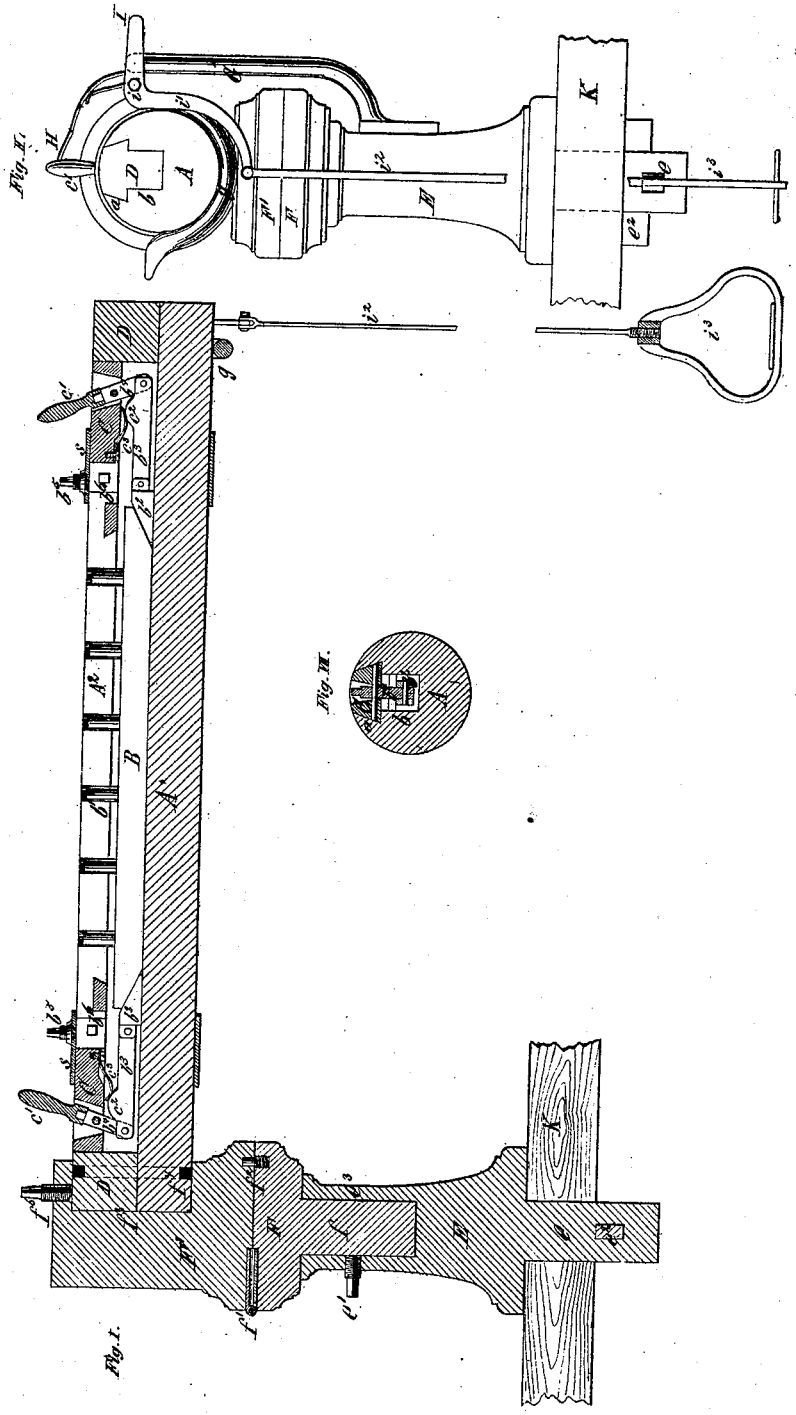
J. Berry, 2 Sheets Sheet 1.

Riveting Mandrel.

No. 109575. Patented Nov. 29. 1870.



Witnesses:
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2 Sheets Sheet 2

J. Berry,

Riveting Mandrel.

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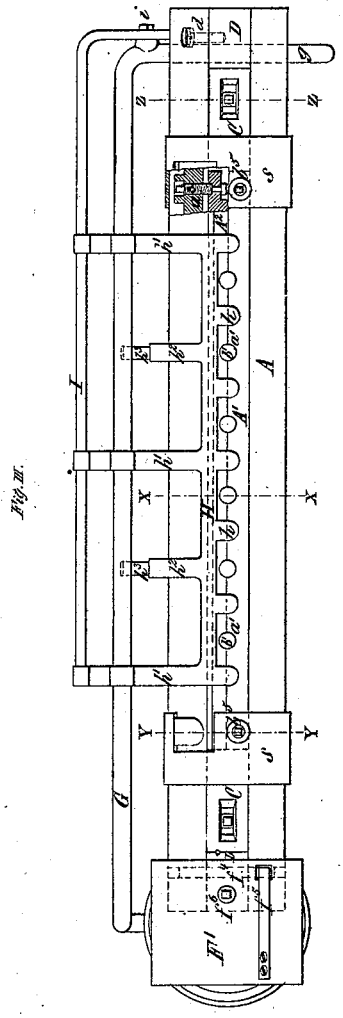

Fig. III.

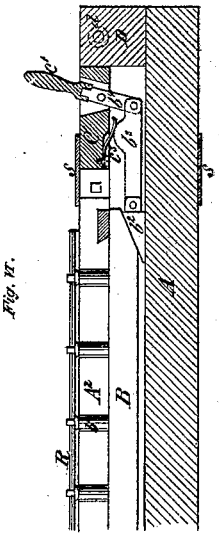

Fig. VI.

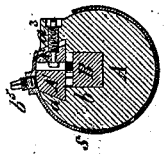

Fig. V.

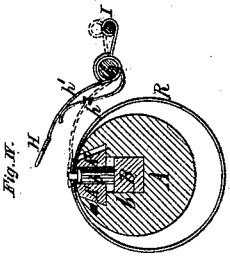

Fig. IV.

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UNITED STATES PATENT OFFICE.

JAMES BERRY, OF BUFFALO, NEW YORK.

IMPROVEMENT IN RIVETING-MANDRELS.

Specification forming part of Letters Patent No. **109,575**, dated November 29, 1870.

To all whom it may concern:

Be it known that I, JAMES BERRY, of the city of Buffalo, in the county of Erie and State of New York, have invented an Improved Riveting-Mandrel, of which the following is a specification.

Heretofore, in the manufacture of sheet-metal pipe formed by bending the sheet of metal and riveting together the overlapping edges on a round bar or mandrel, the rivets have been separately inserted by hand and riveted one at a time, which involves considerable time and labor.

The object of my invention is the construction of a riveting-mandrel adapted to receive and hold all of the rivets required for a joint or section of pipe, and at a relative distance apart to correspond with the holes therefor in the pipe, which is then arranged on the mandrel, so that the upwardly-projecting ends of the rivets, which coincide with the holes in the pipe, will readily enter the same, so as to enable all of the rivets to be clinched or headed by a single continued operation without removing or changing the position of the pipe.

The invention consists, first, in the arrangement, in a longitudinally-grooved mandrel, of socketed clamping-bars to hold the rivets until they are inserted in the pipe, and an elevating mechanism to expel them from the sockets after they have been inserted, and permit the mandrel to be turned to bring uppermost and under the heads of the rivets a solid portion thereof to receive the concussions of the riveting-hammer; second, in the arrangement of levers, wedges, and connecting-rods at the ends of the elevating-bar to operate the same, as aforesaid; third, in the arrangement of a curved spring and stop for holding the wedge in either of its two positions of engagement or disengagement with the elevating-bar; fourth, in the combination and arrangement, with my improved mandrel, of a clamping device for holding the two edges of the pipe together during the riveting process.

In the accompanying drawings, Figure I is a sectional elevation of the mandrel and standard. Fig. II is an end elevation thereof. Fig. III is a plan view thereof. Fig. IV is a cross-section of the mandrel and fender on line *x x*. Fig. V is a cross-section on line *y y*. Fig. VI is a sectional elevation of the mandrel, illustrating the working of the pins. Fig. VII is a cross-section on line *z z*.

Like letters designate like parts in each of the figures.

A is the body of the mandrel, consisting of a cylindrical bar of metal. A dovetail groove, *a*, is arranged longitudinally therein, in the bottom of which is made a groove, *b*, of rectangular cross-section, both running from end to end through the mandrel A. Longitudinally in groove *a* fit two clamp-bars, A' A^2, the jaw A' being stationary, while the jaw A^2 is made a little narrower, so as to be able to be moved to and from the jaw A' to the extent of the play in said groove.

B is a bar, rectangular in cross-section, fitting in groove *b*, but not quite as deep as the groove, so as to leave a little play vertically between the bar B and jaws A' A^2, as shown in Fig. IV. It is provided with a series of pins, b', corresponding in number and arrangement to the rivet-holes in the piece of pipe to be riveted. These pins pass through semi-cylindrical notches a' in the blocks A' A^2, and in their normal position stop short of the surface of the mandrel, so that when the bar B is in its lowest position, as represented in Fig. IV, the socket formed by the semi-cylindrical notches in jaws A' A^2 as sides, and the top of pins b' as a bottom, will be large enough to receive a rivet-head. The length of the bars A' A^2 must be in excess of the length of pipe usually riveted on the mandrel. b^6 are dovetail keys running transversely through the bars A' A^2 and the mandrel, so as to secure said bars in their relative position. The stationary jaw A' may further be secured by a set-screw, b^5, passing through a collar, *s*, surrounding the mandrel and bearing against the jaw. The adjustments of the movable jaw A^2 is effected by screws a^3 a^3, one at each end of the jaw. These screws pass through the mandrel and work in threads cut therein, and take hold of the end of the jaw A^2 in such a manner that the jaw will follow the movement of the screw in either direction. The head of the screw is preferably countersunk, as represented in Fig. V. The vertical movement of the lower bar, B, is effected by wedges b^2 b^2, arranged in the groove so as to bear against the beveled edges of said bar. By forcing the wedges against this bar the latter

is elevated in the direction of the pins b'. The wedges b^2 are worked by connecting-rods b^3, pivoted to the wedges and levers b^4, the latter being of the first order and pivoted in pieces C, arranged in the dovetail groove a, next to the clamp-bars A' A^2. The lower end of lever b^4 takes hold of the connecting-rod, while the upper end is hidden in piece C and worked by means of a wrench or handle, c', the socket of which receives the end of lever b^4. The connecting-rod b^3 is formed on its upper side with a stop-enlargement, c^2, which engages with a spring, c^3, fastened to the under side of piece C, and bent at its end, so as to hold the wedge b^2 either in engagement with the bar B, while elevating the same, as represented in Fig. VI, or in its opposite position, as shown in Fig. I.

D D are end blocks filling the remainder of the dovetail groove a and rectangular groove b at the ends of the jaws and lever-fulcrum pieces C, so as to give the mandrel a smooth cylindrical appearance. They are secured in place by countersunk screws d. The standard supporting the mandrel consists of a stationary base, E, provided with a square shank, e, fitting in a socket in the bench K, and secured by a key, e^2. This base E is constructed with a cylindrical socket, e^3, in the top thereof, which receives a cylindrical shank, f, attached to the upper portion of the standard. A set-screw, e', passing through the metal of said socket and bearing against the shank f, may secure the latter in a fixed position, if desired. The upper portion of the standard is cut horizontally in halves F F', hinged together at the rear at f'. A locking-pin, f^2, fastened to part F and fitting in a socket in part F', helps to secure the halves in their relative position against lateral movement when resting on each other. The lower half, F, carries the cylindrical shank f, already mentioned, while the upper half, F', is provided with a horizontal cylindrical socket, f^3, of a size to receive the mandrel A. The end of the mandrel fitting in this socket is constructed with a circular groove, f^4, in which engages a spring-catch, f^5, Fig. III, attached to part F' of the standard, the hook of the same passing through an opening in the socket f^3. This arrangement prevents the accidental disengagement of the mandrel from the part F' until the spring-catch is released. A set-screw, f^6, passing through part F' and bearing against the mandrel, serves to hold the latter from turning in its socket when it is required to be stationary.

It will be seen from the foregoing that the shank f enables the entire upper part of the standard and the mandrel attached thereto to swing in a horizontal plane, and that the hinge f' enables the bearing F' and the mandrel secured therein to swing in a vertical plane, while the mandrel itself may be turned in the socket in part F' around its own axis when not secured by the set-screw f^6.

G is a bent rod or arm rigidly attached to the lower portion, E, of the standard, and extending vertically to a point a little above the center of the mandrel, from whence it runs, parallel to the same, to a point near the opposite end thereof, when it turns toward the mandrel and terminates in a hook, g, which forms a rest and support for the mandrel at that point, as clearly shown in Figs. II and III. This rod forms at the same time a fulcrum for a device which serves to hold the edges of the pipe together before and during the operation of riveting the same. It consists of a bar, H, preferably provided with fingers h, projecting into the spaces between the rivets. This bar is supported by arms h' from the fulcrum-rod G, and is held away from the mandrel, in the position shown in Fig. IV, by springs h^3, bearing against arms h^2. The arms h' extend beyond the fulcrum-rod G and take hold of a rod, I, which runs parallel to rod G, and, following the bend of rod G, at its free end is pivoted to the same at i, whence a curved arm, i', extends downward and connects by means of a rod, i^2, with a stirrup, i^3, Fig. I. By pushing down the stirrup the rod I is swung upward on the pivot i, and the clamp-bar H pressed down upon the outer edge of the pipe R, so as to clamp its two edges together against the mandrel, as represented in dotted lines, Fig. IV. Upon releasing the stirrup the parts are thrown back into their former position by means of the springs h^3.

The operation of my device is as follows: The pin-bar B being in its lower position, the rivets are placed with their heads below in the cavities a', formed between the jaws A'A^2, and clamped therein by turning the screws a^3, which adjusts the movable jaw A^2. The piece of pipe to be riveted, with the rivet-holes already punched, is then placed on the mandrel in such a manner as to cause the rivet-holes to coincide with the rivets on the mandrel, when the rivets will readily enter the holes. By applying the pressure of the foot to the stirrup i^3 the finger-bar H clamps the edges of the pipe together, as above described. The movable jaw-bar A^2 is then loosened and the pin-bar B forced upward by the wedges b^2, worked by the levers b^3, whereby the rivets are elevated out of their sockets and above the surface of the mandrel. This permits the mandrel to be turned on its axis, so as to bring a solid portion thereof under the rivets preparatory to heading them.

In order to apply and remove the pipe, it is necessary to disengage the mandrel from the hook of supporting-rod G, which is easily accomplished by swinging the same upwardly on the hinge f', and then turning the mandrel and the upper portion of the standard in the socket e^3.

What I claim as my invention is—

1. The combination and arrangement of the rivet-elevating bar B and mechanism for elevating it, pins b', socketed clamp-bars A' A^2, and mandrel A, as and for the purpose hereinbefore set forth.

2. The combination and arrangement of the wedges b^2, levers b^4, connecting-rod b^3, with the bar B, pins b', clamps A' A^2, and mandrel A, as and for the purpose set forth.

3. The combination and arrangement of the curved spring c^3, with the stop-enlargement c^5 on connecting-rod b^3, wedges b^2, elevating-bar B, pins b', and mandrel A, as and for the purpose set forth.

4. The combination of the clamping-bar H, arm G, riveting-mandrel A, constructed as described, and standard-bearing E F F', arranged and operating as hereinbefore set forth.

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