

M. FESSLER.
WIRE CHAIN MAKING MACHINE.
APPLICATION FILED AUG. 22, 1907.

943,110.

Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

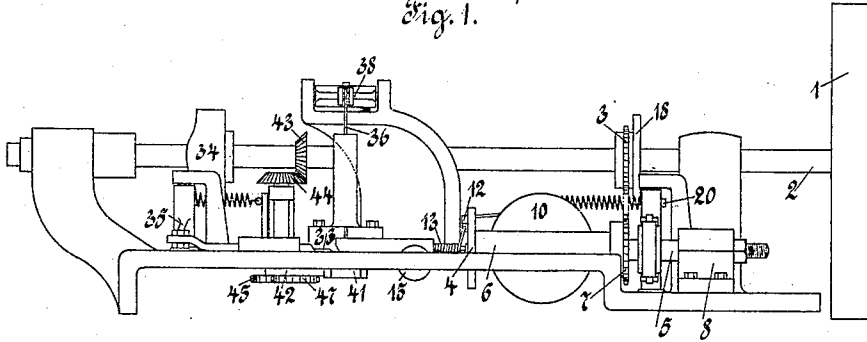


Fig. 2.

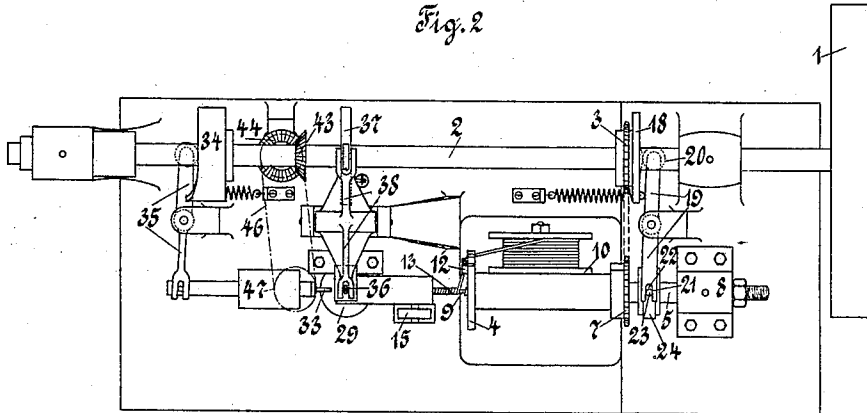


Fig. 4.

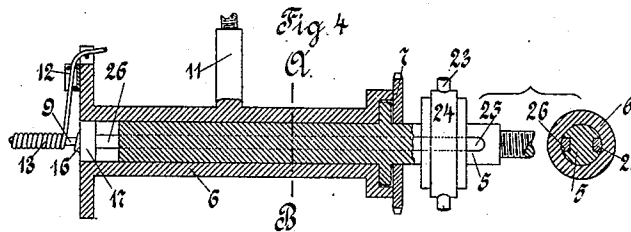
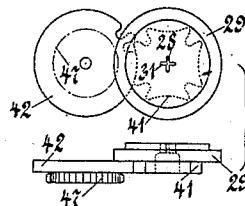


Fig. 5.



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S. Brashear
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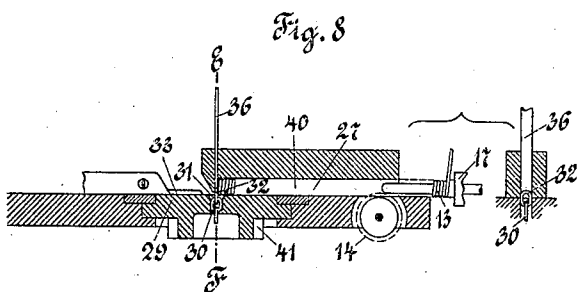
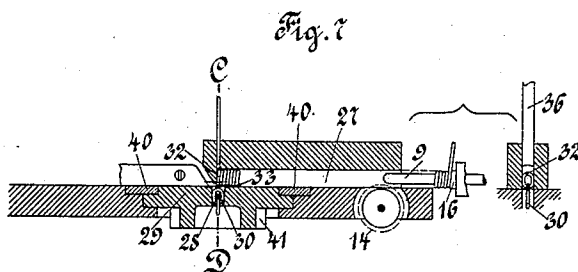
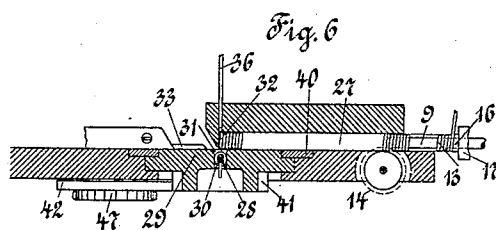
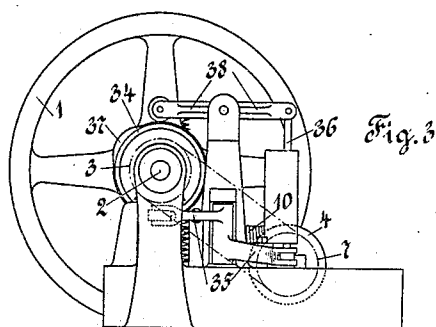
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

MAX FESSLER, OF PFORZHEIM, GERMANY.

WIRE-CHAIN-MAKING MACHINE.

943,110.

Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed August 22, 1907. Serial No. 389,700.

To all whom it may concern:

Be it known that I, MAX FESSLER, a subject of the German Emperor, residing at Pforzheim, Baden, German Empire, have invented certain new and useful Improvements in Wire-Chain-Making Machines, of which the following is a specification.

The subject of my invention is a machine for automatically manufacturing wire chains for personal wear and the like.

My new machine differs from prior machines for the like purpose, inasmuch as the spirals, wound in the usual manner, while in the tightly coiled state are slit along one side in longitudinal direction by means of a rotating cutter, and the compact assemblage of separate coils thus constituted then fed forward by suitable mechanism into an appropriately shaped channel, at the exit of which they are successively adjusted, brought together and closed by means of special devices.

My improved machine is essentially less complicated than previous apparatus of this class, and there being relatively few working parts, higher speed can be attained and the output greatly increased.

One form of construction of my new machine is illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation, Fig. 2 a plan, and Fig. 3 a side elevation of the machine. Fig. 4 is a longitudinal and cross section through the feed mechanism with winding device. Fig. 5 in plan and edge views shows the Maltese cross gearing for intermittently rotating the die plate. Figs. 6-8 show in longitudinal and cross sectional views the principal working parts of the machine in three different positions.

The particular machine illustrated is driven by means of a belt pulley 1 mounted on the main shaft 2. On the latter there is also mounted a sprocket wheel 3, which by means of a chain or the like drives a winding device 4 of well-known construction (Figs. 2 and 4). For this purpose the sleeve 6 of the winding device is provided with a sprocket wheel 7 or a grooved pulley. The sleeve 6 can not slide in longitudinal direction and rotates on a spindle 5 which is bolted to the block 8 of the machine framing. At the other end the spindle has a mandrel 9, the diameter of which corresponds with the inside shape of the chain link to be made.

Rotating simultaneously with the sleeve 6 there is a reel 10 on which the wire being worked is wound. The reel is mounted upon a pin 11 projecting at right angles from the sleeve 6, or the latter itself may serve as reel carrier, the wire coils in the latter case encircling the sleeve concentrically.

The wire is led to the mandrel 9 by means of a guide 12, and as the sleeve and reel rotate the wire winds itself around the stationary mandrel 9 in closely lying coils. This wire spiral 13 is cut through on the underside, in longitudinal direction, by a rotating cutter 14 (Figs. 6-8) driven by the pulley 15. In this manner an assemblage of separate single coils is constituted. For the further working it is requisite that these coils are periodically fed along, each time through a distance corresponding to the thickness of a single coil. For this purpose a discoid head 17, presenting a boss 16 (Fig. 4), is pushed against the spiral 13 at certain intervals, the motion of the head 17 being such that the spiral is only fed through a distance corresponding to the thickness of one coil. This periodical feed is effected by means of a cam wheel 18 on the shaft 2 actuating the one arm, furnished with a roller 20, of a double armed lever 19. The other arm of the lever is forked at 21, the slots 22 receiving the studs 23 of the disk 24 which slides on the spindle 5, whereby the movements of the lever are transmitted to the disk 24. The latter is connected with the pressing head 17 by two long bars 25, 26, lying in the manner of feathers in grooves in the spindle 5. The pressing head 16, 17 thus follows the movements of the disk 24. The slit spiral, now consisting of separate coils, is fed forward in a guide channel 27, whose form corresponds with that of the coils.

At the commencement of a working period a chain link stands exactly above an opening 28 in a die 29 (Figs. 6-8). The last finished link 30 is located in a lower part of said opening, which lies at right angles to the hole 28, (Fig. 5). Thus the plane of the new link 32 about to be connected, lies at right angles to that of the link 30 already in the part 31. In order to bring the link 32 into exact position for junction, so that its lower slit may be readily forced over the top of the link 30, a pin 33 whose cross section corresponds with the slit, is provided. This pin 33 is driven into the slit in the links by

a double armed lever 35 (Figs. 1 and 2), actuated by a cam wheel 34 (Figs. 1, 2 and 3). In this way the slit in the links is brought into the exact position and at the same time somewhat opened, corresponding to the thickness of the links. On retreat of the pin 33 a flat driver 36 which is actuated by a double armed lever 38, positively operated by a cam wheel 37 (Figs. 2 and 3), forces down the link 32 located just above the opening 28. The opening 28, and its part 31 in the die 29 are flared at the top so that the link 32 forced down by the flat driver 36 merely receives guidance until it has passed the bend of the already finished link 30. Hereupon, on further advance of the link 32 through the opening 28, owing to the reduced shape of the latter, the link ends are bent into one plane, so that they stand opposite to each other, and on further advance of the driver 36 and owing to the peculiar form of the opening 28 are finally pressed together. After the closing of the link 32 the latter is forced down by the driver 36 until its top bend registers with the surface of the die 29. In order to join on a fresh link, the just finished link 32 must now be turned through an angle of 90°. This is done by the die 29 being periodically rotated by a Maltese cross gear 41 (Fig. 5) through an angle of 90°. The die 29 may be mounted to rotate in an aperture in the machine framing, in which it is retained by a ring 40. The Maltese wheel 41 is mounted on the underside of the swage and the single toothed gear 42 which meshes with it, is driven from a sprocket chain or the like. In the construction shown in the drawing motion is transmitted from the driving shaft 2 by means of bevel gearing 43, 44, and chain 46 to a sprocket wheel 47 secured to the single toothed wheel 42.

The manner of working is as follows:—The wire coming from the reel winds tightly onto the mandrel 9. The spiral 13 on being advanced by the pressing head 17, actuated by the lever 19, passes the circular saw 16, which slits it along the underside. When the first link 32 has reached the end of the channel 27, the pin 33 forced forward by the lever 35 will adjust the slit and somewhat widen it. After the pin 33 has retreated to its initial position, the flat driver 36, actuated by the lever 38 and cam wheel 37, forces the first link 32 into the opening 28 in the die 29. Owing to the peculiar form of this opening the ends of the downwardly pressed link 32 are brought opposite each other and then pressed together. In order to connect the next following link with the just finished link 32, the die 29 must now be rotated through an angle of 90°, so that the planes of the links may cross at right angles as in a chain. The intermittent rotation of the swage 29 through 90° is effected

by the Maltese cross gear. The second link is received by the second opening in the die 29, which crosses the first-mentioned opening at right angles. The form of the opening is such that when the link to be connected has reached the opening, it is at first only lightly guided, until its ends have at length passed the top of the finished link. In the course of the further descent connection of the two links is then effected.

Having thus described my invention, and in what manner the same is carried out, I claim as new:—

1. In a wire chain making machine, the combination with a die having a cross shaped opening, of means for intermittently feeding a longitudinally slitted wire spiral into position to bring its forward coil into position above said opening, means for flattening, and opening the slit of the forward coil of the spiral to form of it an open link, means for consecutively forcing the links thus made into the opening in the die, and means for rotating the die a quarter revolution after each link is forced into the die.

2. In a wire chain making machine, the combination with a die having a cross shaped opening, of means for slitting longitudinally a wire spiral, means for intermittently feeding said slitted spiral to bring its forward coil over the opening of the die, means for forcing said forward coil into the opening in the die, and means for rotating the die a quarter revolution after the insertion therein of each coil.

3. In a wire chain making machine, the combination with a die having a cross shaped opening, of a cutter, means for feeding the wire spiral longitudinally into contact with said cutter and thereby longitudinally slitting said spiral, means for intermittently feeding said slitted spiral to bring its forward coil over the opening of the die, means for forcing said spiral coil into the opening in the die and means for rotating the die a quarter revolution after the insertion therein of each coil.

4. In a wire chain making machine, the combination with a die having a cross shaped opening, of a mandrel, means for winding wire thereon in the form of a spiral, a cutter, means for feeding the mandrel forward over said cutter and thus slitting the spiral longitudinally and bringing the forward coil of the spiral into position over the opening in the die, means for forcing said spiral coil in the opening in the die, and means for rotating the die a quarter revolution after the insertion therein of each coil.

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

MAX FESSLER.

Witnesses:

SYDNEY FEESIN,
JOSEPH ROHMER.