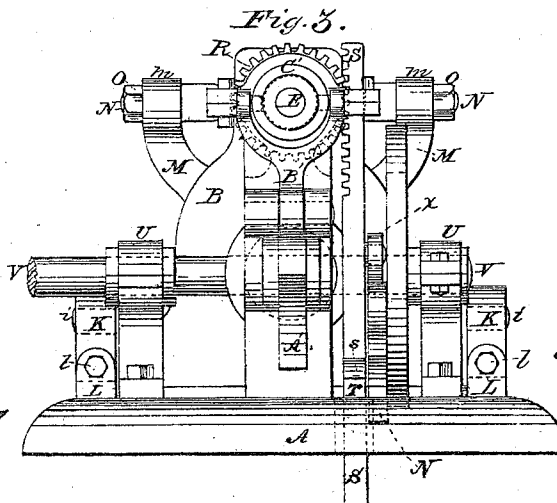
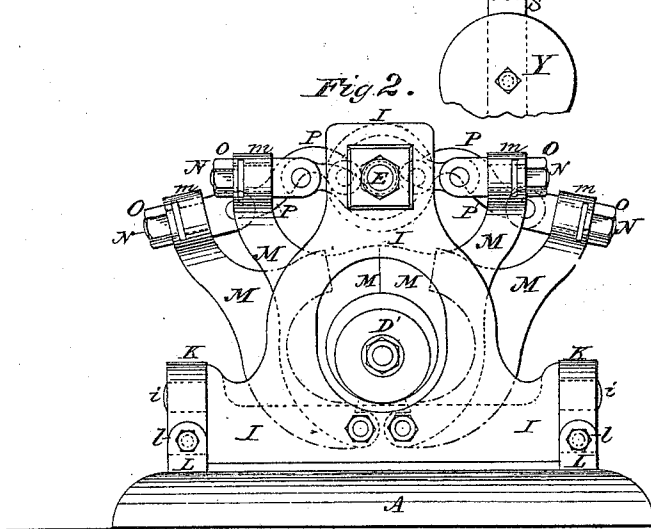
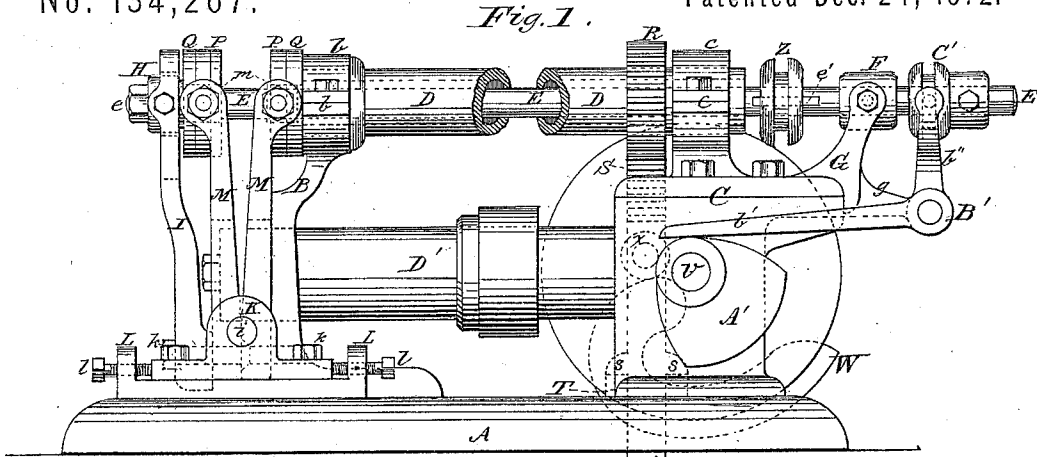


L. C. GOODALE.

Machines for Making Pipe-Elbows.

No. 134,267.

Patented Dec. 24, 1872.



Witnesses:

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UNITED STATES PATENT OFFICE.

LEVI C. GOODALE, OF CINCINNATI, OHIO.

IMPROVEMENT IN MACHINES FOR MAKING PIPE-ELBOWS.

Specification forming part of Letters Patent No. 134,267, dated December 24, 1872.

To all whom it may concern:

Be it known that I, LEVI C. GOODALE, of Cincinnati, in the county of Hamilton and in the State of Ohio, have invented certain new and useful Improvements in Machines for Making Pipe-Elbows; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a side elevation of my improved machine, and Figs. 2 and 3 are elevations of opposite ends of the same.

Letters of like name and kind refer to like parts in each of the figures.

My invention is an improvement upon a machine for making pipe-elbows for which Letters Patent No. 126,884 were issued to me on the 21st day of May, 1872; and it consists, principally, in the means employed for connecting the pivoted jaws to or with their shafts so as to cause the latter, by a partial revolution, to close or open the former, substantially as and for the purpose hereinafter specified. It consists, further, in the means employed for imparting to the shafts a semi-rotary motion, substantially as and for the purpose hereinafter shown. It consists, further, in the means employed for imparting to one of the shafts, with its jaws, a longitudinal movement within its bearings, substantially as and for the purpose hereinafter set forth. It consists, further, in the construction of the bearings for the longitudinally-moving shaft, substantially as and for the purpose hereinafter shown and described. It consists, further, in the construction of the support for the forward bearing of the longitudinally-moving shaft and for the jaws of said shaft, and in the combination of said support with said parts and with the main frame, substantially as and for the purpose hereinafter specified. It consists, further, in the peculiar construction of the clamping-jaws and their arrangement upon the machine, substantially as and for the purpose hereinafter shown. It consists, further, in the means employed for relieving the shock of the toothed rack-bar as it drops to place, substantially as and for the purpose hereinafter set forth. It consists, finally, in the machine as a whole, when constructed and arranged to

operate substantially as and for the purpose shown and described.

In the annexed drawing, A represents the bed or base of the machine, having, preferably, a rectangular shape in plan view, from near the ends of which extend upward two standards, B and C, respectively, that at their upper ends form boxes or bearings *b* and *c* for the reception of a hollow shaft, D, which rests horizontally therein. Within the hollow shaft D is placed a second shaft, E, which extends longitudinally outward beyond the former, and at or near its rear end rests within a box, F, that is so pivoted within the forked end of a rearward and upward extending arm G of the standard C as to be capable of movement in a vertical plane and in a line with said shaft. The forward end of the shaft E rests within a box, H, that is pivoted upon or within the upper end of a standard, I, which has the form shown, and at its lower end is provided with suitable trunnions *i*, that extend laterally outward and rest within boxes K attached to the frame, the whole being so arranged as to enable the upper end of said standard, its box H, and the shaft E to be moved, within certain limits, in a line fore and aft of the machine. In order that the longitudinal position of the shaft E within the box H may be insured, the portion which rests within said box is somewhat reduced in diameter, so as to form a journal having a shoulder upon its inner side, while upon the outer end of said shaft is placed a nut, *e*, that, having a somewhat greater size than that of said journal, forms a shoulder or end bearing for its forward end. It being requisite that the standard I should be capable of adjustment toward or from the standard B, the openings through which the bolts *k* of the boxes K pass downward into the frame are lengthened so as to permit said boxes to be moved forward or back. A lug, L, extending upward near each end of and in a line with each box, is provided with a set-screw, *l*, which, bearing against said end, serves as a means for moving said box, or, in connection with the opposite screw, of securing the same in position. Pivoted at their lower ends to or upon each of the contiguous faces and corresponding ends of the standards B and I are two jaws, M, which have the form shown in Fig. 2, and

at their upper ends are each provided with a cylindrical enlargement, *m*, that contains an opening for the passage of a bolt, *N*, and has swiveled within its outer face a nut, *O*, said parts being so arranged that by turning said nut within its bearing said bolt may be moved longitudinally through said opening in either direction. To the inner end of each bolt *N* is pivoted one end of a bar, *P*, which from thence extends inward, and has its opposite end pivoted to or upon the face of one of two disks or collars, *Q*, that are attached to and revolve with the shafts *D* and *E*, the arrangement of parts being such as to cause each of said shafts to control and operate one set of jaws. In order that while the shafts each turn one-half of a revolution the pivoted ends of the connections *P* may start from and stop at points upon a line, horizontally, with the centers of said shafts, said connections are so formed that when their forward or inner ends are upon the further side of their shaft and the jaws closed together, a semicircular recess is provided, which corresponds to and receives the latter, the effect of which arrangement is to afford the greatest possible leverage at the time when said jaws are grasping the pipe being operated upon. As thus arranged, it will be seen that as the shafts *D* and *E* are rotated in one direction, the jaws are opened or moved apart, while by rotating the former in an opposite direction said jaws are closed or moved together, the motion in either direction being positive. The requisite semi-rotary motion of the shafts *D* and *E* is communicated through and by means of the following described mechanism: Secured to or upon the shaft *D*, immediately in front of the bearing *e*, is a pinion, *R*, which engages with a toothed rack-bar, *S*, that is contained within suitable bearings attached to the frame, and is capable of motion therein in a longitudinal and vertical direction. The lugs, *s*, formed upon opposite sides of the bar *S* extending outward over the base-plate *A*, limit the downward motion of said bar, while the shock of the impact of the same is deadened by means of rubber cushions *T* which are placed beneath and receive said lugs. Resting horizontally within suitable bearings *U*, in a line transversely with the standard *C*, is a driving-shaft, *V*, arranged to rotate continuously rearward, upon which is secured a scroll-shaped cam, *W*, that, commencing at a point upon a line with the periphery of said shaft, extends in a curve outward and rearward (with relation to the motion) until a sufficient size is obtained, and thence for about one-third of an entire circle has its periphery concentric to the center of said shaft. The cam thus constructed is placed in a line with the outer face of the rack-bar *S*, and engages with a roller, *X*, which is pivoted to or upon the latter, so that as said cam revolves with its shaft said rack-bar and roller will be raised and held in an elevated position until the whole of said cam has passed beneath the

latter, after which said parts are caused to drop to position by means of a weight, *Y*, attached to the lower end of said bar. The motion of the shaft *D* is communicated to the shaft *E* by means of a sliding clutch, *Z*, which is placed upon the latter immediately in rear of the former, and is caused to engage with the end of the same in the usual manner. A key or feather, *e*, extending radially outward from the periphery of the shaft *E* and fitting into a corresponding groove cut in the interior of the clutch *Z*, insures the relative circumferential position of said clutch and shaft, while permitting the former to move freely upon the latter in a longitudinal direction. A longitudinal movement of the shaft *E* within its bearings is produced by means of a cam, *A'*, which is attached to and revolves with the shaft *V*, and impinges against the horizontal arm *b'* of a right-angled lever, *B'*, that is pivoted within a rearward-projecting arm, *g*, of the arm *G*. The vertical arm *b''* of said lever is forked at its end, and embraces a grooved collar, *C'*, which is secured to or upon said shaft *E* in rear of bearing *F*.

By this arrangement of parts, the cam *A'* as it revolves raises the horizontal arm of the lever *B'*, and causes the upper end of the vertical arm of the same to move rearward and carry with it the shaft *E*. After the cam has passed from beneath the lever, the shaft *E* may be caused to return to its normal position by a weight attached to the end of the horizontal arm of said lever, or by any of the other suitable means which will readily suggest themselves.

The device is now complete, and operates as follows: The pipe is placed in position upon a shaft, *D'*, of usual construction, which extends rearward from the front side and through the center of the opening within the jaws, and is propelled forward, as required, by any of the usual and well-known means. The shaft *V* being set in motion, the cam *W* impinges upon the roller *X*, and, raising the rack-bar *S*, causes the shaft *D* to be rotated within its bearings, and, through the intermediate mechanism described, close together the jaws *M* connected therewith, which jaws impinge upon the pipe and produce the preliminary crimp. As the cam *W* passes rearward the rack *S* is released and permitted to drop downward so as to open the jaws and release the pipe, which is then fed forward. The clutch *Z* is now drawn forward so as to connect the shafts *D* and *E*, so that upon the next revolution of the driving-shaft both of said shafts *D* and *E* will be semi-rotated and their jaws closed upon the pipe, after which, and while said jaws are thus closed, the cam *A'*, operating through the lever *B'*, moves said shaft *E* rearward so as to bring its jaws against the jaws of the shaft *D*, and between them form a gather or crimp upon the upper side of the pipe, when, by the continued motion of said driving-shaft, the cams *W* and *A'* pass from beneath their bearings and the

parts resume their original positions once more, said operation described being repeated until the desired number of crimps are produced in the pipe.

The advantages possessed by this construction of the machine are, first, efficiency, the motions of the various parts being positive, and in their operations not liable to obstruction; second, the operative parts of the mechanism are strong, durable, not liable to get out of order, and are easily removed or replaced when necessary for the purpose of repairs; third, the simplicity of construction and the small number of parts render the machine comparatively inexpensive.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. In combination with the shafts D or E and the jaws M, the bars P pivoted to or upon said jaws and to or upon the collars Q attached to said shafts, substantially as and for the purpose specified.

2. In combination with the jaws M and connecting-bars P, the bolts N and swiveled nuts O, substantially as and for the purpose shown.

3. In combination with the shaft D, the pinion R, the rack-bar S, the roller X, and the cam W secured upon and revolving with the driving-shaft V, substantially as and for the purpose set forth.

4. In combination with the elements next above named and with the shaft E, the clutch Z revolving with and sliding upon said shaft, substantially as and for the purpose shown and described.

5. In combination with the shaft E and its pivoted jaws M, the angle-lever B', the grooved collar C', and the cam A' secured upon and revolving with the shaft V, substantially as and for the purpose specified.

6. The boxes F and H pivoted, respectively, within the arm G and the standard I, and combined with the shaft E, substantially as and for the purpose shown.

7. The standard I provided with the trunnions *i* and pivoted to or within the boxes K, in combination with the shaft E, substantially as and for the purpose set forth.

8. In combination with the boxes K of the pivoted standard I, the bolts *k*, the lugs L, and the set-screws *l*, substantially as and for the purpose shown and described.

9. The clamping-jaws M, constructed as shown, and relatively arranged upon the machine, substantially as and for the purpose specified.

10. In combination with the bed-plate A and toothed rack S, the lugs *s* and the rubber cushions T, substantially as and for the purpose shown.

11. The hereinbefore-described machine as a whole, when constructed and arranged to operate substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 5th day of September, 1872.

LEVI C. GOODALE.

Witnesses:

W. S. MUNSON,
W. J. COPPOCK.