationary horizontal engine having a continuous frame or bed supporting the bearing of the crank-shaft at one end and the cylinder at its opposite end, the cylinder being secured to the extreme end of the frame, and constructed to overhang the latter, as will be hereinafter fully set forth, and as illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of an engine embodying the several features of my invention. Fig. 2 is a plan view of the same. Fig. 3 is a transverse vertical section taken upon line xx of Fig. 2. Fig. 4 is a longitudinal vertical section of the engine, taken on line yy of Fig. 2.

A is the main frame or bed of the engine, and B is the cylinder thereof, which is secured horizontally at one end of the frame, so as to overhang the latter.

C is the crank-shaft, which has a bearing, c , at one end in the frame A, and at its opposite end is supported in a pillow-block or bearing, c' , mounted upon a frame or standard, D, suitably located to receive it. The said shaft C is provided upon its end adjacent to the frame A with a disk, C' , in which the crank-pin c^2 is secured, and also with a balance or band wheel, C^2 , and an eccentric, C^3 , by which the steam-valve is actuated. The cylinder B is provided with a piston, E, of any ordinary or preferred construction, to which is attached a piston-rod, E' , which is provided with a cross-head, F, constructed to operate in guides G and G' , formed upon the engine-frame, said piston-rod being connected with the crank-pin c^2 by means of a connecting-rod, F' , in the usual manner.

H is the valve-casing or steam-chest, which is preferably located beneath the cylinder, and is provided with a slide-valve, I, which is, as herein shown, of the form known as a "hollow piston" valve, and is operated from the eccentric C^3 through the medium of a rock-shaft, J, which is provided with an upwardly-projecting arm, J' , connected with the eccentric rod K, and a downwardly-projecting arm, J^2 , which is connected with the said valve by means of a valve-rod, I' , and connecting-rod I^2 .

As an improved construction in the engine-frame, it is formed with a base or lower portion, A' , which is cast hollow, so as to form a box-girder, and extends the full length of the frame and beneath the crank-disk at one end thereof, and an upper portion comprising a longitudinal top plate, A^2 , and a straight vertical web, A^3 , joining the said top plate with the base A' . The base A' consists, generally, of an upper horizontal part, A^4 , and longitudinal front and rear walls, a and a' , which terminate at their lower edges in horizontal outwardly-extending flanges a^2 and a^3 , arranged to rest upon the foundation supporting the engine, and through which suitable bolts are inserted for holding the frame in place. The top plate, A^2 , and the upper part, A^4 , of the base A' are horizontal and parallel with each other in their portions adjacent to the cylinder, and the upper and lower guides, G and G' , for the piston cross-head F are preferably formed in the adjacent faces of the said plate A^2 and the part A^4 , respectively. The vertical web A^3 , as shown more clearly in Fig. 2, extends in a straight line from the side of the cylinder to the shaft-bearing or pillow-block c at a point close to the crank-disk, so as to take the strains caused by the action of the piston upon the crank to the greatest advantage. The top plate, A^2 , is deflected rearwardly from a point near the end of the slide G, adjacent to the crank-shaft, so as to pass to the rear of the crank-disk, and said plate thus forms a curved girder connecting the cylinder and pillow-block. The portion of the plate adjacent to the cylinder, as herein shown, is joined to the web A^3 at its rear edge, and the portion adjacent to the crank-disk is extended rearwardly from the said web A^3 the full width of the pillow-block. At the end of the frame adjacent to the cylinder the upper horizontal part,

A⁴, of the base A', the vertical web A³, and the top plate, A², are united with an annular part or ring, A⁵, to which the cylinder B is bolted. The ring A⁵ is preferably extended rearwardly, so as to overhang the base A', and is provided with an inwardly-extending flange, a⁴, through which bolts are passed for securing the cylinder thereto.

As illustrated in the accompanying drawings, Fig. 4, the forward head, B', is shown as held at its edges between the cylinder and frame, the parts mentioned being held together by bolts b, passing through the flange a⁴ of the frame, the head B, and the flange of the cylinder. The ring A⁵ is preferably made of the same size in outside diameter as the exterior of the outer casing or jacket of the cylinder B, so that the exterior of the cylinder will be flush with the adjacent part of the frame when finished. By making the annular portion A⁵ of the frame to overhang, or, in other words, by cutting away the base A' beneath the part mentioned, the exterior surface of the said part may be turned in a lathe, so as to accurately correspond with the adjacent end of the cylinder, and to give a superior appearance or finish to the engine.

By the construction above described it will be observed that the web A³, together with the horizontal parts A² and A⁴, joined to the upper and lower margins of the said web, form a stiff girder in which a great degree of rigidity is obtained with a minimum weight of material. The parts of the frame, by the construction described, are also disposed with reference to bearings for the moving parts of the engine in a manner calculated to prevent liability of the frame to spring or yield, so as to throw said bearings out of their proper relative positions, and to avoid the consequent liability of the moving parts to bind and thereby cause heating when the engine is running at a rapid speed or operating against great resistance at a high steam-pressure. An advantage of the hollow or box form of the base A' is that the top thereof, in which the lower cross-head guide, G', is formed, is supported by the side walls, a a', of the base, whereby the said lower slide is made perfectly rigid and upheld at both sides against the downward pressure due to the angular position of the connecting-rod.

Additional rigidity is given the entire structure of the frame by the form of the base portion A', and by locating the top plate, A², and the horizontal portion A⁴ of the base A' in position to form the upper and lower guides for the cross-head. The said guides, being connected with the shaft-bearing and the cylinder both by the web A³ and by the continuations of the said plates A² and A⁴, are held accurately in proper working relation with each other and with the crank-shaft and cylinder. The rock-shaft J is located transversely beneath the lower slide, G', and the top A⁴ of the base A', and is provided with suitable bearings at its ends in the side walls, a a', of the said base. As here-

in shown, said rock-shaft is fitted to rotate in a bearing formed in the metal composing the said frame at its front end, and at its rear end it is provided with a bearing in a circular plate, L, bolted to the back surface of the frame, said plate, preferably, being provided with a central hub, l, which affords a desirably-extended bearing for said shaft. The plate L is constructed to cover an opening, L', in the frame, through which the rock-shaft may be removed, the arm J', connecting said rock-shaft with the slide-valve, preferably being cast in one piece with the shaft, and, as shown in Fig. 3, located near the front end of the rock-shaft, so that it may be readily removed through the aperture L'.

By placing the steam-chest and valve below the cylinder two important advantages are gained. One is that only dry steam enters the cylinder from the top of the steam-chest, and the other is that the steam-ports being on the bottom side of the cylinder all condense-water in the cylinder passes directly out with the exhaust-steam and no cylinder-cocks are required. In connection with this location of the steam-chest the rock-shaft J, arranged beneath the lower cross-head slide, as described, affords a simple and convenient means of operating the valve from the eccentric-rod.

I claim as my invention—

1. A steam-engine frame comprising a lower part or base, A', an upper horizontal curved plate or girder, A², and a straight vertical web, A³, uniting the base A' with the curved girder A², substantially as described.

2. In a steam-engine frame constructed for the attachment of a cylinder at one end, and having a crank-shaft bearing at its opposite end, a lower part or base, A', extending beneath the shaft-bearing at one end of the frame, an upper horizontal curved plate or girder, A², extending from the cylinder to the shaft-bearing, and a straight vertical web, A³, uniting the base A' with the curved girder A², substantially as described.

3. A steam-engine frame comprising a rectangular base made hollow on its under side, an upper horizontal curved girder, A², extending from the cylinder to the shaft-bearing, and a straight vertical web of metal uniting the base A' with the girder A², substantially as described.

4. In a steam-engine frame constructed for the attachment of a cylinder at one end, and having a crank-shaft bearing at its opposite end, a base, A', an upper curved girder, A², and a straight vertical web uniting the base and girder, and located in a line with the side of the cylinder and the front portion of the crank-shaft bearing, substantially as described.

5. In a steam-engine frame, a hollow base, A', the top of which forms the lower slide for the cross-head, and which is provided with vertical walls a a', constructed to support the said lower slide at both sides of the latter, substantially as described.

6. The combination, with the hollow base

A' of an engine-frame provided with an aperture, L', in its rear wall, of a rock-shaft, J, supported at one end in the front wall of the base A', and a flanged sleeve, L, constructed to cover the aperture L' and to afford a bearing for the rear end of the rock-shaft, substantially as and for the purpose set forth.

7. The combination, with a hollow base, A', of an engine-frame provided with an opening, L', in its rear wall, of a flanged sleeve, L, constructed to cover the said aperture, and a rock-shaft, J, provided with a downwardly-extending arm, J², and having bearings at one end in the front wall of the base A' and at its opposite end in the sleeve L, substantially as and for the purpose set forth.

8. The combination, with a steam-engine

frame supporting suitable cross-head guides and a cylinder provided with a steam-chest located beneath the latter and having a suitable slide-valve and rod, of a rock-shaft located transversely beneath the lower cross-head slide, means for operating the said rock-shaft from the crank-shaft, and a depending arm fixed to said rock-shaft and connected with the valve-rod, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

ALBERT L. IDE.

Witnesses:

C. CLARENCE POOLE,
OLIVER E. PAGIN.