

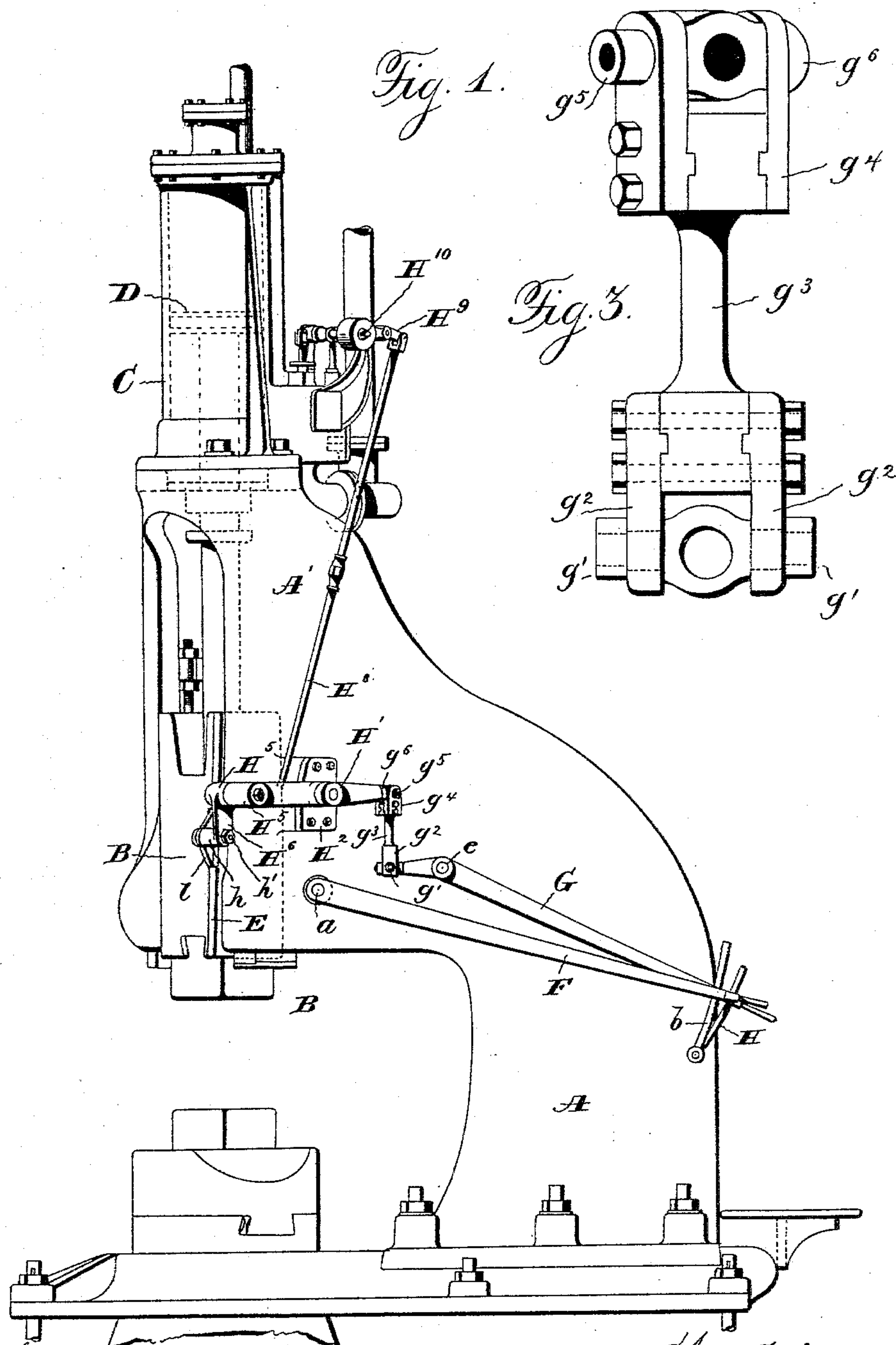
(No Model.)

2 Sheets—Sheet 1.

T. R. MORGAN, Sr.  
STEAM HAMMER.

No. 565,015.

Patented Aug. 4, 1896.



Witnesses:  
Jas. Hutchinson.  
G. F. Downing.

Inventor:  
T. R. Morgan Sr.  
By H. A. Symonds Attorney.

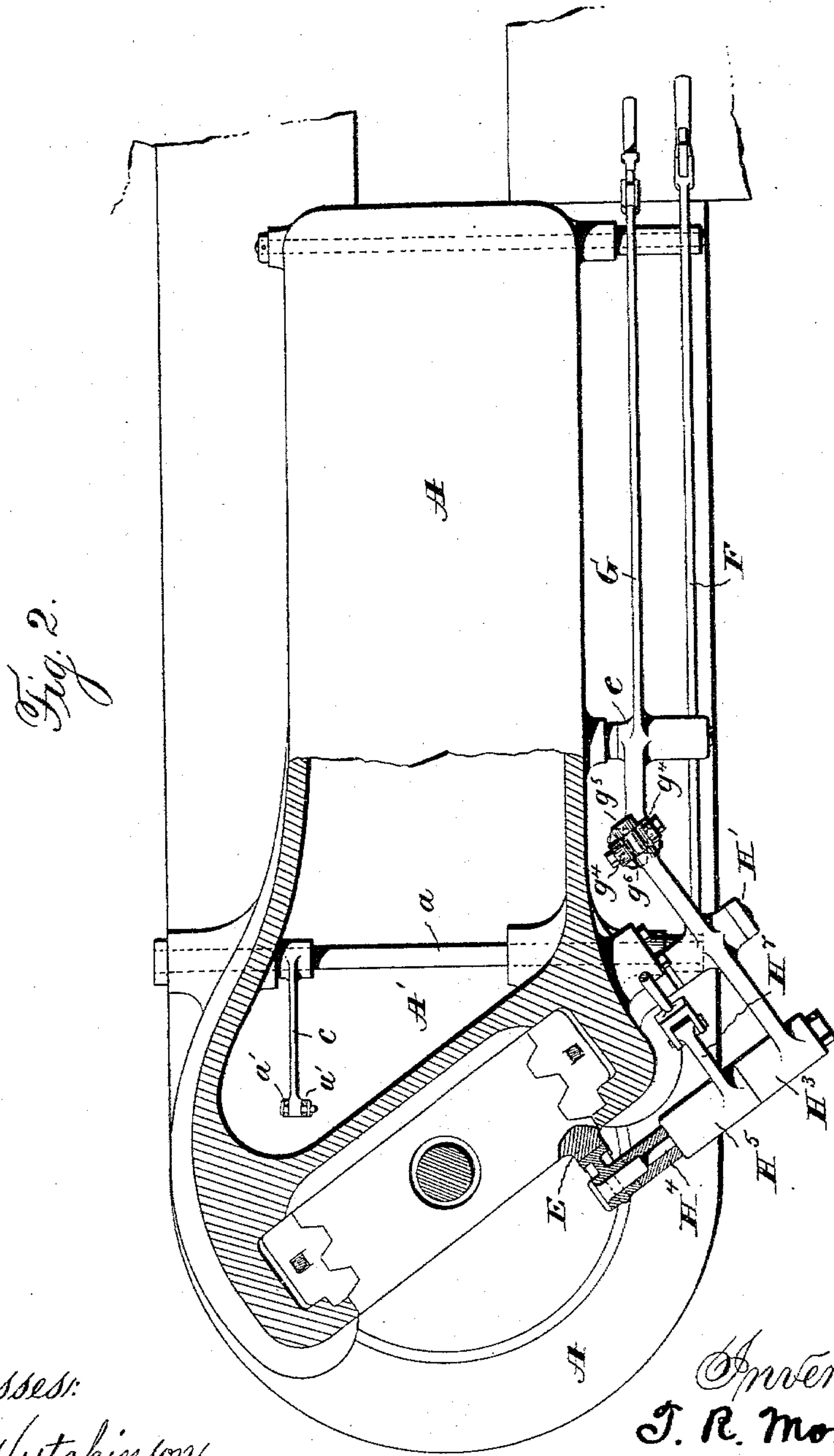
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Attorney



# UNITED STATES PATENT OFFICE.

THOMAS R. MORGAN, SR., OF ALLIANCE, OHIO.

## STEAM-HAMMER.

SPECIFICATION forming part of Letters Patent No. 565,015, dated August 4, 1896.

Application filed May 14, 1895. Renewed January 4, 1896. Serial No. 574,392. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS R. MORGAN, Sr., of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Steam-Hammers; 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.

My invention relates to an improvement in steam-hammers, and more particularly to steam-hammers in which the hammer head or ram is arranged obliquely or at an angle to the frame; and it consists in the peculiar gearing for actuating the valve, as will be more fully hereinafter described.

In the accompanying drawings, Figure 1 is a view in side elevation of a hammer embodying my invention. Fig. 2 is a view in plan, partly in section; and Fig. 3 is a detail view.

A represents the frame or standard of the hammer, the upper portion A', which forms a guide in which the head B moves, being arranged obliquely or at an angle to the frame.

C is a steam-cylinder bolted to the upper end of frame A', and D is a piston-rod carrying the hammer or head B.

The outer face of the upper or guiding section of frame A' is arranged obliquely or at an angle to the portion A of the frame, and the head or hammer is practically parallel with the outer face of the guiding-section of the frame, thus bringing the head or hammer obliquely or at an angle to the section A' of the standard or frame, as clearly shown in Fig. 2, and permitting long bars to be handled from both ends and passed lengthwise under the hammer or head without coming in contact with the section A of the standard.

The head or hammer B moves in suitable removable and adjustable guides D, carried by the guiding-section of the frame A, and is provided on its front face, which is also at an angle to the section A' of the frame, with an inclined rib E, by means of which motion is imparted automatically to the valve-gearing.

F is a throttle-valve lever secured at one end to a rock-shaft *a*, and at its opposite end is provided with a slot through which passes the adjustable guard-rod *b* and to which it can be secured by a spring-catch or any suit-

able device. To the opposite end of rock-shaft *a* is secured an arm *c*, which latter is connected at its free end to the connecting-rod *a'*, the upper end of the latter being attached to the stem or crank-arm of a throttle-valve.

As the rock-shaft *a* is at right angles to the lever F, no special devices are required for connecting the parts; but as the lever which actuates the slide-valve is located parallel to the side of the section A' of the frame, and hence at an obtuse angle to the face of the hammer, it follows that special connections between the shoe which engages the rib E and the lever G are essential in order to prevent binding or straining of the parts while the head or hammer B is in operation.

G is the slide-valve-adjusting lever, fulcrumed at *e* to one side of the section A' of the standard or frame and provided at its outer end with a slot through which passes the adjustable guard-rod H, the lever being adjustably secured to said guard-rod by a spring-catch or any equivalent device.

To the short end of lever G is mounted a short sleeve *g*, free to rotate on said lever and provided at diametrically opposite points with pintles *g'*, to which is pivotally secured a block *g*<sup>2</sup>, bifurcated at its lower end to straddle the sleeve *g* and receive the pintles *g'*. Thus it will be seen that the sleeve *g* is free to rock or rotate on the lever, while the block *g*<sup>2</sup> is free to rock in a direction at right angles to the movement of the sleeve.

Secured to the block *g*<sup>2</sup> is the rod *g*<sup>3</sup>, which latter carries at its upper end the bifurcated block *g*<sup>4</sup>, connected to the pintles *g*<sup>5</sup> of sleeve *g*<sup>6</sup>. This sleeve is similar in construction to sleeve *g* and is mounted on the cylindrical end *h* of lever H. This lever H is journaled in bearing H<sup>2</sup>, which latter is secured to one side of the guiding-section of the frame and projects laterally in a plane parallel with the front face of the hammer and at an acute angle to the bearing carrying the lever G. The lever carries sleeve H<sup>3</sup> and the latter carries the bolt H<sup>4</sup>, on which is mounted the sleeve H<sup>5</sup>, the latter being free to turn on the bolt. This sleeve H<sup>5</sup> is provided with a depending crank-arm H<sup>6</sup>, the horizontal member *h* of which is hollow for the reception of the bolt *h'*, which latter carries the shoe I. This shoe



is loosely mounted on the bolt and bears against the rib E, and hence as the hammer-head B moves upwardly the inclined rib moves the shoe outwardly and hence turns the sleeve H<sup>5</sup> on its bolt. This sleeve H<sup>5</sup> has a rearwardly-projecting arm H<sup>7</sup>, which latter is connected by rod H<sup>8</sup> with the rock-shaft H<sup>9</sup>, which latter actuates the slide-valves. Rock-shaft H<sup>9</sup> carries a weight H<sup>10</sup>, the tendency of which is to hold the shoe I against the inclined rib E. This shoe and its connected parts are designed for the automatic operation of the hammer, and when it is desired to operate the hammer in an automatic manner the lever G is moved so as to bring the shoe toward or away from the hammer-head, the nearer the shoe to the hammer-head the shorter the stroke of the head. The lever G can then be locked. Steam is admitted by actuating the throttle-valve as the hammer-head rises the shoe is forced outwardly or away from the head and acting through the medium of sleeve H<sup>5</sup>, arm H<sup>7</sup>, and rod H<sup>8</sup> operates the valve which opens the exhaust-port for the escape of steam below the piston and at the same time admitting steam above the piston to force the same and hammer-head through its downstroke to impart an effective blow on the work. When the hammer reaches the end of its downstroke, the valve is again shifted by the mechanism described and steam allowed to escape from above the piston and enter below the piston and raise the hammer-head.

By means of the loose connection between the levers G and which, as before stated, are located at an angle to each other, either lever is free to move in its own plane without straining, twisting, or binding any of the parts, the loose joints connecting the parts compensating for the difference in direction of movements of the parts.

It is evident that numerous slight changes might be resorted to in the general arrangement and combinations of parts herein shown without departing from the spirit and scope of my invention. Hence I would have it understood that I do not limit myself to the exact details of construction shown; but,

Having fully described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In a steam-hammer the combination with a frame having a guiding-section arranged at an angle to the main frame, and a hammer-head mounted in said guiding-section, of valve-actuating levers, one journaled to the guiding-section and the other to the main section of the frame and a device connected to one of said levers and carrying a rocking bearing in which the other lever is journaled.

2. In a steam-hammer the combination with a frame having a guiding-section arranged at an angle to the main frame, a cylinder located on the top of the guiding-section and a hammer and piston, of a bearing at the side of the guiding-section and a bearing at the side of the main section of the frame, the two bearings arranged at an acute angle, a lever on each bearing and a device connecting the two levers, the said device having rocking bearings in which the adjacent ends of said levers are journaled.

3. In a steam-hammer, the combination with a frame having a guiding-section arranged at an angle to the main frame, a cylinder on said guiding-section and a piston and hammer, of two levers carried by said frame and arranged at an angle to each other, a sleeve on the inner end of each lever, a block pivoted to each sleeve and a rod connecting the two blocks.

4. In a steam-hammer the combination with a frame having a guiding-section at an angle to the main frame, a cylinder, a piston therein and a hammer-head carried by the piston, of two valve-actuating levers arranged at an angle to each other, a sleeve mounted on the inner end of each lever, each sleeve having pintles located diametrically opposite each other, a block mounted on the pintles of each sleeve and a rod connecting the two blocks.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS R. MORGAN, SR.

Witnesses:

WILLIS H. RAMSEY,

T. D. RUSSELL.