

(No Model.)

3 Sheets—Sheet 1.

C. M. BROWN.  
POWER HAMMER.

No. 497,013.

Patented May 9, 1893.

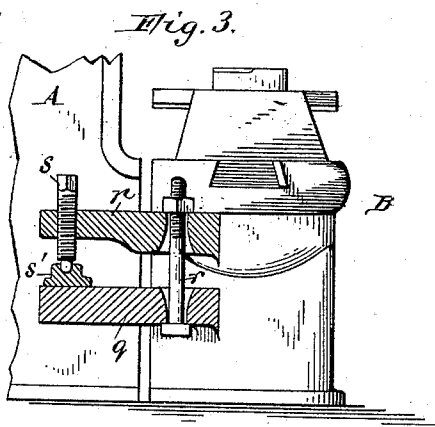
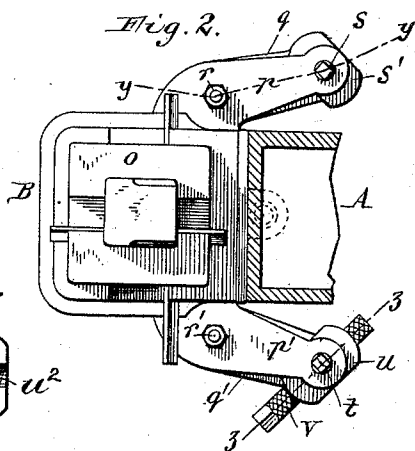
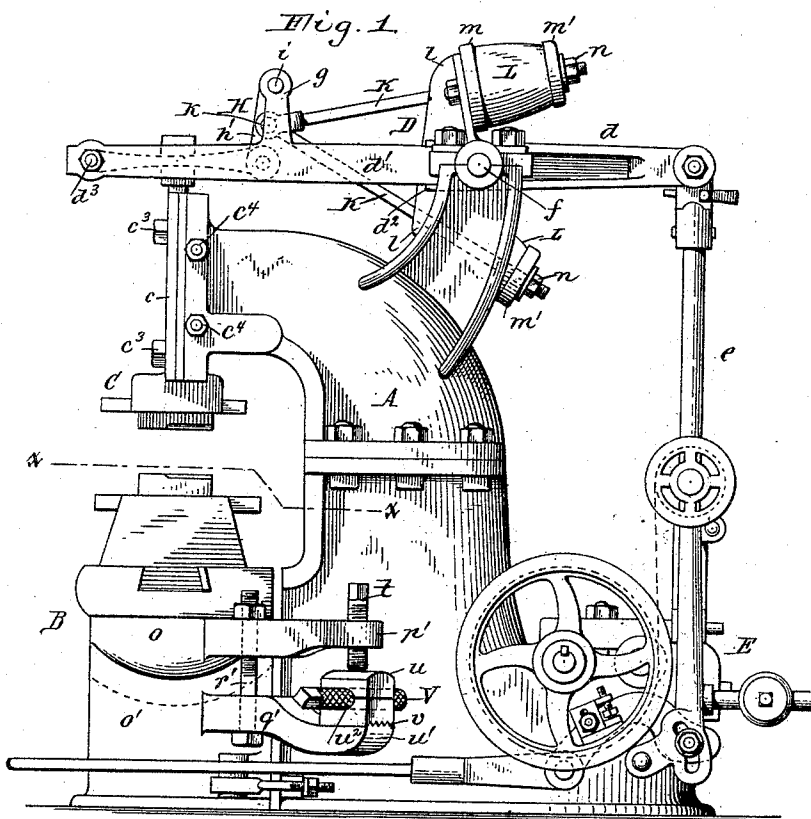
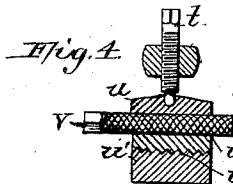
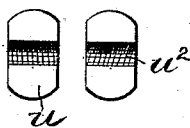


Fig. 12.



Witnesses:

Chas. L. Popp.  
Chester D. Howe.

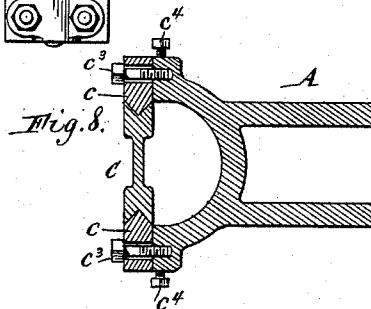
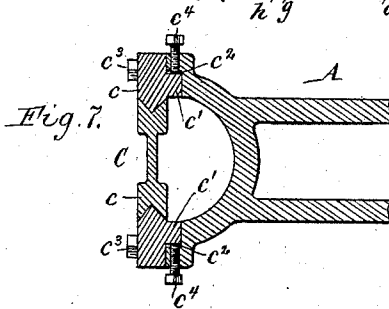
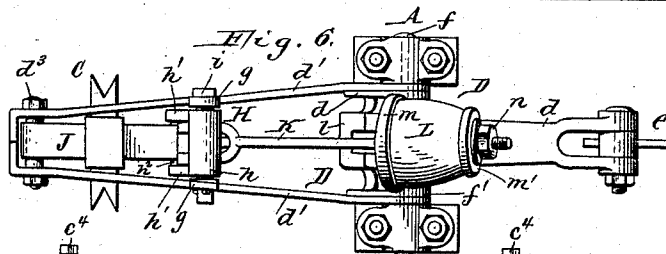
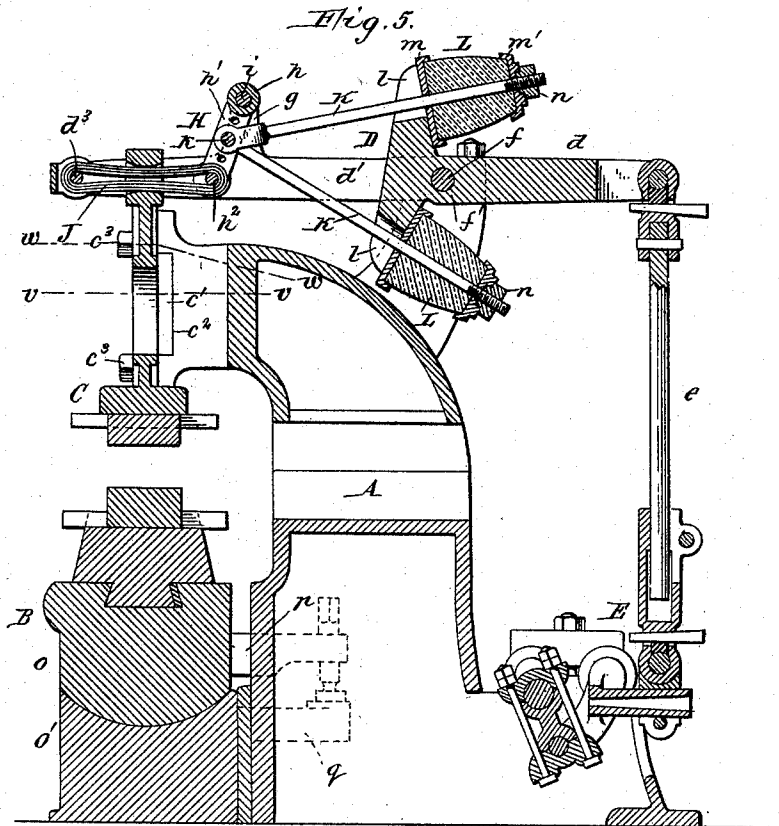
Chas. M. Brown, Inventor.

By Edward Wilhelm  
Attorney.

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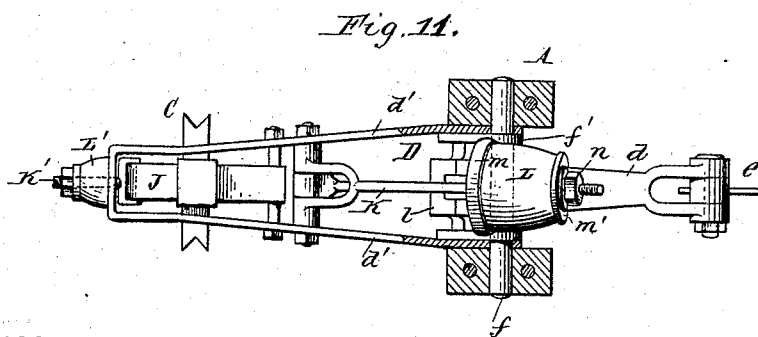
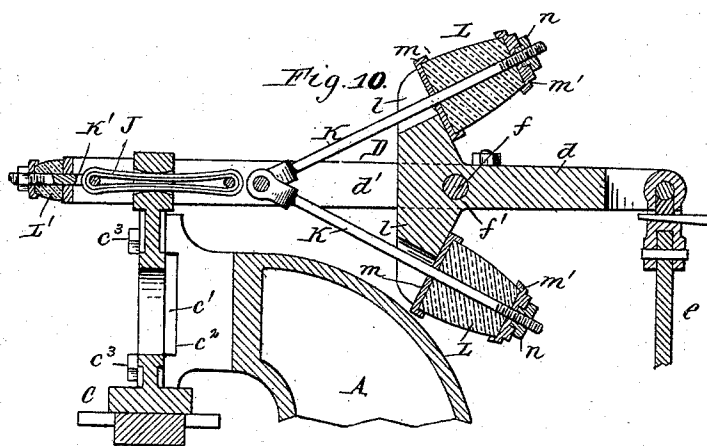
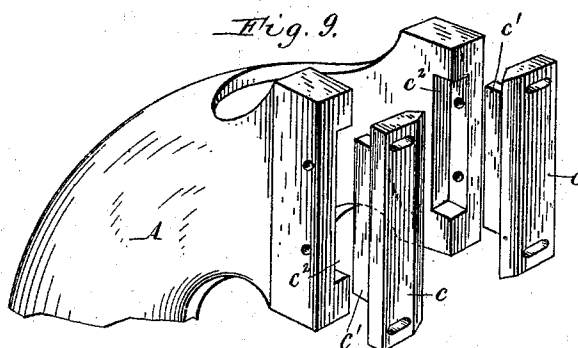
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POWER HAMMER.

3 Sheets—Sheet 3.

No. 497,013.

Patented May 9, 1893.



Witnesses:  
Thos. L. Popp.  
Chester D. Howe.

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# UNITED STATES PATENT OFFICE.

CHARLES M. BROWN, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHRISTOPHER C. BRADLEY, OF SYRACUSE, NEW YORK.

## POWER-HAMMER.

SPECIFICATION forming part of Letters Patent No. 497,013, dated May 9, 1893.

Application filed December 9, 1889. Serial No. 333,086. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES M. BROWN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Power-Hammers, of which the following is a specification.

This invention relates to that class of power hammers in which the ram or hammer head is carried by a flexible strap attached to the helve.

One object of my invention is to provide simple means for adjusting the tension of the ram-supporting strap; another object is to provide convenient means for adjusting the anvil to any desired position with reference to the face of the ram.

The invention has the further object to render the guides of the ram adjustable in a compact and convenient manner so as to avoid obstructing the view of the operator.

In the accompanying drawings consisting of three sheets: Figure 1 is a side elevation of a power hammer provided with my improvements. Fig. 2 is a fragmentary horizontal section thereof, in line  $x-x$ , Fig. 1. Fig. 3 is a vertical section in line  $y-y$ , Fig. 2. Fig. 4 is a similar view in line  $z-z$ , Fig. 2. Fig. 5 is a sectional elevation of the power hammer. Fig. 6 is a top plan view of the helve and its supports. Figs. 7 and 8 are horizontal sections in lines  $v-v$  and  $w-w$ , Fig. 5. Fig. 9 is a fragmentary perspective view of the hammer frame and the adjustable guides, showing the latter detached. Fig. 10 is a fragmentary view of the helve and ram showing a modified construction of the means whereby the strap which supports the ram is held taut. Fig. 11 is a top plan view thereof, partly in section. Fig. 12 is an inside plan view of the half nuts for adjusting the anvil.

Like letters of reference refer to like parts in the several figures.

A represents the stationary frame of the machine, B the anvil, and C the ram or hammer head which slides between upright guides  $c$  adjustably secured to the upper front portion of the frame above the anvil. The upper front portion of the main frame is provided with two upright jaws to which the

guides are adjustably secured, as shown in Figs. 7, 8 and 9. These guides are each provided on the rear side with an upright rib  $c'$ , which is seated in a corresponding recess  $c^2$  formed in the inner front corner of the adjacent jaw of the main frame. The two recesses on the inner opposing sides of the two jaws of the main frame permit the guides to be adjusted toward each other, and the shoulders of the recesses guide the ribs horizontally and support the guides in adjusting the latter. The weight of the guides and the perpendicular strains to which they are exposed in the operation of the hammer are transmitted to the main frame directly by the horizontal shoulders of the ribs and recesses, and are not applied to the fastening bolts.

$c^4$  represent adjusting screws arranged in threaded openings in the sides of the front portion of the main frame and bearing with their inner ends against the ribs or lugs  $c'$  of the guides. Upon loosening the fastening bolts  $c^3$ , the guides can be moved inwardly by means of the adjusting screws to take up wear; the fastening bolts being again tightened after the guides are properly adjusted. This forms a compact construction which narrows the front portion of the hammer and gives the operator a much better view of his work than can be obtained when wide, heavy lugs for the support of the adjusting screws are arranged outside of the guides.

D represents the helve pivoted to the upper portion of the main frame and connected at its rear end with the actuating mechanism E by a connecting rod or pitman  $e$ . This actuating mechanism may be of any well known construction. The helve is composed of a solid rear portion or arm  $d$ , preferably of cast iron, and an open front portion or frame consisting of two wide, flat, wrought-iron bars  $d'$ . These bars extend forwardly from the arm  $d$  and are pivoted at their rear ends concentric with the journals of the helve. The front ends of these bars are bent inwardly, and abut against each other and are connected together by a horizontal bolt  $d^3$ , or other means, but, if preferred, these bars may be made in one piece of wrought-iron bent to the proper form. The helve is pivoted by means

of a horizontal bolt or pin  $f$  secured tightly in a hub or boss  $f'$  formed at the front end of the rear arm of the helve and journaled with its end portions in bearings or journal boxes arranged at the upper portion of the main frame, as clearly represented in Figs. 1, 5 and 6.

$g g$  represent two upright parallel standards formed on the front bars  $d' d'$  of the helve, and  $H$  an open frame which is suspended from a transverse bolt or pin  $i$  arranged in the upper ends of the standards  $g$ . The frame  $H$  consists of a hub  $h$ , side bars  $h'$  and a lower connecting bolt  $h^2$  and extends downwardly between the front bars of the helve.

$J$  represents the flexible strap carrying the ram and which passes with its rear portion around the lower bolt  $h^2$  on the frame  $H$  and with its front portion around the transverse pin or bolt  $d^3$  connecting the front ends of the bars  $d' d'$ , or, in case the front bars of the helve are formed in one piece, around a supporting bolt or pin arranged at the front end of the helve for the purpose. The strap passes loosely through an opening in the upper portion of the ram, the supporting bolts of the strap being preferably so arranged that the ram is supported at the central portion of the strap.

$K K$  represent tension rods pivoted at their front ends to a transverse bolt  $k$ , which is secured in the pivoted frame  $H$ . These rods diverge rearwardly on the upper and lower sides of the helve.

$L L$  represent rubber or other suitable springs arranged upon the rear portions of the tension rods and bearing with their front ends against lugs or abutments  $l l$  formed on the upper and lower sides of the helve. These springs are confined between caps or flanged plates  $m m'$  and the tension rods pass loosely through central openings in these plates and in the springs. The rear end portions of the tension rods are screw threaded and the springs  $L$  are held upon the tension rods and pressed against the lugs or abutments  $l$  by screw nuts  $n$ . The outer ends of the lugs  $l$  are notched for the introduction of the tension rods, as shown in Figs. 5 and 6.

Upon tightening the nuts  $n$ , the springs  $L$  are compressed between the nuts and the lugs on the helve, thereby drawing the frame  $H$  rearwardly and tightening the ram-carrying strap. By adjusting the nuts upon the tension rods, the tension of the strap is increased or diminished and the ram is rendered more or less yielding, proportionately to the tension of the springs. As the strap is connected at one end to the pivoted frame, which offers a yielding resistance to the deflection of the strap, an elastic tension of the strap is always maintained, which, while rendering the strap sufficiently stiff to cause the ram to follow the movements of the strap, permits the strap to yield under the force of the blows, thereby preventing the concus-

sions of the ram from being transmitted to the driving mechanism.

By placing the connecting bolt to which the tension rods are pivoted at a greater or less distance from the fulcrum of the pivoted frame  $H$ , the leverage of the springs upon the strap and the tension of the strap are correspondingly increased or diminished. By placing the bolt farther away from the fulcrum of the levers, the springs exert a greater force on the strap and render it comparatively stiff, while by placing it nearer to the fulcrum, the tension of the strap is diminished and the strap is rendered more flexible and yielding. By this construction the hammer is thoroughly cushioned and protected against severe shocks and the tension of the ram-carrying strap is readily regulated.

The springs  $L$  serve the double purpose of keeping the flexible strap  $J$  yieldingly taut and of giving a large range of flexible movement to the front end of the helve.

In the construction and arrangement of the parts represented in Figs. 1, 5 and 6 of the drawings, the springs  $L$  serve the double purpose of cushioning the helve and applying a yielding tension to the ram carrying strap. In the construction represented in Figs. 10 and 11, a separate tension rod  $K'$  and spring  $L'$  are employed for yieldingly supporting one end of the strap and the main tension rods and springs are employed simply for cushioning the helve.

It is obvious that the front bars of the helve may be rigidly secured to the arm  $d$  instead of being pivoted thereto, if desired.

The anvil  $B$  is divided and consists of an upper part  $O$  and a lower part  $O'$ , the contiguous surfaces of the parts being spherical, so that the upper part can be tilted or adjusted to any desired position upon the stationary lower part. The lower part is preferably provided with the concavity or socket-portion and the upper part with the corresponding convex portion, as shown. The upper part is provided at or near its rear corners with rearwardly and outwardly projecting arms  $p p'$  and the lower part is provided with similar arms  $q q'$  arranged a short distance beneath the upper arms.

$r r'$  represent vertical fastening bolts passing through the inner portions of the arms of the two anvil sections and whereby the parts of the anvil are firmly secured together after being adjusted.

$s$  represents a vertical adjusting screw arranged in a threaded opening in the outer portion of one of the upper arms  $p$  and seated with its lower rounded end in a washer or block  $s'$  resting upon the flat upper side of the lower arm  $q$  below, which washer is provided with a socket for receiving the rounded end of the adjusting screw.

$t$  represents a similar adjusting screw arranged in a threaded opening in the opposite arm  $p'$  of the movable anvil section and seated with its lower rounded end in a divided or

double nut  $u u'$  resting upon the outer end of the arm  $q$  below. The upper part  $u$  of this nut is provided in its top with a socket in which the rounded end of the adjusting screw is seated. In the contiguous portions of the parts of the divided nut is formed a threaded opening  $u^2$  which extends through the nut at right angles, or nearly so, to a radial line drawn diagonally through the adjacent corner of the anvil. The portion of the threaded opening in the upper part of the divided nut is threaded in an opposite direction from the part of the opening in the lower half of the nut.

V is a horizontal adjusting screw having a double right and left hand thread and engaging in the screw threaded opening of the double nut, one of the screw threads engaging with the thread of the upper part of the nut and the other thread thereof with the thread of the lower part of the nut. The lower part of the nut is provided on its under side with ribs or serrations  $v$  which interlock with corresponding serrations on the upper side of the adjacent supporting arm  $q'$ . These serrations extend toward the center or vertical axis of the anvil block, so as to permit the lower half of the nut to slide inwardly and outwardly on the supporting arm, in a direction at right angles to the horizontal set screw, while preventing the same from moving lengthwise of the horizontal adjusting screw, upon turning the latter.

Upon loosening the fastening bolts  $r r'$ , the upper movable part of the anvil can be tilted forwardly at any desired angle with reference to the face of the ram by turning the vertical set screws  $s t$  forwardly, the arms  $p p'$  of the movable part of the anvil being caused to move upward on the adjusting screws and thereby tilting the movable part of the anvil forwardly. After the anvil is properly adjusted, the bolts  $r r'$  are again tightened to firmly hold the parts in place. To tilt the anvil backwardly, the vertical adjusting screws are screwed upwardly to permit the arms to move downwardly and the anvil is then shifted by screwing the nuts of the fastening bolts  $r r'$  downward on the bolts, so as to depress the upper arms  $p p'$  after which the vertical adjusting screws are screwed down upon the washer and divided nut to limit the farther downward movement of the upper arms  $p p'$ . In this position of the parts, the anvil is prevented from tilting upwardly by the fastening bolts  $r r'$  and it is prevented from tilting farther backward by the vertical adjusting screws. The anvil is tilted sidewise in either direction, by loosening the fastening bolts  $r r'$  and screwing one of the vertical adjusting screws  $t s$  upward and the other downward.

The bolt holes in the arms  $p p' q q'$  through which the fastening bolts  $r r'$  pass, are made considerably larger than the bolts and are flared toward both ends, as shown in Fig. 3, so as to provide the necessary play to per-

mit the upper movable part of the anvil to be tilted to different inclinations.

If it is desired to rotate or adjust the movable part of the anvil horizontally, this is readily accomplished by means of the horizontal adjusting screw V. Upon turning this screw the two parts of the divided nut tend to move in opposite directions, but as the lower part of the nut is held against lateral movement on the arm by the ribs  $v$ , the upper part alone is moved laterally and carries with it the vertical adjusting screw seated therein and the adjacent arm of the upper part of the anvil, thereby turning the latter upon the stationary lower part.

The vertical movement of the upper movable arm  $p'$  of the anvil causes the angle of the adjusting screw  $t$  to vary with reference to the lower fixed arm  $q'$  and this variation in the position of the adjusting screw tends to cause the divided nut to move radially inward or outward on the lower arm  $q'$ , according as the upper arm is moved up or down. To permit of this movement of the divided nut, the ribs of the nut and the supporting arm  $q'$  are arranged radially.

The anvil proper being capable of a practically universal adjustment sidewise as well as forwardly and rearwardly, the lower die which is carried by the anvil may be quickly and conveniently adjusted to any desired position with reference to the upper die carried by the ram.

Instead of employing two fastening bolts  $r r'$ , one for each pair of arms, a single bolt may be employed in which case the bolt is arranged at the center of the rear side of the anvil, as shown by dotted lines in Fig. 2, and the parts of the anvil are provided with lugs through which the bolt passes.

I claim as my invention—

1. The combination with the main frame, the helve and the ram, of a flexible strap carrying the ram, a rigid support arranged upon the helve and supporting the outer portion of the strap, a frame pivoted upon the helve and supporting the inner portion of the strap, a tension rod attached to said pivoted frame and a spring arranged upon the tension rod and bearing against the helve, substantially as set forth.

2. The combination with the main frame, the helve and the ram, of a flexible strap carrying the ram, a rigid support arranged upon the helve and supporting the outer portion of the strap, a frame pivoted upon the helve and supporting the inner portion of the strap, and a tension rod arranged upon the helve and made adjustable upon said frame toward and from its fulcrum, substantially as set forth.

3. The combination with the main frame, the helve pivoted thereto and the ram guided between ways on the main frame, of a flexible strap carrying the ram and supported at its front portion upon the helve, a frame pivoted to the helve and supporting the rear portion of the strap, tension rods pivoted with their

front ends to said frame and diverging rearwardly on the upper and lower sides of the helve, and springs arranged upon said rods, substantially as set forth.

5 4. The combination with the main frame, of the rear portion of the helve pivoted thereto, the front portion of the helve made separate from the rear portion and pivoted concentric with the journals thereof, a flexible  
10 strap carrying the ram and supported with one portion upon the front portion of the helve, a frame pivoted upon the front portion of the helve and supporting the opposite  
15 end of the strap, a tension rod attached to said frame, and a spring arranged upon the tension rod and bearing against the rear portion of the helve, substantially as set forth.

5. The combination with the ram, of a main frame having in its front jaws recesses provided with horizontal shoulders, upright  
20 guides having horizontal slots and having on their rear sides ribs which are provided with horizontal shoulders and are seated in said recesses, longitudinal clamping screws which  
25 pass through said slots and secure the guides to the main frame, and transverse adjusting screws which are arranged in threaded openings in the jaws of the main frame and bear  
30 inwardly against the ribs of the guides, substantially as set forth.

6. The combination with the stationary lower part of the anvil, and the movable upper part thereof, of a divided nut having its  
35 two parts provided with screw threads running in opposite directions and having its lower part supported on the stationary lower part of the anvil and its upper part connected with the movable upper part of the anvil,  
40 and a double threaded screw engaging in both parts of the nut, whereby the upper parts of the nut and anvil are adjusted with reference

to the lower parts of the nut and anvil, substantially as set forth.

7. The combination with the upper and lower parts of the divided anvil having contiguous spherical faces and each provided with a projecting arm, of a divided nut resting upon the arm of the lower part and provided in the contiguous portions of its parts with a horizontal threaded opening, the portions of the openings in the two parts being threaded in opposite directions, a horizontal  
50 adjusting screw having a double right and left hand screw thread engaging in the threaded opening of the nut, and a vertical screw  
55 arranged in the arm of the upper movable part of the anvil and bearing upon the divided nut, substantially as set forth.

8. The combination with the upper and lower parts of the divided anvil having contiguous spherical faces and each provided with a projecting arm, the lower arm being provided with ribs or serrations, of a divided  
60 nut resting upon the arm of the lower part and provided in its under side with ribs interlocking with the ribs of the arm, and in the contiguous portions of its parts with a horizontal threaded opening, the portions of the  
65 openings in the two parts being threaded in opposite directions, a horizontal adjusting  
70 screw having a double right and left hand screw thread engaging in the threaded opening of the nut, and a vertical adjusting screw arranged in the arm of the upper movable  
75 part of the anvil section and bearing upon the divided nut, substantially as set forth.

Witness my hand this 18th day of November, 1889.

CHARLES M. BROWN.

Witnesses:

HENRY P. SINDEN,  
JOS. WELTIK, Jr.