

F. DIECKMANN.
ELBOW FORMING MACHINE.

(Application filed Oct. 15, 1900.)

(No Model.)

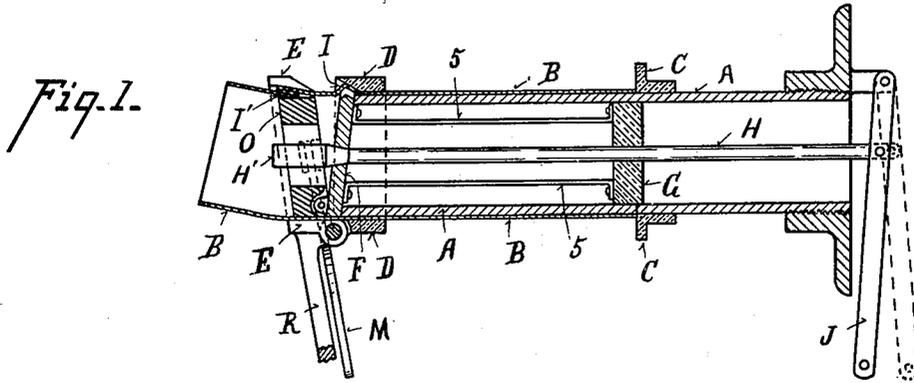


Fig. 1.

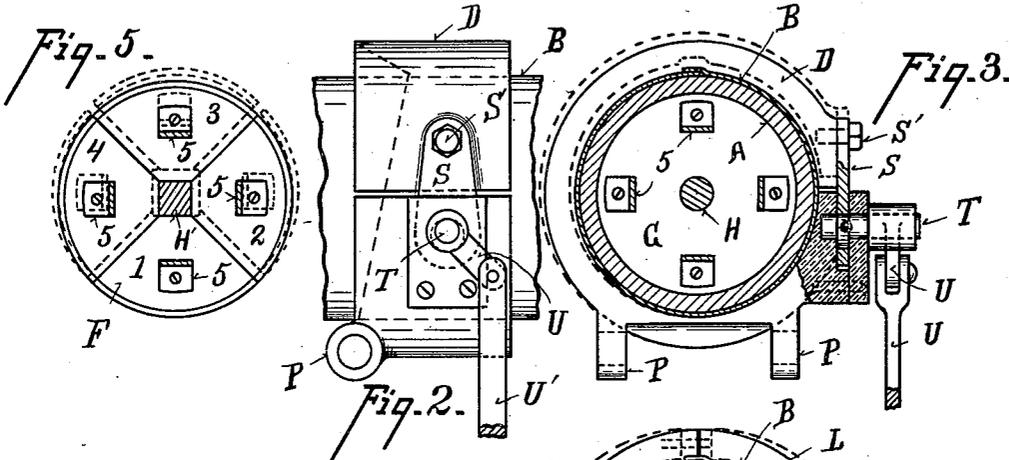


Fig. 5.

Fig. 3.

Fig. 2.

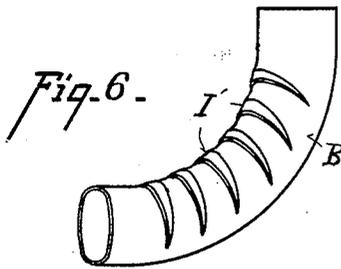


Fig. 6.

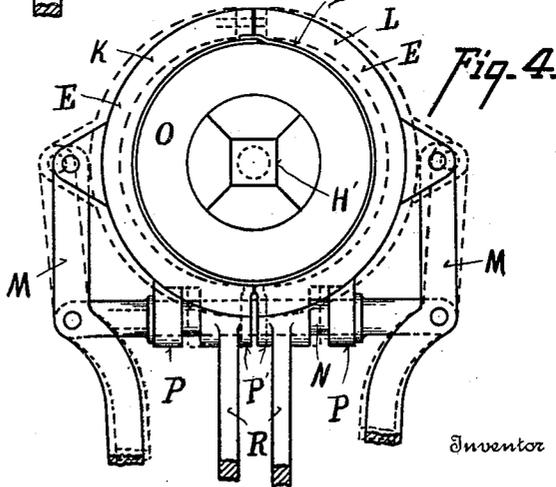


Fig. 4.

Inventor

Witnesses.

E. W. Throckmorton
Joseph L. ...

Ferdinand Dieckmann

By *C. W. Miles* Attorney

UNITED STATES PATENT OFFICE.

FERDINAND DIECKMANN, OF CINCINNATI, OHIO.

ELBOW-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 678,946, dated July 23, 1901.

Application filed October 15, 1900. Serial No. 33,035. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND DIECKMANN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Elbow-Forming Machinery; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machinery for forming sheet-metal elbows.

One object is to provide improved machinery for forming sheet-metal elbows.

Another object is to provide improved machinery whereby flat crimped sheet-metal elbows may be produced.

Another object is to form the elbows with as little straining or stretching of the metal as possible.

My invention also consists in certain details of form and combination, all of which will be more fully set forth in the description of the accompanying drawings, in which—

Figure 1 is a central vertical section through the crimping-machine, showing an elbow in the act of being formed. Fig. 2 is a side elevation of one of the crimping-jaws. Fig. 3 is a front elevation, partly in section, of the same and also with the spreader removed and showing the mandrel in section. Fig. 4 is a plan view of the opposite crimping-jaw and its operating-levers. Fig. 5 is a plan view of the spreader. Fig. 6 is a perspective view of a finished elbow.

The machine comprises a tube or mandrel A, over which the sheet-metal tube or blank B, out of which the elbow is to be formed, is placed. This blank is fed forward in a step-by-step movement by means of a collar C, which may be fed forward by means of a lever or in any approved manner. At the forward end of the mandrel are located a pair of crimping-jaws D E. The jaw D, which is preferably in the form of a heavy split ring, is adapted to clamp the blank upon the mandrel, as well as to serve as one of the crimping-jaws. F represents a spreader the function of which is to increase the diameter of the blank at the point where it is desired

to form a crimp preparatory thereto. This spreader may be formed in any one of several different ways, depending upon the size of elbow it is desired to make, and I do not wish to limit myself to the particular formation thereof. As shown in the drawings, it is composed of the several sections 1 2 3 4, which are supported and held in place by means of the spring-rods 5, attached at their opposite ends to the head G. In order to spread the sections of the spreader, I provide a draw-bar H, having a wedge-shaped head H', which when drawn into the central opening between the sections of the spreader separates them, as indicated in dotted line, Fig. 5, and increases the diameter of the blank, as shown at I, Fig. 1. J represents a lever for operating the draw-bar. As soon as the draw-bar is retracted the spring-arms 5 return the sections to their normal positions.

The crimping-jaw E is divided, preferably vertically, into two sections K L, which are capable of being drawn apart, as indicated in dotted line, Fig. 4, by means of levers M, which pivot to the ends of the hinge-bolt N. Within the jaw E and hinged or otherwise secured to the spreader to hold it in place is a ring (or it may be a solid head) O, between which and the jaw E the blank can be clamped, first, in order to bring the two jaws D E together to telescope the metal of the blank to form the crimps I', and, second, after being opened and taking a new bite this clamp serves to press the previously-formed crimp down tightly upon the face of the blank, as shown in Fig. 1. The jaw D and the two sections of the jaw E are preferably hinged together by means of the ears PP', encircling the hinge-bolt N. I also provide room between the ears P on the jaw D for the lateral movement of the ears P', so that the sections K L may be separated.

R represents levers for forcing the jaws D E toward each other. It will be noted that the meeting faces of the jaws are beveled, so that the jaw D overhangs the opposite jaw, and that by this means I am more readily enabled to telescope the metal to form the crimps without projecting it vertically from the face of the blank to any considerable extent, and thereby prevent the breaking of the metal

along the crimps, due to the excessive stretching of the metal at this point, as is common with other elbows.

The jaw E may be formed of more than two sections, if desired.

I have shown the jaw D constructed in the form of a split ring, the meeting edges of which are adapted to be drawn together by means of a link S, one end of which pivots on the bolt S', while the other end engages the eccentric shaft T, which is rotated by the crank-arm U and pitman U'. Other suitable mechanism may, however, be employed for clamping this jaw in place of that shown.

The mode of operation is as follows: A blank in the form of a tube of sheet metal is placed on the mandrel A and fed up to the position at which the first crimp is to be formed by means of the collar C. The jaw D is then clamped upon the blank. The draw-bar H is operated to separate the sections of the spreader, and thereby increase the diameter of the blank at the point at which the crimp is to be formed. The sections K L of the jaw E are closed upon the blank and clamped upon the ring or head O. Then the jaw E is forced toward the jaw D, telescoping the metal of the blank where its diameter has been increased by the spreader until the faces of the jaws D E nearly meet. The jaws D E are then unclamped and the blank fed forward, after which the jaw D is again clamped upon the blank, while the sections of the jaw E are opened and then clamped over the crimp or fold I', previously formed, and thereby force this previously-formed crimp down upon the face of the blank. The operation of forming the second crimp is then proceeded with, as before described. As many crimps are successively formed as required to give the elbow the desired curvature.

It will be noted that either a small or large crimp may be formed, since it requires but little, if any, more vertical projection to form a large crimp than a small one, depending upon the opening between the jaws D E, and that these crimps may be placed close to each other or not, depending upon the extent to which the blank is fed forward by the collar C. Thus large crimps may be formed so close to each other as to cause one crimp to overlap the other, or small crimps may be formed either close to each other or at considerable distances apart, which is of great utility and is not practical with the machinery heretofore in use.

Mechanism of various styles may be employed to feed the blank forward, to operate the spreader, and to effect the movements of the crimping and clamping jaws. For instance, these several movements may be successively and automatically performed by power-driven mechanism, or these several movements may be successively effected by hand. The different sizes of elbows require modifications in the transmitting mechanism, and I therefore do not wish to limit myself to

any particular mechanism for effecting the movements of the above-mentioned essential parts of my mechanism.

Having described my invention, what I claim is—

1. In an elbow-forming machine, a pair of crimping-jaws having counterpart beveled faces, each jaw adapted to be clamped upon the blank and then moved toward each other to telescope the metal of the blank to form a crimp.

2. In an elbow-forming machine, a pair of jaws having counterpart beveled faces, each adapted to clamp and hold the blank; a spreader adapted to increase the diameter of the blank between the jaws; and means for forcing the jaws toward each other to telescope the metal of the blank to form the crimp.

3. In an elbow-forming machine, a pair of jaws, each adapted to clamp and hold the blank, and having their adjacent faces beveled; a spreader adapted to increase the diameter of the blank between the jaws; and means for forcing the jaws toward each other to telescope the metal of the blank to form the crimps.

4. In an elbow-forming machine, a pair of jaws having counterpart beveled faces, each adapted to clamp and hold the blank; a spreader adapted to increase the diameter of the blank between the jaws; and means for forcing the jaws toward each other to form the crimp, one of said jaws being formed in sections adapted to be opened and then clamped upon the previously-formed crimp, substantially as specified.

5. In an elbow-forming machine, a pair of jaws, each having their adjacent faces beveled and adapted to move toward and from each other to form the crimps; a spreader adapted to increase the diameter of the blank between the jaws, one of said jaws being formed of sections adapted to be opened for the introduction of the previously-formed crimp, substantially as specified.

6. In an elbow-forming machine, a clamping-jaw adapted to clamp and hold the blank; a spreader adapted to increase the diameter of the blank in front of the clamping-jaw; and a jaw hinged to the clamping-jaw, adapted to clamp the blank and to be forced toward the clamping-jaw said jaws having cooperating beveled faces to telescope the metal of the blank to form the crimp.

7. In an elbow-forming machine, a clamping-jaw adapted to clamp and hold the blank in place; a spreader located within the blank and adapted to increase the diameter of the blank in front of the clamping-jaw; a ring within the blank in front of the spreader; and a jaw hinged to the clamping-jaw and adapted to clamp the blank, and to be forced toward the clamping-jaw to telescope the metal of the blank to form the crimps, substantially as specified.

8. In an elbow-forming machine, a clamping-jaw adapted to clamp and hold the blank;

a spreader adapted to increase the diameter of the blank at the point where the crimp is to be formed; and a jaw having a beveled face, adapted to clamp the blank, and to be forced toward the opposite jaw to telescope the metal of the blank to form the crimp.

9. In an elbow-forming machine, the combination with a mandrel of a clamping-jaw adapted to clamp the blank upon the mandrel; and a jaw having a beveled face and adapted to move toward and from the clamping-jaw and having means for clamping the blank, substantially as specified.

10. In an elbow-forming machine, a mandrel adapted to support the blank; a jaw having a beveled face and adapted to clamp the blank upon the mandrel; and a divided jaw having a beveled face, and adapted to move toward and from the opposite or clamping jaw.

11. In an elbow-forming machine, a mandrel adapted to support the blank, a clamping-jaw adapted to clamp the blank upon the mandrel and having a recess in its face; a spreader adapted to increase the diameter of the blank at the point where the crimp is to be formed, and a clamping-jaw movable relative to said first clamping-jaw, and having a beveled face.

12. In an elbow-forming machine, two sets of clamping-jaws for gripping the pipe, means for moving said jaws toward each other, the faces of said jaws being so shaped that such motion will cause the metal of one side of the blank to be telescoped to form a crimp, substantially as described.

13. In an elbow-forming machine, a mandrel; a clamping-jaw adapted to clamp the blank upon the mandrel and having a recess in its face; a spreader located within the blank and adapted to increase the diameter of the blank in front of the clamping-jaw; a ring attached to the spreader on the opposite side from the mandrel; and a jaw having a beveled face, adapted to clamp the blank upon the ring, and to be moved toward the clamping-jaw to form the crimp.

14. In an elbow-forming machine, a pair of crimping-jaws having counterpart beveled faces, each jaw adapted to be clamped upon the blank and then moved toward each other to telescope the metal of the blank to form a crimp, one of said jaws being divided into sections so as to be subsequently clamped upon the outside of the crimp to force it down upon the blank.

15. In an elbow-forming machine, a mandrel; a clamping-jaw adapted to clamp the blank upon the mandrel; a spreader adapted to increase the diameter of the blank in front of the clamping-jaw; a jaw adapted to clamp the blank in front of the clamping-jaw, and to be forced toward the clamping-jaw the

faces of said jaws being so shaped as to telescope the metal of the blank to form the crimps.

16. In an elbow-forming machine, a mandrel adapted to support the blank; means for feeding the blank forward on the mandrel; a jaw adapted to clamp the blank upon the mandrel; a spreader adapted to increase the diameter of the blank in front of the clamping-jaw, a ring attached to the spreader; a jaw adapted to clamp the blank upon the ring, and to be moved toward the clamping-jaw to telescope the metal of the blank to form the crimps, substantially as specified.

17. In an elbow-forming machine, a mandrel adapted to support the blank; means for feeding the blank forward on the mandrel; a clamping-jaw adapted to clamp the blank upon the mandrel; a spreader adapted to increase the diameter of the blank in front of the clamping-jaw; a ring within the blank in front of the spreader, and a jaw adapted to clamp the blank upon the ring, and to be moved toward the clamping-jaw to telescope the metal of the blank to form the crimps; said jaw being formed of sections, and adapted to be opened and then clamped upon the previously-formed crimp, substantially as specified.

18. In an elbow-forming machine, a mandrel adapted to support the blank; means for feeding the blank forward thereon; a clamping-jaw adapted to clamp the blank upon the mandrel and having a recess in its face; a spreader adapted to increase the diameter of the blank in front of the clamping-jaw; a ring or head within the blank in front of the spreader; and a jaw formed of sections adapted to clamp the blank upon the ring or head, said jaw having a beveled face, and adapted to be moved toward the clamping-jaw to telescope the metal of the blank to form the crimps, substantially as specified.

19. In an elbow-forming machine, a mandrel adapted to support the blank; means for feeding the blank thereon; a clamping-jaw adapted to clamp the blank upon the mandrel; a spreader located within the blank and adapted to increase the diameter of the blank in front of the clamping-jaw; a ring located within the blank in front of the spreader; a jaw formed of sections and adapted to clamp the blank upon the ring; said jaws being beveled upon their adjacent faces, substantially as specified.

In testimony whereof I have affixed my signature in presence of two witnesses.

FERDINAND DIECKMANN.

Witnesses:

JOS. J. SCHORR,
C. W. MILES.