M. BRAY.

Rivet-Setting Machine.

No. 199,503. Patented Jan. 22, 1878.

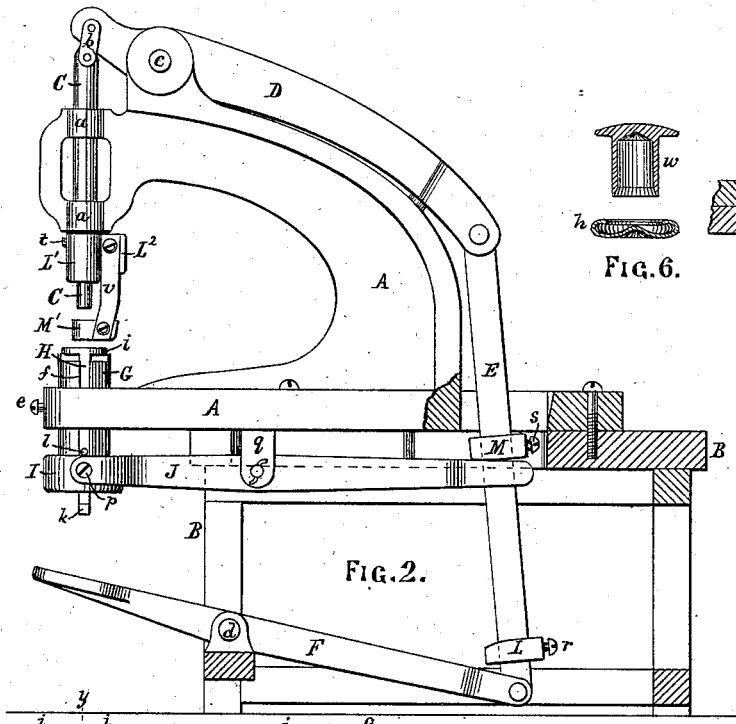

FIG. 2.

FIG. 6.

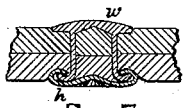

FIG. 7.

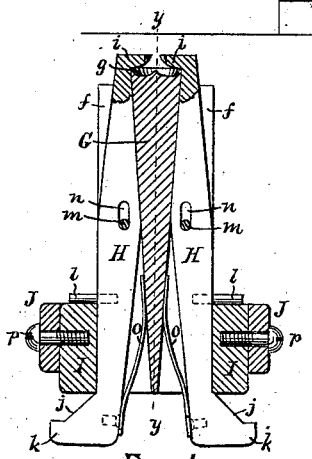

FIG. 4.

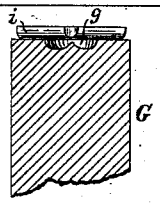

FIG. 5.

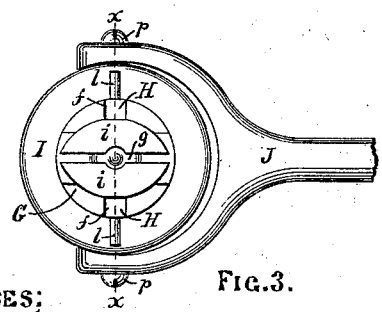

FIG. 3.

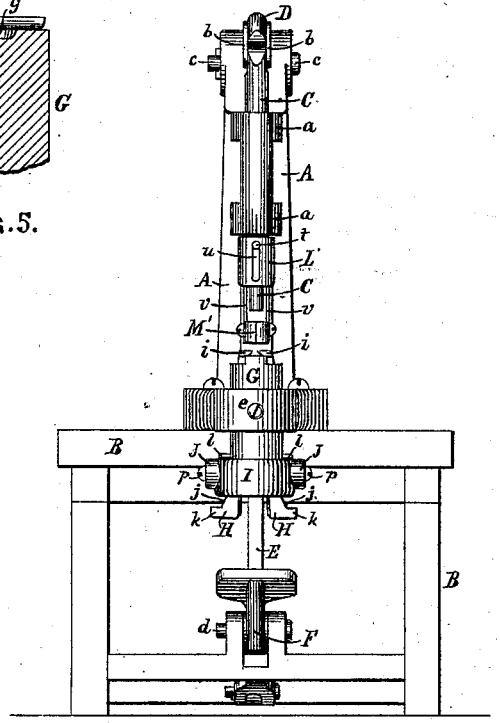

FIG. 1.

WITNESSES:

N. P. Lombard,

E. A. Hemmenway.

INVENTOR:

Millen Bray

UNITED STATES PATENT OFFICE.

MELLEN BRAY, OF NEWTON, MASSACHUSETTS.

IMPROVEMENT IN RIVET-SETTING MACHINES.

Specification forming part of Letters Patent No. **199,503**, dated January 22, 1878; application filed July 26, 1877.

To all whom it may concern:

Be it known that I, MELLEN BRAY, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Rivet-Setting Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to a machine for setting tubular rivets in leather, cloth, rubber, or other flexible material, and is especially designed to facilitate the setting of such rivets into, and securing to the tubular ends thereof, a hollow washer, burr, or secondary head, substantially such as described in Letters Patent No. 80,791, granted to E. S. Wheeler, August 4, 1868.

Formerly in setting the Wheeler rivet the material was punched prior to the introduction of the rivet, and then there was no difficulty in setting the rivet and turning its tubular end outward into the hollow head, and closing the same upon the outwardly-turned flange of the rivet; but since the introduction of tubular rivets adapted to cut their own way through the material in which they are to be set a difficulty has arisen in applying the hollow washer or burr to a rivet that cuts its own way at the same time that it is being set, for the reason that when the washer or burr is placed beneath the material and the rivet is forced down upon and into the material the pressure upon the hollow burr is very liable to close up the burr before the end of the rivet enters it, thus causing a failure to unite the burr and the rivet.

To obviate this difficulty is the object of my invention; and it consists, first, in the use, in combination with a reciprocating plunger adapted to force the rivet through the material and clinch the same, and a fixed or stationary anvil upon which the rivet may be clinched, of a movable table or rest adapted to be interposed between said anvil and the reciprocating plunger, to support the material while the rivet is being forced through it, and then to be automatically retracted to permit the material and the rivet contained therein to move downwardly into contact with the anvil for the purpose of clinching the rivet into a hollow burr resting on said anvil, as will be described.

My invention further consists in the use, in combination, of a reciprocating plunger adapted to force the rivet through the material, a fixed or stationary anvil provided with a sunken recess or pocket to receive the burr, and a pair of levers pivoted to said anvil, and provided at their upper ends with inwardly-projecting jaw-like pads, adapted to project over and nearly meet above said anvil to support the material while the rivet is being forced through it, and then to be automatically retracted to allow the material to rest upon the anvil while the rivet is being clinched.

My invention further consists in the use, in combination, of a reciprocating plunger, a fixed or stationary anvil, a pair of levers, each pivoted to said anvil by means of a pin passing through a slot formed in said lever, and provided at its upper end with an inwardly-projecting jaw-like pad, to serve as a rest or support for the material while the rivet is being forced through it, and at its lower end with an inclined or cam-shaped surface and an outwardly-projecting shoulder, and between said inclined surface and its pivotal connection with the anvil with a second outwardly-projecting shoulder or pin, a ring or annular collar surrounding and embracing said anvil and levers between said two projecting shoulders, and adapted to be moved up and down upon said anvil, and, by contact with said shoulders and inclined surfaces, cause an up and down and an outward and inward motion to be imparted to the upper ends of said levers, for purposes to be hereinafter described.

My invention further consists in the use, in combination with a fixed anvil, a pair of levers pivoted thereto, and provided with jaw-like pads at their upper ends, and with projecting shoulders and inclined or cam-shaped surfaces at their lower ends, and a ring or annular collar surrounding said anvil and levers, of a lever pivoted to the frame of the machine and to said ring or annular collar, and a reciprocating rod provided with two adjustable collars, adapted to alternately engage with the last-mentioned lever, and thereby cause an intermittent upward and

downward movement of said annular collar, and thus center the movements and position of the upper end of the jaw-like levers which form the work-support during the passing of the rivet through the material.

My invention further consists in the use, in combination, of a reciprocating setting-plunger, a rivet-receiver, made in the form of a pair of spring-jaws, and adapted to receive the rivet at the top, center it, and hold it in a vertical position till forced into the material to be riveted by the downward motion of the plunger, and to yield or separate laterally to allow of the rivet being forced downward into the material, an intermittently movable table or support for the material while the rivet is being forced through it, and a fixed or stationary anvil, upon which the material rests after the movable support is withdrawn and while the rivet is being clinched.

Figure 1 of the drawings is a front elevation of a machine illustrating my invention. Fig. 2 is a side elevation of the same, with a portion of the machine shown in section. Fig. 3 is a plan of the anvil and movable jaws or work-support, with a portion of the lever for operating the same detached from the machine. Fig. 4 is a vertical section on line *x x* on Fig. 3, and Fig. 5 is a partial vertical section on line *y y* on Fig. 4. Fig. 6 is a central vertical section of the rivet and burr before being set, enlarged; and Fig. 7 is a vertical section of the same set in two pieces of leather or other like material.

A is the frame proper of the machine, supported upon and bolted to the bench B.

C is the setting-plunger mounted in bearings *a a* in the front end of the frame A, and connected at its upper end by the links *b b* to the short arm of the lever D, and adapted to be moved endwise in its bearings for the purpose of forcing the rivet through the material and clinching the same.

The lever D is pivoted at *c* to the frame A, and has pivoted to its rear end the upper end of the connecting-rod E, the lower end of which is pivoted to the rear end of the treadle-lever F, which, in its turn, is pivoted to the lower front girt of the bench B at *d*.

G is a cylindrical metal anvil, set in a fixed or stationary position in the lower arm of the frame A, in such a manner that its position may be changed to adapt it to the work in hand; but when set for a given job, it remains in a fixed position till the job is completed, being held in such position by the set-screw *e*.

The anvil G has formed in opposite sides thereof two narrow longitudinal grooves, *f*, to receive the levers H H, and in its upper face a circular recess, *g*, in which is to be placed the hollow burr *h*. (Seen in Fig. 6.)

The levers H H are each provided with the jaw-like pad *i* at its upper end, the inclined or wedge-shaped surface *j*, and the projecting shoulder *k* at its lower end, and the pin *l* set in its outer edge, between its lower end and its point of attachment to the anvil. The levers H H are attached to the anvil G by means of the pins *m m* set in said anvil, and passing through the oblong slots *n n* formed in said levers, as shown in Fig. 4. The lower ends of the levers H H are constantly forced in an outward direction by the springs *o o* interposed between them and the anvil G, as shown in Fig. 4.

I is an annular collar or ring of metal, surrounding the lower ends of the anvil G, and embracing the levers H H between the shoulders *k* and pins *m*, and pivoted at *p* to the forked forward end of the lever J, which, in its turn, is pivoted to ears *q* projecting downward from the under side of the frame A, as shown in Fig. 2. The rear end of the lever J is also forked, and embraces the connecting-rod E between two adjustable collars, L and M, secured upon said connecting-rod by the set-screws *r* and *s*, which collars alternately engage with the upper and lower sides of the rear end of the lever J, to impart an intermittent vibratory motion thereto and an intermittent vertical reciprocation to the annular collar I, and through the movements of said collar, acting upon the wedge-surfaces *j*, shoulders *k*, and pins *l*, cause the jaw-like pads *i i* at the upper ends of the levers H H to be alternately raised above the upper surface of the anvil G, moved inward toward each other, remain in such position till the plunger has descended sufficiently far to force the rivet through, or nearly through, the material, moved away from each other, and drawn down again to the level of the upper surface of the anvil, allowing the material to rest on the anvil while the rivet is being forced into and clinched within the hollow burr *h*.

L^1 is a cylindrical collar, fitted loosely upon the lower end of the setting-plunger C, and held in position thereon by the pin *t* set in said plunger, and projecting through the oblong slot *u* formed in said collar, and provided with the rearward-projecting ear L^2, to the opposite sides of which are secured the depending springs *v v*, to the lower end of each of which is secured one-half of a tubular socket or rivet-receiver, M′, projecting forward from said springs directly under or in line with the setting-plunger, the said split socket being so formed that the rivet may be placed therein from the top with the fingers, and be held thereby in a vertical and central position till forced downward by the plunger, when the head of the rivet forces the two parts of the socket to separate laterally, to allow the passage of the rivet-head.

The operation of my invention is as follows: The several parts of the machine being in the position shown in the drawings, with the ring I bearing hard against the under sides of the pins *m*, and the jaws *i i* of the levers H H above and projecting over the upper end of the anvil G, and a hollow burr, *h*, having previously been placed in the recess *g* in the upper end of the anvil, the material to be riveted is placed upon the jaws *i i* directly under the

setting-plunger C, and a rivet, *w*, (shown in Fig. 6,) is dropped point downward into the rivet-receiver M′, when the operator places his foot upon the front end of the treadle-lever F, and presses downward thereon. The first result of such movement of the treadle-lever is to move the setting-plunger C and the rivet-receiver downward till the latter rests upon the material to be riveted, when the motion of the receiver is arrested, and the plunger C, continuing to descend, forces the rivet through the material, causing the rivet-receiver to separate for the passage of the rivet-head.

When the point or lower end of the rivet has nearly reached the lower surface of the material, the jaws *i i* are made to separate laterally by the movement of the annular collar I along the inclined surfaces *j* in a downward direction, caused by the collar L striking the under side of the rear end of the lever J, and said collar I, coming in contact with the shoulders *k*, causes the levers H H to be moved downward till the tops of the jaws *i i* are on a level with the top of the anvil.

The plunger C, while moving downward to force the rivet through the material and clinch it after the rivet-receiver comes in contact with the material, moves freely through the collar L′, the pin *t* moving along the slot *u* in the collar L′.

When the tubular end of the rivet strikes the concavo-convex plate of the hollow burr, it is spread and deflected outward under the annular upper lip of said burr, which is closed down upon the flange thus formed on the rivet, as shown in Fig. 7.

When the rivet is set, the operator raises his foot from the treadle sufficiently to permit the weight of the rear end of the levers D and F and the connecting-rod E to lift the setting-plunger and the rivet-receiver away from the material.

At the proper point, just before the annular collar I comes in contact with the pins *m*, the operator arrests the motion by holding the treadle-lever F stationary till he removes the material and places another burr in the recess *g*, when he removes his foot entirely from the treadle, and the parts immediately assume the position they were in at the commencement, and the machine is ready to repeat the operation.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a machine for setting tubular rivets, the combination of a reciprocating plunger adapted to operate on one side of the material in which the rivet is to be inserted, a stationary anvil for upsetting the rivet, and a movable rest or table upon the opposite side, said rest being adapted to be interposed between the driver and anvil, and afterward retracted to allow of the rivet being clinched, substantially as described.

2. The combination of a reciprocating plunger adapted to force the rivet through the material from one side thereof, a fixed or stationary avil, arranged upon the opposite side of said material, and provided with a recess or pocket in its upper end to receive the burr, and the movable jaws or pads *i i*, adapted to be automatically interposed between said anvil and the material to be riveted, in a position to support the work while the rivet is being forced through it, and to be retracted to allow the work to rest upon the anvil while the rivet is being clinched, substantially as described.

3. The combination of the reciprocating setting-plunger C, the fixed or stationary anvil G, a pair of levers, H H, each provided at one end with the jaw-like pad *i*, and at the other end with the inclined or wedge-shaped surface *j*, shoulder *k*, and pin *l*, and pivoted to the anvil by the pin *m* passing through the slot *n* in said lever, and the annular collar I, surrounding and inclosing the lower ends of the anvil and the levers H H, and suitable mechanism for imparting an intermittent reciprocation of said collar, substantially as and for the purposes described.

4. In combination with a fixed or stationary anvil, a pair of levers, H H, pivoted thereto, and provided with jaws or pads *i i*, inclined surfaces *j*, shoulders *k*, pins *l*, and slots *n*, and the annular collar I surrounding said anvil and levers, the lever J, receiprocating rod E, and the two adjustable collars L and M, all arranged and adapted to operate substantially as and for the purposes described.

5. The combination of a reciprocating setting-plunger, a rivet-receiver mounted loosely upon and adapted to move during a portion of its stroke with said plunger, and made in the form of a pair of spring-jaws, containing a socket adapted to receive the rivet at the top and hold it in a vertical position directly beneath the setting-plunger, a fixed or stationary anvil adapted to receive the thrust of said setting-plunger, and a movable rest or table adapted to be automatically interposed between said anvil and the material to be riveted, in a position to support the work while the rivet is being forced through the material, and then to be retracted to a level with the top of said fixed or stationary anvil, substantially as and for the purposes described.

Executed at Boston, Massachusetts, this 23d day of July, A. D. 1877.

MELLEN BRAY.

Witnesses:

N. C. LOMBARD,

E. A. HEMMENWAY.