

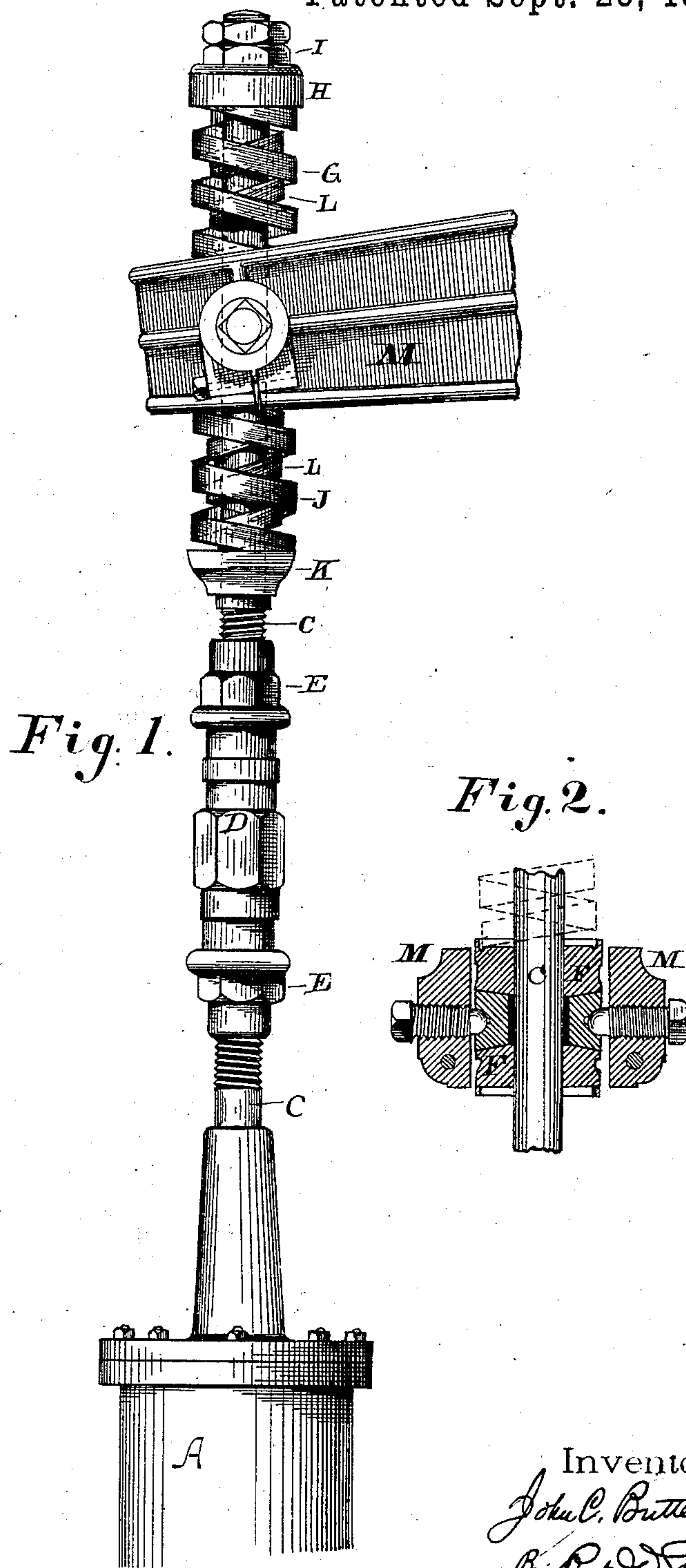
(No Model.)

J. C. BUTTERFIELD.

ATMOSPHERIC HAMMER.

No. 285,389.

Patented Sept. 25, 1883.



Witnesses:  
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Aug Jordan

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# UNITED STATES PATENT OFFICE.

JOHN C. BUTTERFIELD, OF CHICAGO, ILLINOIS.

## ATMOSPHERIC HAMMER.

SPECIFICATION forming part of Letters Patent No. 285,389, dated September 25, 1883.

Application filed May 8, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN C. BUTTERFIELD, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful improvement in that class of atmospheric hammers for which Letters Patent have been heretofore granted to me; and I do hereby declare that the following is a full and accurate description of the same.

10 In the machines described in my patents referred to above the atmospheric-compression cylinder is carried on the driving-crank, and the rapid reversal of motion of the walking-beam, hammer-rod, and hammer causes undesirable strains upon all the bearings intermediate to said cylinder and hammer. These extra strains are reduced to unimportance by my present improvement, which consists in adequate springs applied to the bearing or  
20 cross-head connection between the piston-rod and cross-head, so that the momentum of the walking-beam and hammer-rod is adequately cushioned.

That others may fully understand my improvement, I will particularly describe it, having reference to the accompanying drawings.

Figure 1 is an elevation showing piston-rod, springs, and end of walking-beam. Fig. 2 is a transverse section, showing the cross-head connection between the walking-beam and piston-rod.

A is the atmospheric-compression cylinder carried by the driving-crank. The piston-rod C is made in two parts united by a sleeve, D, into which the two parts of said rod are  
35 screwed, one part having a right-hand thread and the other part having a left-hand thread, so that the length of said rod may be increased or diminished at any time by turning said sleeve. Jam-nuts E E are placed on said rod to jam the ends of the sleeve to prevent change of position. The piston-rod C at its upper end passes through the cross-head F, jointed to the walking-beam M, being free to  
40 slide therein, and extends sufficiently far above said cross-head to receive the spring G, between said cross-head and the cup H, placed at the top of said rod and forced down upon the spring by the nut I. A similar spring, J,

is placed below the cross-head, and confined at its lower end by a cup, K, which is fixed in position upon the rod C. The elastic resistance of the springs G and J must be such that they will not perceptibly yield during the ordinary action of the machine, but only at the  
55 moments of contact and reversal of motion; and the requisite degree of rigidity is obtained by compressing the spring by means of the nut I.

In practice I have found it preferable to employ double springs by putting coils L within the coils G and J. In this way the springs themselves are more elastic. They are cheaper, and failure of one of them is less likely to be  
65 disastrous.

I am aware that a cushion has been applied in a similar way in my machine above mentioned to the hammer-rod for the purpose of preventing the transmission of vibrations from said rod to the frame of the machine; but the springs therein shown do not accomplish the purpose and effect of the springs  
70 herein described, located upon the piston-rod, because being located beyond the bearings, which it is my present purpose to relieve, it is manifest the relief sought cannot be obtained.

Having described my improvement, what I claim as new is—

1. In combination, the driving air-compressing cylinder A, the piston-rod C, cross-head F, and beam M, and the springs G and J, substantially as set forth.

2. In combination, the driving air-compressing cylinder A, the piston-rod C, in two parts united by the sleeve D, having right and left  
85 hand threads, whereby it is made adjustable as to length, the beam M, pivoted cross-head, springs G and J, and tension-regulating nut I, substantially as set forth.

3. In combination with the cylinder A, piston-rod C, cross-head F, the outer springs, G and J, and the inner springs, L, substantially as set forth.

JOHN C. BUTTERFIELD.

Witnesses:

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