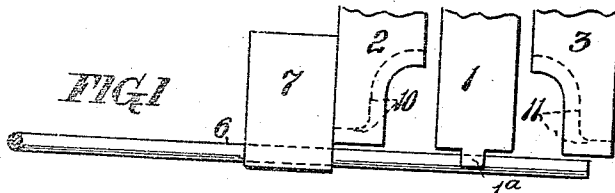
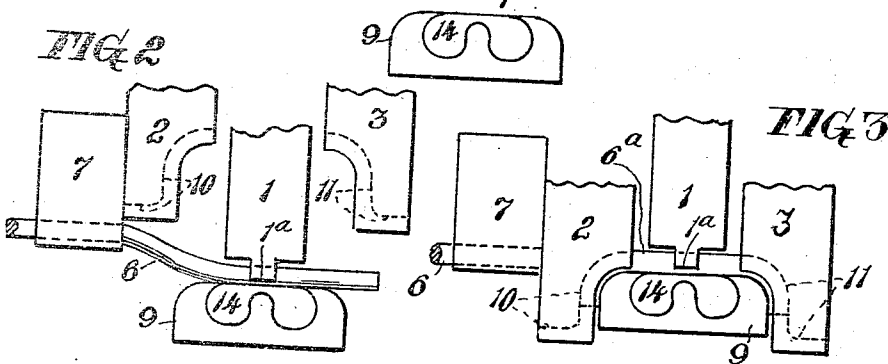
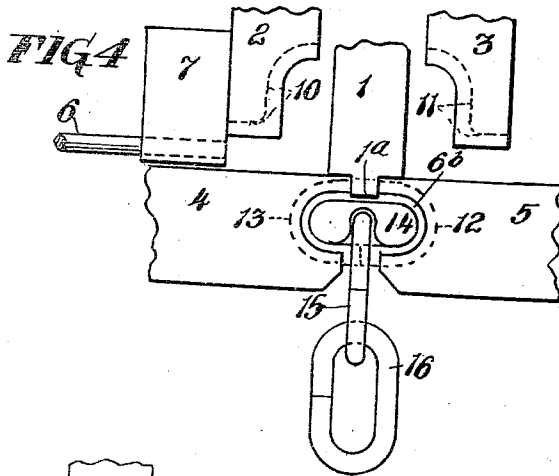
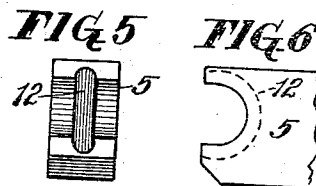
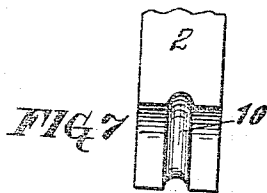
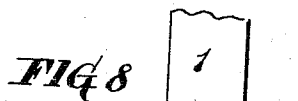
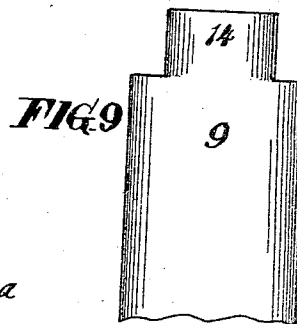
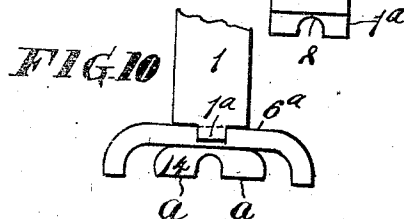


A. BERG.
WIRE CHAIN LINK FORMING MECHANISM.
APPLICATION FILED MAY 8, 1916.

1,244,448.

Patented Oct. 23, 1917.
2 SHEETS—SHEET 1.



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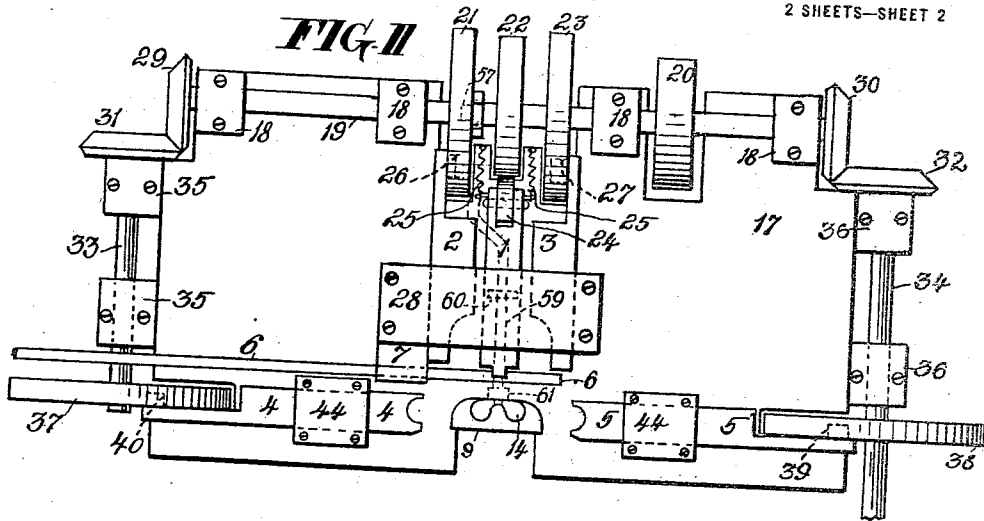
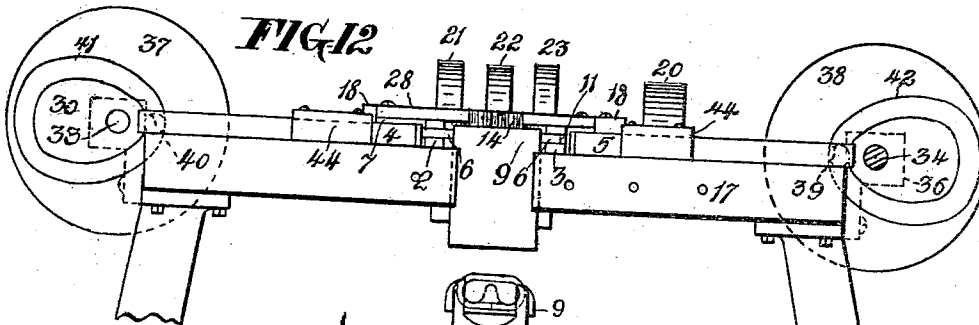
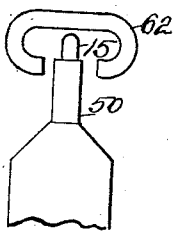
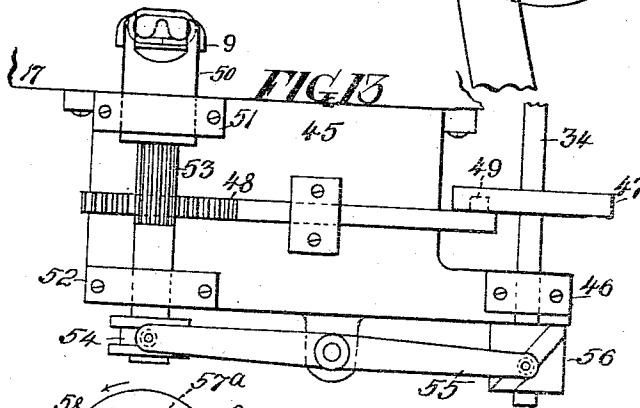
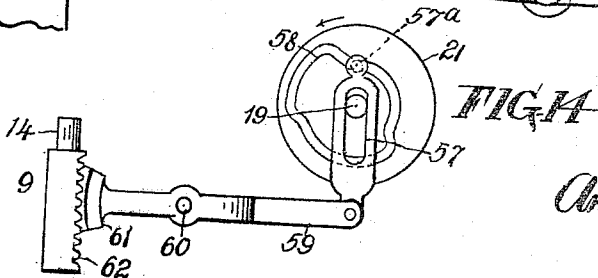


FIG 15



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UNITED STATES PATENT OFFICE.

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WIRE-CHAIN-LINK-FORMING MECHANISM.

1,244,448.

Specification of Letters Patent.

Patented Oct. 23, 1917.

Application filed May 8, 1916. Serial No. 96,060.

To all whom it may concern:

Be it known that I, ANDREW BERG, citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Wire-Chain-Link-Forming Mechanism; 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 improved tools for forming wire chain links, and it consists in certain details of construction to be fully described and particularly pointed out in the claims.

Referring to the drawings wherein most of the operating tools are shown broken,

Figure 1 represents the initial bending tools in their normal inoperative position, and a broken section of wire and upper plan view of the anvil or mandrel about which links are formed;

Fig. 2 represents the first step in forming the link, showing the wire forced and held against the larger part of the mandrel by the gripping tool;

Fig. 3 represents the initial bending tools advanced and forming the initial bend;

Fig. 4 represents the initial bending tools retreated to their normal position and the side scrolling tools advanced to complete the link about the smaller end of the mandrel;

Fig. 5 is a detail end elevation of the link forming face of one of the side link scrolling tools;

Fig. 6 is a broken detail side elevation of one of the side scrolling tools;

Fig. 7 is a detail view of the inside face of one of the initial bending tools;

Fig. 8 is a detail broken side elevation of the wire gripping tool;

Fig. 9 is a broken detail view of the inside face of the mandrel; and

Fig. 10 is a detail view of the upper and smaller part of the mandrel, and broken view of the gripping tool showing the position of an unfinished link preparatory to the final bend.

Fig. 11 is a reduced plan view of the machine for operating the several tools, and broken view of one of the shafts.

Fig. 12 is a front elevation of the machine, broken view of the machine legs, and sectional view of one of the shafts;

Fig. 13 is a broken section of the machine bed showing a bracket attached thereto on which is mounted the link carrier and its operative tools;

Fig. 14 is a detail view of one of the operative cams and mechanism connecting the same with the mandrel; and

Fig. 15 is a broken detail view of the link carrier holding a completed link in vertical position to receive an uncompleted link.

The mechanical means for supporting and actuating the tools above described, consists of the bed 17 on which are mounted the standard 18 supporting the driving shaft 19 carrying the driving pulley 20, and cams 21, 22, 23. The wire gripping tool 1 carries the roll 24 which is kept in constant engagement with the peripheral cam 22 by the springs 25.

The initial bending tools 2 and 3 carry rolls 26—27 adapted to engage properly formed cam grooves—not shown—in the outer vertical faces of the cams 21—23 for reciprocating said tools. 28 is an overlying cap under which tools 1, 2 and 3 freely operate.

Bevel gears 29—30, on the driving shaft, mesh with bevel gears 31—32 carried by the shafts 33—34, journaled in the brackets 35—36. These shafts carry the cams 37—38 for actuating the scrolling tools 4 and 5 through the medium of their rolls 39—40 and cam grooves 41—42. These scrolling tools are guided in the boxes 43—44.

The object of the present invention is to form a link adapted for any practical use, and while certain well known mechanism is shown for actuating the several link forming tools, it will be understood that other suitable and well known means could be substituted therefor. If the several link units are to be connected together to form a chain, the bracket 45, Fig. 13, can be attached to the front of the machine bed, on which is mounted the box 46 for supporting the extension of shaft 34. 47 is a cam mounted on this shaft for reciprocating the rack bar 48 through the medium of roll 49 operating in a properly formed cam groove—not shown—in the vertical face of said cam. The link carrier 50 is operatively mounted in boxes 51—52 and is provided with the toothed portion 53 with which the rack bar 48 engages. 54 is a clutch collar on the link carrier 50 for reciprocating the carrier to and from the

mandrel 9 through the medium of the lever 55 and the cam 56 on shaft 34.

57, Fig. 14, is a vertical lever carrying roll 57^a operating in the cam groove 58, located in the inner face of the cam 21. The lever 57 is pivoted to the horizontal lever 59, which, in turn, is pivoted on the pin 60 and carries at its outer end the toothed segment 61 meshing with the rack teeth 62 of the mandrel 9 whereby said mandrel is vertically operated.

The link carrier 50 is advanced, Fig. 13, to embrace a formed link by means of lever 55 and retreat a short distance when it is turned by the rack bar 48 to bring the link into vertical position, Fig. 15, in readiness to receive the partially formed link 62. When the link carrier has engaged a completed link, as shown in Fig. 13, the mandrel 9 is further depressed to strip said link from the mandrel by its contact with the upper surface of the machine bed, when the mandrel is returned to its first upward position. As soon as a link has been joined to a previously formed link, held by the carrier 50, said carrier will retreat far enough to release the link carried thereby. It will be observed that a link is partially formed outside of a previously formed link and threaded into such previously formed link by means of the side scrolling tools. It will also be observed that the smaller diameter of the mandrel does not determine the shape of the link, as that is determined by the initial bending tool and the scrolling tools. Therefore, this smaller diameter is in no sense a former, but simply furnishes a support or backing for the partially formed link and gripping tool after the mandrel has retreated and until after the scrolling tools have taken hold.

The several operative tools comprising the gripping tool 1, initial bending tools 2 and 3, side scrolling tools 4 and 5, are parts of a machine and are actuated by well known mechanism—not shown. The wire 6 is delivered from a reel—not shown—to the bending tools.

The wire first passes through a hole in the guide 7, permanently attached to the machine, and is partially embraced by the groove 8, Fig. 8, of the gripping tool 1 with the free end of the wire advanced far enough to be engaged by the initial bending tools 2 and 3, as shown in Fig. 1.

The first operation consists in advancing the gripping tool 1 to bring the wire firmly against the large diameter 9 of the mandrel as shown in Fig. 2, then both bending tools are advanced to bend the ends of the severed wire sections 6 about the large part of the mandrel as shown in Fig. 3. The outer face of the bending tool 2 registers with the inner face of the guide 7 to sever a link section of wire when the initial bending tools

are advanced. The wire contact faces of these initial bending tools are provided with the grooves 10 and 11.

As soon as the initial bending tools have performed their work, they are retreated to their normal position as shown in Fig. 1, while the gripping tool 1 still remains in its advanced position to hold the partially formed link in place for the next and final scrolling operation performed by the side tools 4 and 5, shown in Fig. 4. These side scrolling tools are provided with the semi-circular grooves 12 and 13 to engage the partially curved ends of the link section, which ends will follow around the curved grooves in the ends of the side scrolling tools to give the proper form to the completed link. Previous to the side scrolling tools engaging the slightly curved ends of the partially formed link, the mandrel is vertically retreated to bring the smaller diameter 14 thereof in position for these side scrolling tools to complete the form of the link about this smaller part of the mandrel. The semi-circular grooves 12 and 13 are shaped to conform to the ends of the completed link.

The most important feature in the link forming operation are these semi-circular grooves 12 and 13. In fact, the success of the final bend depends entirely on these grooves. After the initial bending tools and the mandrel have retreated the unfinished blank 6^a will then be held firmly against the small portion 14 of the mandrel. The upper ends of the semi-circular grooves of the side scrolling tools will first engage the slightly curved ends of the link blank and the inward pressure of said tools will cause the wire to follow these curved grooves to form the link about the small part of the mandrel as shown in Fig. 4. These grooves prevent the slightest deviation of the ends of the wire blank from the path they must follow in order to form a perfect abutting link, except the first link, is linked to the previously formed link as shown. As shown in Fig. 4, the newly formed link 6^b is linked to the previously formed link 15, and this link to the link 16.

The narrow projection 1^a of the gripping tool 1 enables the side scrolling tools to have sufficient inward travel to practically embrace the entire link.

The lower curved part of the small anvil 14 could be cut away as shown at *a*, Fig. 10, for it is the scrolling tools alone that impart the finished shape to the link.

Having thus described my invention, what I claim is;

1. The herein described mechanism for forming chain links comprising a vertically movable mandrel of two diameters about which the links are formed, a guide for the wire, a movable gripping tool adapted to

force the end of the wire, projecting from the guide, firmly against the larger diameter of the mandrel, movable initial bending tools on each side of the gripping tool adapted to sever a link section and form an initial bend in the end of the link section about a part of the larger diameter of the mandrel, final scrolling tools operating at right angles to the initial bending tools and having semi-circular grooves in their ends adapted to engage the ends of the partially formed link and form a completed link about the smaller diameter of the mandrel when the larger part of the mandrel and the initial bending tools have been retreated.

2. The herein described mechanism for forming chain links comprising a movable mandrel about which links are formed, a wire gripping tool adapted to hold the wire against the mandrel until a link section is severed and hold such severed section against the mandrel during the link forming period, initial bending tools located on each side of the gripping tool and having grooves in their inner faces conforming to the initial bend, and final scrolling tools having grooves in their ends conforming to the ends of a completed link.

3. The herein described mechanism for forming chain links comprising a movable mandrel having two diameters, bending

tools having grooves in their wire contact faces, said tools adapted to give the initial bend to the wire about a portion of the larger diameter of the mandrel, means for retreating the mandrel to bring its smaller diameter into operative position, and side scrolling tools having semi-circular grooves in their wire contact faces adapted to give the final bend to the link about the smaller diameter of the mandrel and cause said link to fully embrace said mandrel after the larger part of said mandrel and initial bending tools have retreated.

4. Mechanism for forming chain links from wire comprising a mandrel, a gripping tool adapted to force and hold the end of the wire against the mandrel before a link section is severed therefrom, bending tools for severing a link section and giving the initial bend thereto about the mandrel, scrolling tools for completing the link and interlocking the same with a previously formed link, and means for holding said previously formed link during such interlocking process.

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

ANDREW BERG.

Witnesses:

CHRISTY NELSON,
GEORGE N. SEARS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."