No. 809,413. PATENTED JAN. 9, 1906.

I. D. WEAVER.

MANUFACTURE OF HELICES FOR CHAIN LINKS.

APPLICATION FILED JUNE 10, 1902. RENEWED JUNE 10, 1905.

2 SHEETS—SHEET 1.

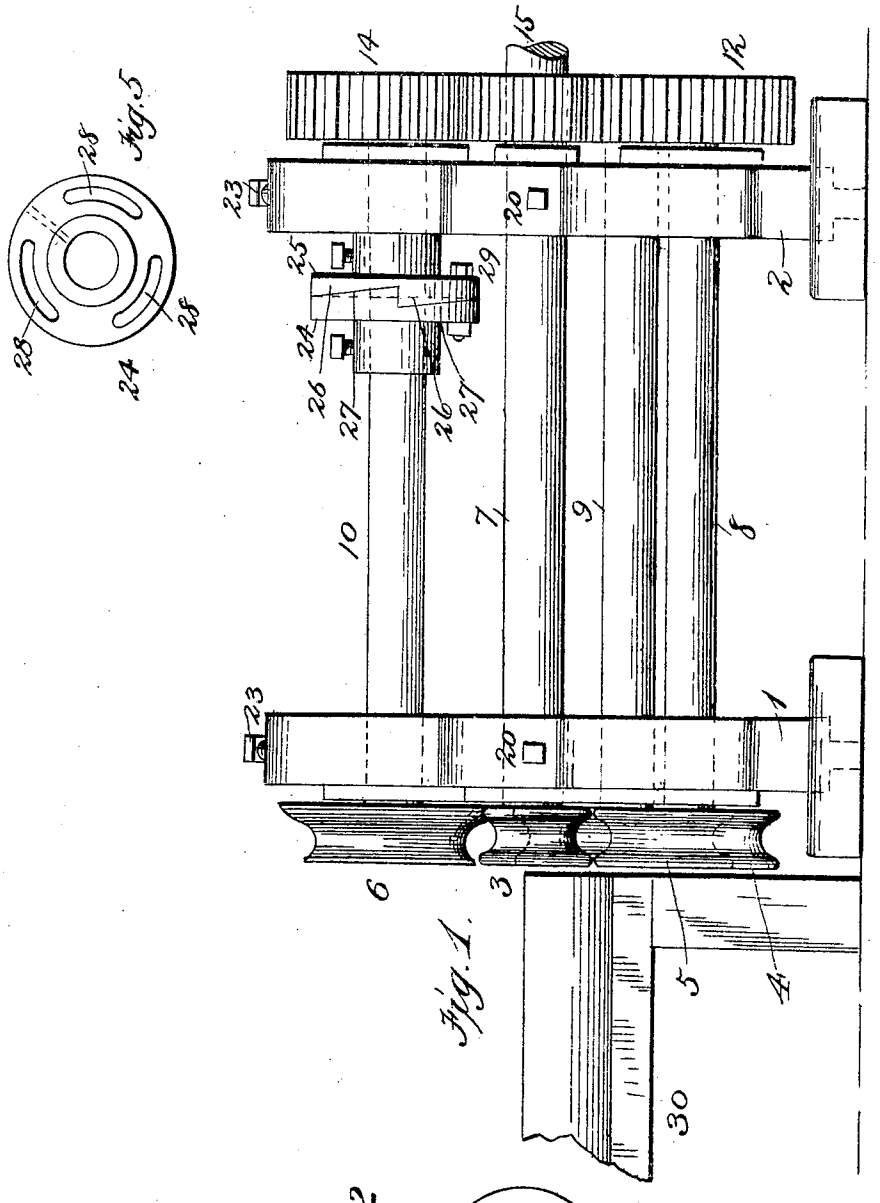


Fig. 1.

Fig. 5.

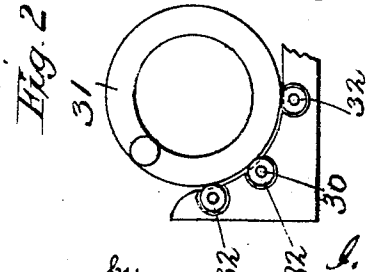


Fig. 2.

Witnesses
Franck L. Ourand
W. Parker Reinold

Inventor
I. D. Weaver.
by D. L. Reinold
Attorney

No. 809,413. PATENTED JAN. 9, 1906.

I. D. WEAVER.

MANUFACTURE OF HELICES FOR CHAIN LINKS.

APPLICATION FILED JUNE 10, 1902. RENEWED JUNE 10, 1905.

2 SHEETS—SHEET 2.

Fig. 6.

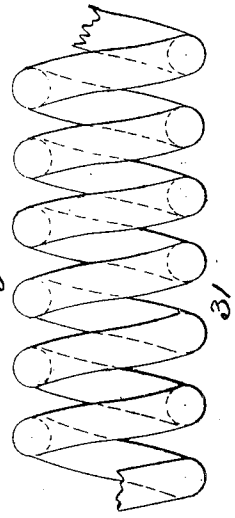


Fig. 3.

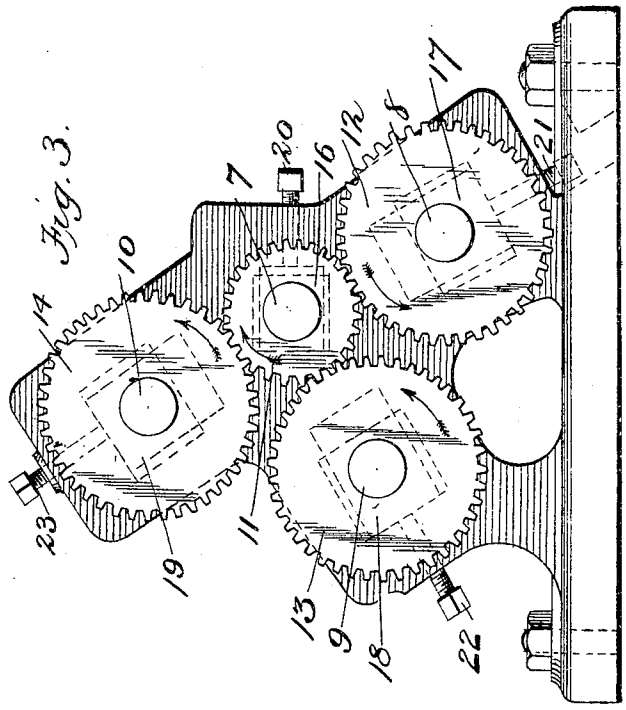
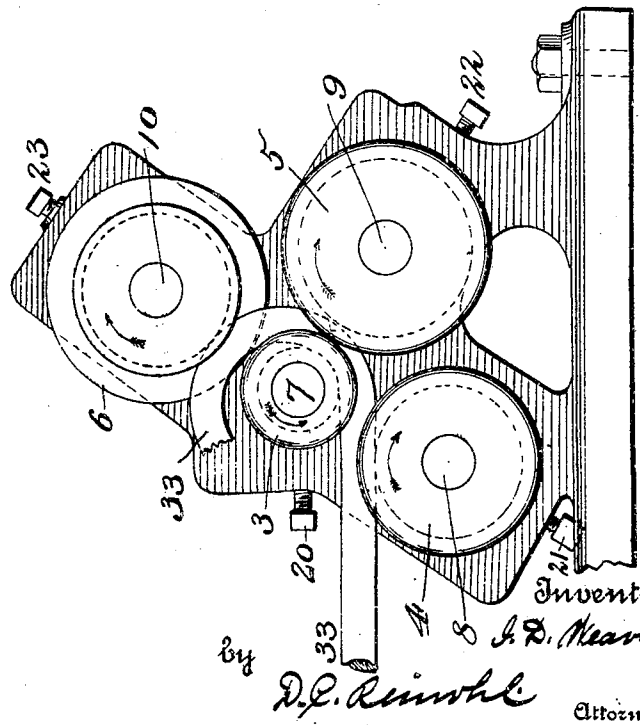


Fig. 4.



Witnesses
Franck L. Ouvard.
H. Parker Reinohl.

Inventor
I. D. Weaver.
by D. P. Reinohl
Attorney

UNITED STATES PATENT OFFICE.

ISAAC D. WEAVER, OF LEBANON, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO SAMUEL E. LIGHT, OF LEBANON, PENNSYLVANIA.

MANUFACTURE OF HELICES FOR CHAIN-LINKS.

No. 809,413. Specification of Letters Patent. Patented Jan. 9, 1906.

Application filed June 10, 1902. Renewed June 10, 1905. Serial No. 264,735.

To all whom it may concern:

Be it known that I, ISAAC D. WEAVER, a citizen of the United States, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Helices for Chain-Links; 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, primarily, to the manufacture of chain, has for its object the production of chain in which the fiber of the metal is the same throughout all the links composing a chain, and consists in certain improvements in the means employed, which will be fully disclosed in the following specification and claims.

In the present practice of making chain by cutting a rod of iron into suitable lengths for link-blanks, then heating the rod and bending it into U shape in or on a suitable machine, then scarfing the free ends of the U-shaped blank, then bending the free ends with sledges on the horn of an anvil or other former, and then welding the scarfed ends, from five to six heats of the metal are required to make a link, and in bending the straight rod into the U-shaped blank the fiber of the metal is elongated on the outer surface of the bent portion and crowded or shortened on the inner surface of the bend, which affects the strength of the chain, as the chain as a whole is no stronger than its weakest point. It is obvious that the heavier the chain this detriment increases proportionately, and the converse is true of chain made of links formed by my machine.

In the accompanying drawings, which form part of this specification, Figure 1 represents a side elevation of the coiling-machine complete; Fig. 2, an end view of the table for supporting a helix; Fig. 3, an end elevation of the machine upon which the gears connecting the roll or disk-carrying shafts are located; Fig. 4, a like view of the opposite end, showing the coiling-disks with a rod of metal in position to be coiled; Fig. 5, an end view of the adjuster on the shaft of the upper roll in Fig. 1; and Fig. 6, a side elevation of a helix.

Reference being had to the drawings and the designating characters thereon, the numerals 1 2 indicate the ends or supports of the coiling-machine, 3, 4, 5, and 6 the grooved coiling rolls or disks supported, respectively, on shafts 7, 8, 9, and 10, provided with gear-wheels 11, 12, 13, and 14, driven from any suitable source of power through shaft, 15 and the several shafts 7, 8, 9, and 10 are provided with bearings 16, 17, 18, and 19 (shown in dotted lines in Fig. 3) and are adjusted by set-screws 20, 21, 22, and 23 in the usual manner. The roll or disk 3 is of less diameter than the rolls or disks 5 and 6, and the roll or disk 6 is of less diameter and set a little farther from the center of the disk 3 than the disk 5 and is revolved a little slower on its perimeter than disk 5. The shaft 10 of the upper coiling-disk is made in two parts connected by heads 24 and 25, having adjacent inclined faces 26 and 27, slots 28, and securing-bolts 29, by which the shaft is lengthened or shortened to adjust the disk 6 with reference to the disk 3 to regulate the space between the coils of the helix.

30 indicates a table at the coiling end of the machine and upon which the helix 31 is delivered and revolves thereon on the friction-rollers 32 while the helix is being formed.

33 is a rod of hot round metal, which as it proceeds from the reducing-rolls (not shown) is fed directly into the coiling-machine and the entire rod formed into a helix. In the operation of forming a helix the roll or disk 3, being of less diameter than the rolls or disks 5 and 6, travels slower on its perimeter than either of said disks, the peripheral movement of the disk 3 being in proportion to the radius of the bend on the rod it is to make. The disk 6 being a little farther from the center of the disk 3 than the disk 5 and revolved a little slower on its perimeter than disk 5 has the effect of holding the rod of metal 33 back or retarding its progress through the machine, and the disk 6 slips a little on the rod. This holding back or retarding of the rod results in forcibly condensing, staving up, or retarding the flow of the hot metal on the inside of the rod throughout its length as it is passing between the rolls or disks and prevents elongation of the fiber of the metal to any appreciable degree on the outside of the rod as the rod is formed into a helix. The helices thus formed are severed into link-

blanks, which are subsequently made into chain-links and which will form subject-matter of a separate application for a patent.

In another application, filed herewith, Serial No. 110,959, I have claimed the method employed in my invention.

Having thus fully described my invention, what I claim is—

1. In the manufacture of helices, a rod-coiling machine having rolls or disks provided with grooved perimeters, said rolls being of different diameters and adapted to receive a rod of metal and move the same, and means for rotating the rolls in opposite directions and constructed to rotate one of the rolls at a slower speed than the other roll, whereby the metal on the inside of the helix is condensed or staved up, and the fiber of the metal of the outside maintained in substantially normal and uniform condition.

2. In the manufacture of helices, a rod-coiling machine having rolls or disks provided with grooved perimeters, said rolls being of different diameters and the smallest one of which is arranged central to the other rolls, and the center of the upper roll a greater distance from the center of the smallest roll than the center of the lower roll, and means for rotating the rolls in opposite directions and constructed to rotate the perimeter of the upper roll at a slower speed than the lower roll, whereby the metal on the inside of the helix is condensed or staved up, and the fiber of the metal on the outside thereof maintained in substantially normal and uniform condition.

3. In the manufacture of helices, a rod-coiling machine having rolls or disks provided with grooved perimeters, said rolls being of different diameters and the smallest one of which is arranged central to the other rolls, and the upper roll provided with an extensible and contractible shaft for varying the spaces between the coils.

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

ISAAC D. WEAVER.

Witnesses:

A. B. SCHROPP,

B. F. WARD.