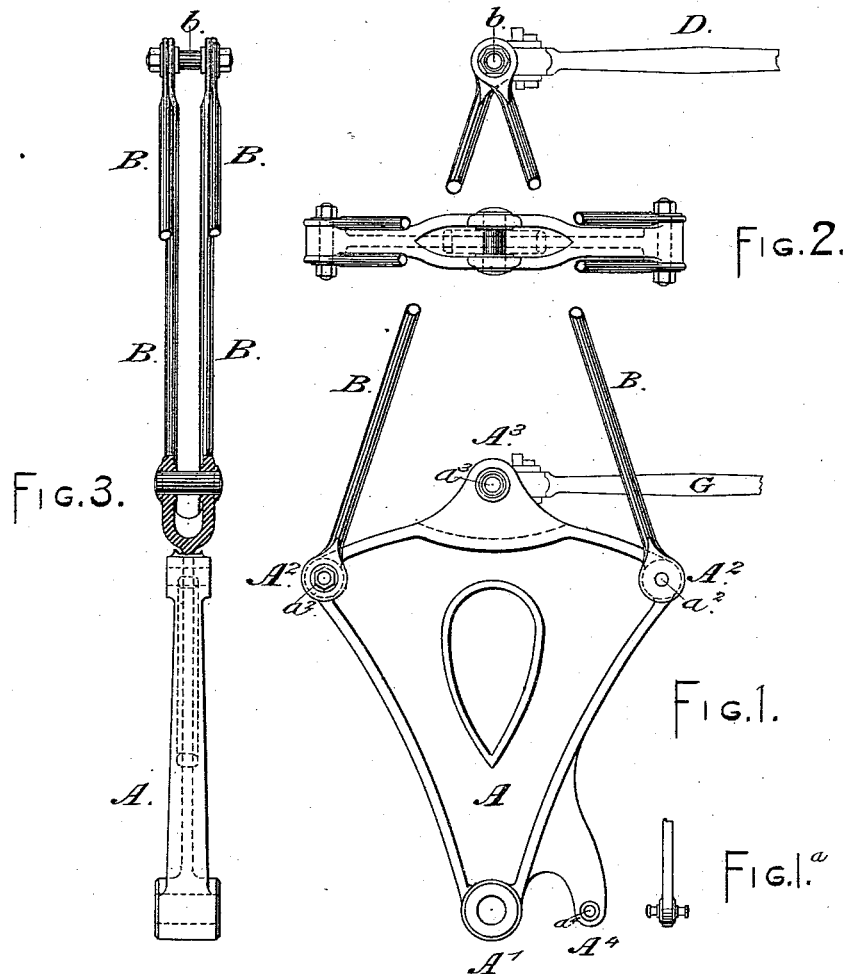


G. H. CORLISS.  
Beam for Steam-Engines.

No. 215,808.

Patented May 27, 1879.



— WITNESSES: —  
*W. C. Brooks*  
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— INVENTOR: —  
*Geo. H. Corlies*  
*by his attorney*  
*J. L. Stearns*

# UNITED STATES PATENT OFFICE.

GEORGE H. CORLISS, OF PROVIDENCE, RHODE ISLAND.

## IMPROVEMENT IN BEAMS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **215,808**, dated May 27, 1879; application filed October 18, 1878.

*To all whom it may concern:*

Be it known that I, GEORGE H. CORLISS, of the city and county of Providence, in the State of Rhode Island, have invented a certain new and useful Construction of Beam or Vibrating Lever for Use in Steam-Engines and Analogous Machines; and I do hereby declare that the following is a full and exact description thereof.

I have devised a form of pumping-engines in which a lever is required vibrating on a fixed center below, and having power connected at the mid-height, while the upper end, which describes the largest arc, carries a connecting-rod, which imparts motion to and is in turn controlled by a crank.

My experiments have been made with that form of engine; but the beam is suitable for use in any analogous situation.

The lower portion is of cast-iron. A stout hub or boss at the bottom takes a firm hold on the center, on which the vibrating motion is performed. The upper end of the cast-iron part is wider, having a general segment form. The upper end has a stout knuckle at the middle of its width adapted to connect with the link which leads out horizontally to the piston-rod. At the extreme angles on the top are bosses adapted to strongly engage with light wrought-iron rods. There are four of these rods. Their lower ends engage with these bosses, one on each side at each angle. Their upper ends engage with a pin which forms the center for the horizontal connecting-rod.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a side view. Fig. 2 is a plan view, partly in section, the plane of section being at the location of this figure on Fig. 1. Fig. 3 is an edge elevation, partly in section. Fig. 1<sup>a</sup> is an edge elevation of the arm represented alongside on Fig. 1.

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

A is the cast-iron portion, certain parts being indicated by additional marks, as A<sup>1</sup> A<sup>2</sup>, &c. The main web with its thickened edge is indicated by A, the lower boss by A<sup>1</sup>, the cor-

ner bosses at the top by A<sup>2</sup> A<sup>2</sup>, and the central knuckle at the top by A<sup>3</sup>. An arm, A<sup>4</sup>, extends from one edge, as represented, to work a feed-pump or air-pump. (Not represented.)

The link G, outlined in Fig. 1, takes hold of the pin a<sup>3</sup> in the knuckle A<sup>3</sup>, and connects the beam to a cross-head connected to the piston of the engine. (Not represented.)

The rods B are peculiarly formed. They may be of any form in section; but I prefer, all things considered, a simple cylindrical section. Each end is upset or thickened and flattened very greatly to afford a fair bearing laterally. There is sufficient space between the pairs of obliquely-placed bars B at their respective edges to allow the free play of the link G as the beam vibrates.

The top center, b, is formed with broad collars, which receive the inner flat faces of the innermost rods B. There is a nut at each end. Under each nut is a washer, which forms a broad bearing against the outer face of the corresponding outermost rod B.

The connecting-rod D may take hold of the upper center, b, by means of the ordinary strap and keyed construction known as a "stub end." The link G may take hold of the middle center, a<sup>3</sup>, by similar means. The arm A<sup>4</sup> holds the center a<sup>4</sup> in the position represented, not by extending directly out from the hub A<sup>1</sup> in a direction at right angles to the general center of the line of the beam, but by an arm of curved outline reaching down from the edge of the beam above. This construction allows the hub A<sup>1</sup> to be inclosed on the lower side in a casing, (not represented,) which may form an efficient strengthening means to support the center, and also a means of preventing the dripping of any lubricating material.

My beam affords the desired strength with great lightness of the upper end, where there is most motion. The side centers, a<sup>2</sup>, are so much below the middle center, a<sup>3</sup>, that nothing comes in contact with the link.

The cast-iron portion A is lightened by being hollowed in the interior. This lightening might easily be carried to a further extent; but it is not necessary. The motion of this end of the lever is slight, and there is little objection to its being made quite massive.

Whether the cast part is made open or not,

the open condition of the upper part is insured by my construction, and thus I am allowed always free access to the center  $a^3$  for adjustment and oiling.

I seek to make the wrought-iron portion B only a little more than sufficient to endure the legitimate strain.

When from any cause the motion becomes ungovernable and excessive, the light upper part of the beam bends and gradually gives way without the violent action which would result from the breakage of a stout casting.

I claim as my invention—

1. The upright beam described, vibrating on a fixed center, and having the lower por-

tion of cast and the upper portion of wrought material, as herein specified.

2. The cast beam A A<sup>1</sup> A<sup>2</sup> A<sup>3</sup> and connecting rod or link G, in combination with the broad-ended rod B and with the connecting-rod D, adapted to serve as and for the purposes herein specified.

In testimony whereof I have hereunto set my hand this 16th day of October, 1878, in the presence of two subscribing witnesses.

GEO. H. CORLISS.

Witnesses:

JEREMIAH MILLER,  
ED. W. RAYNSFORD.