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Patented June 13, 1899.

L. ZAMBONI.
RIVETING TOOL.

(Application filed Jan. 23, 1899.)

(No Model.)

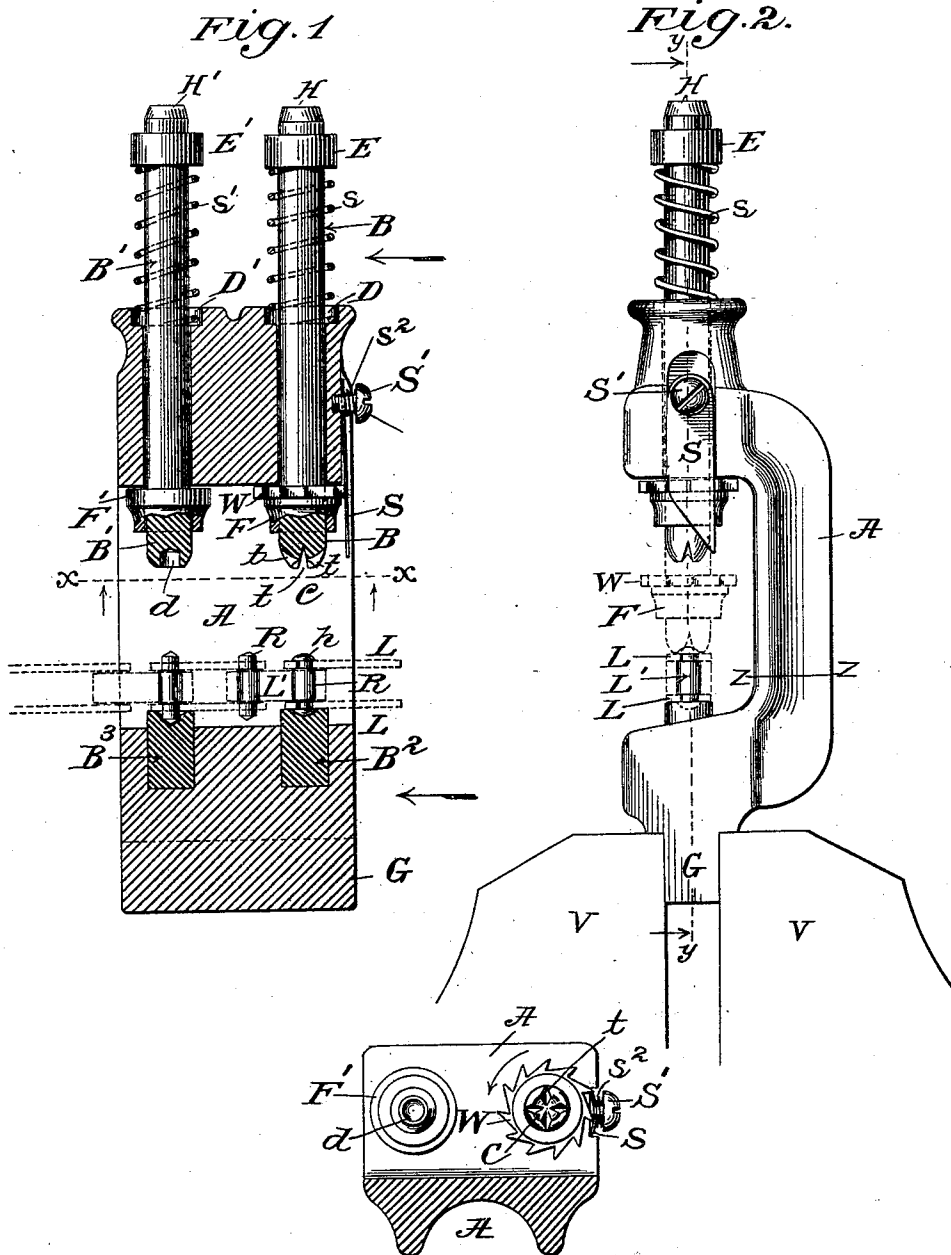


Fig. 3.

Witnesses
Edward L. Howard.
Chas. F. Keating

Inventor
Lawrence Zamboni
By his Attorney
Charles J. Kinner

UNITED STATES PATENT OFFICE.

LAWRENCE ZAMBONI, OF NEW YORK, N. Y.

RIVETING-TOOL.

SPECIFICATION forming part of Letters Patent No. 626,802, dated June 13, 1899.

Application filed January 23, 1899. Serial No. 703,070. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE ZAMBONI, a subject of the King of Italy, residing at New York, in the borough of Brooklyn and State of New York, have made a new and useful Invention in Riveting-Tools, of which the following is a specification.

My invention is directed particularly to improvements in riveting-tools designed for use in connection with the riveting together of the links of bicycle or similar sprocket-chains, and has for its objects, first, to provide means for correctly assembling the links of the chain and their uniting-rivets in such manner that the opposite ends of the rivets will project at equal distances beyond the lateral or side links, so that the rivet-heads when completed will be of the same size and finish, and, second, to provide means for making completed rivet-heads which shall be symmetrical in size and finish.

My invention will be fully understood by referring to the accompanying drawings, in which—

Figure 1 illustrates the invention in vertical sectional view on the line *y y*, Fig. 2, and as seen looking at that figure from the left toward the right hand side of the drawings in the direction of the tailless arrows, parts of the tool and a sprocket-chain being shown in elevational view. Fig. 2 is a side elevational view illustrating the invention as seen looking at Fig. 1 from the right toward the left hand side of the drawings in the direction of the tailed arrows and illustrating also said tool as held in a vise. Fig. 3 is a transverse sectional view taken on the line *x x*, Fig. 1, and as seen looking at that figure of the drawings from the bottom toward the top in the direction of the tailless arrows.

Referring now to the drawings in detail, A represents the supporting-frame of the tool, constructed, preferably, of cast metal and of the conformation shown, with a downwardly-extending rectangular section G, designed for the purpose of enabling a completed tool to be held in a machinist's vise V V.

B² B³ represent cylindrical-shaped steel an-

vils set in the lower lateral extension of the frame A, the upper end of the anvil B² being hollowed out, so as to constitute a seat for the completed end of a rivet, while the upper end of the anvil B³ is hollowed out in cylindrical and cone form, as shown, so as to constitute a guideway for the lower end of the rivet when assembling the parts of a sprocket-chain, one of said sprocket-chains being shown in position to be riveted in full and dotted lines, R being the rivets, L L the side links, L' L' the intermediate links, and *h* the head of a completed rivet.

B' represents a reciprocating assembling device, made, preferably, of a short length of steel and having a guiding and spacing opening *d* in its lower end of the same conformation and diameter as the end of the unfinished rivet, said opening *d* being the counterpart of the corresponding guiding and spacing opening in the upper end of the anvil B³.

B represents a reciprocating riveting device provided at its lower end with a cup-shaped concavity *c* and radially-disposed teeth *t t t t*, the function of which will be described in connection with the description of the mode of operation.

The parts B and B' are each provided with shoulders E E', integral therewith, and heads H H' and are adapted to slide longitudinally in openings drilled side by side in the frame A, D D' being seats for the lower ends of springs *s s'*, adapted to bear when in position against the under surface of the shoulders E E'.

W is a ratchet-wheel secured to the reciprocating riveting device B, and F F' are collars swaged upon the lower ends of the reciprocating parts B B', the collar F holding the ratchet-wheel W in place and the arrangement being such when said parts are in position that the springs *s s'* will normally tend to hold the reciprocating parts B B' in their extreme upper positions, as clearly illustrated in Fig. 1 of the drawings.

S is a steel spring-pawl having an inclined surface at its lower end adapted to take in the teeth of the ratchet-wheel W when the latter

is in its lower position, said spring-pawl being secured to the side of the frame A by a screw S' and a spiral spring S² in such manner that it will yieldingly act, as will be described later on.

The operation of the improved tool is as follows: A sprocket-chain, as illustrated in Fig. 1, having the parts thereof roughly assembled by uniting the side links L L and intermediate links L' L' with the unfinished rivets R, is placed in position in the tool, as shown, and each succeeding unfinished rivet is placed with its lower end in the upper end of the anvil B³, after which the reciprocating assembling device B' is struck a sharp blow with a hammer upon the head H', thereby causing it to descend with such force that the lower cylindrical cone-shaped end thereof will effectually compress or unite the side links and the intermediate links and accurately assemble the parts in such manner that the opposite ends of the rivets will be in such position that they are of equal length. The chain is now moved forward and the lower end of the rivet placed in the upper end of the anvil B³, after which the hammer is applied successively to the head H of the reciprocating device B, causing it to descend with such force upon the head of the rivet that the cup-shaped concavity c will tend to give to the rivet-head the conformation shown. As the reciprocating device descends that ratchet-tooth of the ratchet-wheel W which is directly under the spring S will ride out from under said spring, so that as the reciprocating device ascends under the action of the springs this ratchet-tooth will come into mechanical contact with the inclined face of said spring-pawl and will cause the ratchet-wheel W, and hence the riveting device, to make a fractional part of a revolution in the direction of the arrow. (See Fig. 3.) On the next succeeding descent of the reciprocating device, therefore, the teeth at the lower end of the riveting-tool will be caused to assume a new position with relation to the rivet-head. It will be appreciated, therefore, that by reason of the successive change of positions of the teeth t t of the riveting device there will be given a riveting tendency and at the same time the concavity or cup-shaped portion c will tend to give to it a round conformation. After the rivet-head is thus completed on one side of the chain it (the chain) is turned over and the rivet-head upon the other side is completed in the same manner.

I do not limit myself to the especial details of construction herein shown and described to the riveting of sprocket-chains, as it is obvious that the riveting-tool, *per se*, may be capable of use generally in the art where riveting is done—as, for instance, it may be applied to the riveting of pieces of metal together, or the lower anvil B³ may be dispensed with by severing the frame A on the line z z,

Fig. 2, and the tool applied to the riveting of boiler-plates or under like conditions of usage, and this without any relation or connection to the assembling device B', which is shown and described in connection with the riveting device for its especial utility in the construction or mending of sprocket-chains, and particularly the sprocket-chains of bicycles, the essential feature of my invention lying in the construction of a portable tool in the nature of an article of manufacture having a downwardly-extending portion which acts to sustain or support the entire tool, either when used for mending bicycle-chains and held in a vise, as described, or when used for the purpose of riveting upon a surface, in which event the downwardly-extending portion will rest or bear upon such surface. When thus used as a riveting-tool with the anvil removed, and the lower portion of the frame cut away, the lower end of the frame constitutes an extension for holding it (the tool) against the face of the plates or parts to be riveted together.

I am aware that a riveting-machine has heretofore been devised adapted to be actuated by power-driven mechanism in which the reciprocating riveting-tool is elevated by a power-driven shaft and successively rotated by ratchet-and-pawl mechanism, the downward or riveting movement of said tool being effected by a strong spiral spring, substantially as described in United States patent to Thomas Morton, No. 315,817, granted April 14, 1885, and I make no claim hereinafter broad enough to include such a structure, my invention being limited to an article of manufacture in the nature of a portable tool adapted to be either held in the hand of the user or in a place of support, as a vise, and actuated by a hammer, mallet, or kindred device by striking the reciprocating part and forcing it downward against the action of a spring, which normally holds it in its upper or retracted position, and also to such a riveting-tool combined with a similar reciprocating assembling device.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. As an article of manufacture a portable riveting-tool consisting of a reciprocating part adapted to move vertically in a supporting-frame and provided with means, such as a spring, tending to normally hold it in its upper position, in combination with means for successively rotating it a fractional part of a revolution once during each stroke of the part, said tool having an extension at its lower end for adapting it to be held in a vise or similar support, substantially as described.

2. As an article of manufacture a portable tool for assembling the links and rivets of a sprocket-chain and riveting the same together; consisting of a reciprocating assembling part

and a reciprocating riveting part, both sustained by a frame carrying an anvil for each, said frame being provided with a downward extension for supporting or sustaining it in a
5 vise; in combination with a spiral spring for each reciprocating part adapted to normally hold them in their upper positions and means, as a pawl and ratchet for the riveting part, adapted to give to said riveting part a par-

tial revolution during each stroke, substantially as described.

In testimony whereof I have hereunto subscribed my name this 21st day of January, 1899.

LAWRENCE ZAMBONI.

Witnesses:

C. J. KINTNER,

W. H. MURPHY.