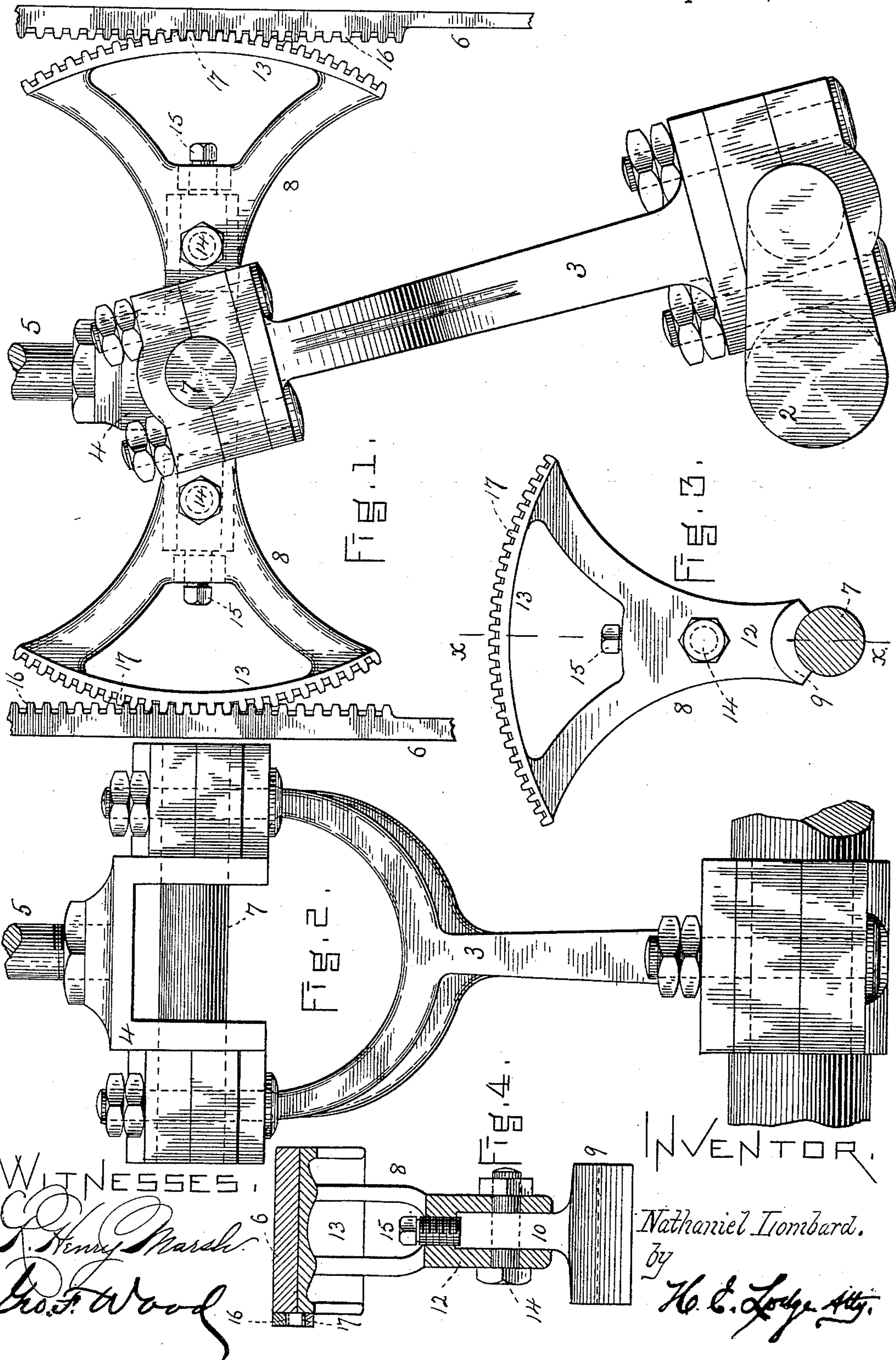


(No Model.)

N. LOMBARD.
CROSS HEAD BLOCK FOR ENGINES.

No. 450,632.

Patented Apr. 21, 1891.



UNITED STATES PATENT OFFICE.

NATHANIEL LOMBARD, OF BOSTON, MASSACHUSETTS.

CROSS-HEAD BLOCK FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 450,632, dated April 21, 1891.

Application filed October 9, 1890. Serial No. 367,520. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL LOMBARD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Cross-Head Blocks for Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in engines, either stationary, portable, or marine, particularly in that portion termed the "cross-head." Ordinarily this part of the engine has sliding reciprocating movement between parallel and straight guides, said cross-head being provided at its end with cross-head blocks rigidly affixed thereto.

My invention consists in pivotally mounting the cross-head blocks, which are to be segmental in shape, so that the required stroke or movement of the cross-head is obtained by oscillation of the cross-head blocks upon the fixed parallel guides, and in providing the oscillating blocks and their parallel guides with teeth, so as to prevent the displacement of the former relative to the latter. In this manner all sliding friction in this part of the structure is obviated. Further details of adjustment and construction will be hereinafter described.

The drawings represent, in Figure 1, a side elevation of a vertical engine in part and embodying my invention. Fig. 2 is a front view of the same. Fig. 3 is a detail view of the cross-head block, side elevation. Fig. 4 is a section of the same on line *xx* in Fig. 3.

In the accompanying drawings, 2 represents the crank, 3 the connecting-rod, 4 the cross-head, and 5 the piston-rod, of a steam-engine, all which are of the usual type of construction.

At 6 6 are shown the parallel guides, between which the cross-head moves. This piece is forked, as shown in Fig. 2, and is bored to receive the cross-head pin 7, by which the connecting-rod 3 is secured thereto, the latter being bifurcated at this end and adapted to straddle the cross-head. (See Fig. 2.)

To support the cross-head between the guides 6 6 and to obviate the friction created by the sliding movement of the cross-head blocks upon the guides as ordinarily occurs, I have shown such blocks 8 8 as curved or segmental pieces, composed as follows: A semi-circular hub 9 in the present instance is formed to fit partially about the connecting-pin. From this hub projects a stud 10, circular or otherwise in cross-section to enter lengthwise the lower end of an arm 12, which at its opposite end terminates in a flanged curved foot or plate 13. A transverse holding-bolt 14 extends through the stud and arm, while an adjusting screw 15 is further provided, whereby accurate adjustment for wear or play can readily be compensated. These cross-head blocks, identical in construction, are mounted upon the cross-head pin 7 with the curved plates 13 bearing against the faces of the guides. Thus as the piston-rod moves and actuates the cross-head such a distance as is required for the length of stroke the cross-head blocks merely rock, while the distance covered by such oscillation from one extreme to the other is equivalent to the length of stroke. In this way it is evident that all sliding friction is removed—in small engines a result of much importance. Further these cross-head blocks are easily adjusted, little or no wear occurs, and they are readily applied to engines of every make at a very small outlay.

To secure the cross-head blocks and compel them to maintain fixed relative positions with respect to the parallel guides, and thereby obviate any tendency to slip, I have formed a series of teeth 16 upon the sides of said guides, while a similar series 17 are created upon or attached to the edge of each block. These teeth project beyond the parts to which they are attached, so as to interlock and yet bring the center of pitch in a plane coincident with the bearing-surfaces of the guides and blocks. It is evident that no strain or thrust is caused by this construction, since the curved plates rock freely and easily upon the guides, the sole function of said teeth being, as before stated, to prevent slip or displacement of the cross-head blocks as they oscillate upon the guides. Other mechanical arrangements than the two series of teeth may be used to effect equivalent results.

What I claim is—

1. In an engine, a cross-head, its parallel guides, the piston and connecting-rod combined with the cross-head blocks oscillating
5 upon the guides, and their adjusting mechanism, substantially as specified.

2. In combination with a piston rod, the parallel guides, a cross-head and its pivotal pin 7, the oscillating cross-head blocks, each

composed of the hub 9, its stud 10, the arm 10 12, and the curved extremity or foot 13, adjustably united, substantially as herein stated.

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

NATHANIEL LOMBARD.

Witnesses:

H. E. LODGE,

FRANCIS C. STANWOOD.