No. 793,208. PATENTED JUNE 27, 1905.

P. MILLER.

ENGINE FRAME.

APPLICATION FILED MAR. 16, 1905.

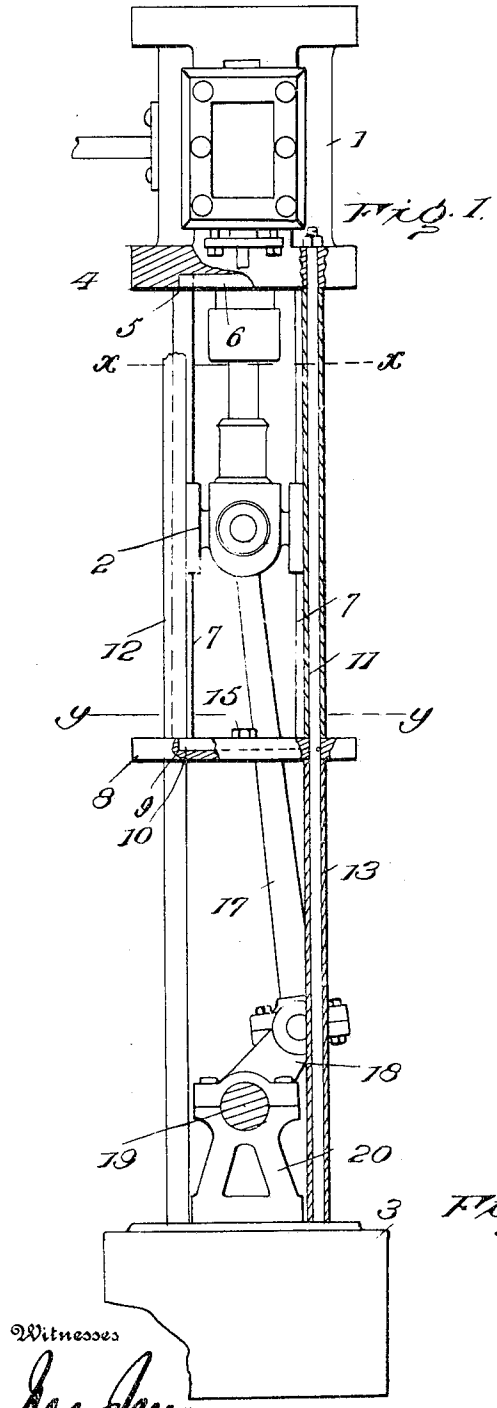

FIG. 1.

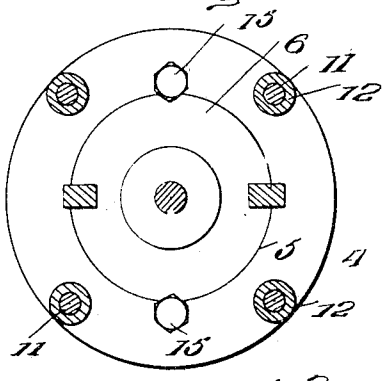

FIG. 2.

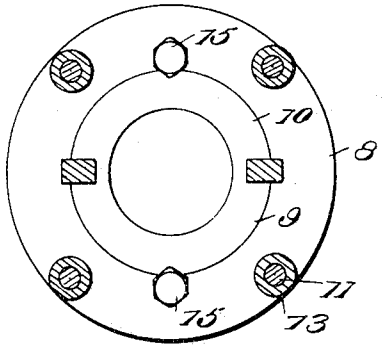

FIG. 3.

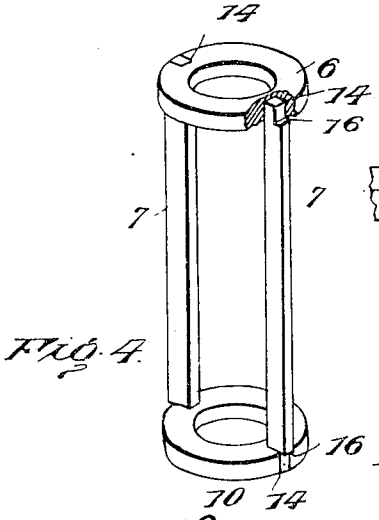

FIG. 4.

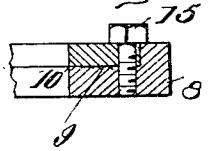

FIG. 5.

Witnesses

Inventor

P. Miller

By Howson & Howson, Attorneys

No. 793,208. Patented June 27, 1905.

UNITED STATES PATENT OFFICE.

PETER MILLER, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-THIRD TO FRANKLIN A. MILLER AND ONE-THIRD TO JOSEPH H. BLACKHAM, OF CINCINNATI, OHIO.

ENGINE-FRAME.

SPECIFICATION forming part of Letters Patent No. 793,208, dated June 27, 1905.

Application filed March 16, 1905. Serial No. 250,493.

To all whom it may concern:

Be it known that I, PETER MILLER, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Engine-Frames, of which the following is a specification.

This invention relates to guides for the cross-head of a reciprocating engine of whatever type, the purpose being to materially reduce the weight of the engine without sacrificing any of its strength or lasting qualities, the improvement being applicable to marine, stationary, or locomotive engines.

For a clear understanding of the invention reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a view in elevation of an engine of the upright type embodying the invention, parts being broken away to show more clearly the structural details. Fig. 2 is a horizontal section on the line *x x* of Fig. 1, looking in the direction of the arrows, showing the parts on a larger scale. Fig. 3 is a view similar to Fig. 2 on the line *y y* of Fig. 1. Fig. 4 is a detail perspective view of the guides and cooperating rings. Fig. 5 is a sectional detail of a support and ring.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The engine-cylinder 1, cross-head 2, and base 3 may be of any construction and relative arrangement, depending upon the type of engine embodying the invention. One head of the engine-cylinder, as 4, constitutes a support and is provided with an annular groove or seat 5, in which is fitted a ring 6, to which an end of the guides 7 is attached. A corresponding support 8 is provided and is formed with a seat 9 to receive a ring 10, to which the opposite end of the guides 7 is secured. The support 8 is of annular formation and is connected to the support 4, engine-cylinder 1, and base 3 by means of tie-rods 11, which pass through corresponding openings in the several parts. Tubes 12 are interposed between the supports 4 and 8 and are mounted upon the tie-rods 11. Other tubes 13 are interposed between the support 8 and the base 3 and are likewise mounted upon the tie-rods 11. The tubes 12 and 13 properly space the parts and sustain the thrust incident to clamping when drawing the parts together. The tie-rods 11 and spacing-tubes 12 and 13, in conjunction with the supports and parts 1 and 3, form a framework which is extremely light and exceedingly strong, thereby enabling the weight of engine structures to be materially reduced without detracting from their efficiency and durability.

The rings 6 and 10 are of similar construction, each being formed with positively-disposed notches 14, in which the ends of the guides 7 are snugly seated and secured. The ring 6 is fitted in the seat 5 of the support 4, so as to come flush therewith, and the ring 10 is seated in the support 8, so as to come flush therewith, suitable fastenings 15 being provided for retaining the rings in the seats of their respective supports against possible movement. The end portions of the guide 7 are reduced to form shoulders 16, which overlap the respective supports, so as to obtain a direct end thrust thereon.

The spacing-tubes 12 are of uniform length, and the same is true of the spacing-tubes 13, to insure equalization of the strain upon the parts when tightening the tie-rods 11.

The cross-head 2 is slidably mounted upon the guide 7, the parts being so arranged as to obviate any possible binding.

By having the support 8 of annular formation the pitman or connecting-rod 17 between the crank 18 and the cross-head 2 can pass therethrough, thereby equalizing the strain upon the engine-frame and resulting in a compact structure.

The crank-shaft 19 is mounted in a pillow-block 20, attached to or forming a part of the base 3.

Having thus described the invention, what is claimed as new is—

1. In an engine-frame and in combination

with the engine-cylinder and cross-head, spaced supports provided with seats, rings fitted in said seats, and guides for the cross-head sustained in proper relation by said rings and supports, substantially as set forth.

2. In an engine-frame and in combination with the engine-cylinder and cross-head, spaced supports provided with seats, rings fitted in said seats, and guides having their end portions reduced and let into the rings and having shoulders at the base of the reduced portions overlapping said supports to exert a direct end thrust thereon.

3. In an engine-frame and in combination with the engine-cylinder and cross-head, spaced supports provided with seats, rings fitted in said seats, and provided at opposite points in their outer edges with notches, and guides having their end portions fitted in said notches and shouldered to overlap the supports to exert an end thrust thereon.

4. In combination, an engine-cylinder, spaced supports, tie-rods connecting the supports, an engine-cylinder, spacing-tubes mounted upon the tie-rods between said supports, guides, means fitted to the ends of the guides for holding them in proper position and with said guides being arranged between the said supports, and a cross-head mounted upon said guides.

5. In combination, an engine-cylinder, a base, supports between the base and engine-cylinder, tie-rods connecting the several parts, spacing-tubes mounted upon the tie-rods between the supports and between the middle support and base, a cross-head, guides therefor, and rings fitted to the ends of the guides and seated in and secured to the aforesaid supports.

In testimony whereof I affix my signature in presence of two witnesses.

PETER MILLER. [L. S.]

Witnesses:
ALFRED SPEER,
WM. H. SPEER.