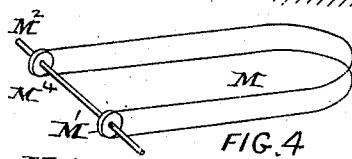
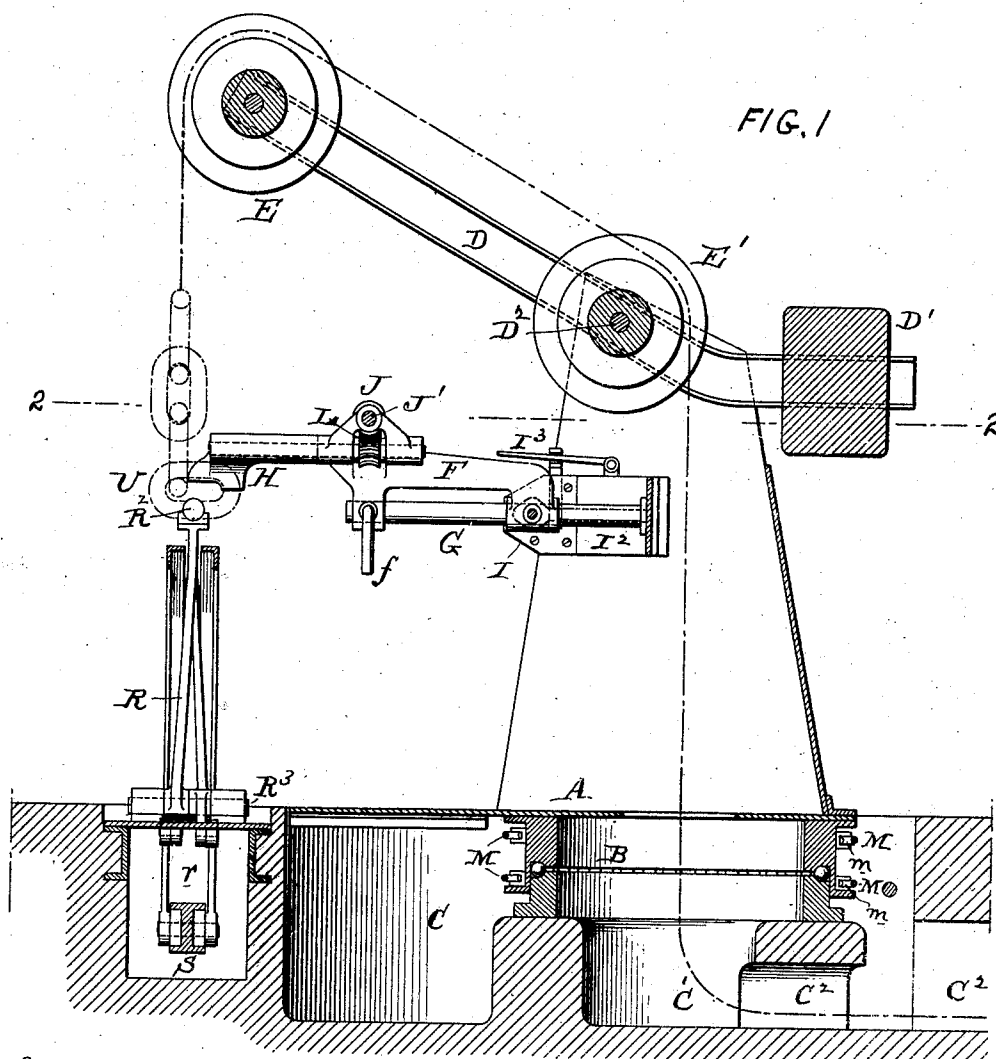


No. 845,877.

PATENTED MAR. 5, 1907.

H. LYSHOLM.
CHAIN MAKING MACHINE.
APPLICATION FILED SEPT. 11, 1905.

3 SHEETS—SHEET 1.



Witnesses:
Henry Dwyer
m. J. Eyre.

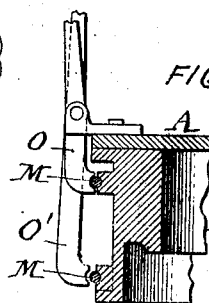


FIG. 3

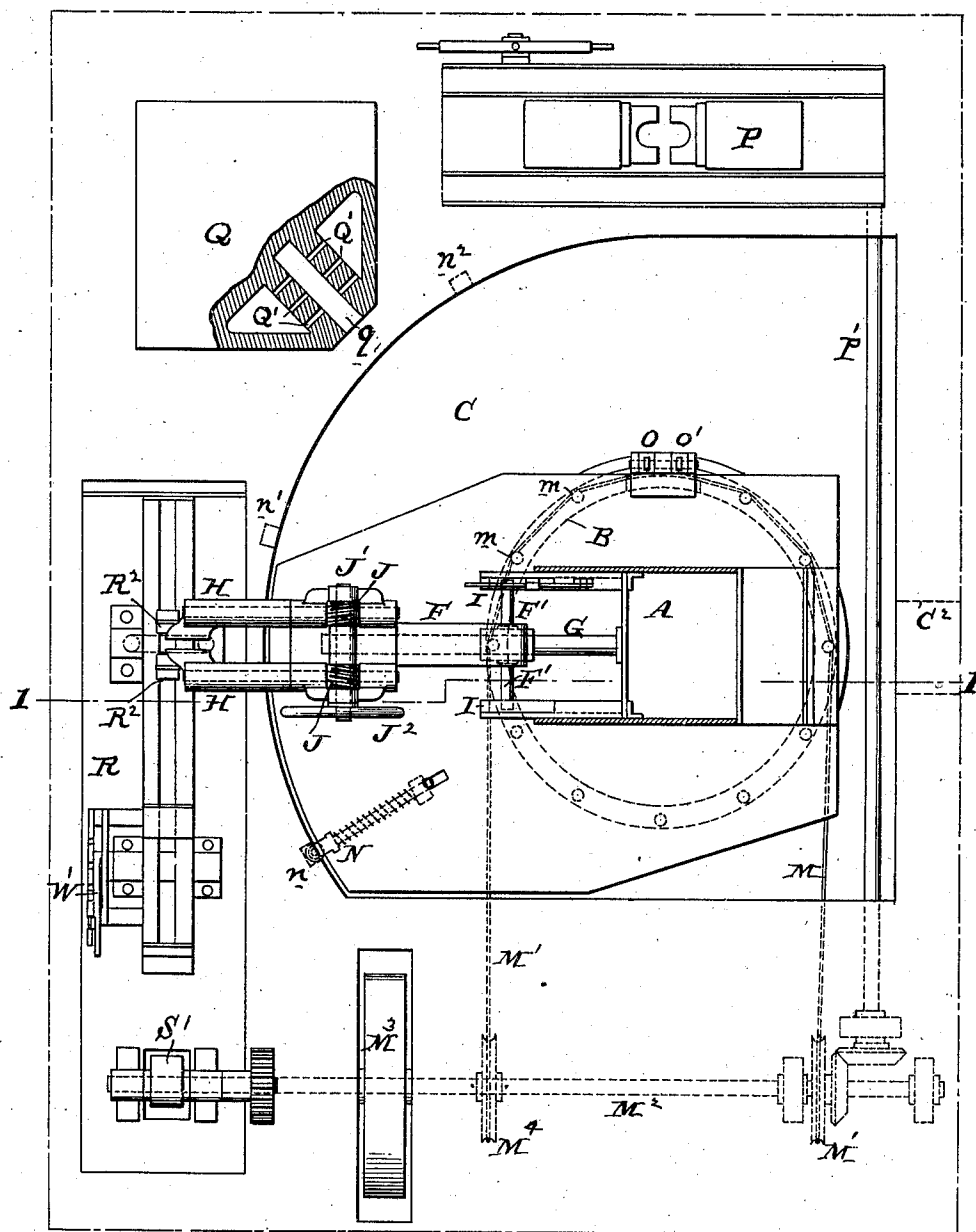
Inventor:
Henry Lysholm
By his atty
[Signature]

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3 SHEETS--SHEET 2.



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3 SHEETS—SHEET 3.

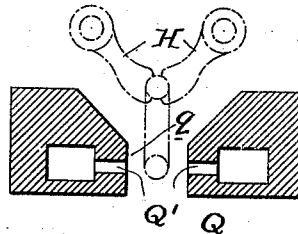
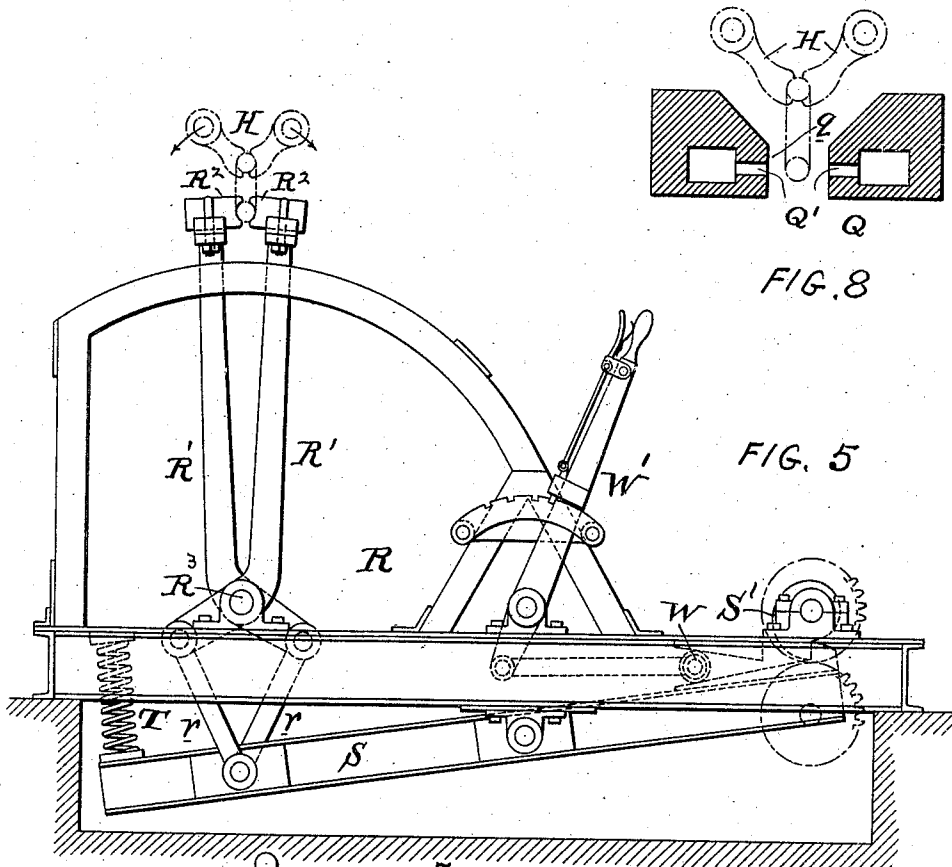


FIG. 8

FIG. 5

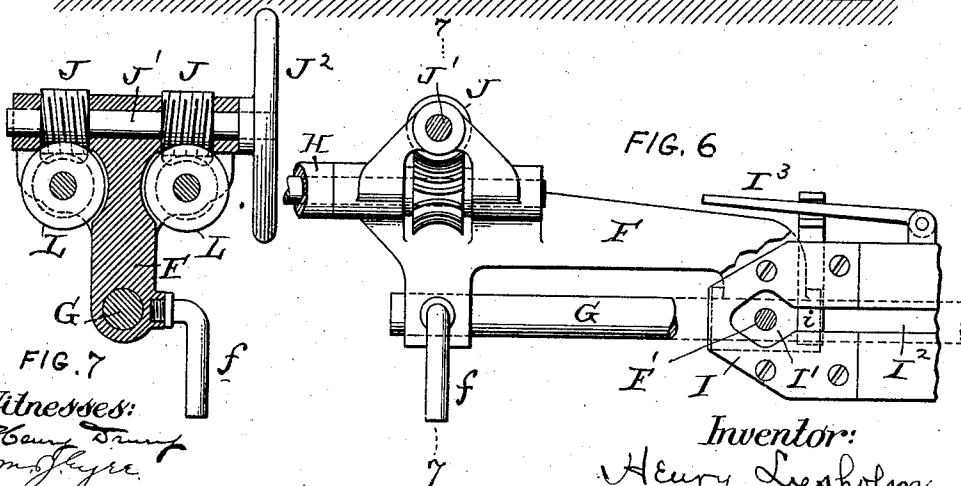


FIG. 6

FIG. 7

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UNITED STATES PATENT OFFICE.

HENRY LYSHOLM, OF WOODBURY, NEW JERSEY.

CHAIN-MAKING MACHINE.

No. 845,877.

Specification of Letters Patent.

Patented March 5, 1907.

Application filed September 11, 1905. Serial No. 277,817.

To all whom it may concern:

Be it known that I, HENRY LYSHOLM, of Woodbury, county of Gloucester, and State of New Jersey, have invented an Improvement in Chain-Making Machines, of which the following is a specification.

My invention has reference to chain-making machines, and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide a machine in which the several operations necessary for the manufacture of large chains having welded links may be performed in a speedy and accurate manner.

More specifically, my object is to provide a carrier for the link which shall have movement whereby the link may be taken from the forming-press and successively conveyed to the welding-furnace and to the forge, but manipulated so as to insure perfect welding.

My invention consists of the combination of a furnace and a forge with gripping-jaws for holding a link and means for conveying the gripping-jaws from the furnace to the forge. My invention also embodies the gripping-jaws for holding the link combined with guides for adjusting the jaws with both a rectilinear and a rotary reciprocating motion while under the forging operation.

My invention also embodies details of construction which, together with the features above specified, will be better understood by reference to the drawings, in which—

Figure 1 is a sectional side elevation of a chain-welding machine, taken on line 1 1 of Fig. 2 and embodying my invention. Fig. 2 is a sectional plan view of the same, taken on line 2 2 of Fig. 1. Fig. 3 is a sectional view through one portion of the turn-table. Fig. 4 is a perspective view showing the arrangement of the driving-cable for the turn-table. Fig. 5 is an elevation of the forge or hammer device. Fig. 6 is an enlarged view of a portion of Fig. 1, showing the clamping and adjusting devices for the link. Fig. 7 is a cross-section on line 7 7 of Fig. 6, and Fig. 8 is a cross-section of the welding-furnace.

A is a rotary reciprocating frame adapted to revolve on a turn-table B of any suitable construction. The frame A is provided with a suitable platform on which the operator may stand and which travels over a well C. Around the turn-table part connected with

the frame A are arranged two series of rollers *m*. At different elevations and about these rollers an endless cable M passes in two loops and is driven by a pulley M', secured on a shaft M², driven by a hand-wheel M³ and guided about loose pulley M⁴, also upon said shaft, so that the cables are continuously traveling, one of the loops moving in the one direction and the other in the opposite direction. The frame A is provided with two hand-grips O O', the former being adapted to clamp the upper loop of the cable and the latter to clamp the lower loop thereof. It will now be seen that if the hand-grip O is operated the frame A will rotate in one direction, and if the other grip O' be operated it will be caused to rotate in the opposite direction.

To the upper part of the frame A is pivoted an arm D at D², said arm being counter-weighted at D'. A guide chain-wheel E' is journaled on the transverse pivoted shaft D², and to the outer end of the arm D is journaled a second chain-wheel E. The chain to be operated upon is supported over the chain-wheels E E', as indicated in dotted lines, and extends downward through the turn-table into the well C', thence laterally through the tunnel C² to one side of the machine. As the links N are completed and added to the end of the chain the chain is drawn down into the well C' and through the tunnel.

G is a horizontal guide carried by the frame A, and upon this guide is journaled a jaw carrying the frame F, to the forward portion of which is journaled the two jaws H H, adapted to rock to and from each other for gripping or releasing the chain-link which is being operated upon. These jaws H H are respectively provided with right and left hand worm-wheels L, which respectively engage with right and left hand worms J J, secured to a transverse shaft J' J' in the frame F and adapted to be rotated by the hand-wheel J². By rotating the hand-wheel J² the jaws may be opened or closed upon the link. The frame F is adapted to be reciprocated on the guide G and may be manipulated by a handle *f*. The rear end of the frame F is provided with lateral extensions F', which are guided in grooves I' I² in lateral frames I on the frame A. The groove I' is more or less elliptical, as indicated in Fig. 6, so as to permit the frame F to have a rocking motion as well as a reciprocating motion, but restricted to small limits such as would

correspond to the extent or area over which the weld in the link would extend, so that the link may be manipulated between the hammers $R^2 R^2$ during the forging operation. 5 The straight part I^2 of the guide holds the frame F in a vertical position when moved back. A bolt i may drop down between the guide-grooves I' and I^2 to lock the lateral extensions F' in the elliptical groove I' during 10 the forging operation. This bolt may be raised by a hand-lever I^3 , Fig. 6, when it is desired to move the frame F back.

It will be understood that while the turn-table support for the gripping-jaws is most 15 useful in connection with the press P and furnace Q, as shown and described, it is nevertheless evident that the turn-table, as the means for conveying the link-holding jaws laterally to or from the forging or weld- 20 ing devices, is an important feature of the invention, as it is not desirable to insert the link into the jaws in front of the forge because of danger of injury. By moving the link-carrying jaws laterally away from the 25 forging or welding devices the link may be inserted in said jaws in any suitable manner whether by hand or from another machine, as preferred, and this operation may take place at a position clear of the forging or welding 30 devices.

As the links vary in size in different chains and as the machine is to be used for making various sizes of chains, I prefer to make the portion of the guide-frame I carrying the elliptical groove I' detachable, so that other por- 35 tions having different sizes of elliptical grooves may be substituted, whereby the machine is adapted to different-sized links. This change in the part I' permits a variation in 40 the extent of movement of the reciprocation of the link between the hammers $R^2 R^2$.

P is a link-forming machine of any suitable construction and presses the link into proper shape ready for welding. It may be 45 driven by a shaft P' from the driving-shaft M^2 . As no specific claim is made upon this machine, the details thereof will not be necessary to be described, as any of the link-forming machines or presses heretofore in 50 use will answer.

Q is a welding-furnace and may be of any suitable construction, but in the form shown it consists of a frame having a vertical slot g , into which lateral gas-flues Q' open and 55 through which combustible gases are forced so as to impinge upon opposite sides of the link, as will be understood by reference to Fig. 8. Any other suitable character of furnace may be employed in lieu of that 60 shown.

R is a forging-machine and is more fully shown in Fig. 5. It consists of two hammers $R^2 R^2$, carried by the pivoted levers $R' R'$, hinged at R^3 . These levers $R' R'$ are 65 vibrated in opposite directions by links $r r$

and the oscillating frame S, which is moved in one direction by a spring T and in the other direction by the rotating cam S' , receiving its power from the driving-shaft M^2 . 70 The extent of the stroke of the levers R' is governed by the adjustable abutment, preferably in the form of a roller W, under the control of the hand-lever W' . In this manner the adjustment of the hammers in striking the link may be regulated. The general 75 features of this hammer is well known, and while I prefer this construction I do not limit myself thereto, as any other character of oppositely-moved forging-hammers may be employed in place thereof. 80

The operation of the apparatus will now be understood. By pressing upon the hand-grip O' the cable M is gripped and the turn-table revolved so as to bring the jaws H in position to take the link from the press P. 85 When the frame A is in the proper position for this purpose, the bolt N snaps into the recess n^2 on the foundation, and thereby holds the frame F and its jaws H in alinement with the jaws of the press P. When the link has 90 been received between the jaws H H, the frame F is moved backward on the guide G. The bolt N is then withdrawn, and the grip-lever O is operated to grip the upper loop of the cable to cause the turn-table to revolve 95 and bring the jaws and link in alinement with the welding-furnace Q. When this position is reached, the bolt N springs into the recess n' and holds the parts in proper alinement. The frame F is then 100 moved outward, so that the link U, held in the jaws H H, enters the slot g of the furnace, as indicated in Fig. 8. This brings the portion of the link which is to be welded into position to be heated to a welding heat. When 105 this is accomplished, the frame F is moved back again to withdraw the link from the furnace, the bolt N is withdrawn, and by the operation of the grip-lever O the turn-table is again revolved and the parts brought to position shown in Fig. 2, in which position they 110 are locked by the bolt N springing into the recess n . The frame F is then moved outward, so that the lower part of the link U is brought between the oppositely-vibrating 115 hammers $R^2 R^2$. When this is accomplished, the lateral projections F' of the frame F will be in the enlarged guide-slots I' and are locked therein by dropping the pin i . The hammers are then set into forging operation 120 by gradually withdrawing the roller W by throwing the lever W' to the right, Fig. 5. This permits the hammers $R^2 R^2$ to strike the link at its heated portion, and thereby produce the weld. During this welding opera- 125 tion the frame F is moved longitudinally upon the guide G and at the same time rocked or oscillated upon it, so as to shift the body of the link between the hammers, and thereby properly shape the welded portion. It will 130

be observed that the construction is such that the axis of the guide G is in alinement with the lower portion of the link, so that when the frame F is rocked the lower portion of the link does not change this alinement. This is an important feature, because otherwise the hammers could not be properly shaped to secure a good weld, since they would not fit to the cylindrical portion of the link at all times, and, moreover, the position of the link would be displaced from a central point between the hammers. With my improvement, however, the frame F may be rocked in any suitable manner under the limits of the controlling devices, and the position of the link between the hammers can never become abnormal. Of course where the links are materially changed as to size the jaws H will be replaced by other jaws or clamps properly shaped to hold the size of link to be operated upon. As the links are successively welded one to the other the chain is guided over the guide-wheels E E' and down into the well C'.

While I prefer the construction shown as being excellently adapted for the purposes of carrying my invention into commercial practice, I do not confine myself to the details, as these may be modified in various ways without departing from the spirit of the invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a chain-making machine, the combination of welding devices, a link-carrying clamp constructed to hold the link positively while being welded, conveying means for conveying the clamp to and from the welding devices whereby a link may be transferred into welding position, and means supported by the carrying means constructed that the clamp is supported so as to be capable of being rocked and reciprocated relatively to both the welding devices and conveying means during the welding operation.

2. In a chain-making machine, the combination of welding devices, a link-carrying clamp constructed to hold the link positively while being welded, conveying means for conveying the clamp to and from the welding devices whereby a link may be transferred into welding position, power devices for actuating the carrying means, means to lock the conveying means against movement when the clamp is in position to coöperate with the welding devices, and means supported by the carrying means constructed that the clamp is supported so as to be capable of being rocked and reciprocated relatively to both the welding devices and conveying means during the welding operation.

3. In a chain-making machine, the combination of a welding device having one or more reciprocating hammers, a link-carrying

clamp, means for conveying the link-carrying clamp laterally to or from the welding devices, means to enable the clamp to be rocked and reciprocated relatively to the conveying means and welding devices, and power devices for moving the means for conveying the clamp laterally to or from the welding devices as required consisting of a turn-table, oppositely-moving cable-sections passing about the turn-table, and independent gripping devices for connecting the turn-table with either one of the cable-sections.

4. In a chain-making machine, the combination of welding devices, a link-supporting clamp, conveying means for conveying the link-supporting clamp laterally to or from the welding devices consisting of a pivoted frame revolving on a turn-table, and guiding means on the conveying means constructed to have rocking and rectilinear motions relative to the conveying devices whereby the link-clamp carried thereby may be freely reciprocated and rocked relatively to the welding devices.

5. In a chain-making machine, the combination of welding devices, a link-supporting clamp, conveying means for conveying the link-supporting clamp laterally to or from the welding devices consisting of a pivoted frame revolving on a turn-table, locking means for locking the pivoted frame in position in front of the welding devices, and guiding means on the conveying means constructed to have rocking and rectilinear motions relative to the conveying devices whereby the link-clamp carried thereby may be freely reciprocated and rocked relatively to the welding devices.

6. In a chain-making machine, the combination of suitable welding devices, a guide in line with the welding devices a frame supported by the guide and constructed and adapted to have a reciprocable movement upon the guide to or from the welding devices, and link-supporting gripping-jaws carried by the reciprocable frame and arranged to one side of the guide and welding devices the said jaw being constructed to hold one portion of the link and be reciprocated past the welding devices without contact therewith during the welding operation on the other portion of the link.

7. In a chain-making machine, the combination of suitable welding-dies, with a guide in line with the welding-dies, a frame supported by the guide and constructed and adapted to have a reciprocating movement upon the guide to or from the welding-dies, link-supporting gripping-jaws carried by the reciprocable frame and arranged to one side of the axis of the guide and the welding-dies, the said jaws being constructed to hold one portion of the link and be reciprocated past the welding-dies during the welding operation on the other portion of the link, and

power devices carried by the reciprocating frame for opening and closing the gripping-jaws and positively holding them in closed position when closed.

5 8. In a chain-making machine, the combination of a welding-hammer, a guide-shaft G, a frame F adapted to reciprocate and rock upon said guide-shaft, and gripping-jaws H carried by the frame F and located out of alignment with the guide-shaft G so as to bring the portion of the link which is required to be welded in alignment with the axis of the guide-shaft G whereby the link may be reciprocated and rocked without abnormally changing its position relatively to the welding-hammer.

15 9. In a chain-making machine, the combination of a welding-hammer, a guide-shaft G, a frame F adapted to reciprocate and rock upon the said guide-shaft and having a lateral extension F', a guide-plate having an enlarged or elliptical guide-groove I' in which the lateral extension is guided and by which the movement of the frame F is limited, and gripping-jaws H carried by the frame F and located out of alignment with the guide-shaft G so as to bring the portion of the link which is required to be welded in alignment with the axis of the guide-shaft G whereby the link may be reciprocated and rocked without abnormally changing its position relatively to the welding-hammer.

30 10. In a chain-making machine, the combination of a welding-hammer, a guide-shaft G, a frame F adapted to reciprocate and rock upon said shaft and having a lateral extension F', a removable guide-plate having an enlarged or elliptical guide-groove I' in which the lateral extension is guided and by which the movement of the frame F is limited, a lock to lock the extension in the groove I', and a guide-frame having a longitudinal groove I² in alignment with and opening into the groove I'.

45 11. In a chain-making machine, the combination of welding-dies, link-supporting gripping-jaws for holding the link in position between the dies during the welding operation arranged to one side of the jaws, a guide arranged in line with the operating parts of the welding-dies, and supporting devices for the gripping-jaws consisting of a frame journaled upon the guide and constructed to have a rocking motion thereon

and also a rectilinear reciprocable movement thereon and formed with a lateral part extending to and carrying the gripping-jaws whereby the said gripping-jaws may without contact with the dies move the portion of the link to be welded between the dies with a rotary and reciprocable rectilinear motion during the welding operation.

12. In a chain-making machine, the combination of welding-dies, a fixed guide in line with the dies, gripping-jaws for grasping a portion of the link to be welded arranged close to the dies and to one side of them and of the axis of the fixed guide, a frame guided upon the fixed guide so as to have rotatable motion about said guide and carrying the gripping-jaws so that they have rotatable motion about the dies, and power devices carried by the frame for closing and holding the jaws tightly upon the link.

13. In a chain-making machine, the combination of welding-dies, a turn-table to one side of the welding-dies, means on the turn-table for holding a link to be welded, means on the turn-table for guiding the chain upward from the welding-dies then transversely and downward through the turn-table, and a laterally-extending tunnel from beneath the turn-table through which to withdraw the chain as it is formed without interfering with the movements of the turn-table.

14. In a chain-making machine, the combination of welding-dies, a fixed guide in line with the dies, gripping-jaws for grasping a portion of the link to be welded arranged close to the dies and to one side of them and the axis of the fixed guide, a frame guided upon the fixed guide so as to have reciprocable motion upon and rotatable motion about said guide and carrying the gripping-jaws so that they have rotatable motion about the dies and reciprocable motion with respect thereto, and power devices carried by the frame for closing and holding the jaws tightly upon the link.

In testimony of which invention I hereunto set my hand.

HENRY LYSHOLM.

Witnesses:

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J. W. KENWORTHY.