

(No Model.)

2 Sheets—Sheet 1.

J. F. WEBSTER.
RIVETING MACHINE.

No. 357,294.

Patented Feb. 8, 1887.

Fig. 1

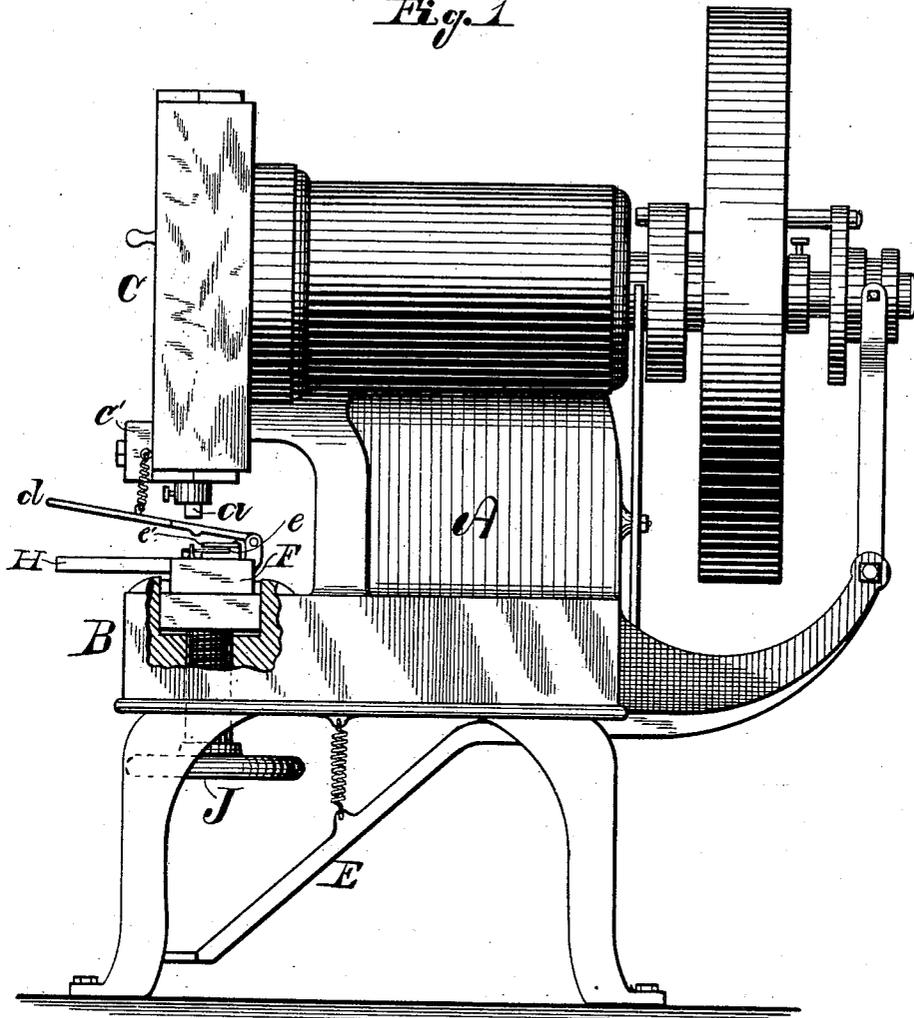
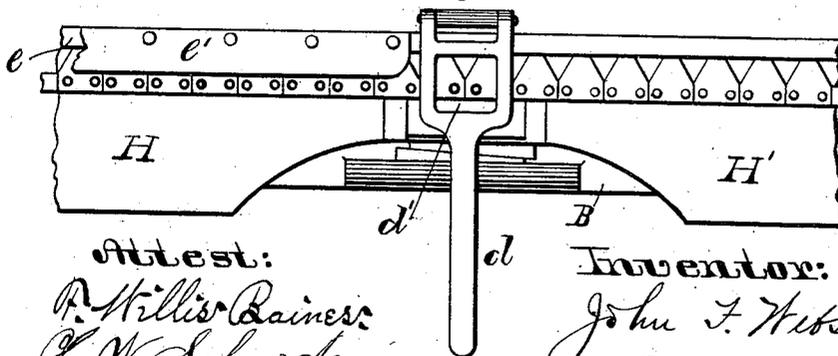


Fig. 2



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Att'y

(No Model.)

2 Sheets—Sheet 2.

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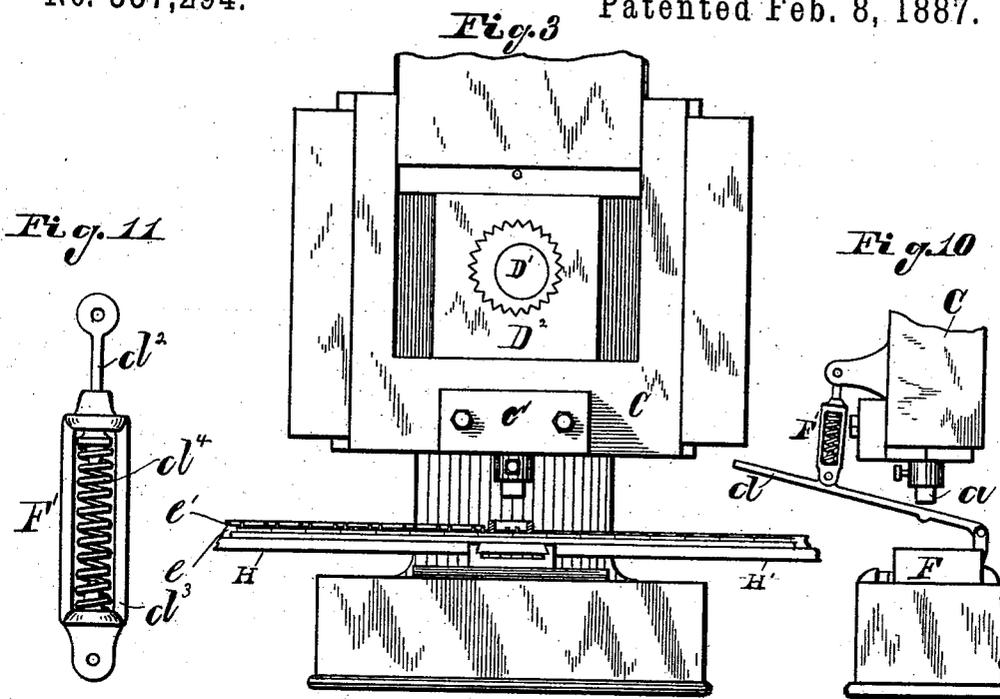


Fig. 11

Fig. 10

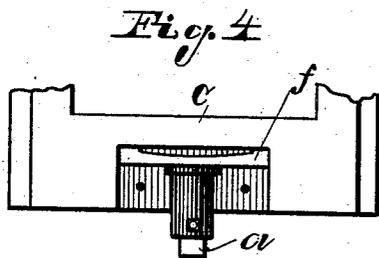


Fig. 4

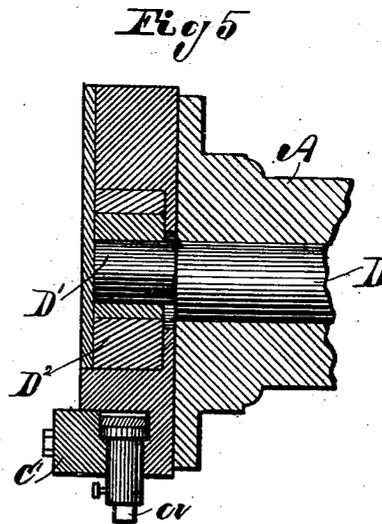


Fig. 5

Fig. 6

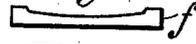


Fig. 7

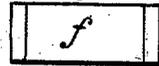


Fig. 8

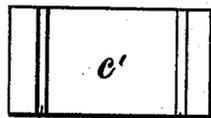


Fig. 9



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UNITED STATES PATENT OFFICE.

JOHN F. WEBSTER, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE CHAMPION BAR AND KNIFE COMPANY, OF SAME PLACE.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 357,294, dated February 8, 1887.

Application filed January 25, 1886. Serial No. 189,562. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. WEBSTER, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Riveting-Machines, of which the following is a specification.

My invention relates to riveting-machines; and the object of my invention is to provide a riveting-machine particularly adapted for riveting together the sections and knife-backs to form harvester knives or sickles. The difficulties heretofore experienced in attempting to perform this operation by machinery have been to upset the rivet sufficiently to fill out the hole through which it passes, and at the same time to form a proper head on the rivet without breaking the sections. The sections, as it is well known, are first provided with the rivet-holes, and then hardened, after which they are riveted to the knife-backs. In order that the sections may not work loose by constant wear thereon, it is essential that the rivet be upset or expanded sufficiently to fill out the hole through which it passes, and it is also essential that a sufficient head be formed thereon to hold the sections from pulling off. That class of riveting-machines in which the riveting is done by a succession of quick blows has been found unsatisfactory for this purpose, because a head is frequently formed on the rivet before it is properly expanded or upset to fill the hole, so that the sections soon work loose. So, also, those machines in which the riveting is done at a single stroke by a heavy pressure—such as the hydraulic, steam, or pneumatic riveting-machines—have been found unreliable, as it is difficult to regulate the pressure thereon sufficient to expand and head the rivet without breaking the section. I overcome these difficulties by the use of a positive-motion reciprocating press, in combination with a yielding or elastic cushion, whereby a positive and uniform and at the same time a yielding pressure is applied to each rivet. I also provide means for varying the length of the stroke of the reciprocating press in relation to the rivet-supporting device, and also means for guiding and holding the sections with the rivets therein during the process of riveting.

My invention consists in the constructions

and combinations of parts, hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation view of a machine to which my invention has been applied. Fig. 2 is a plan view of the table of the same, showing the guiding and holding devices. Fig. 3 is a partial front elevation of the same, showing the table and the reciprocating press. Figs. 4 to 11, inclusive, are detailed views of some of the various parts.

In said drawings, A represents the main frame, B the table thereon, and C the reciprocating slide or press.

Extending through the top of the frame, in a suitable bearing, is a shaft, D, which is provided at its forward end with a crank, D', journaled in a sliding bearing, D², in the reciprocating press C. The shaft D is provided at the rear with a suitable clutch mechanism, by means of which it may be connected to or disconnected from continuously-revolving mechanism, whereby it may be revolved at will; a foot-lever, E, extending to a convenient point under the table B, being preferably employed for operating the clutching mechanism.

The reciprocating press C is provided at its lower end with a clamping device, C', by means of which the hammer or riveting-tool *a* is secured in place. Supported on the table B, immediately under the riveting-tool *a*, is the anvil F, on which the knife, with the rivets therein, is supported during the process of riveting.

The anvil F is made in two parts, *b* and *c*, the lower one, *c*, of which is recessed out at *c'*, leaving bearings *c'' c''* at either side, respectively, on which the upper part, *b*, or anvil proper, is supported. The upper part, *b*, or anvil proper, is made of steel tempered to the proper degree of hardness, and being supported at the ends only is adapted to yield under any undue pressure exerted thereon.

Hinged to the anvil F, at the rear, is a clamping-lever, *d*, provided with an opening, *d'*, therein and adapted to be forced down against the knife to be riveted, and thus clamp the same against the anvil, the riveting-tool being adapted to pass through the opening *d'*. This clamping-lever is connected to the reciprocating press or slide C by means of a spring-

connection, F', (see Figs. 10 and 11,) which is adapted to be compressed as the slide is moved downward, thus pressing the clamping-lever against the anvil F. The spring-connection F' is preferably made in two parts, d^2 and d^3 , between which parts the spring d^1 is located. These parts d^2 and d^3 are connected together in such a manner that a pushing strain thereon causes the parts to telescope together, thus bringing the pressure on the spring d^1 ; but when a pulling strain is applied the strain is relieved from the spring after a limited movement and the parts move positively together. By this means the clamping-lever is forced toward the anvil with a yielding pressure as the press accomplishes the forward portion of the stroke, but is drawn positively away from the anvil as the press recedes.

On either side of the main table B are auxiliary supporting-tables H and H', respectively. One of these supporting-tables is provided on its rear edge with a guiding-strip, e , and an overhanging flange, e' , adapted to retain the sections and knife-back in their relative positions.

The operation of the machine is as follows: The knife-backs are placed on the table H and the rivets inserted through the holes therein. The back is then turned over so that the rivet-heads rest on the table, with the other ends of the rivets projecting through the back. The sections are then placed over the rivets, and the knife, with the rivets thus loosely inserted therein, is pushed under the flange e' , by which the sections, back, and rivets are held in their relative positions as the knife is slipped longitudinally across the anvil F. This preliminary work is preferably accomplished by boys, two boys being thus employed to prepare the knives for one machine. The operator now takes the knife and slides it longitudinally along until the first rivet rests on the anvil proper, b . The reciprocating slide or press C is then caused to descend by the operator pressing down on the foot-lever E. As the slide descends the clamping-lever is forced by the spring-connection F' against the section, thus holding it firmly in place. The riveting-tool, being secured in the reciprocating press C, which is operated by the crank D', is forced positively down against the rivet to the limit of its stroke, and then reciprocates to its normal position. As it descends it comes in contact with the rivet and compresses the same just enough to fill out the hole through which it passes and to form a sufficient head thereon. As the riveting-tool is withdrawn the clamping-lever is raised positively by the slide and the knife is advanced until the other rivet in the section and one of the rivets in the next succeeding section are brought under the riveting-tool. The tool is again caused to descend, thus upsetting and heading both rivets at a single stroke. This operation is repeated, two rivets being operated on at each stroke, until all the sections are properly secured. With a little experience the operator learns

to time the movement of the knife with the strokes of the press, so that the motion of the reciprocating press is continued uninterruptedly until the knife is finished.

It is obvious that the spring-connection between the slide C and clamping-lever d may be dispensed with, if desired, and the clamping-lever operated by hand. In this case the lever is preferably connected to a stationary spring, as shown in Fig. 1, by which the said lever is raised out of the way when released by the operator.

Means are furnished for varying the distance between the anvil and the riveting-tool when at the limit of its stroke, so that the rivet will be compressed to exactly the right degree. This may be accomplished by providing an eccentric bearing, D³, in the slide D² for the crank D', as shown in Fig. 3, this eccentric bearing being adapted to be turned to different positions, and held by a series of serrations surrounding its outer edge, thus raising or lowering the press C in relation to the crank D; or the same result may be obtained by raising or lowering the anvil by means of a suitable hand-screw, J, passing up through the table B, as shown in Fig. 1. By this means the exact compression necessary can be secured to properly expand and head the rivet. Any slight variation in the thickness of the sections or knife-backs or in the size of the rivets will be compensated for by the yielding of the anvil proper, so that the operation of riveting up the sections of a knife may be quickly and accurately performed without breaking the sections. It is obvious that the same result would be obtained by making the anvil rigid and providing an elastic connection for the riveting-tool or the reciprocating press. This could be accomplished as shown in Figs. 4, 6, and 7, in which a spring-plate, f , is used between the riveting-tool and the reciprocating press C. Other modified forms of this feature may be used which will readily suggest themselves to the mind of an ordinary mechanic.

The machine as above described is particularly adapted for riveting up harvester knives or sickles, though it is obvious that it may be used with equally good results for other similar purposes.

Having thus described my invention, I claim—

1. The combination, with a positive reciprocating press having a riveting-tool therein and a table under said press, of an anvil secured on said table, said anvil being so constructed and supported that it is adapted to yield under an undue pressure of said press, substantially as and for the purpose set forth.

2. In a riveting-machine, the combination, with the reciprocating press, of the riveting-tool therein, a yielding anvil adapted to receive the pressure of said press, a table under said tool, and an auxiliary supporting-table provided with a guide having an overhanging flange thereon, substantially as described.

3. The combination, with the positive re-

5 ciprocating press, of the table under said press, an elastic anvil adapted to receive the pressure of said press, and a clamping device on said table adapted to hold the work in position thereon, substantially as set forth.

10 4. The combination, with a positive reciprocating press having a riveting-tool therein, of a table under said press, and an anvil on said table, said anvil being made in two parts, one of which is adapted to yield under the pressure of said press, substantially as specified.

5. The combination, with the positive re-

ciprocating press having a riveting-tool therein, of a table under said press, a yielding or elastic anvil on said table, and a hinged 15 clamping-lever adapted to mark the point of riveting and hold the work in position, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 22d day of January, A. D. 1886. 20

JOHN F. WEBSTER.

Witnesses:

P. J. CLEVINGER,
PAUL A. STALEY.