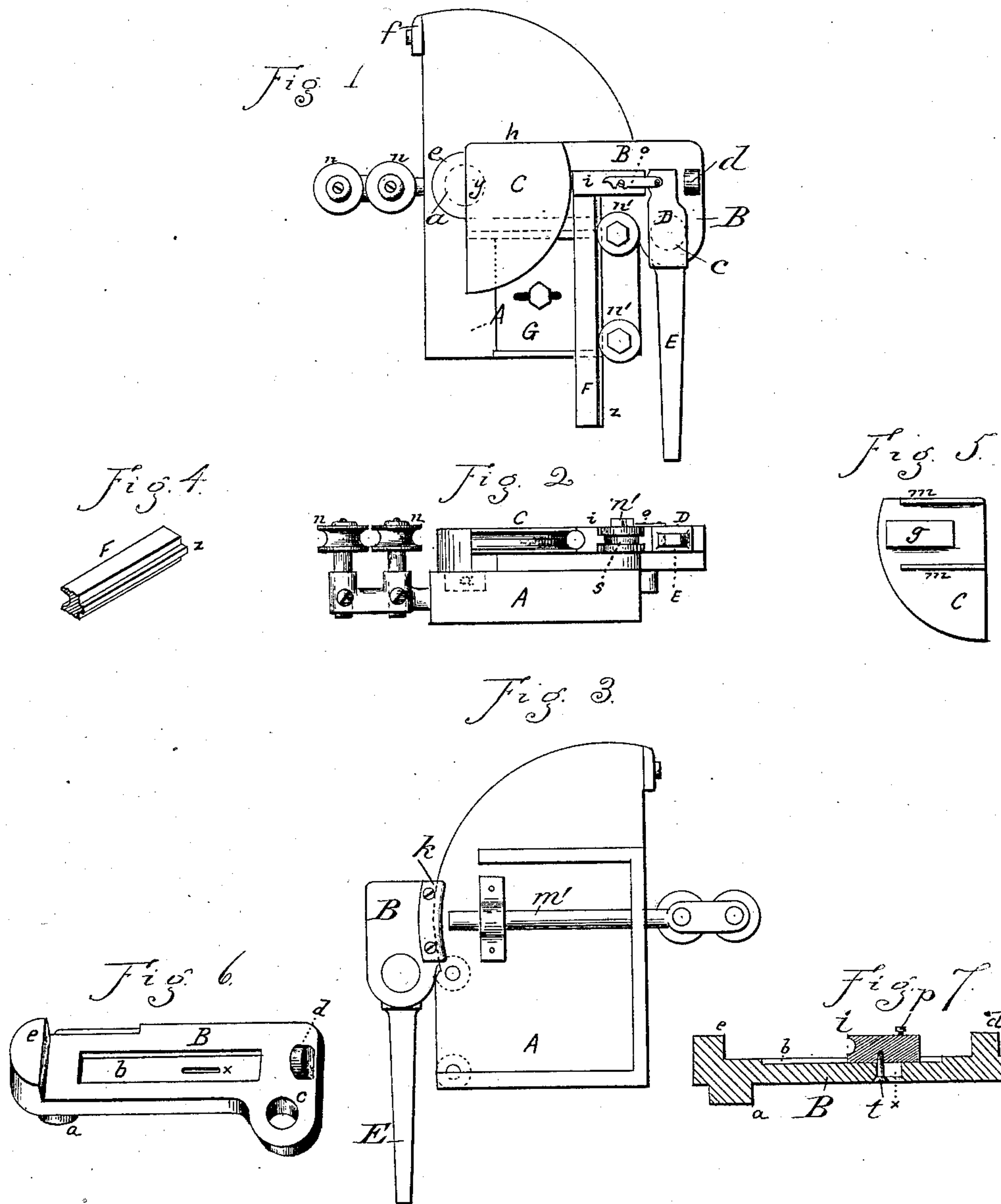


(No Model.)

J. M. EVARTS.
MACHINE FOR BENDING PIPE.

No. 256,890.

Patented Apr. 25, 1882.



Witnesses
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JAMES M. EVARTS, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE
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MACHINE FOR BENDING PIPE.

SPECIFICATION forming part of Letters Patent No. 256,890, dated April 25, 1882.

Application filed November 9, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. EVARTS, of New Haven, in the county of New Haven and State of Connecticut, have invented a new and Improved Machine for Bending Pipe into Coils and other Forms, of which the following is a description.

My invention is an improvement on the machine for which Letters Patent were issued to me December 30, 1879; and the improvement consists in the construction and arrangement of parts, as hereinafter described, whereby the machine is adapted to bend pipe into coils as well as into the more usual forms ordinarily required.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is an end view, the grooved bar being omitted. Fig. 3 is a view of the under side of the machine. Fig. 4 is a view of a removable grooved bar. Fig. 5 is a view of the under side of the former. Fig. 6 is a view of the arm to which the lever is pivoted and in which a clamping-bar moves, and Fig. 7 is a vertical and longitudinal section of said arm and of the clamping-bar.

To enable others to make and use my improved machine, I will describe its parts in detail and their operation.

A is the frame or bed of the machine, to which all the parts are mediately or immediately attached. Its under side is shown in Fig. 3. To this frame is pivoted an arm, B, which is provided on its under side, at one end, with a stud, *a*, that enters a circular opening in the frame.

The arm B, as shown in Fig. 6, is also provided with a groove or recess, *b*, in one end of which is a narrow slot, *x*. It also has on its upper surface, at one end, a shoulder, *e*, and at its opposite end a stop, *d*, and an aperture or circular opening, *c*, in which is pivoted the end D of a lever. On its underside is a flange or projection, *k*, which engages with the curved edge of the frame. The frame C has the shape of a sector of a circle or quadrant, and its curved side or edge is grooved, as shown in Fig. 2, the center of the circle of which the former is a segment being shown at *y*, Fig. 1, which is in a line passing through the center of the stud *a*, Fig. 6. On the under side of the form-

er C is a lug, *g*, which fits into one end of the recess *b* in the arm B. The former is also provided on its under side with ribs *m m*, which fit over the edges of the pivoted arm. When in position upon the arm B the straight side of the former rests against the shoulder *e* at the inner end of the arm, and its loose connection with the arm B is such that its end *h* is enabled to rise at the proper time, and thereby assist in giving direction to the pipe as it is carried forward and bent. Formers of different sizes may be used, the size in each case corresponding with that of the coil to be made.

A clamping-bar, *i*, which is grooved at one end to correspond with the groove in the edge of the former, is fitted into one end of the recess *b*, in which it is adapted to slide. This bar is held in the groove *b* by a screw, *t*, passing through the slot *x*, as shown in Fig. 7. It is also provided with a pin, *p*, for engagement with a latch, *o*, by which it is connected with the part D, as shown in Fig. 1.

Attached to the part D, or integral therewith, is a lever, E, the whole being pivoted to the end of the arm B by means of a stud passing through the opening *c*. The throw of this lever is limited by the stop *d* at the outer end of the arm.

Attached to the frame A, or to a slide, G, adjustable thereon, are studs carrying pulleys *n' n'*.

F is a removable straight bar, which is provided on one side or edge with a semicircular groove, corresponding with the groove in the end of the clamping-bar *i* and former C. On its opposite edge is a tongue, *z*, which fits into rectangular grooves *s* formed in the pulleys *n' n'*. By attaching the pulleys *n' n'* to an adjustable slide they may be adjusted to correspond with varying diameters of pipe or with variations in the size of the removable bar. On the opposite side of the frame A is a bar, *m'*, which is secured in bearings beneath the frame, and carries on its projecting end a pair of studs which are adjustable thereon by means of set-screws. These studs carry the pulleys *n n*, which support and give direction to the bent pipe after the curve is formed.

The operation of the machine is as follows: The bar F being arranged in connection with the

former C, bar *i*, and pulleys *n' n'*, as shown in Fig. 1, the pipe to be bent is passed along the groove in the side of said bar F and end of the clamping-bar *i* and in contact with the groove in the edge of the former C. By throwing the end of the lever E outward the clamping-bar *i* is caused to move slightly in the recess *b* toward the former C, the end of the pipe being thus firmly grasped between the grooved edges of the former and clamping-bar. The lever E is now pressed upon in a forward and outward direction so as to cause the arm B to rotate upon its stud or pivot *a*, thus carrying the former C in the same direction and causing the pipe to be grasped between its curved edge and that of the bar F, which is also gradually fed forward by the application of a proper pressure, thus imparting to the pipe a curve or bend corresponding to the curve of the frame C. When the rotation of the arm B brings it in contact with the stop *f* the end *h* of the former C rises slightly to give a proper direction to the pipe, the end of which is finally caused to pass between the pulleys *n n*, which support the pipe as it is bent. The latch *o* is now disengaged from the pin *p* on the clamping-bar *i*, and the lever E is drawn back so as to return the arm B and attached former C to their first position. The clamping-bar *i* being again latched to the part D or inner end of the lever, the operation is repeated as before. By this means the pipe is formed and bent into a curve corresponding with the curved portion of the former C. When the end D of the lever E is unlatched from the clamping-bar *i* and the former C rotated backward to the position shown in Fig. 1, the partially-coiled pipe is held by any suitable means, so as to prevent its backward movement with said former. Each repetition of the forward movement of the former C not only results in bending successive portions of the pipe, but also feeds forward in circular direction that portion that has been already coiled, and thus directs the forward end of the coiled pipe into engagement with the grooved peripheries of the supporting-rollers *n n*. This operation is assisted

by the flexible or loose connection of the former C with the arm B, which enables the end *h* of the former to rise slightly with the coiled pipe, and thus facilitate its passage between the rollers.

It will be seen that by reason of the segmental shape of the former C the pipe, when bent into the desired form, may be readily removed from the machine.

This machine is adapted for use in bending metallic pipes of any ordinary diameter, either with or without the aid of heat, as may be found necessary.

Having described my improved machine for bending coils, what I claim as new, and desire to secure by Letters Patent, is—

1. The lever E, part D, pivoted to the part B, and bar *i*, in combination with the part B, provided with the stud *a* and shoulder *e*, and with the former C, having the lug *g* and ribs *m*, as set forth.
2. The combination of the lever E, part D, pivoted to the part B, bar *i*, part B, provided with the stud *a* and shoulder *e*, and former C, having the lug *g* and ribs *m*, with the bar F, having a groove and tongue, as described, and with the adjustable pulleys *n'*, having the rectangular grooves, as set forth.
3. In a machine for bending pipe into coils, the adjustable pulleys *n*, arranged and adapted to hold the bent pipe in their semicircular grooves and give direction to the same, as set forth.
4. In a machine for bending pipes into coils, the combination of the bed A, having pulleys *n n'*, the slotted and shouldered arm B, pivoted to said bed, the segmental former C, adapted to be supported on the pivoted arm, the bars F and *i*, arranged at a right angle, and the lever D E, having a latch-connection with the bar *i*, substantially as and for the purpose described.

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Witnesses:

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