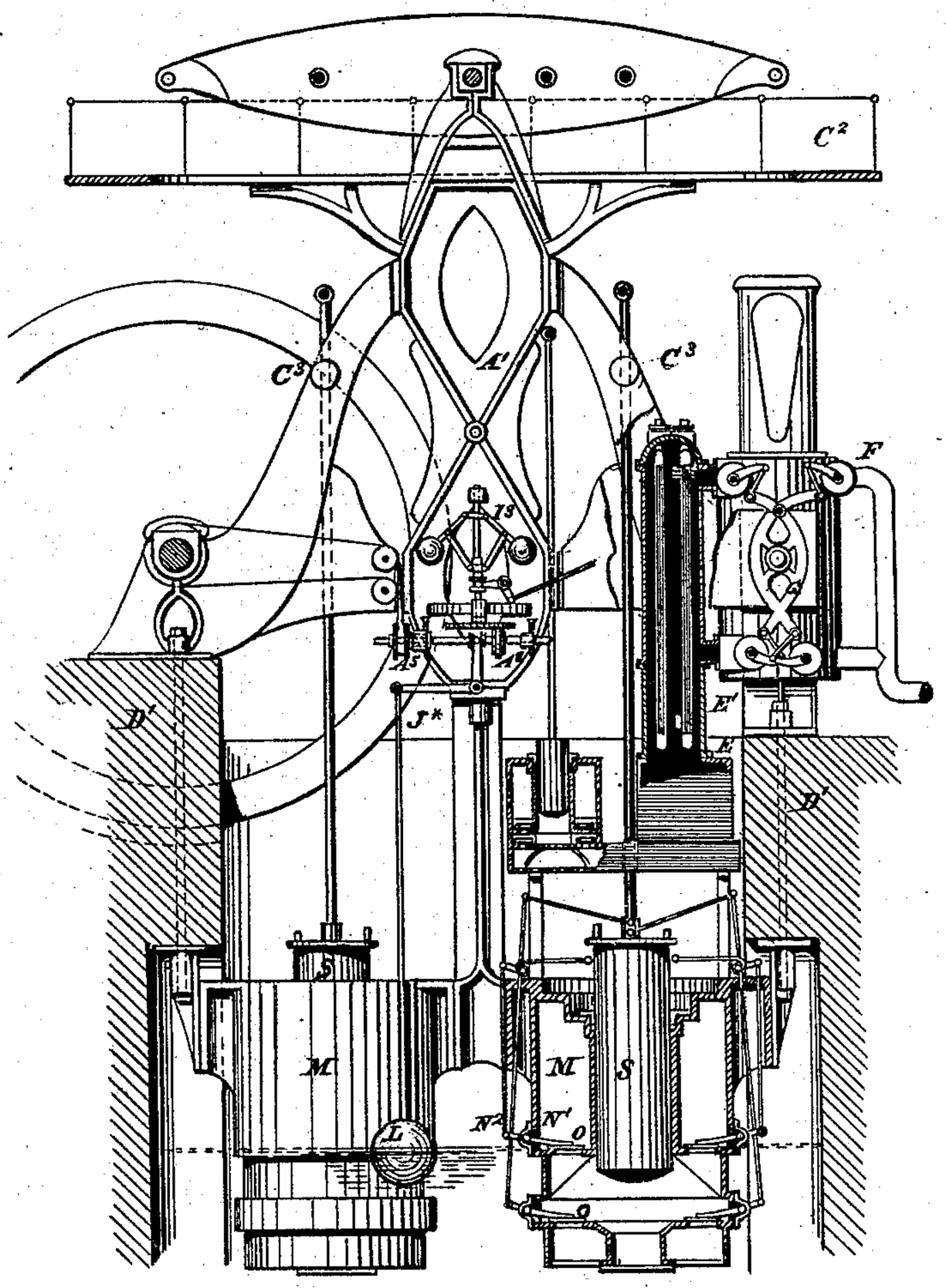
(No Model.) 2 Sheets—Sheet 1.

G. H. CORLISS.

Framing of Beam Steam Engines.

No. 235,745. Patented Dec. 21, 1880.

Fig. 1.



Witnesses:
W. Colborne Brookes
Charles C. Stetson

Inventor.
George H. Corliss.
by his attorney
Thomas D. Stetson.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

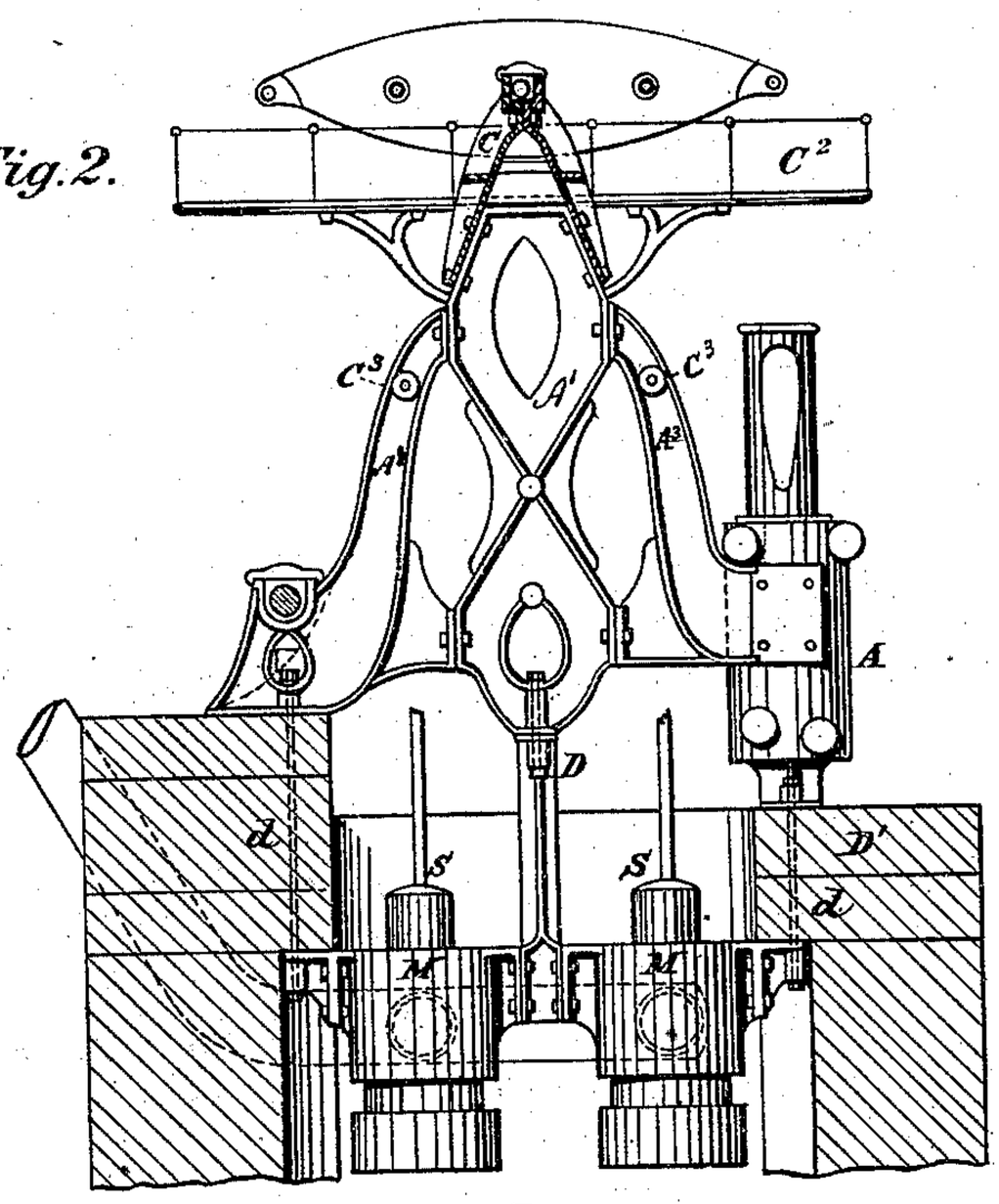
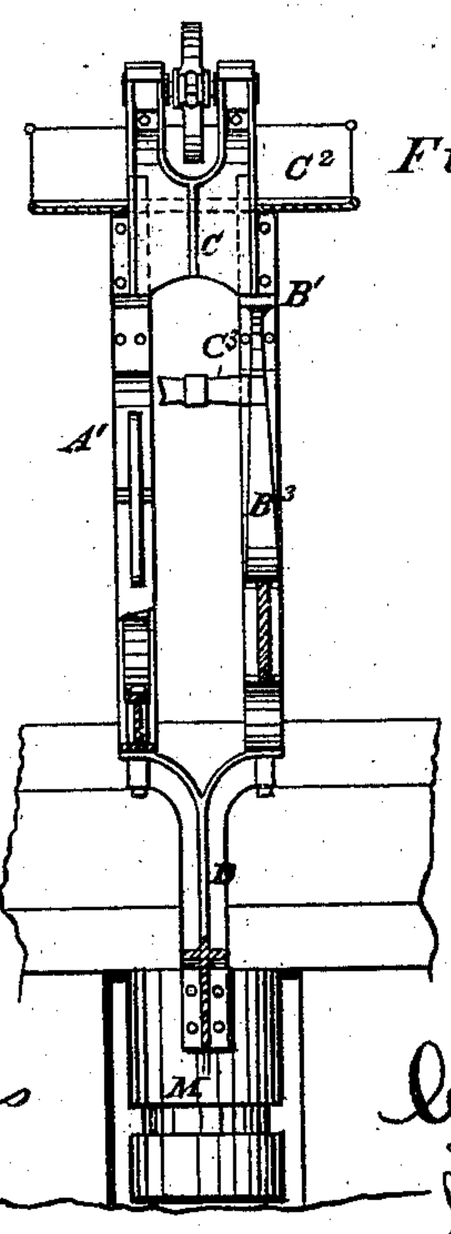


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE H. CORLISS, OF PROVIDENCE, RHODE ISLAND.

FRAMING OF BEAM STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 235,745, dated December 21, 1880.

Application filed June 14, 1880. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. CORLISS, a citizen of the United States, residing at Providence, in the county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements relating to the Framing of Beam Steam-Engines, of which the following is a full and exact description.

The invention relates to the triangular framing, the rigid parts by which the members of the mechanism are held in their respective positions, notwithstanding the great strain thrown on them by the working of the engine. I construct this frame of cast-iron, in sections of convenient size, with joints easily and perfectly faced, by ordinary machinery, and so formed that the strains are transmitted in a nearly right line in all the directions in which they are received. The frame is especially adapted for pumping-engines; but a part of the advantages thereof may be realized in its use for engines for any purpose.

The accompanying drawings form a part of this specification, and represent my improved frame as carried out in a large pumping-engine.

Figure 1 is a side elevation, partly in section, and Fig. 2 is a transverse section. Fig. 3 is a vertical section, showing the upper portion of the framing, the braces, the lower central portion of the framing, and the pump below.

Similar letters of reference indicate like parts in all the figures.

The drawings represent the novel parts, with so much of the ordinary parts as is necessary to indicate their relations thereto.

Referring to Figs. 1, 2, and 3, which show the main framing, I will, when necessary, indicate all the parts which form one side by the single letter A, and all the parts which form the other side by the single letter B, designating the parts of each side by the additional marks A′ A^2 B′ B^2, &c.

A′ is a central casting, formed wide near the top and wide near the bottom, and with a cross-web at the mid-height, as shown. It is strengthened by a heavy rim or web. B′ is a corresponding casting for the central portion of the other side of the frame. The surfaces of each are planed, or otherwise perfectly faced, where they match against the adjacent castings.

A^2 is a casting formed, as shown, with stout webs or ribs faced and bolted to the piece A′. B^2 is a corresponding casting bolted to B′. The casting B^2 is formed with a jaw for the pillow-block brasses which support the main shaft. It may be considerably thicker than the casting A^2 throughout to better resist its additional strain; but I do not consider that point essential.

A^3 is a casting stoutly webbed and bolted to the piece A′ on the edge opposite to A^2, as shown. B^3 is a casting correspondingly bolted to B′. The cylinder A may itself form the support of this side of the framing, being fixed directly, or through the medium of other castings, on the strong masonry D′ below.

C C are top castings, which are faced and bolted on the inclined surfaces of both the frames A′ B′, and stiffly unite them to form a unit. The upper portions of the castings C C are faced and bolted together. They form by their union a jaw for the brasses for the beam-center.

To the bottom of both the respective castings B′ is bolted a stout central casting, D, extending downward. The lower portion is broadly webbed, and is faced on the two sides, to be stiffly bolted to the pumps, one on each side. This casting unites the frames A′ and B′ together to form a unit at their respective bottoms, and unites the pumps together with the same absolute rigidity, and unites the pumps and the frames to form a unit of the whole. The section of the part D is that of a Greek cross, giving great stiffness. The strain due to the pumping is received very directly by this casting.

The main pumps M constitute in themselves a stout framing, and are bolted under the masonry D′. Stout through-bolts *d* also extend from the bases of the castings A^2 B^2 down through the masonry D′, to take hold of the pumps M. Corresponding bolts, similarly marked, extend down from the base of the castings A^3 A^3, or from the cylinder, or from the casting on which it is bolted, to take hold of the pumps below.

The framing is all in parts of a size convenient for manufacture and transportation. The

strain is received in a nearly right line from one bottom bearing to the other, from each to the top center, and from the crank-bearing to the top and bottom. I may repeat that the downward extension D aids to support the engine by the pumps and to support the pumps by the engine, and particularly to receive the strain of pumping and transmit it in a direct line.

I have described the frame as adapted for a single engine only. In such case the other end of the crank-shaft would be supported by an additional bearing, (not represented,) and which may be entirely independent of this frame. Where two engines with my improved frames are used together, constituting a double engine, they are braced across by castings bolted near the top, and both bearings of the crank-shaft are in the framing.

A steadiment, C^3, mounted between the frames A^2 B^2, forms a guide for the pump-rod on that side of the machine. A corresponding steadiment, C^3, is mounted between A^3 B^3 for a corresponding purpose. Bosses are formed in the castings to give a proper bearing for these important members. Bosses at other proper points aid in giving support for the rock-shaft, governor-shaft, and other members of the mechanism in the required positions.

C^2 is a horizontal gallery, formed of cast-iron or other suitable material, and mounted at the proper level to afford convenient access for attention to the several bearings on the beam. The gallery C^2 rests on a portion of the top of the central pieces, A' B', and is further supported by braces, as shown.

Modifications may be made. I can substitute cast-iron for the whole or a part of the masonry D' between the bases of the castings A^3 B^3 and the pumps below, and the same modification may be made on the other side, under the castings A^3 B^3. The latter castings may be continued down to rest on the masonry D^2; or they may be held up by bolting solidly to the cylinder, or to a condenser, or any suitable casting under the cylinder.

The framing is eminently stiff by virtue of its form, which braces it in all the directions in which strain is received. Additional braces may be introduced in various directions, if desired. I propose especially to introduce a diagonal cross-piece, extending from the interior of the frame B^2 obliquely upward to the interior of the frame A' near its top, with a proper aperture for the passage of the pump-rod. This may be of service in communicating the strain more directly between both main centers and the crank; but I do not believe it generally necessary.

It will be observed that the main portion of the framing, at and above the level of the cylinder, is, in effect, and substantially in form, a rigid triangular framing, with a central bar reaching downward from the apex of the triangle to connect with the pumps. The triangle is composed of the cross-piece connecting the cylinder and crank-bearing in a nearly straight line, and the inclined sides of the other portion of the frame extending from the main center of the beam in nearly right lines to the cylinder and crank, respectively.

I attach importance to the triangular disposition of the metal, as giving the greatest ability to resist the severe strains between the several members.

I claim as my invention—

1. The engine-frame described, composed of the central castings, A' B', side castings, A^2 B^2 A^3 B^3, and top castings, C C, combined and adapted to serve as herein specified.

2. In a steam pumping machine, the central base-piece, D, arranged as shown, in combination with the pumps M, masonry D', and with the triangular framing above, adapted to serve as herein specified.

In testimony whereof I have hereunto set my hand, at Providence, Rhode Island, this 9th day of June, 1880, in the presence of two subscribing witnesses.

GEO. H. CORLISS.

Witnesses:
EDGAR PENNEY,
ED. W. RAYNSFORD.