(No Model.)

G. R. CULLINGWORTH.

CROSS HEAD.

No. 343,300. Patented June 8, 1886.

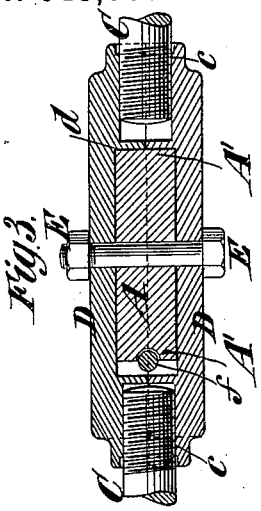

Fig 3.

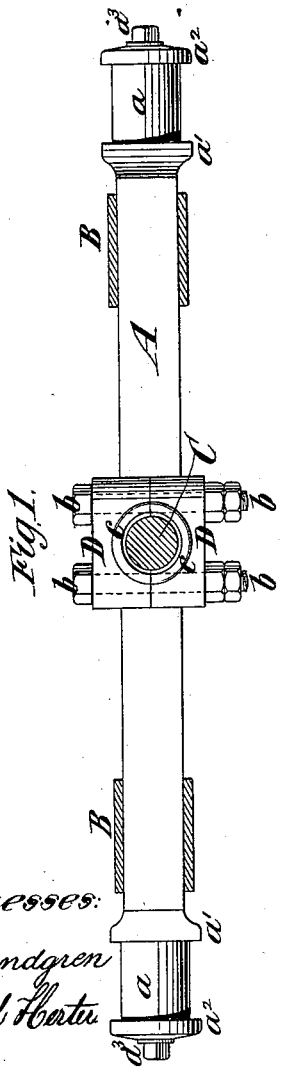

Fig 1.

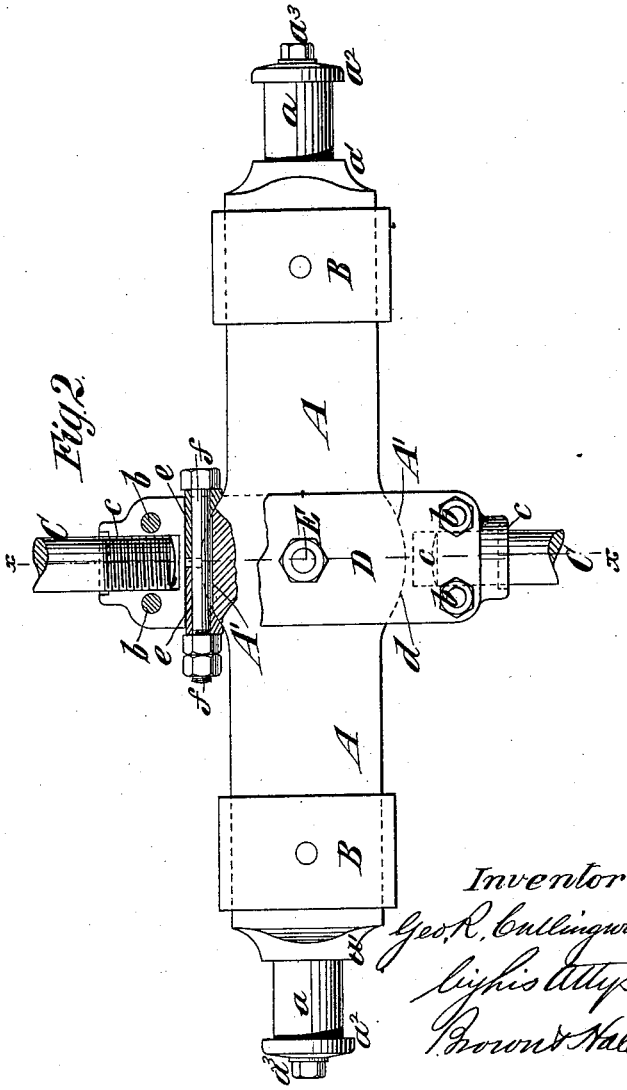

Fig 2.

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UNITED STATES PATENT OFFICE.

GEORGE R. CULLINGWORTH, OF NEW YORK, N. Y.

CROSS-HEAD.

SPECIFICATION forming part of Letters Patent No. 343,300, dated June 8, 1886.

Application filed October 28, 1885. Serial No. 181,122. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. CULLINGWORTH, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Cross-Head and Piston-Rod Connections for Engines, of which the following is a specification.

My invention relates more particularly to air-compressors and pumping-engines in which the power-cylinder and the pump-cylinder are arranged in line, with their pistons upon a common piston-rod; but the invention is generally applicable to engines in which are employed outside connecting-rods attached to the outer ends of the cross-head, and serving to transmit power therefrom to the crank-shaft. In such engines it is desirable that the piston-rod should be so connected with the cross-head as to be self-adjusting relatively thereto, so that any inequality in the length of the two connecting-rods, which may exist when new, or by reason of unequal wear in their boxes, will not cause the cross-head to bind in its guides, nor the pistons to bind in their cylinders.

The invention consists in a novel construction of a clamping device, whereby the piston-rod is connected with the cross-head, and in the combination of such clamping device with the cross-head, as hereinafter more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of the cross-head and a transverse section of the piston-rod, showing the rod connected with the cross-head by my improved device. Fig. 2 is a plan of the cross-head and portions of the rod and clamp, the members of the clamping device being shown partly in section to more clearly illustrate their construction; and Fig. 3 is a transverse section on the plane of the dotted line *x x*, Fig. 2.

Similar letters of reference designate corresponding parts in the several figures.

A designates the cross-head, which consists of a bar of metal approximately flat from end to end, and provided at the ends with wrists *a*, for the attachment of the connecting-rods. The cross-head also has on opposite ends of the wrists *a* collars or shoulders a' a^2, the latter of which may be formed by a cap secured to the end of the wrist by a bolt, a^3. Near opposite ends of the cross-head are fitted slides B, which are fitted to reciprocate in the cross-head guides of the engine.

The cross-head here represented is intended for an engine in which two cylinders are in line, and the two sections of the piston-rod C C are connected with opposite ends of the clamp D, which embrace the cross-head, and through which the piston-rod transmits power to the cross-head. This clamp D is divided in a horizontal plane, and its two halves or sections are secured together by clamping-bolts *b*. The sections C of the piston-rod are received in sockets *c*, at opposite ends of the clamp, and may be screwed therein, as here represented, or fastened by a key or otherwise. The clamp D and the cross-head A are pivoted together by a bolt, E, which extends transversely through them and forms a center on which the clamp and cross-head may swing relatively to each other. The making of the clamp D in two halves or sections enables it to be readily applied to the cross-head A, which could not be readily done if it were made in a single piece, because of the collars or shoulders a', which are integral with the cross-head.

As before-stated, the cross-head consists, essentially, of a flat bar having a considerable width; and it has at opposite sides convex projections A′, the faces of which are concentric with the center pivot, E. The opening in the clamp D is at one end, *d*, curved or made concave to fit the convex projection A′ on that side of the cross-head, and at the other end of the clamp are wedge-blocks *e*, the faces of which are concaved to fit the convex projection A′ on the cross-head, and the backs of which are flat to fit the end wall of the opening in the clamp. These wedge-blocks *e* may be inserted from opposite sides of the clamp D, and may be tightened by means of a bolt, *f*, which passes through them and serves to draw them inward toward each other.

From the above description it will be readily understood that the clamp D and the cross-head A are self-adjusting relatively to each other, as they are made to swing upon a center pivot, E, and hence no binding or cramping of the parts from excessive friction will be produced, even if the cross-head does not stand exactly at right angles to the line of piston-rod.

The cross-head may be readily finished in a shaping-machine, and the concave bearing-surfaces of the clamp and wedge-block *e* may be finished truly in a lathe to fit the curvature of the convex projections A′ of the cross-head.

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

1. The combination, with the cross-head and piston-rod, of a clamp embracing the cross-head, and with which the piston-rod is connected, and a central pivot-bolt passing through the clamp and cross-head, whereby provision is afforded for the self-adjustment of the clamp and cross-head relatively to each other, substantially as herein described.

2. The combination, with a cross-head having at opposite sides convex projections, of a clamp embracing the cross-head, and with which the piston-rod is connected, the clamp at one end of its opening being concave to fit the convex projection on one side of the cross-head, and wedge-blocks having concave faces inserted in the clamp between the opposite end of its opening and the cross-head, substantially as herein described.

3. The combination, with the cross-head A, having at opposite sides convex projections A′, of a two-part or divided clamp, D, and the bolts *b*, for securing its sections together, one end wall of the clamp being concave to fit the convex projection at one side of the cross-head, the wedge-blocks *e*, having concave faces, inserted from opposite sides of the clamp, between the opposite end of its opening and the cross-head, and the bolts *f*, whereby the wedge-blocks may be adjusted, substantially as herein described.

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