(No Model.) 2 Sheets—Sheet 1.

F. M. JEFFERY.

RIVETING MACHINE.

No. 348,397. Patented Aug. 31, 1886.

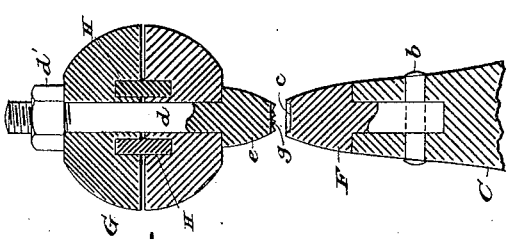

Fig. 4.

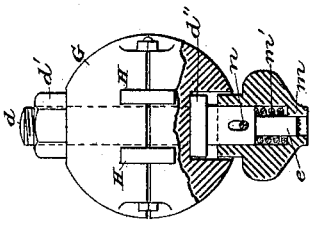

Fig. 5.

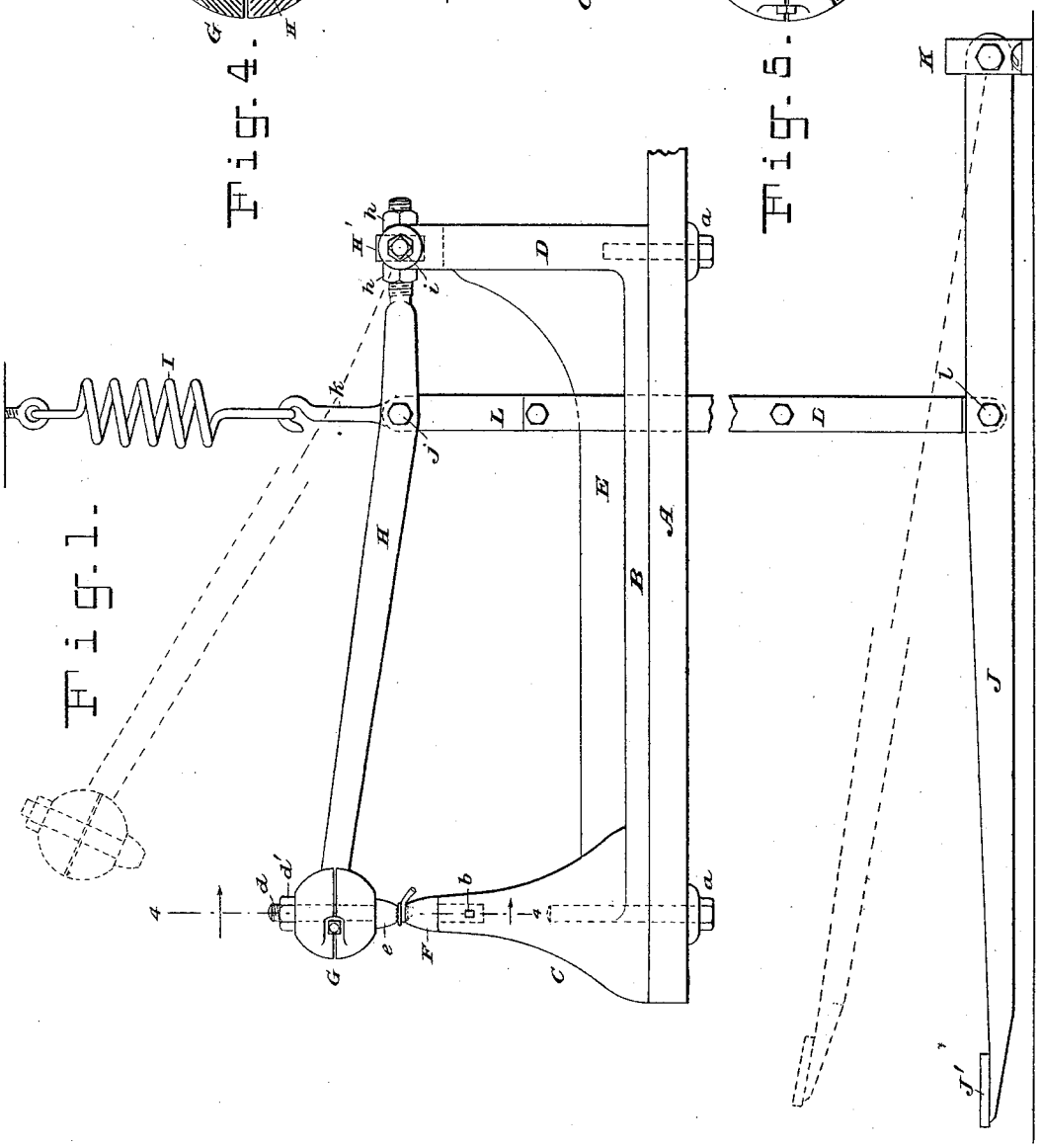

Fig. 1.

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Fig. 5.

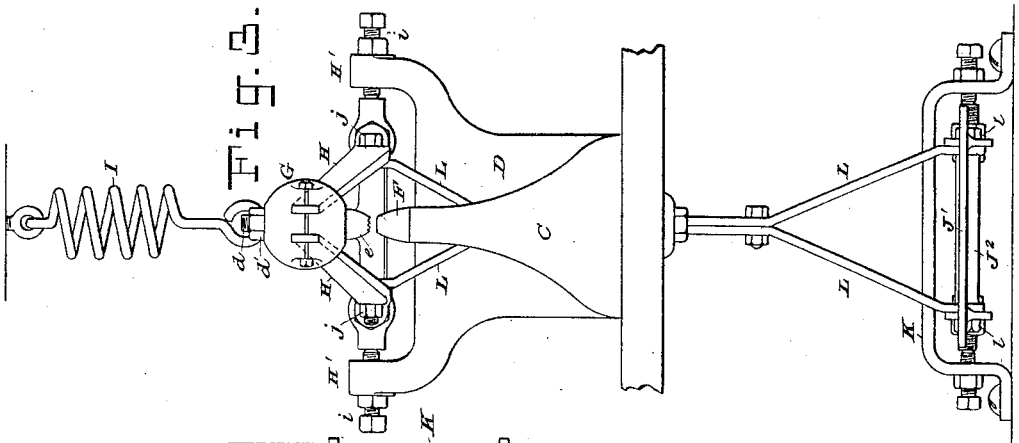


Fig. 2.

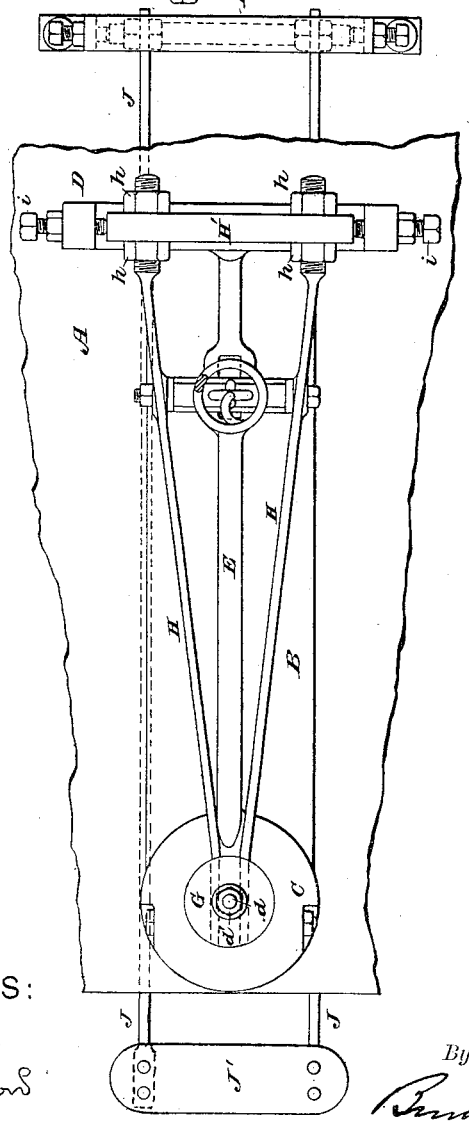
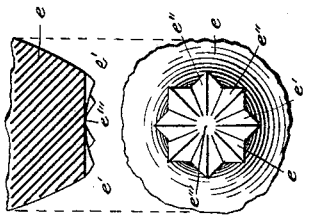


Fig. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK M. JEFFERY, OF JERSEY CITY, NEW JERSEY.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 348,397, dated August 31, 1886.

Application filed November 11, 1885. Serial No. 182,445. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. JEFFERY, a citizen of the United States, and a resident of Jersey City, Hudson county, New Jersey, have invented certain Improvements in Riveting-Machines, of which the following is a specification.

My invention relates to machines for light riveting in the main and such as may be operated by the foot.

The object is to provide a simple, readily-adjusted machine which may be readily operated by the foot, while the hands are left free to control the parts to be riveted.

The novel features of my invention will be fully set forth hereinafter, and carefully defined in the claims.

In the drawings which serve to illustrate my invention, Figure 1 is a side elevation of my improved riveting-machine. Fig. 2 is a plan of the same. Fig. 3 is a front elevation. Fig. 4 is a sectional elevation of the hammer-head, drawn to a scale twice that of Fig. 1. The plane of the section of Fig. 4 is indicated by line 4 4 in Fig. 1. Fig. 5 is a view of the hammer-head provided with an elastically-mounted tubular presser-foot, which latter is shown in section. This presser-foot is designed mainly for use in riveting together small malleable-iron castings. Fig. 6 illustrates the peculiar form of the face of the riveting-hammer.

Let A represent a table or other substantial support on which the main portion of the riveting-machine is mounted.

B is the bed-piece of the machine, which I usually cast in one piece with the anvil-bed C and the frame D, in which the hammer is mounted on a vibratory axis.

E is a stiffening-rib which connects bed C with frame D. The bed-piece B is secured firmly to the support A by screws *a a*.

F is the anvil, usually of steel, with a hardened face. This anvil has a shank which fits into a socket in the anvil-bed C, where it is held in place by a key, *b*, as seen in Figs. 1 and 4. In the face of the anvil is formed a recess, *c*, to receive the head of the rivet in the process of riveting and prevent the rivet from being moved from under the hammer in adjusting the parts to be connected by the rivet. This recess also enables the operator to properly place the rivet to receive the blow of the hammer with ease and certainty. This riveting-hammer comprises the hammer head and helve. G is the hammer-head, which I have shown as composed of two hemispherical blocks, usually of cast-iron, forming, when placed together, a sphere. Through these, and forming a part of the head, is passed the shank *d* of the riveting-head *e*.

On the end of the shank *d* is a nut, *d'*, which serves to clamp the riveting-head to the sphere which furnishes the weight, and to clamp the halves of the sphere together, as will be described.

In order to form the swaged end of the rivet properly, I form a concave recess, *g*, in the face of the riveting-head, as best seen in Fig. 6, which represents on an enlarged scale an axial section of the riveting-head *e* of the hammer and a face view of the concave end. In addition to forming a concave recess in the hammer-face, I also divide said face up into radial V-edged ribs *e'*, formed by making radial V-shaped channels *e''*, which run out at the center *e'''* of the hammer-face. I find that this form of hammer-face produces much better results than a smooth face. A lighter blow will serve, the metal of the rivet "flows" more evenly, and the rivet cannot well turn or bend to one side in swaging.

I do not wish to limit myself to the exact form of radial grooving shown in Fig. 6, as some departure therefrom may be made without materially affecting the swaging of the rivet.

The helve of the hammer comprises two arms, H H, which are connected to the hammer-head G at one end and to an axis, H', at the other. In the two hemispheres of the hammer-head are formed recesses to receive the ends of the helve-arms H, as clearly shown, and a bolt passes through the said arms. The arms H H are spread apart where they join the axis H', and have screw-threaded extremities which pass through holes in the said axis, and each arm is provided with two clamping and adjusting nuts, *h h*, one on each side of the axis. These nuts serve not only as a means of attaching the arms H to the axis H', but they also serve to adjust the hammer-head with respect to the anvil with the greatest accuracy. By loosening both inside nuts and screwing up both outside nuts, the helve will be short-

ened. A reverse operation will lengthen the helve. By loosening one inside and one outside nut and tightening the other two, the hammer-head will be moved to the right or left, as the case may be. I do not limit myself, however, to this construction of the hammer-helve, as an ordinary helve would serve. The axis H′ is pivotally mounted in the frame D by means of pivoting-screws *i i*. The hammer is upheld by a spring, I, one end of which is secured above to the ceiling or a fixed beam overhead, and the other end is connected to the helve, preferably to a cross-bar, *j*, in the helve, by an intermediate hook or link, *k*. The hammer is drawn down by a treadle, usually composed of two bars, J J, a foot-board, J′, and an axis, J², the latter being pivotally mounted in a frame, K, fixed to the floor. In the treadle is a cross-bar, *l*, to which is coupled the lower end of a connecting-rod, L, the upper end of which is coupled to the cross-bar *j* of the helve. I prefer to construct the connecting-rod L of two flat bars, bent as indicated in Fig. 3. This rod passes through and plays in an aperture in the bed-piece B.

In riveting with my improved machine, the operator sets the rivet-head down in the recess *c* of the anvil F, and then places on it the plates or parts to be secured together by the rivet. He then places his foot on the treadle and brings it down forcibly. This brings the hammer-head down upon the rivet and swages the latter. When the foot is removed from the treadle, the spring I instantly throws up the hammer. The blow may be repeated, if necessary.

When the pieces to be riveted together are small, as when made from malleable iron, and especially where one piece has a stud formed on it, which is passed through a hole cast in the other piece and then riveted down, I employ an elastic presser-foot on the riveting-head *e*. This is shown in Fig. 5. On the shank *d* of the head *e* I form a collar or flange, *d*″, which engages a recess formed in the lower hemisphere of the hammer-head. The tubular presser-foot *m*, to which I usually give the form seen in Fig. 5—that is to say, of a bulbous or pear shape—in order to impart weight is made to slip over the shank *d* from below, and is contracted at its lower end to snugly fit the contracted end of head *e*. In an annular space between the tubular foot *m* and the shank *d* is placed a spring, *m*′, which abuts at its ends against shoulders formed, respectively, on said foot and shank. A cross-pin, *n*, in the foot engages a slot in the shank *d* and limits the movement of the foot. This foot I may and do use on all riveted work except japanned work. This latter work is apt to be marred by the blow it receives from the ring-like face of the foot. I find it convenient to make the presser-foot tubular; but it is not absolutely necessary that the tube shall be complete. The foot might be parti-tubular. When the hammer-head descends, the end of the presser-foot strikes the upper plate or piece, impinging thereon around the rivet, and this drives the plates or pieces firmly together. The spring *m*′ yields and allows the head *e* to strike the end of the rivet and expand it.

It will be observed that the presser-foot *m* serves as a supplementary hammer-head, being comparatively heavy and acting under the momentum acquired in giving the blow. This enables it to drive the pieces firmly together about the rivet by impact, the spring afterward yielding to allow the riveting-head to come into play. This foot *m* may, as I have said, be used for almost all kinds of riveting; but it is most needed with work of the character before described—that is to say, where the rivet or stud fits rather tightly in the hole and the parts require to be driven together before the expansion of the rivet. This spring *m*′ should be quite strong, so as to effect this closing together of the pieces properly.

I am aware that it is not new to provide the head of a riveting-hammer or die with a sleeve backed by a spring to strike the parts to be riveted before the riveting-head impinges on the rivet, and this I do not broadly claim. The hammer-head need not be of spherical form, although I usually give it this form.

Having thus described my invention, I claim—

1. The combination, with the helve, of the hammer-head, comprising the two blocks of metal, and the riveting-head *e*, provided with a shank, *d*, and nut *d*′, substantially as described.

2. The riveting-head of the hammer, having its recessed or concave face provided with radially-arranged grooves, whereby the swaged end of the rivet is divided up into parts and its lateral expansion is equalized and determined, as set forth.

3. The riveting-head *e*, having its face formed of the radial sharp-edged ribs *e*′, substantially as and for the purposes set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FRANK M. JEFFERY.

Witnesses:
ARTHUR C. FRASER,
GEO. BAINTON.