Sheet 1 2 Sheets.

G. B. Brayton,

Making Rivets,

No. 45,116. Patented Nov. 15, 1864.

Fig. 1.

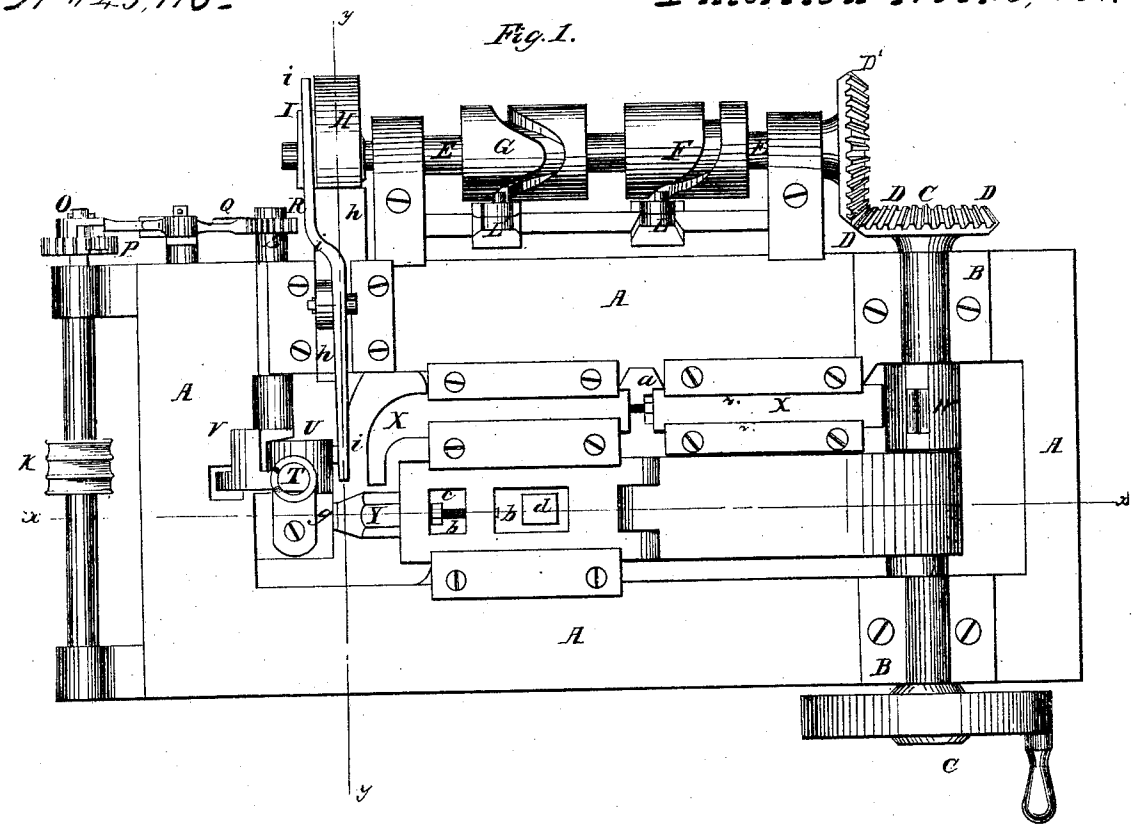
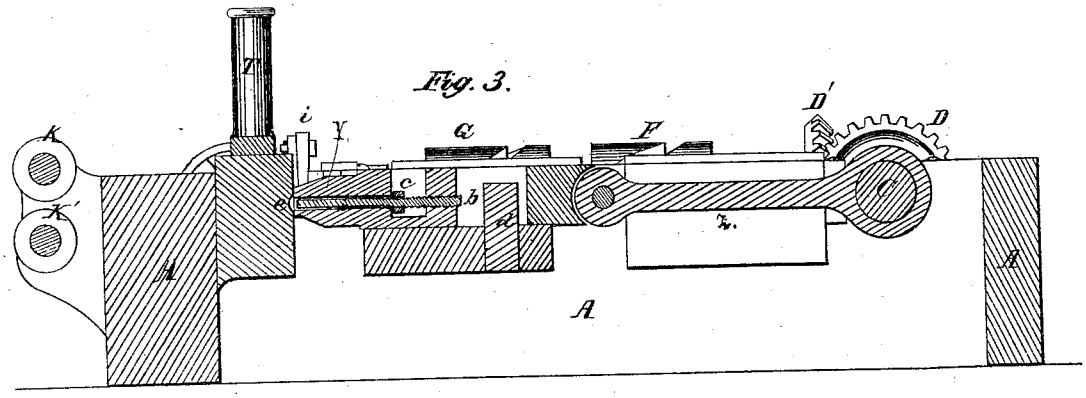


Fig. 3.



Witnesses.

Emmett Quinn.

B. S. Hedrick

Inventor.

Geo. B. Brayton

A. Bowk

Atty

Sheet 2 - 2 Sheets.

G. B. Brayton,

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Fig. 2.

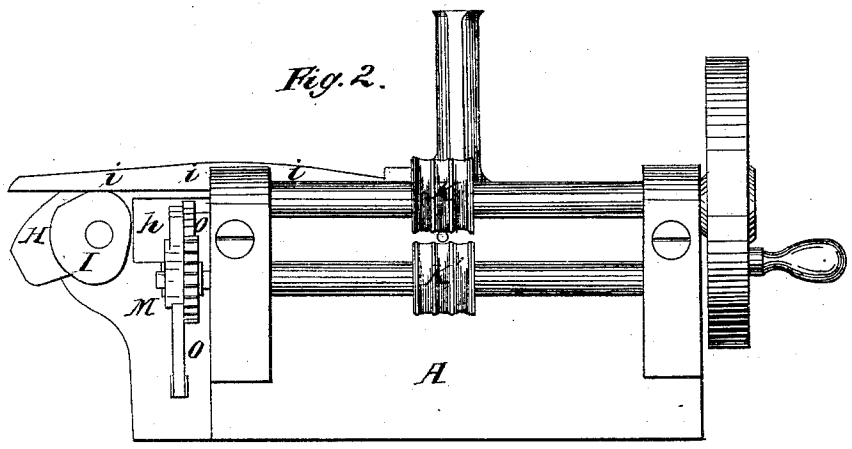
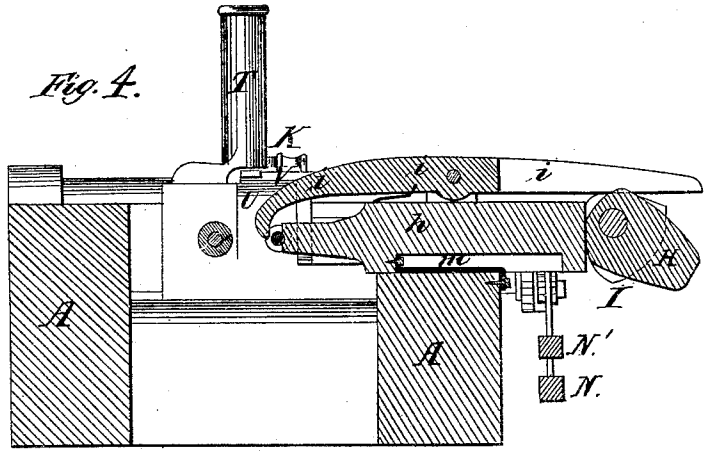


Fig. 4.



Witnesses.

Stewart Gray mr

Jos. L. Coombs

Inventors

Geo. B. Brayton

by A. Pollok

his atty.

UNITED STATES PATENT OFFICE.

GEORGE B. BRAYTON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE BRAYTON RIVET COMPANY.

IMPROVED MACHINE FOR MAKING RIVETS.

Specification forming part of Letters Patent No. 45,116, dated November 15, 1864.

To all whom it may concern:

Be it known that I, GEORGE B. BRAYTON, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Rivet-Machine; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of a machine or apparatus constructed in accordance with this my invention; Fig. 2, an end elevation of the same; and Figs. 3 and 4, sectional elevations on lines *x x* and *y y*, respectively, in Fig. 1.

This invention relates to a new method of and apparatus for making rivets, having for result the production of a rivet of a peculiar construction, for which Letters Patent of the United States were granted to me on the 26th day of May, 1863.

For the better understanding of the machine, subject of this patent, I shall briefly refer to the mode of making rivets which underlies the principle of this invention. The heads and shanks or stems of the rivets, which are made of two distinct pieces of metal, are united by forcing the stem into the head while the latter is at a welding-heat. To effect this under the best condition, the shank is at first but partly penetrated into the head-blank and is held in that position for a short space of time in order to allow the shank end in the head-blank to partake of the temperature of the latter sufficiently to become soft or ductile. The shank is then forced into the head against a finishing-die to the full extent of calculated penetration, the effect of which is the upsetting or spreading of the end of the shank within the head, thus producing a dovetail joint, the strength of which is increased by the shrinking of the head upon the shank.

The object of this invention is to produce such rivets by machinery; and it consists, first, in a machine operating as described so as to form a rivet by forcing the shank into the head, substantially as described; second, in combining in one machine the following elements: First, a mechanism for feeding the wire or rod to a cutter, dividing it into shanks, and a mechanism for feeding the heads into the machine, as hereinafter described; second, a pair of nippers or grippers seizing the shank and conveying it successively to the head-blank and hammer and the header; third, a plunger or hammer actuated to insert the shank into the head-blank, and a header to force the shank home into the head against the heading-die; fourth, a means for stripping the header of the finished rivet; third, in the employment of a pair of grippers which receive the shanks, one at a time, and whose motion is such as to present them first to the plunger or hammer for insertion of the shank into the head, then convey them to the header, and then release them, substantially as hereinafter more fully explained; fourth, in the combination of the cutter, severing the wire or rod as it is fed into the machine, with a gripping-lever mounted upon the cutter-stock, so that the two being actuated by suitable cams move together in their translatory movement, though acting as grippers, as before referred to and hereinafter more fully described; fifth, in the combination of feed-rollers feeding the wire or rod during the intervals of action of the plunger and header, as described, with a cutter and gripping-lever for action together, substantially as and for the purposes set forth; sixth, in combining with a hopper for supplying the machine with rivet-head blanks a carrier so arranged as to seize one head-blank at a time, presenting it to the plunger in position for the insertion of the shank, as set forth; seventh, in the combination of a stationary heading-die with a movable header, the latter being recessed to inclose the shank while compressing the head-blank; eighth, in the combination, with the header, of a central plunger, movable within said header and arranged to force the shank into the head, substantially as described; ninth, in the means hereinafter described for regulating the stroke of the plunger within the header, according to the length of the shank, and to compensate for wear, substantially as hereinafter set forth; tenth, in the employment, in combination, with the header and central plunger, of a stationary block, or the equivalent thereof, to arrest the plunger during part of its receding motion with the header, for the purpose of ejecting the finished rivet in the header, hereinafter described; eleventh, in combining with the hammer for setting the shank into the head of the rivet a means for adjusting the same accord-

ing to the length of the shank and to compensate for wear, substantially as set forth; twelfth, in the friction-mount upon its pivot of the segmental cog-wheel which imparts reciprocating rotary movement to the blank-carrier so as to prevent the breaking of parts of the machinery should they by accident or otherwise become clogged, substantially as set forth.

To enable others to make and use my improved rivet-machine, I shall now proceed to describe in detail its construction and operation; and, referring to the accompanying drawings—

A is the frame, built entirely of iron, or of wood strengthened by iron. Upon and within this frame are established the working parts of the machine. At the sides of the frame and in the rear thereof are arranged suitable bearings, B, inclosing the main shaft C, which receives rotary motion from some prime mover and transmits it to the working parts of the machine. The one end of the shaft is provided with a bevel gear-wheel, D, which meshes into a similar wheel, D′, fast upon a shaft, E, running along the sides of the frame, upon which shaft are mounted four cams, F, G, H, and I, whose functions will be described more fully hereinafter. At the forward end of the machine, hung in suitable brackets for the purpose provided, are arranged two corrugated feed-rollers, K K′, which seize and feed into the machine the wire or rod of which the shanks of the rivets are composed. The movement of these feed rollers is derived from the grooved cam-wheel F, in whose groove works the pin or friction-roller of an upright arm, L, mounted upon a horizontal bar, N, sliding in guides or openings provided in the side brackets, M. To this horizontal bar is jointed a connecting-rod, with which is articulated the pawl-lever O, which meshes in with the teeth of a ratchet-wheel, P, fast on the end of the shaft of the under feed roller. The revolution of the cam-wheel F, therefore, causes the sliding bar N to reciprocate, which movement, being transmitted to the lower end of the pawl-lever, causes it to vibrate upon its fulcrum, which is the shaft of the lower feed-roller. The vibratory motion of the pawl lever actuates the ratchet-wheel in but one direction, thus producing intermittent rotary motion of the feed-rollers, the amount of feed or intermittent rotary motion being calculated according to the length of the shank of the rivet. The cam-wheel G transmits its rotary movement in a similar manner to a horizontal sliding bar, N′, which is connected through the intermediary of a pitman with the vertical arm of a horizontal segmental cog-wheel, Q, whose vibratory movement is transmitted to a pinion, R, on the shaft S of the blank-carrier V, giving it a quarter-revolution to each revolution of the main shaft or to each stroke of the machine.

The rivet-head blanks, which, as before stated, are first heated in a suitable furnace, are placed in a hopper or pipe, T, of a diameter but slightly exceeding that of the head-blanks, so that the same may be held within the hopper, piled up one above the other. On the front side the hopper is slotted to allow of the blanks being inserted or taken out of the tube by means of tongs, and the hopper is secured to the machine by means of a plate extending sidewise in such manner that the tube may be held, at a distance equal to or slightly exceeding the depth of a blank, away from the support underneath. It is in this intermediate space between the hopper and the supporting-block that the carrier in its motion travels along the cylindrical surface of the block U. The blank-carrier is indented in front, forming a fork, which seizes the lowermost blank in the hopper and carries it forward and down the cylindrical surface of the block into position and in time for the shank to be pressed into the head-blank. As soon as this operation is performed, the blank-carrier recedes into position for another operation. The main shaft C is provided with a cam, W, which actuates the hammer X, which presses the shank of the rivet into the blank as soon as brought in position by the blank-carrier, as before described. This plunger is composed of two parts, confined within suitable ways and united by means of a right-and-left hand screw or by means of an ordinary screw secured in one portion and loose in the other, but provided with a nut, *a*, so that by turning the said nut the length of the plunger may be increased or decreased at pleasure, to compensate for wear or to regulate the distance of the block from the face of the hammer, according to the length of the shank.

The header Y is also confined within sliding blocks and receives its reciprocating motion from the main shaft C, with an eccentric portion of which it is connected by means of the link Z. A central hole of a diameter but slightly exceeding that of the shank passes through the header, allowing the stem or shank of the rivet to enter therein while the head is being formed. Within the central orifice of the header is arranged a plunger, *b*, the rear end of which is screw-threaded, carrying a nut, *c*, which regulates the play of the plunger within the header. A stationary block, *d*, projecting upwardly from the bed of the header, is provided for the plunger to strike against when the header recedes, thus ejecting the formed rivets from the header. The heading-die *e* is in the face of the block *g*, in line with the axis of the header.

The wire rod is fed into the machine by means of the rollers K and K′ through an orifice terminating in the cylindrical block U. When the requisite amount of wire or rod for one shank is fed through the orifice in the block, the cutter or punch *h* is advanced by direct action of the cam H and shears off the piece used for the shank, and simultaneously with this operation the gripper *i* is caused, in

conjunction with the cutter, to seize the shank thus cut. The two cams G and H are so constructed as to perform these operations of cutting and seizing the shank immediately in advance of the head-blank being brought into position. They are further so constructed as to impart to the cutter or punch and the gripper an intermittent motion—that is to say, first advance opposite the head-blank on the one side and the hammer on the other side, and remain stationary until the hammer shall have advanced and forcibly inserted the shank of the rivet into the head; then advance again until both the shank and the head are brought opposite the header and remain stationary until the heading-blow shall have been struck, and then immediately recede to its original position. These motions are all given by the cams, with the exception of the back movements, which are determined by a powerful spring, *m*.

The operation of this machine as a whole will be understood from the following: The end of a coil of wire, (if wire be used,) being engaged between the rollers and the hopper, charged with a pile of blanks heated to a forging temperature, the machine is started. Rotary motion from the main shaft which operates the hammer and header is transmitted to the shaft carrying the cam-wheels and cams which actuate the cutter, blank-carrier, and grippers, in the manner as follows: The wire is first fed forward a distance such as that the quantity projecting from the face of the block be equal the length of the intended shank, at the moment the blank-carrier seizes a head-blank and carries it down into position opposite the hammer, while at the same time the cutter is advanced to shear off the piece of wire, which, by means of the cutter together with the gripper, is seized and carried in front of the hammer and is held between the blank and the hammer, (its axis corresponding to the center of the blank,) until the hammer shall have given its blow whereby the shank is caused to penetrate the head-blank and be embodied therewith. In the meantime the blank-carrier recedes, clearing the path for the gripper to advance and to convey the now united shank and head-blank to the header. When the rivet is thus brought in position, the head-blank rests on the head-die while the shank faces the orifice in the header. Now, as the header advances to give the finishing-stroke the rivet-shank becomes engaged in the central orifice of the header, and the grippers release their hold on the rivet and recede to their normal position. The header driving the blank into the concave heading-die will finish the head of the rivet, and at the same time the plunger within the header, butting by means of its nut against the cross-piece *m* of the header, will force the shank up and into the head, the two thus becoming dovetailed together, as hereinbefore referred to. On receding from the head-die the header carries the finished rivet with it until the rear end of the plunger buts against the stationary block *d*, whereby the rivet is discharged and dropped into a receiver below. These successive operations are repeated for every rivet.

To provide against breaking of the machine or any parts thereof, if by accident or otherwise a blank should clog the carrier or other part, I mount the segmental cog-wheel upon its shaft by means of a friction device sufficiently powerful to cause the cog-wheel to move with the shaft when the path is clear, but yielding in case anything should obstruct the free working of the carrier. In this way the principal parts of the machine may continue to operate without danger of breaking.

Having thus fully described my invention, I shall state my claims as follows:

1. A machine operating as described, so as to form a rivet by forcing the shank into the head, substantially as described.

2. The combination in one machine of the following elements: first, a mechanism for feeding the wire or rod to a cutter dividing it into shanks, and a mechanism for feeding the heads into the machine, as herein described; second, a pair of nippers or grippers seizing the shank and conveying it successively to the head-blank and hammer and the header, as herein described; third, a plunger or hammer actuated to insert the shank into the head-blank and a header to force the shank home into the head against the heading-die; fourth, a means for stripping the header of the finished rivet.

3. The employment of a pair of grippers which receive the shanks one at a time and whose motion is such as to present them first to the plunger or hammer for insertion of the shank into the head, then conveying them to the header, and then release them, substantially as set forth.

4. The combination of the cutter severing the wire or rod as it is fed into the machine with a gripping-lever mounted upon the cutter-stock so that the two, being actuated by suitable cams, move together in their translatory movement, though acting as grippers, substantially as before described.

5. The combination of feed-rollers feeding the wire or rod during the intervals of action of the plunger and header, as described, with a cutter and gripping-lever for action together, substantially as and for the purposes set forth.

6. The combination of a hopper for supplying the machine with rivet-head blanks with a carrier so arranged as to seize one head-blank at a time, presenting it to the plunger in position for the insertion of the shank, as set forth.

7. The means herein described for regulating the stroke of the plunger within the header, according to the length of the shank

and to compensate for wear, substantially as set forth.

8. In combination with the hammer for setting the shank into the head of the rivet, a means for adjusting the same according to the length of the shank and to compensate for wear, substantially as set forth.

In testimony whereof I have signed this specification in presence of two witnesses.

GEO. B. BRAYTON.

Witnesses:

A. POLLOK,

JOHN A. TAUBERSCHMIDT.