No. 640,640. Patented Jan. 2, 1900.

L. P. DIXON.

DEVICE FOR TUBING WIRE OR OTHER METAL STRIPS.

(Application filed Feb. 7, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

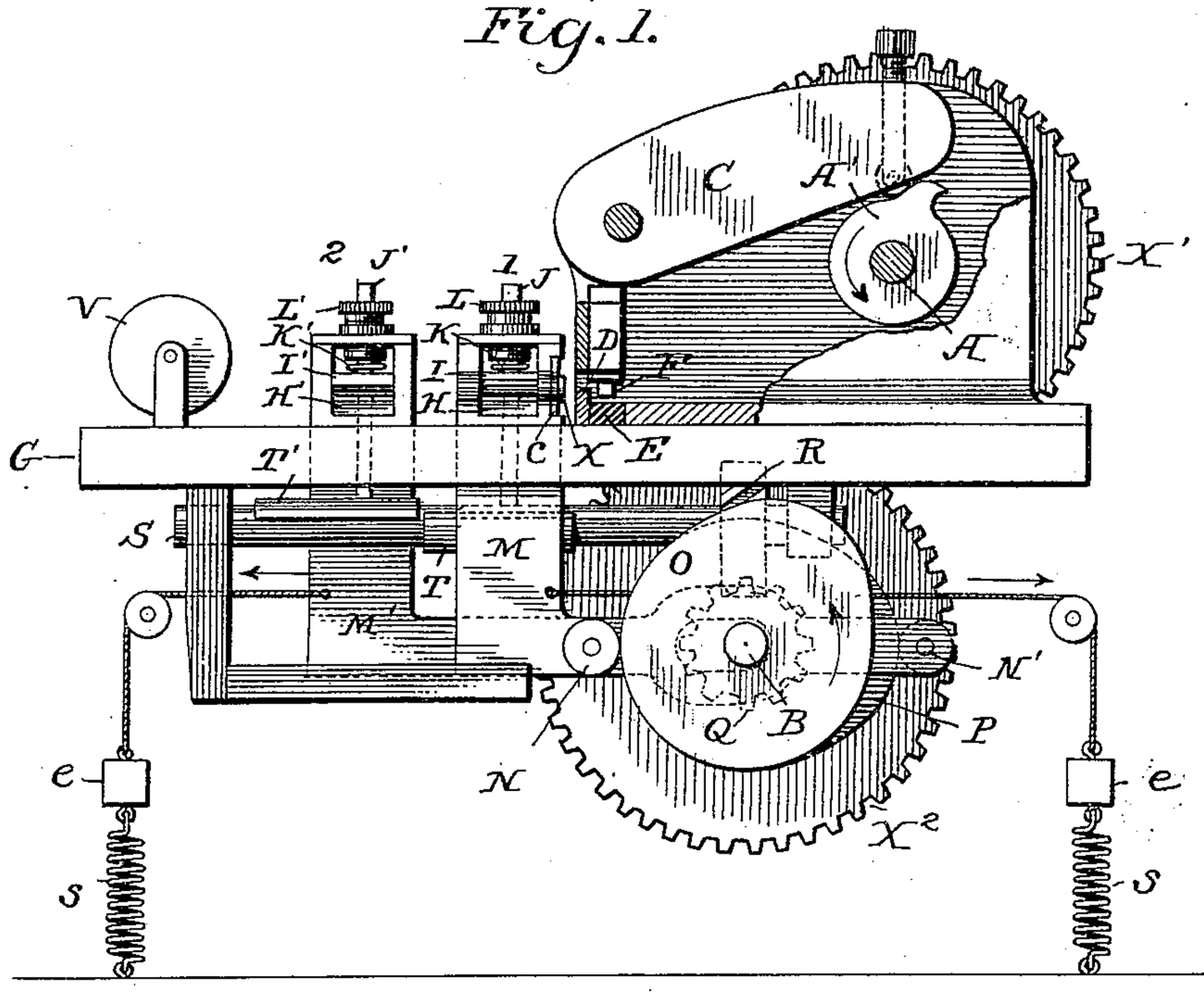
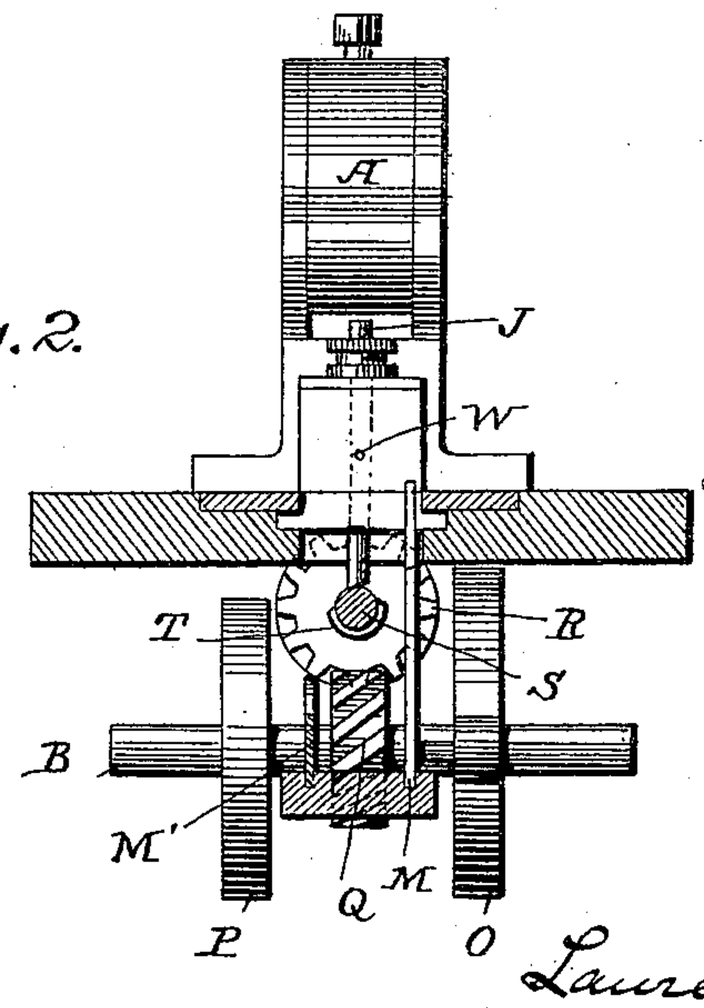


Fig. 2.



Witnesses
J. J. Hinkle
Arthur A. Fisher

Inventor
Laurens P. Dixon
By Foster Freeman
Attorneys

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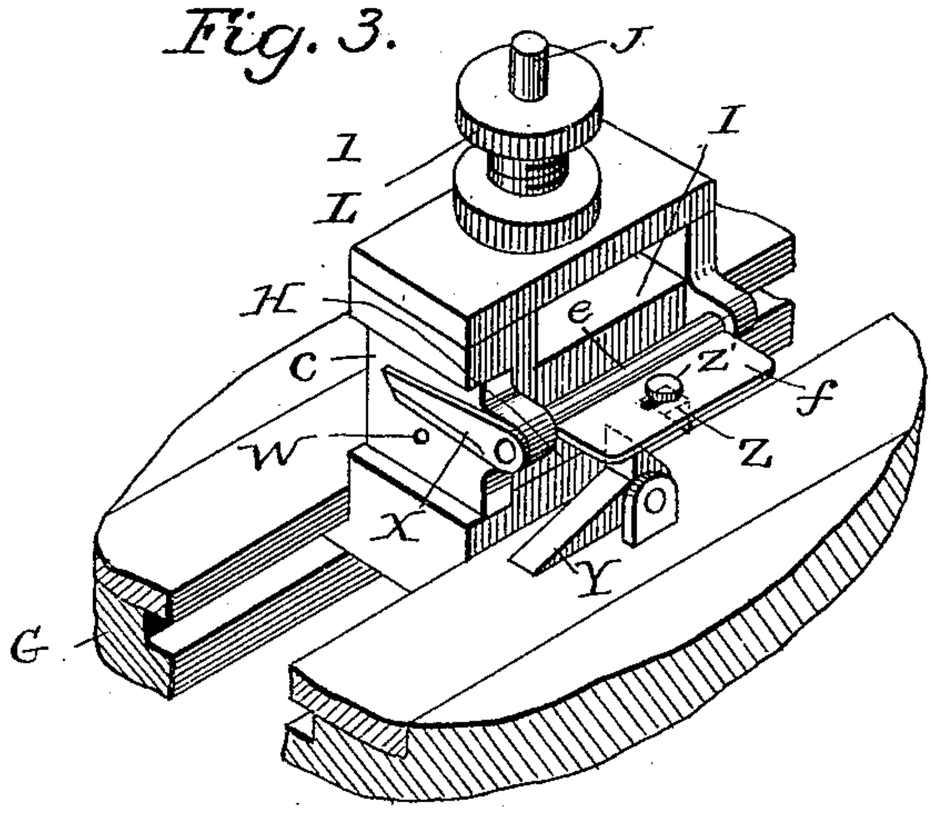
Fig. 3.



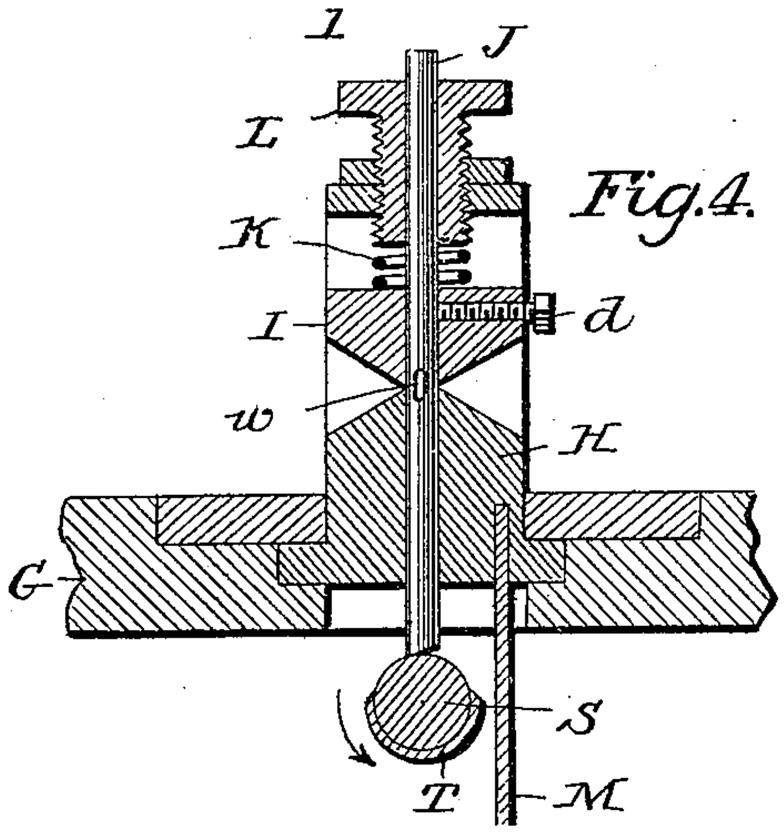


Fig. 4.

Fig. 5

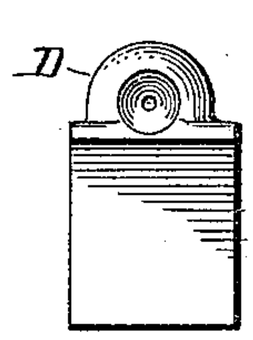


Fig. 6.

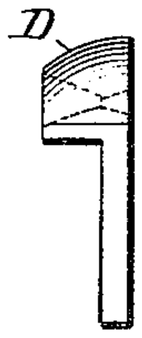


Fig. 7.

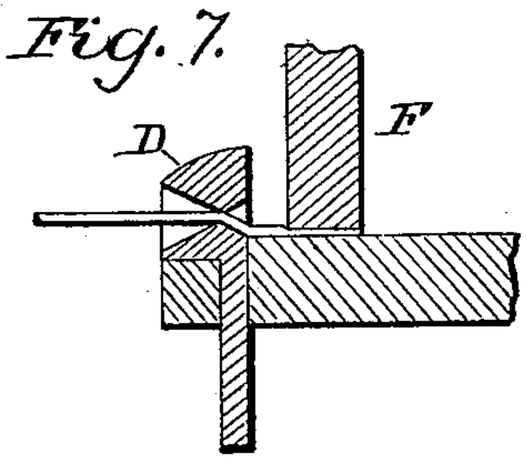


Fig. 8.

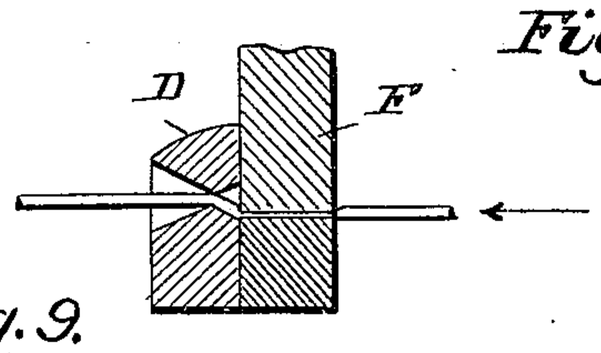


Fig. 9.

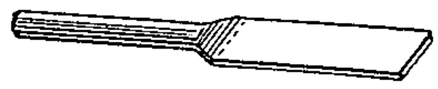


Fig. 10.

Witnesses
J. J. Hinkel
Arthur A. Fisher

Inventor
Laurens P. Dixon
by Fisher Freeman
Attorneys

UNITED STATES PATENT OFFICE.

LAURENS P. DIXON, OF TOLEDO, OHIO.

DEVICE FOR TUBING WIRE OR OTHER METAL STRIPS.

SPECIFICATION forming part of Letters Patent No. 640,640, dated January 2, 1900.

Application filed February 7, 1899. Serial No. 704,856. (No model.)

To all whom it may concern:

Be it known that I, LAURENS P. DIXON, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Devices for Tubing Wire or other Metal Strips, of which the following is a specification.

My invention has for its object to expeditiously manufacture such articles as the leading-in wires of electric lamps where a section or strip of metal terminates in a tube or hollow portion; and my invention consists of certain devices for flattening a wire or strip of metal at intervals, curling the flattened portions, and cutting off the metal in sections, as fully set forth hereinafter, and illustrated in the accompanying drawings, in which—

Figure 1 represents the side elevation of the machine, with the portion of the pedestal broken away necessary to show the interior mechanism. Fig. 2 is the end elevation of the same, part in section, and with the wire-reel V omitted for the sake of clearness. Fig. 3 is a perspective view of the carriage 1 from the opposite side to that shown in Fig. 1, showing the cutting-off mechanism. Fig. 4 is a transverse section through the middle of carriage 1. Figs. 5 and 6 are end and side elevations, respectively, of the die D enlarged. Fig. 7 is a sectional view of a die and press. Fig. 8 is a view showing a modification, and Figs. 9 and 10 are enlarged views showing the article in different stages of manufacture.

The machine consists of a flattening-press C, which flattens at intervals the strip, rod, or wire fed thereto, curling-die D for turning in the flattened portions to tubular form, a feeding device composed, as shown, of two carriages 1 and 2, arranged tandem, and wire-reel V, all mounted on a base-plate G. (See Fig. 1.) The purpose of the machine is to automatically take wire or metal strip from the reel V, place one end in the press F E, where the end is flattened, and then draw it through the circular die D, turning the flattened portion into a tube, and finally cutting the tubed piece off at the desired length.

The press C may be constructed as shown in the drawings or in any other way to secure the desired result, the only essential being that the press be operated from a shaft A, geared to revolve with a shaft B, through gears X' X^2. The wire is passed from the reel V, Fig. 1, through the hole W in the carriages 1 2, Figs. 2, 3, and 4.

The feeding devices or carriages, Figs. 3 and 4, each support a suitable clamp. Thus the carriage 1 is made of a main piece H, carrying an upper jaw I, fastened, preferably, by means of a set-screw *d* to the rod J. The jaw I is forced down upon the main piece H, forming a lower jaw, by pressure, preferably the coiled spring K, the tension of which is regulated by the thumb-screw L. The wire passing through the hole W is firmly held between H and I when the rod J is free at the bottom. A hole *w*, preferably elongated, Fig. 4, is made in the rod J, so that the latter is free to move, preferably vertically, without disturbing the wire. The holes W, Figs. 2 and 3, in the sides of the carriage, preferably being circular, are large enough for wire to pass through freely. The carriage 2 is similar in all respects to the carriage 1 so far as described, the parts H′, I′, J′, K′, and L′ being like the parts H, I, J, K, and L on the carriage 1. The rod J is operated by the cam T and the rod J′ by the cam T′ on the shaft S, preferably in a vertical direction, and the carriages 1 and 2 are operated, preferably in a horizontal direction, from a shaft B through cams O and P, which are mounted on the shaft B and revolve with it and bear upon L-shaped pieces M and M′, Figs. 1 and 4, which are connected to the carriages and which may carry rollers N and N′ to lessen the friction of the cams.

The shaft S, Figs. 1, 2, and 4, upon which the cams T and T′ are mounted has rigidly mounted upon it the spiral gear R, Figs. 1 and 2, which meshes with the spiral gear Q on the shaft B, causing the shaft S, and with it the cams T and T′, to revolve in unison with the shaft B. The three shafts A, B, and S thus revolve in unison.

For a cutting device I have on the end of carriage 1 nearest to the press a steel plate *c*, Fig. 3, carrying the knife X on the shaft *e*, having the plate *f* rigidly attached thereto. The plate *f* carries the lug Z and causes the knife to descend when it comes in contact with the pawl Y. The knife cuts off the wire when the carriage H is moving toward

the die and the wire is stationary, thereby allowing the knife to act against the steel plate on the carriage and make a clean cut. The lug Z, Fig. 3, may be arranged to be moved backward and forward in a groove on the carriage 1 by means of a thumb-screw Z'. Any other form of cutting device may be used to sever the wire in place of the knife device shown.

I show in the drawings, Figs. 1, 2, and 4, the mechanism in the position where the wire (not shown) is in the die F E about to be flattened, and the process from that point continues as follows: All shafts, Figs. 1, 2, and 4, revolve in a direction opposed to the hands of a clock. The carriage 1 is stationary, close to the die. The cam T is out of action. The carriage 1, having hold of the wire, holds the latter under the press. The cam T' has raised the rod J' and jaw I', and the wire is thereby loose in the carriage 2, which is being moved by the cam P away from the press. By the time the press has compressed the wire by action of the cam A' and has then risen from the wire the carriage 2 has moved away from the press the length of the piece to be cut off, at which time the cam T' releases the jaw I', and the carriage 2 takes hold of the wire as the carriage is still moving away. At the same instant the other carriage 1 begins to move away from the press, still holding the wire. The two carriages thus moving away from the press at the same rate, both holding the wire, draw the wire back out of the press, and through the die D turning up the spread portion and forming the tube, when the carriage 2 becomes stationary. The cam T then raises the jaw I and releases the wire from the carriage 1, which moves away from the press to the end of its stroke and then returns toward the press, the carriage 2 meantime being stationary. When the carriage 1 reaches the proper backward point regulated by the length of the piece to be cut off, the lug Z, Fig. 3, comes in contact with the pawl Y, causing the knife X to descend and cut off the wire. The carriage 1 continues to move toward the press to the end of its stroke close to the die not holding the wire. During this time the wire has been held by the carriage 2 stationary, and as soon as the carriage 1 is close to the die the carriage 2 begins to move toward the press, carrying the wire with it, and passes the wire through the carriage 1, acting as a guide, into and through the die D into the jaws of the press F E. Immediately upon its coming in that position the jaws of the press begin to close and flatten the wire, while the carriage 2 releases its hold on the wire by the cam T' raising the jaw I', and at the same instant the carriage 1 takes hold of the wire by the cam T dropping the jaw I. The carriage 1 then holds the wire stationary, while the carriage 2 not holding the wire travels away from the press on the wire a sufficient distance to get the necessary length of the wire for a new cut, and the operation is repeated.

The mechanism can be so arranged as to employ only one feeding device or carriage or one made stationary and one movable instead of both movable.

Fig. 6 shows the form of die I have preferred to use through which the wire is drawn, the large hollow cone acting as a guide to the wire in case the machine should be slightly out of line, and the small hollow cone starts the flattened part of the wire to curl before it reaches the narrowest point, (at the intersection of the two cones,) the size of which regulates the size of the tube to be made.

I hold the carriages against the cams O and P by springs *s s* and weights *e e;* but the cams may be made double-acting instead of single, as shown, or the same result may be obtained by any other suitable mechanical means.

I also contemplate adding an automatic device to count the number of cuts made which would consist of any well-known form of device that may be attached to a machine for that purpose, and also a device to change receptacles for the cuts when one is filled.

It is not essential to first push the wire through the die, then flatten it, and then draw it back. Thus, as shown in Fig. 8, the wire may be fed along in the direction of the arrow, arrested while the press-plunger F acts, and then resume its travel to carry the flattened parts through the die.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim as my invention—

1. The combination of a reel of wire or metal strip, a flattening-press, a curling-die, feeding device, and means for operating it to push or pull the wire or strip through the die and under the press where it is flattened and then draw the same through the die, substantially as set forth.

2. The combination of a reel of wire or metal strip, a press, a die, feeding devices and propelling-cams, and devices arranged to draw the wire or strip off the reel feed the same through the die into the press where it is flattened, and then draw it through the die turning the flattened portion into a tube or hollow form.

3. In a machine for flattening a portion of a piece of wire or metal strip and subsequently curling the flattened portion, the combination of a flattening-press, a curling-die adjacent thereto and in line therewith, and a traveling clamp to grip the wire or strip and feed that portion of it to be flattened to the flattening-press, and then carry the flattened portion through the die, for the purpose specified.

4. In a machine for flattening a portion of a piece of wire or metal strip and subsequently curling the flattened portion, the combination of a reel of wire or metal strip, a flattening-press, a curling-die in line therewith, a traveling clamp to grip and convey the wire or strip from the reel and feed the

portion to be flattened to the press and then through the die, and a cutter to sever the wire or strip, into suitable lengths, substantially as described.

5. The combination with a reel of wire or metal strip, a curling-die, and a flattening-press, of a feed mechanism comprising two movable carriages arranged tandem between the reel and the press, a wire or strip clamp on each carriage, independent devices to release the respective clamps at predetermined intervals, means to move the rear carriage with the wire or strip gripped therein to feed the wire or strip through the front carriage to the press, and means to move both carriages simultaneously to force the flattened portion of the wire or strip through the curling-die, for the purpose set forth.

6. The combination with a reel of wire or metal strip, a curling-die, and a flattening-press, of a feed mechanism comprising a carriage supported to move between the press and reel, a clamp on the carriage to grip the wire or strip, devices to release the clamp at predetermined intervals, and means to reciprocate the carriage, the reciprocating means and the clamp and clamp-releasing devices coöperating to first move the carriage forward, carrying a portion of the wire or strip through the die to the press, then moving the carriage back part of the way without moving the wire or strip, and completing the backward movement of the carriage and drawing the flattened portion of the wire through the die, for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LAURENS P. DIXON.

Witnesses:
E. W. SCHAUSTEN,
PERCY H. HOWE.