J. F. ALLEN.

RIVETING-MACHINES.

No. 194,396. Patented Aug. 21, 1877.

Fig. I.

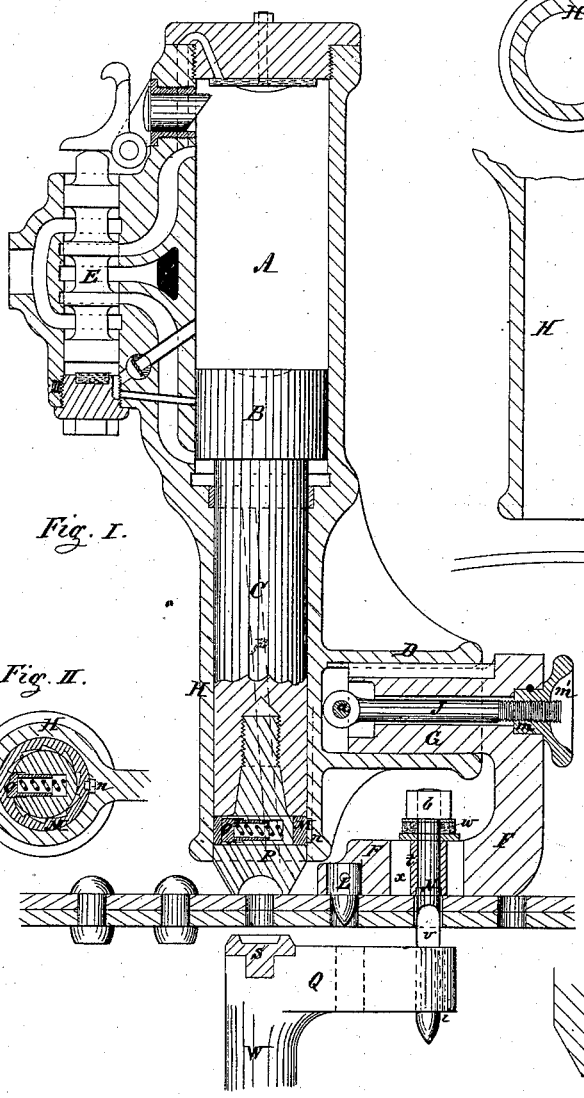


Fig. II.

Fig. III.

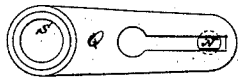


Fig. VI.

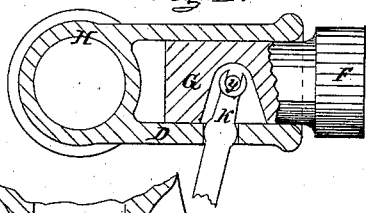


Fig. V.

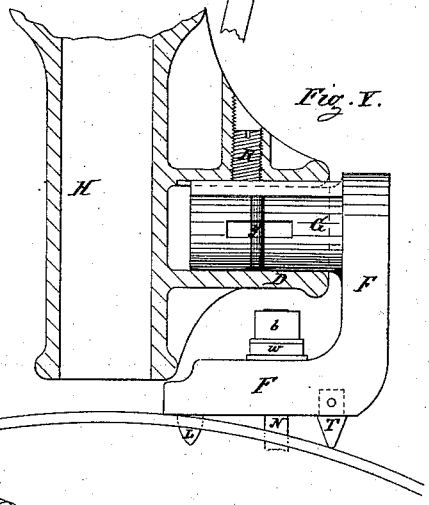


Fig. IV.

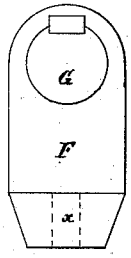


Fig. VIII.

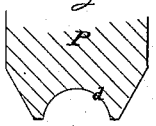


Fig. IX.

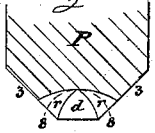
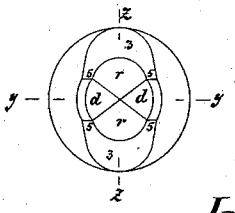


Fig. VII.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN F. ALLEN, OF NEW YORK, N. Y.

IMPROVEMENT IN RIVETING-MACHINES.

Specification forming part of Letters Patent No. **194,396**, dated August 21, 1877; application filed April 3, 1877.

To all whom it may concern:

Be it known that I, JOHN F. ALLEN, of New York, in the State of New York, have invented new and useful Improvements in Riveting-Machines, which improvements are fully set forth in the following specification and accompanying drawings, in which—

Figure I is a vertical section of a riveting-machine with my improvements attached. Figs. VII, VIII, and IX represent plan and sections of the hammer. The other figures represent different views to be referred to in the following specification.

Similar letters of reference represent similar parts in all the figures.

My invention relates to certain improvements in riveting-machines for which Letters Patent were granted to me on the 5th day of October, 1875; and consists in a peculiar construction of the hammer-face, whereby the weight of the same and the size of the machine can be considerably reduced; further, in an arrangement of turning the hammer partly around at each stroke automatically; and, further, in the arrangement of a sliding foot, whereby the machine is readily adapted to all distances of the rivet-holes from each other; and in the construction of the holding-on bolt.

In the drawing, A is the cylinder, provided with suitable valves E for the admission and exhaustion of the pressure to operate the piston and hammer.

B is the piston; C, the piston-rod, to the end of which the hammer P is attached; or the end of the piston-rod may be made to form the hammer-head.

To the end of the cylinder a tube, H, is attached, which acts as a guide for the piston-rod and hammer-head. In a suitable recess near the end of the piston-rod or hammer a ratchet-wheel, M, is fitted, provided with internal teeth. A spring bolt or tooth, O, fitted in the rod, is made to work into the teeth of this ratchet-wheel M.

In the tube H an inclined groove, *p*, is made, the inclination of which corresponds with the pitch of the teeth in the wheel M, into which a projection or feather, *n*, attached to the outside of the wheel M, is made to work.

During the upward motion of the piston and hammer the tooth O will securely lock the wheel M to the rod, and the feather *n*, working in the inclined groove *p*, will cause the same to turn partly around, the distance corresponding with the inclination of the groove or the distance of one tooth. During the downward motion the motion of the feather *n* in the inclined groove *p* will cause the ratchet-wheel M to turn, whereby its internal tooth will force the spring-bolt O inward until the tooth is passed, when said bolt O enters the next tooth.

In Fig. II a horizontal section of the ratchet-wheel M with spring-bolt O and feather *n* is shown.

This continued turning of the hammer at each stroke allows the cutting away of the hammer-face considerably, as will be hereinafter fully described, so that only a very small part of the rivet-surface will be acted upon at each stroke, and will produce, when the operation is completed, a regular circular head.

The construction of a hammer-face is represented in Figs. VII, VIII, and IX, where Fig. VII shows a plan or end view; Fig. VIII, a section at line *y y*, and Fig. IX a section at line *z z* of Fig. VII. In Fig. VIII, which shows the finished size and shape of the rivet-head, the same is represented as circular; but it will readily be understood that any other desired shape may be given. Two opposite sides, 3 3, of the hammer are cut away, so that the outer circumference of the head will be only about one-half of the diameter of the same. The space or surfaces *r r*, opposite each other, from the points 5 5 to the central point of the cavity, are cut away or recessed, leaving only the opposite surfaces *d d* the exact shape of the rivet-head, as desired, when finished. The dotted line 8 8, in Fig. IX would represent the section of the hammer-head at line *z z* without these cut-away surfaces.

By this construction of the hammer-face of giving only to the reduced surfaces *d d* the exact shape of the rivet-head, the action of these surfaces upon the rivet will allow the spreading out of the metal opposite the surfaces *r r*, and act exactly as the peen of a riveting-hammer upon the rivet, while the continued turning of the hammer will cause the said surfaces *d d* to act upon each part of the

rivet, and eventually produce the regular circular shape of the head when finished.

This cutting away of part of the operative surface, while necessitating the turning of the hammer, either by hand or automatically, allows of the use of a much lighter hammer, and consequently the reduction of the cylinder.

When the ends of the rivets are to be hammered into countersunk cavities in the plates—as, for example, on the outside of iron ships—the end of the hammer-head, or the surfaces *d d*, are made square or straight, while the opposite intervening surfaces *r r* are depressed or cut away, so as not to act upon the end of the rivet.

F is the foot, which supports the machine upon the boiler or other work operated upon. To this foot the steady-pin L, which enters the adjoining rivet-hole to regulate and fix the position of the machine, as well as the holding-on bolt N, to which the holding-on bar is fastened, are attached.

This foot F has an arm, G, attached, fitting into a suitable boss, D, provided on the sleeve H of the machine. A bolt, J, whose end *a* is attached to this boss D, or to the body of the machine, passes through this arm G, and has on its outer end a nut, *m*, attached to the foot-piece or bracket F, capable of turning, and provided with a suitable wheel, *m'*, for the purpose of turning said nut *m*. By this arrangement this foot-piece F may be moved inward or outward, bringing thereby the steady-pin L, firmly attached to the foot, nearer to or farther away from the center of the hammer or machine, and thus adapting the machine to any size of rivet-work, or to any distance the rivet-holes may be from each other.

In punching the rivet-holes the fixed distances of the holes from each other vary from one-thirty-second to one-fourth of an inch generally, and by this movable foot, independent of the advantage of fixing the machine for all distances and sizes of riveting, the machine can easily be regulated by means of this screw-bolt J before operating, so as to bring the hammer exactly over the center of the rivet, independent of any irregularity in the punching of the holes.

Instead of moving this foot F, as above described, the same may be operated by means of a lever, as represented in Fig. V, which shows a vertical section, and Fig. VI showing a horizontal section of the same. In this arrangement a lever, K, turning on a fulcrum in the side of the boss D, takes hold of a pin, *y*, fast in the arm G, and thus moves said arm and the foot F, or, when the foot is fixed, the machine, inward or outward, as may be desired. A bolt, R, is arranged, bearing upon the surface of the arm G, to lock the same in any desired position, or, by producing a greater or less friction on its surface, regulate the facility of its motion. This arrangement, after fixing the position of the foot F so as to bring the steady-pin L the right distance from the center of the hammer, leaves the machine at liberty to move and accommodate itself to any irregularities which may exist between the distances of the rivet-holes, as it will be found that the action of the hammer upon the rivet will regulate or center itself if the machine is left at liberty to move, while the friction produced and regulated by the screw-bolt R will prevent the too easy moving or sliding of the same.

The holding-on bolt N passes through the rivet-hole adjoining the hole into which the steady-pin L is made to enter, and is made of sufficient length to receive the head Q of the holding-on bar W, which rests upon shoulders *i*, produced by flattening the part *v* of the bolt.

The upper part of this bolt N is surrounded by a square sleeve, *t*, fitting into a longitudinal opening, *x*, in the foot F, to hold this bolt N steady sidewise, and at the same time allow for any longitudinal motion of the same, according to the distances of the rivet-holes. Instead of this arrangement of the sleeve *t*, the sides of the bolt N may be flattened to form the desired guide sidewise; but I prefer the use of the sleeve, as thereby an opportunity is given for the turning of the bolt N. Below the nut *b*, which holds the bolt N in the sleeve *t* or in the foot F, an india-rubber washer, *w*, or its equivalent, is arranged to give an elastic bearing and counteract the force of the blow on the holding-on bar.

When the riveting-machine is used on circular work, a stud, T, is inserted in the end of the foot F, (see Fig. V,) to rest on the work operated upon, so as to support the hammer perpendicular over the rivet to be hammered.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a riveting-machine, the combination of the ratchet-wheel M with internal teeth, feather *n*, and spring bolt or tooth O, arranged near the lower end of the piston-rod or hammer-head, with the guiding-tube H, and inclined groove *p*, substantially in the manner and for the purpose described.

2. The riveting hammer-head P, having portions of its operating-surfaces cut away, so as to form depressions opposite each other, in the manner and for the purpose substantially as specified.

3. In combination with a riveting-machine, the movable or sliding foot F, with steady-pin L and movable bolt N, arranged to operate in the manner and for the purpose substantially as set forth.

4. The combination of the bolt N, supporting the holding-on bar, the square guiding-sleeve *t*, and the elastic *w* under the nut *b*, for the purpose substantially as described.

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Witnesses:

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