

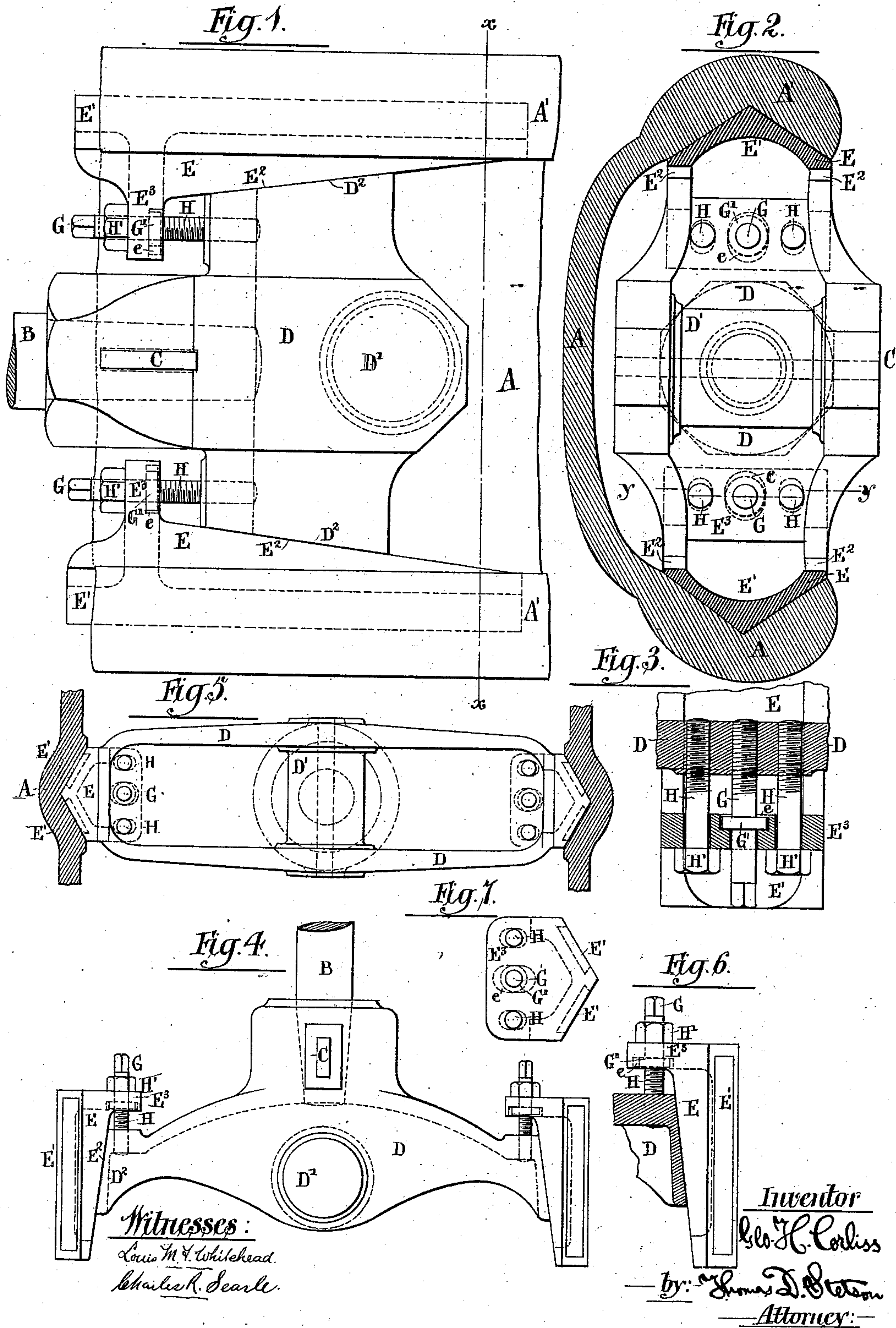
(No Model.)

G. H. CORLISS.

CROSS HEAD.

No. 298,068.

Patented May 6, 1884.



UNITED STATES PATENT OFFICE.

GEORGE H. CORLISS, OF PROVIDENCE, RHODE ISLAND.

CROSS-HEAD.

SPECIFICATION forming part of Letters Patent No. 298,068, dated May 6, 1884.

Application filed February 14, 1884. (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 in Cross-Heads for Steam-Engines and analogous Machinery; and I do hereby declare that the following is a full and exact description thereof.

I will describe the invention as applied at the connection of the piston-rod to the connecting-rod of a steam-engine.

My improvements apply to that class of cross-heads which are arranged to fit closely between parallel guiding-surfaces. It is customary to hold the guides stationary, and to adjust the surfaces of the cross-head to maintain the tight fit required to properly steady the piston-rod.

My invention provides means for adjusting with delicacy, combined with strength and rigidity.

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

Figure 1 is a side view of a cross-head constructed according to my invention, adapted for a horizontal engine having a guide with a V-shaped groove above and a corresponding guide below the center of the piston-rod. Fig. 2 is an end view of the same cross-head, with a cross-section through the adjacent portion of the fixed framing, including the guides. Fig. 3 is a section through a portion on the line *y y* in Fig. 2. Fig. 4 is an elevation of a cross-head constructed according to my invention, adapted for an upright engine having a V-shaped guiding-surface on each side. Fig. 5 is a corresponding plan view. Fig. 6 is a side view of one of the gibs and its adjusting means on a larger scale, and Fig. 7 is a plan view of the same.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

Referring to Figs. 1, 2, and 3, A is a portion of the fixed frame-work, the parts serving as guides for the cross-head being designated by additional marks A'.

B is the piston-rod, and C the cross-key or cotter.

D is the cross-head, certain portions being indicated, when necessary, by additional marks, as D' D². The wrist which receives the connecting-rod (not represented) is marked D'. Inclined surfaces on the upper and under faces are marked D².

E E are long gibs having hollow inner faces and outer faces, E', adapted to match into the V-shaped grooves A'. The inner face presents on each side a sufficiently wide inclined face, E², matching against the inclined surfaces D² on the cross-head. Each gib has a lug, E³, on its inner face, and is provided with three elongated holes to receive the bodies of bolts G H, which are tapped into the cross-head D. The central hole in each lug E³ is recessed on its inner face, as indicated by *e* in Fig. 3. The bolt G has no head. Its outer end is simply squared to receive and be turned by a suitable key. It has a collar, G', at a considerable distance from its outer end. The bolts H have square heads H', and draw the gibs E longitudinally in the direction to force them outward against the slides. Each bolt G G' holds back on its gib and allows the bolts H to be set up as tightly as may be desired without moving the gib, but only holding it firmly, except as the bolt G G' is adjusted to allow the gib to be moved.

The inclination of the surfaces D² E² can be made as slight as desired. I prefer a taper of about one and one-half inch to the foot. The construction affords an extended bearing on the guiding-surfaces A', while requiring but a short cross-head. The hollow form of the gibs allows ample room for projecting ends of the key in the connecting-rod. (Not represented.) The mode of adjustment by shifting the gibs endwise gives a capacity for extraordinary fineness. The lugs E³, by being set considerably inward from the end of the gib, allow room for the bolt-heads H', and for the extended end of the bolt G, without occupying any space beyond the bearing-surface of the gib. This allows the cross-head to run closer to the cylinder-head. It also allows the stuffing-box (not represented) to extend out farther than would be otherwise practicable with the same amount of bearing-surface of the gib E. The recess *e* in the lug E³, by allowing the collar G' to be received therein, allows the gib to be shifted endwise until the lug G³

is quite home against the adjacent surface of the cross-head.

The ordinary cross-heads for horizontal engines, formed to work in guides that are placed 5 above and below the center of the piston-rod, are supported and adjusted by a vertical pin located between the end of the piston-rod and the center of the wrist to which the connecting-rod is jointed. In this construction the 10 up-and-down thrust of the connecting-rod converts the cross-head into a horizontal lever acting upon the vertical pin as a fulcrum, tending to impart a transverse strain to the piston-rod where it enters the cross-head 15 socket.

In my invention I avoid the effect of working over a fulcrum by furnishing instead a firm support to the cross-head directly under and over the center of the wrist. By extending 20 the inclined surfaces D^2 to a point directly under and over the center of the wrist D' , and by extending the gibs E to the same point and considerably beyond it, the up-and-down thrust is received directly against the inclined 25 surfaces $D^2 E'$, and by them transmitted to the gib and slide, thus relieving the piston-rod from the aforesaid transverse strain.

To apply or remove the strap of the connecting-rod, (not shown,) the strap-fastenings 30 being removed and the connecting-rod taken away, it is sufficient to simply operate the bolts $G H$ and draw back one of the gibs E . Then, after moving the cross-head slightly beyond the open ends of the guides, ample space 35 is afforded in which to turn the strap and allow its ready application to and removal from the wrist D' .

Figs. 4, 5, 6, and 7 show a modification in

which the cross-head is more extended. This form may be applied to the cylinder in any 40 position; but it is intended more particularly for upright cylinders. The several parts correspond in make and in functions to the form described.

It is obvious that the guides may be flat or 45 circular as well as V-shaped, the gibs, of course, corresponding; and further modifications may be made by any good mechanic in the forms and proportions without sacrificing the advantages or departing from the principle of the invention. 50

I claim as my invention—

1. The combination, with the cross-head D , having inclined faces D^2 , of gibs E , having inclined faces E^2 , and two or more independent 55 adjusting-bolts, $G G'$ and $H H'$, exerting forces in opposite directions, all arranged for joint operation, to move and to resist the movement of the gibs relatively to the cross-head, substantially as herein specified. 60

2. The combination of a cross-head, D , having inclined faces D^2 , with adjustable gibs E , having inclined faces E^2 , and adapted to be operated in the direction of their length relatively to the cross-head by means of one or 65 more adjusting-bolts, substantially as herein described.

In testimony whereof I have hereunto set my hand, at Providence, Rhode Island, this 12th day of February, 1884, in the presence of 70 two subscribing witnesses.

GEORGE H. CORLISS.

Witnesses:

HENRY MARSH, Jr.,
B. W. PERSONS.