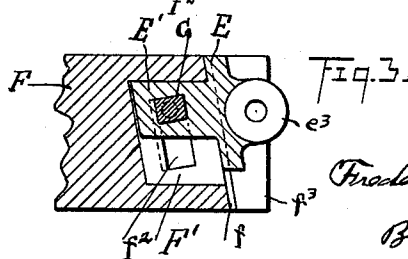
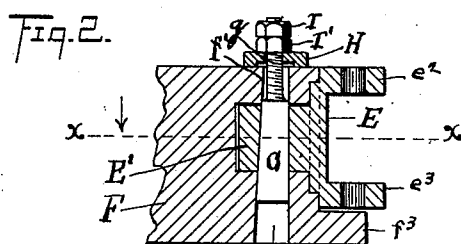
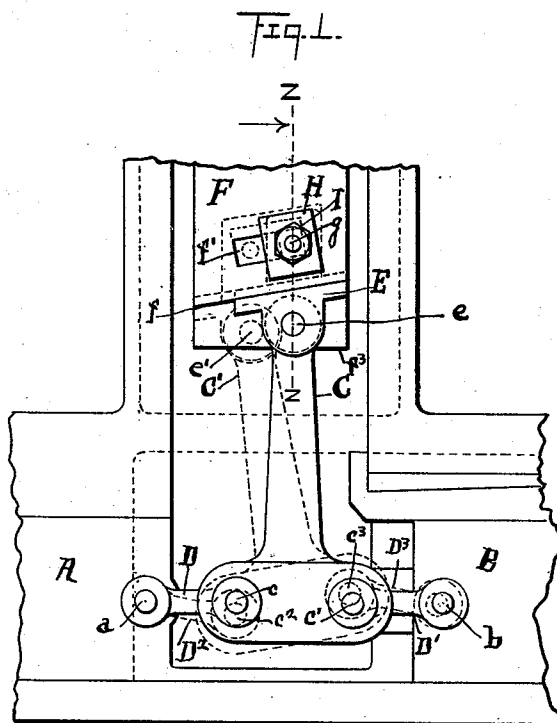


(No Model.)

F. W. BRUCH.
GRIPPING TOGGLE FOR BOLT HEADING MACHINES.

No. 565,877.

Patented Aug. 18, 1896.



WITNESSES

Willie S. Lowrie.
E. E. Osborne.

INVENTOR.

Frederick W. Bruch,
By J. A. Osborne & Co.,

ATTORNEYS.

UNITED STATES PATENT OFFICE.

FREDERICK W. BRUCH, OF CLEVELAND, OHIO, ASSIGNOR TO THE ACME
MACHINERY COMPANY, OF SAME PLACE.

GRIPPING-TOGGLE FOR BOLT-HEADING MACHINES.

SPECIFICATION forming part of Letters Patent No. 565,877, dated August 18, 1896.

Application filed March 20, 1896. Serial No. 584,195. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. BRUCH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Gripping-Toggles for Bolt-Heading Machines, of which the following, with the accompanying drawings, is a full, clear, and exact specification.

My invention relates to gripping-toggles of machines adapted to heading spikes, bolts, and rivets and to forging metal for various purposes. In machines of this character spikes, bolts, rivets, &c., are formed from rod or bar metal, the rod or bar being gripped between two dies, one of which is movable to and from the other die to grip and hold the metal rod or bar while being operated upon and to release the grip therefrom after the operation of heading or forging shall have been completed. The upsetting of the metal to form the spike, bolt, or rivet head is done by a plunger-head that strikes the end of the rod or bar while gripped between the dies. In most of these machines the movable die is operated through toggles from a crank upon a shaft that rotates continuously with uniform speed. As it is necessary that the rod or bar remain gripped between the dies while the metal is being upset, and as the dies would close and open almost instantly as the crank rounds the forward throw of its travel if no provision were made to prolong the grip of the dies, various expedients have been adopted to prolong the grip of the dies. One of these means consists in having the toggles so disposed that one of the toggles will be brought to a right angle with the line of travel of the toggle-operating member in advance of the other toggle. This is accomplished in two ways, one of which consists in pivoting the toggle-operating member at one side of a line extended at right angles from a line drawn through the extreme pivotal points of the toggles. In this form the three pivotal points in the toggle-operating member are in the angles of an isosceles triangle. In the other form the pivotal points of the

toggle-arms upon the toggle-operating member are in a line at an angle to the axial line of said arm other than a right angle. In other words, the three pivotal points in the toggle-operating member are in the angles of a scalene triangle. In both cases the toggles are said to be "staggered," because the toggles will at no time be in line with each other, *i. e.*, their inner pivotal points are never in a line at right angles with their line of travel. The extent of "stagger" in both cases determines the length of time the dies will remain closed. The length of time the dies remain closed ought to be regulated to the amount of metal to be upset while the dies are gripped and to the character of the work. In the machines of the character referred to heretefore in use when the toggles have been staggered they were adapted to a single work only. If made for rivets or small bolt-heads, the dies would not grip long enough to upset larger work, and if the toggles were staggered for larger bolts, spikes, and forging work the dies would grip too long for smaller work. Such machines are restricted to one class of work, while it is often desired to do other kinds of work with the machine.

The object of my invention is to make the gripping-toggles of bolt-heading machines adjustable, so that machines to which my invention shall be applied may be adjusted to the widest range of sizes of rivets, bolts, and spikes within possible limits of the machine; and, further, to simplicity of construction and ease of adjustment of said adjusting means.

My invention consists in making the pivotal point between the operating-slide and the operating-toggle element adjustable transversely of the line of travel of said pivotal point, and also in the means herein described to accomplish such adjustment.

In the drawings, Figure 1 is a plan view of that part of a bolt heading and forging machine to which my invention applies and fully illustrates the application of the invention to such a machine. Fig. 2 is a vertical

section on the line Z Z, the toggle-operating element being removed; and Fig. 3 is a horizontal section on the line X X of Fig. 2.

A represents the machine-frame, or a fixed part of the machine, and B is the die-slide to which the movable die (not shown) is attached. The toggle-operating element C is connected with the fixed part of the machine by the toggle-link D, said toggle-link being attached to the fixed part of the machine by the pivot *a* and to the toggle-operating member C by the pivot *c*, and the toggle-operating member C is connected with the die-slide B by the toggle-link D', said toggle-link being attached to the die-slide by the pivot *b* and to the toggle-operating member by the pivot *c'*. The toggle-operating element is pivoted at *e* to the operating-slide F. Said slide F receives reciprocating motion from any suitable means. The reciprocation of the slide F reciprocates the die-slide B through the toggle-operating member and the toggle-links to open and close the gripping-dies.

My invention, which consists in making the pivotal connection between the slide F and the toggle-operating member C adjustable and the means by which such adjustment is accomplished, provides for varying the grip of the dies by varying the time that the pivoted point *b* will remain at the extreme outer limit of its travel.

In the form of toggle-operating member shown in the drawings the pivotal point *e* is in a line at right angles to a line through the centers of the pivots *c* and *c'*, and always remains so. When the parts are in the position illustrated, the pivot-points *a*, *c*, *c'*, and *b* are in a right line when the dies are closed. By moving the pivot-point *e* to one side, as indicated by the dotted outlines C' and *c'*, the toggle-link D will be advanced, as shown by the dotted lines D², and the toggle-link D' will be drawn backwardly, as shown by the dotted lines D³. In this position the pivot-point *c* will be at one side of a line extended through the pivot-points *a* and *b* at *c*², and the pivot-points *c'* will be at the opposite side of said line at *c*³. In other words, the pivot-points of the toggles will be staggered. The greater the distance the pivot-point *e* is moved to one side the more the pivot-points of the toggles will be staggered and the longer the dies will remain closed or gripped.

To provide for adjusting the point *e* transversely of the slide F, I employ an adjustable block E. Said adjustable block is provided with a rectangular lug E', that enters a rectangular recess F' in the end of the slide F. The end *f* of the operating-slide F is at an angle with the line of its travel, and the adjustable block E is shaped to fit the angled end of the slide. A slot *f'*, parallel with the inclined end of the slide, is made in the upper side of the slide to open into the recess F', and a like slot *f*² is made through the lower side of the slide and opens into the recess F'.

Said slots are in the same vertical plane. The slots have their sides inclined to fit the tapering key G. The lug E' of the adjustable block E has a hole through which the key G passes. The key is provided at its upper end with a screw projection *g*, as illustrated. A washer H fits over the screw projection of the key, and the nuts I I' draw the key upward and lock it in position to hold the adjustable block to its adjustment. The end of the member C enters between the upper and lower ears *e*² and *e*³ of the adjustable block E. To enlarge the bearing-surface of the slide F, its lower side *f*³ projects under the adjustable block.

The purpose of inclining the forward end of the slide and fitting the adjustable block thereto is to cause the meeting-line between them to be nearly at right angles to the resistance offered by the toggle mechanism and to lessen the possibilities of the adjustment becoming displaced.

I have described my adjustable device as applied to a toggle-operating member in which its three pivot-points are in the angles of an isosceles triangle. This is the preferred form, because with it the adjustment of the toggles may be made to a straight line to close the dies but an imperceptible time for the smallest upsetting work. My invention may, however, be applied to a toggle-operating member in which the pivot-points are in the angles of a scalene triangle. In this form the toggles are always staggered and cannot be brought to a straight line for slight upsetting; but the stagger can be increased by my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of an operating-slide with a toggle-operating member connected therewith, said toggle-operating member being adjustable transversely of the operating-slide, and toggles having their inner ends connected with the toggle-operating member and their outer ends connected with other parts of a machine in which they are employed, substantially as described.

2. The combination, with an operating-slide and a toggle-operating member, of a pivotal connection between them, said pivotal connection having adjustment transversely of the operating-slide, and toggles having their inner ends connected with the toggle-operating member and their outer ends connected with other parts of a machine in which they are employed, substantially as described.

3. The combination, with the operating-slide and the toggle-operating member of a bolt heading and forging machine, of a pivot-block having adjustment on the slide transversely to its line of travel, substantially as described.

4. The combination, with the operating-slide of a bolt heading and forging machine,

of a pivot-block having a lug entering a recess in the end of the operating-slide and having adjustment transversely of the slide, means for securing said adjustment, and a
5 toggle-operating member pivotally connected to said pivot-block, substantially as described.

In testimony whereof I affix my signature, in the presence of two witnesses, this 17th day of March, 1896.

FREDERICK W. BRUCH.

Witnesses:

J. A. OSBORNE,
E. E. OSBORNE.