S. A. HOLMAN.

WRENCH.

APPLICATION FILED JAN. 14, 1909.

943,545.

Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

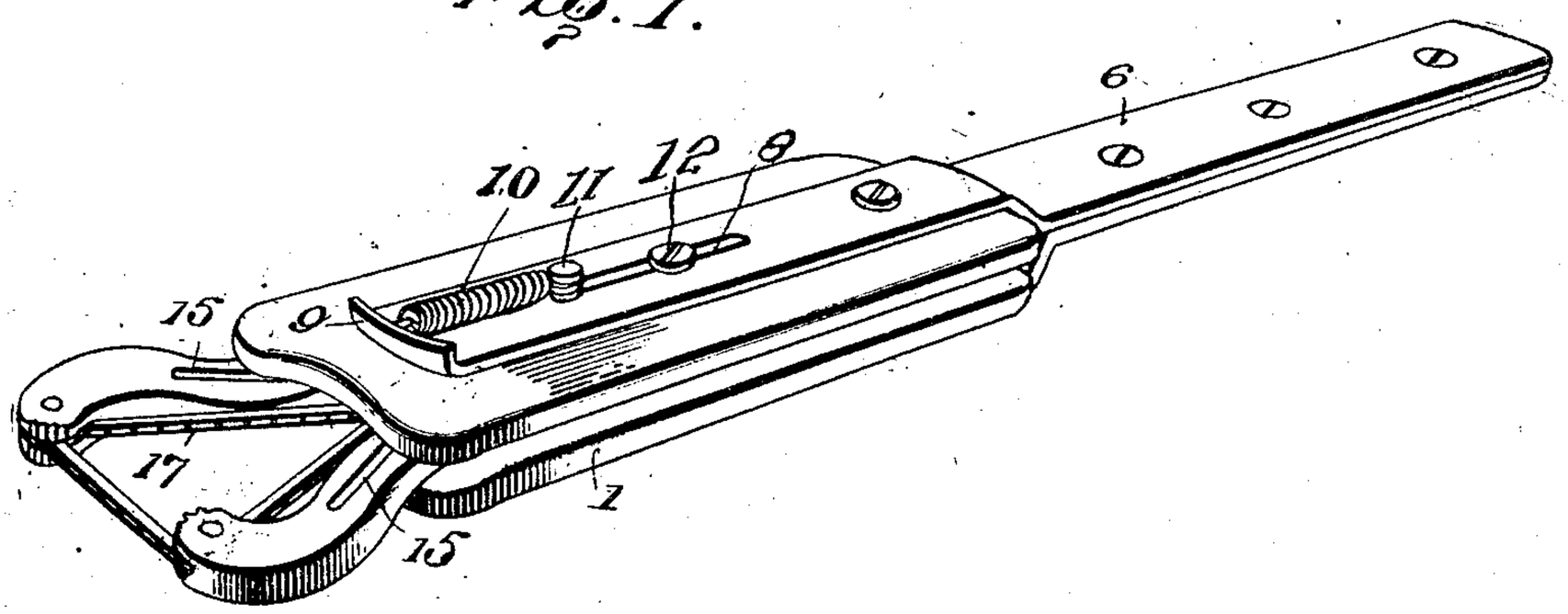


Fig. 2.

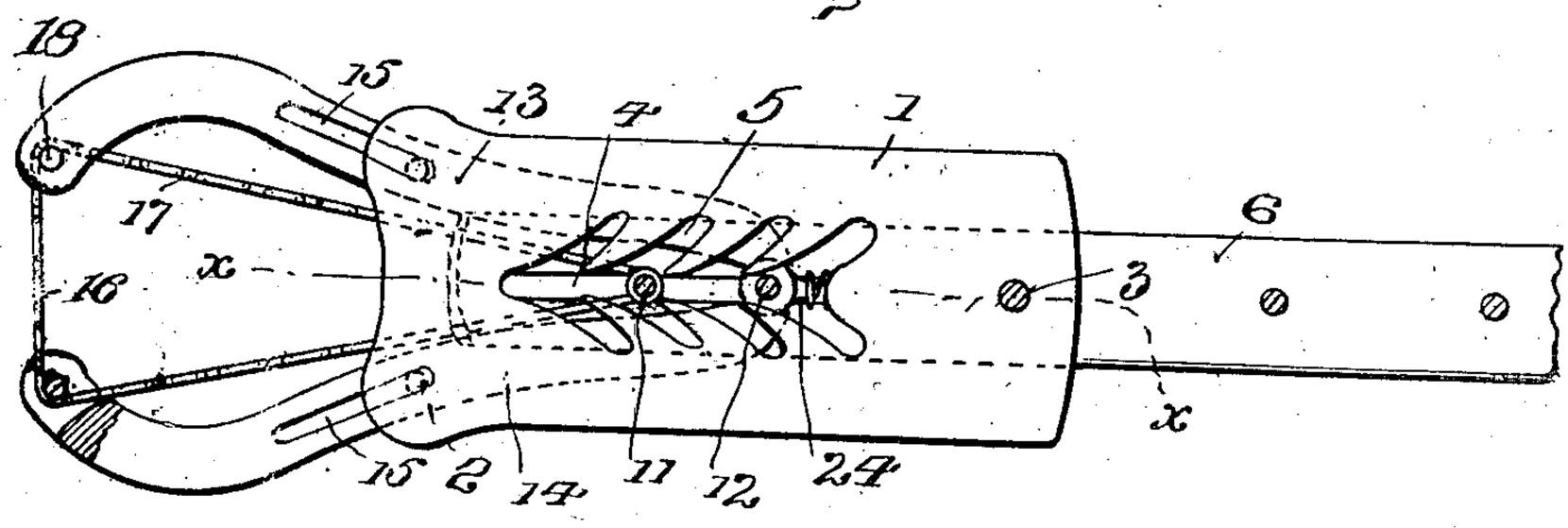
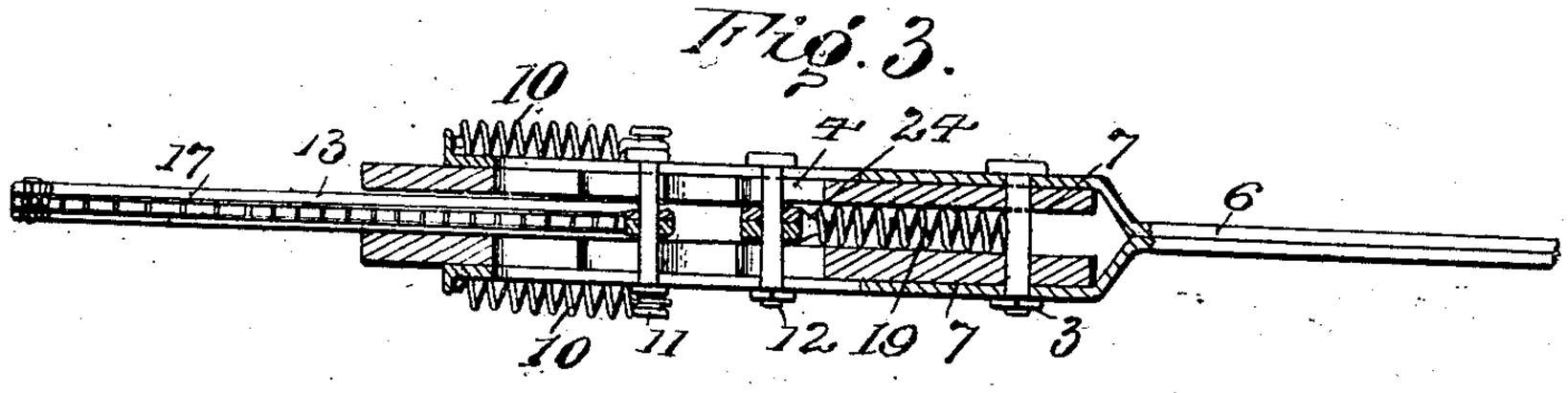


Fig. 3.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

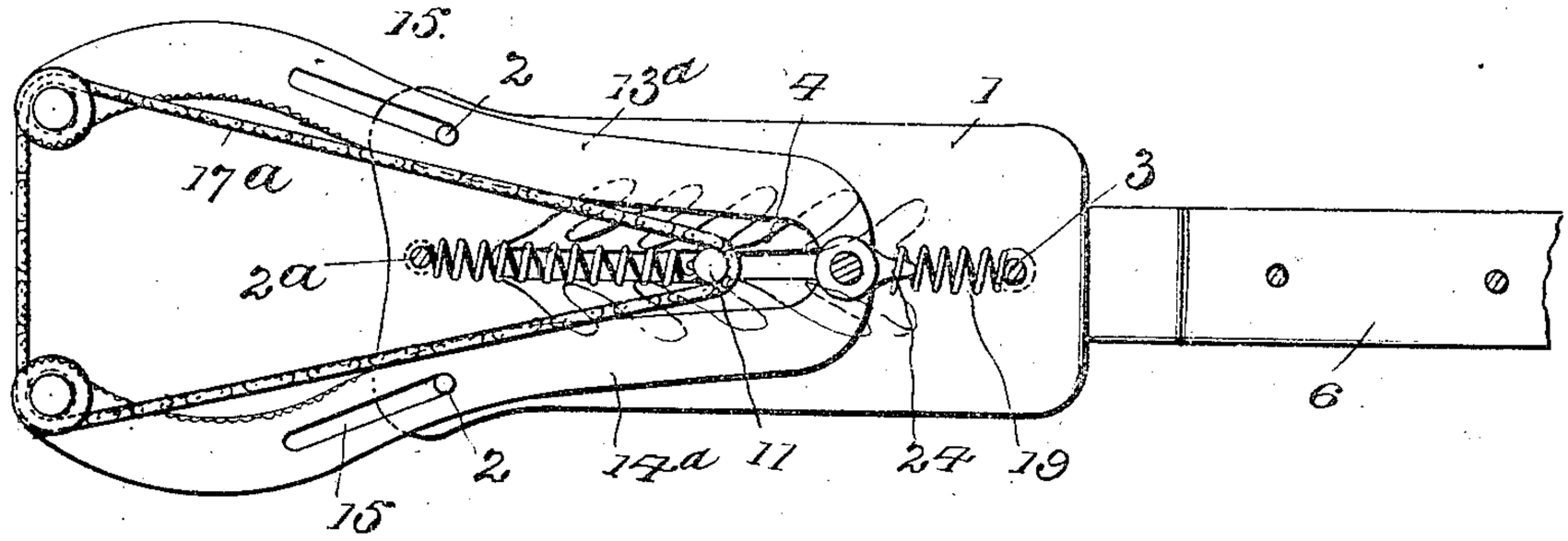


Fig. 5.

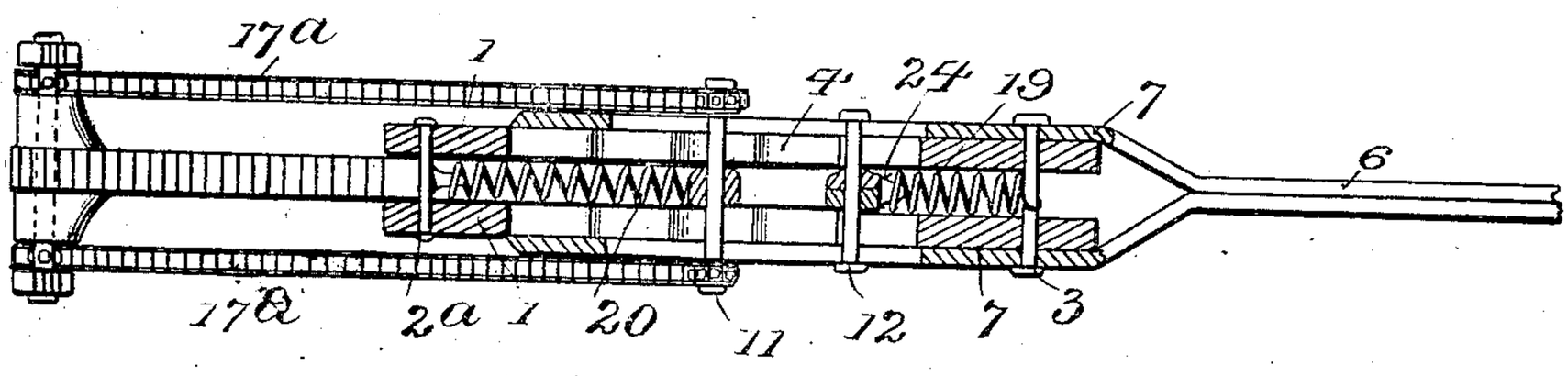


Fig. 6.

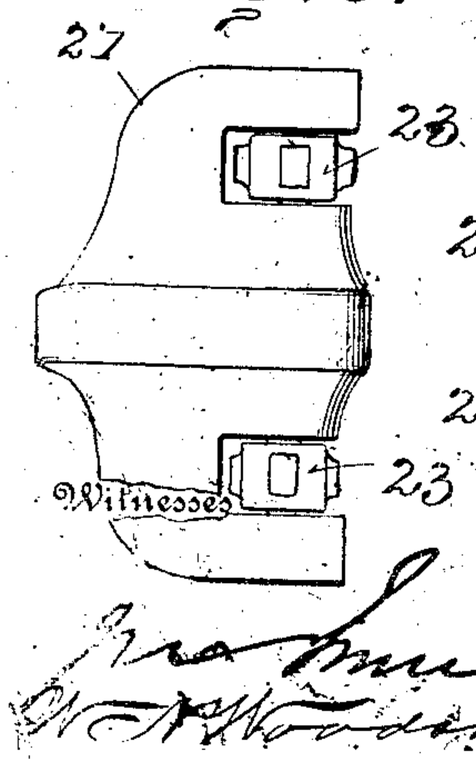
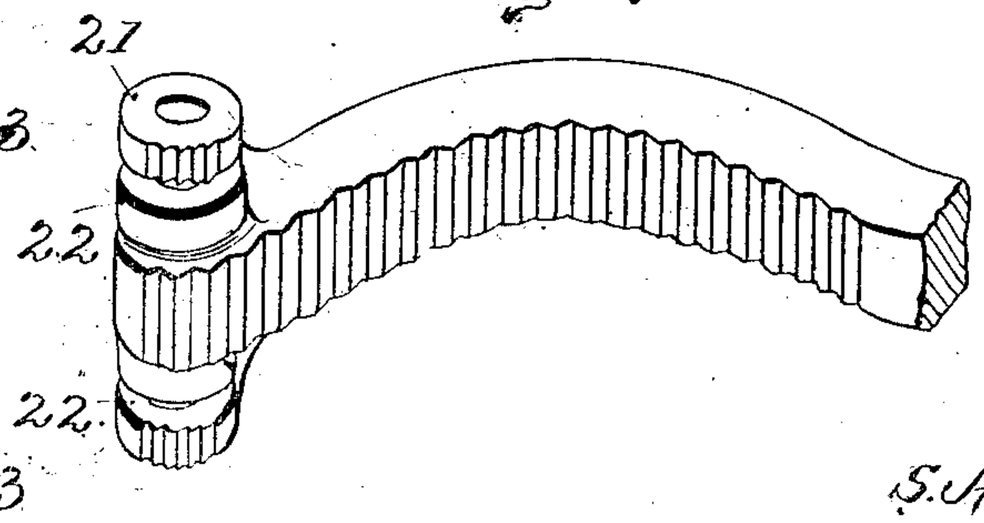


Fig. 7.



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UNITED STATES PATENT OFFICE.

STEPHEN A. HOLMAN, OF SANTA MARIA, CALIFORNIA.

WRENCH.

943,545. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed January 14, 1909. Serial No. 472,366.

To all whom it may concern:

Be it known that I, STEPHEN A. HOLMAN, citizen of the United States, residing at Santa Maria, in the county of Santa Barbara and State of California, have invented certain new and useful Improvements in Wrenches, of which the following is a specification.

Many types of wrenches have been devised for various work, but as a general rule they require to be adjusted to the work preliminary to use, thereby entailing loss of time and inconvenience in adapting the tool to the work in hand.

The present invention supplies a wrench of the kind embodying a handle and pivoted jaws, and combining therewith novel means for positively and automatically closing the jaws upon the work by application of properly directed force to the handle after the wrench has been placed in position upon the work, the tool being effective for operation either as a right or a left hand wrench according to the direction of oscillation of the handle.

In its organization the tool comprises a head, a handle for the head and having pivotal connection therewith, coöperating jaws carried by the head and having a sliding connection therewith and with the handle, a flexible connection between the jaws and a stop having sliding connection with both the head and handle, and springs coöperating with the several parts to maintain them in a given or normal position.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a perspective view of a wrench illustrative of the preferred embodiment of the invention; Fig. 2 is a plan view, one side plate and handle member being removed; Fig. 3 is a central longitudinal section of the complete tool on the line *x*—*x* of Fig. 2, a portion of the handle being broken away; Fig. 4 is a plan view of a modified form of wrench, the upper chain or flexible connection and the top plate being removed; Fig. 5 is an edge view of the modification shown in Fig. 4, the wrench head being in central longitudinal section; Fig. 6 is an end view of the modified form of jaw; and, Fig. 7 is a perspective view of the same.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The wrench head comprises like plates 1 spaced apart a proper distance and suitably connected by fastenings 2 and 3 which may consist of bolts, rivets or analogous fastening means. Each plate 1 is provided with a centrally disposed longitudinal slot 4 notched along their edges as indicated at 5, said notches being inclined to form in effect teeth. The plates 1 may be formed in any manner either by being cast or cut from heavy sheet metal.

The handle is formed of similar members which are offset intermediate of their ends to provide a grip portion 6 and a head portion 7, the grip portions 6 being brought together and connected in any substantial way and the head portions 7 embracing opposite sides of the wrench head and having a longitudinal slot 8 formed in each. The terminal portions of the parts 7 are bent outward as indicated at 9 to form abutments to sustain the outer thrust of expansion springs 10 arranged exterior to the forward portions of the handle members. The handle members are pivotally connected to the inner or rear portion of the wrench head by means of the fastening 3 whose ends are extended and pass through openings formed in said handle members near their offset portions. The longitudinal slots 8 in the head portions of the handle members register with the longitudinal slots 4 in the wrench head, so as to provide ways for pins or fastenings 11 and 12. It is to be understood that the handle may be of any formation so long as it provides portions embracing opposite sides of the wrench head and has longitudinal slots in the parts embracing the wrench head to receive the end portions of the pins or fastenings 11 and 12, said handle having pivotal connection with the rear portion of the wrench head.

Coöperating jaws 13 and 14 are fitted to the head of the wrench and have end portions arranged to come between the plates of the wrench head and pivotally connected by means of the pin or fastening 12. The opposite end portions of the jaws project beyond the head of the wrench and are oppositely curved and may be toothed or otherwise formed, so as to make positive engagement with the work and prevent slipping when the tool is in operation. A slot 15 is

provided in each jaw and receives the adjacent fastening 2 connecting the forward corner portions of the plates 1. The slots 15 have an outward flared arrangement, so as to cause a relative inward or closing movement of the jaws when the latter receive a rearward movement with reference to the head of the wrench. The jaws are of substantial formation, so as to resist strain and provide a reliable and effective tool.

A flexible connection is interposed between the forward extremities of the jaws 13 and 14 and the pin 11 whose projecting ends form stops for the expansion springs 10. The flexible connection preferably consists of a chain formed of suitably constructed links pivotally connected in any practical way. When the parts are assembled the flexible connection has its middle portion 16 extended between the forward extremities of the jaws and its remaining portions 17 extended between the extremities of the respective jaws and the pin or fastening 11. It will be observed that the remaining portions 17 are rearwardly converged and normally stand inward from the gripping faces of the jaws 13 and 14. The flexible connection has a running connection with the end portions of the jaws 13 and 14, thereby admitting of said jaws closing and opening. Rollers 18 are fitted to the extremities of the jaws and receive the flexible connection which passes therearound, thereby admitting of the parts coöperating with a small amount of resistance. The expansion springs 10 exert a rearward pressure upon the pin or part 11 and since the extremities of the flexible connection are attached to said pin, there is a normal tendency to move the ends of the flexible connection, thereby maintaining said flexible connection under a given tension at all times, which results in maintaining the same taut.

An expansion spring 19 is interposed between the ends of the jaws 13 and 14 and the rear portion of the wrench head and is preferably placed between the plates 1 and the pins or fastenings 3 and 12. The expansion spring 19 normally exerts an outward pressure upon the jaws 13 and 14 to force the same forward in position with the fastening 2 at the inner or rear end of the slots 15 and with the projecting ends of the jaws spread or separated to their maximum extent.

To use the tool the same is placed with the part 16 of the flexible connection against the work and pressure is exerted in a forward longitudinal direction upon the handle, thereby causing the part 16 to move rearward between the jaws, and the pin or part 11 to move forward against the tension of the springs 10 which are compressed. After the part 16 has moved rearward a certain distance and the springs 10 have been subjected to a predetermined tension a continued forward longitudinal movement of the handle results in a relative rearward movement of the jaws 13 and 14 and a compression of the spring 19. As the jaws 13 and 14 move rearward with reference to the head of the wrench they simultaneously advance or close upon the work, this being due to the forwardly diverged slots 15 riding upon the fastenings 2. After the jaws have taken a firm hold upon the work the handle may be oscillated in one or the other direction according to the desired rotation of the work to effect the required result. As the handle is oscillated the pins 11 and 12 receive a relative lateral movement and are carried into certain notches 5 with the result that the jaws and flexible connection are locked to the head of the wrench. The springs 10 and 19 have a tendency to aline the parts, that is to hold the handle in longitudinal alinement with the head of the wrench, so as to bring the slots 4 in the plates 1 in registry with the slots 8 in the handle members, thereby holding the pins 11 and 12 in the center of the slots 4 and clear of the notches 5 at the edges of said slots. When the handle is relieved of pressure the springs 10 and 19 act in the manner herein stated and restore the parts to normal position.

The flexible connection acts in the capacity of jaw closing means and supplements the action of the fastenings 2 and outwardly diverged slots 15, and it may serve as work gripping means to prevent slipping of the tool when subjected to working pressure.

In the modification illustrated in Fig. 4 and the detail views thereof two chains or flexible connections 17^a are provided and are located upon opposite sides of the wrench head and jaws. A single expansion spring 20 is provided and replaces the expansion springs 10 shown in Fig. 1 and the detail views thereof. This spring 20 is arranged between the plates 1 forming the wrench head and is confined between the center fastening 2^a and the pin or fastening 11. The spring 20 serves the same purpose as the springs 10 and normally presses the pin or fastening 11 rearward, so as to hold the chains or flexible connections taut. The jaws 13^a and 14^a are widened at their outer ends to provide heads 21, the end portions of which upon opposite sides of the body of the jaws are notched, as indicated at 22, to receive rollers 23 around which the chains or flexible connections 17^a pass. This formation of wrench enables the jaws to close directly upon the work, since the chains or flexible connections are adapted to clear the gripping edges of the jaws by being deflected by the work to one side of the planes of the gripping edges of the jaws.

By toothing the chains or flexible connections they may in a great measure supplement the action of the jaws in gripping the work and preventing slipping of the wrench. The inner ends of the jaws are formed with points 24 which are adapted to enter the outer end of the spring 19 and center the same.

The wrench just described operates in substantially the manner previously described.

Having thus described the invention what is claimed as new is:

1. A tool of the nature and for the purposes herein specified, the same comprising a head, a handle connected to the head and movable with reference thereto, coöperating jaws fitted to the head and having both a pivotal and a sliding connection therewith, means coöperating with said jaws to effect a closing of the same upon the work when applying properly directed pressure to the handle, and means for locking the jaws, and jaw closing means to the wrench head and actuated by said handle and thrown into and out of operative position thereby.

2. In a tool of the nature set forth the combination of a head, a handle in coöperative relation with said head, coöperating jaws pivotally mounted upon the head and having a sliding movement with reference thereto, and a flexible or linked connection between the free ends of said jaws and adapted to effect a closing thereof upon the work by properly directed force applied to the handle.

3. In a tool substantially as set forth the combination of a head provided with a handle, coöperating jaws mounted upon the head, a flexible connection coöperating with said jaws to effect a closing thereof upon the work upon application of properly directed force to the handle, and a spring connection between the said flexible connection and the handle of the tool.

4. In combination a head having an operating handle, coöperating jaws slidably mounted upon the head, coöperating means between said jaws and head to effect a closing of the jaws simultaneously with a relative sliding movement thereof, a flexible connection between the jaws and adapted to engage with the work and supplement the action of the aforesaid jaw closing means, and a spring connection between said flexible connection and the handle of the tool.

5. In combination a head provided with an operating handle, jaws mounted upon the head and adapted to have a relative sliding movement, coöperating means between the jaws and head to effect a closing of the jaws when moved rearward, a spring connection between the jaws and head to normally exert an outward pressure upon the jaws, a flexible connection between said jaws to make positive engagement with the work and supplement the action of the jaw closing means, and a spring connection between said flexible connection and the handle to normally exert a rearward force upon said flexible connection.

6. In combination a head, an operating handle having pivotal connection with the head, coöperating jaws mounted upon the head and having both pivotal and slidable connection therewith, coöperating means between said jaws and head to effect a closing of the jaws upon rearward movement thereof, a spring connection normally tending to press the jaws outward, a flexible connection between the jaws and head and adapted to engage with the work and supplement the action of the jaw closing means, a spring connection between said flexible connection and the handle, and locking means between said jaws, flexible connection and head to secure the parts in working position and adapted to be actuated by the operating handle to be turned into and out of operative position thereby.

7. In combination a head, an operating handle pivotally connected to said head, both the handle and head having registering slots, coöperating jaws mounted upon the head and having slidable connection therewith, coöperating means between said jaws and head to effect a closing of the jaws simultaneously with a rearward movement thereof, a pivot fastening connecting the inner ends of the jaws and operating in the registering slots of the head and handle, a flexible connection between the jaws and adapted to engage with the work and supplement the action of the jaw closing means, a fastening connecting the ends of said flexible connection and operation in the registering slots of the head and handle, a spring normally exerting an outward pressure upon the jaws to hold the latter spread, and another spring exerting an inward pressure upon said flexible connection to hold the same taut.

8. In combination a tool of the variety specified, the same comprising a head provided with an operating handle, coöperating jaws having pivotal connection with the head, a flexible connection having running connection with the ends of the jaws and having a portion extended between the jaws, and its remaining portions rearwardly converged, a fastening connecting the rear portions of the flexible connection and having slidable connection with the head, and a spring normally exerting a force upon said connection to hold the flexible connection taut.

9. In combination a head, an operating handle having portions embracing opposite sides of the head and provided with outwardly extending parts forming stops, cooperating jaws mounted upon the head, a

flexible connection having running connection with the jaws and having its middle portion extended across the space formed between them and having its remaining portions rearwardly converged, a fastening connecting the remaining portions of said flexible connection and having its end portions arranged to operate in longitudial slots formed in the head and in the parts of the handle embracing said head, and springs interposed between the projecting ends of said fastening and the outer portions of the separated parts of said handle.

10. A tool of the character described comprising a head having longitudinal slots and having notches along the edges of the slots, a handle pivoted to the head and comprising spaced portions embracing opposite sides of said head and formed with longitudinal slots to register with the slots of the head and having outwardly extended portions, coöperating jaws mounted upon the head and having both pivotal and sliding connection therewith, a fastening connecting the inner ends of the jaws and operating in the longitudinal slots of the head and handle, a flexible connection having running connection with the jaws, a fastening connecting the remaining portions of the flexible connection and operating in the slots of the head and parts of the handle embracing said head, a spring exerting an outward force upon the jaws, a spring exerting a rearward pressure upon the fastening connecting the remaining portions of said flexible connection, the parts being arranged to admit of automatic closing of the jaws and a locking of the same when closed, the locking means being turned into and out of operation by rotative movement of the operating handle.

11. A tool of the nature specified comprising a head provided with an operating handle, coöperating jaws mounted upon the head, a flexible connection between the jaws and head and serving to connect the outer ends of the jaws with each other and with the said head, and a spring connection between the inner portions of the flexible connection and said head, the parts being constructed and arranged to admit of the jaws closing when said flexible connection is subjected to pressure.

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

STEPHEN A. HOLMAN. [L. S.]

Witnesses:
GEO. H. FISHER,
JESSE E. OGDEN.