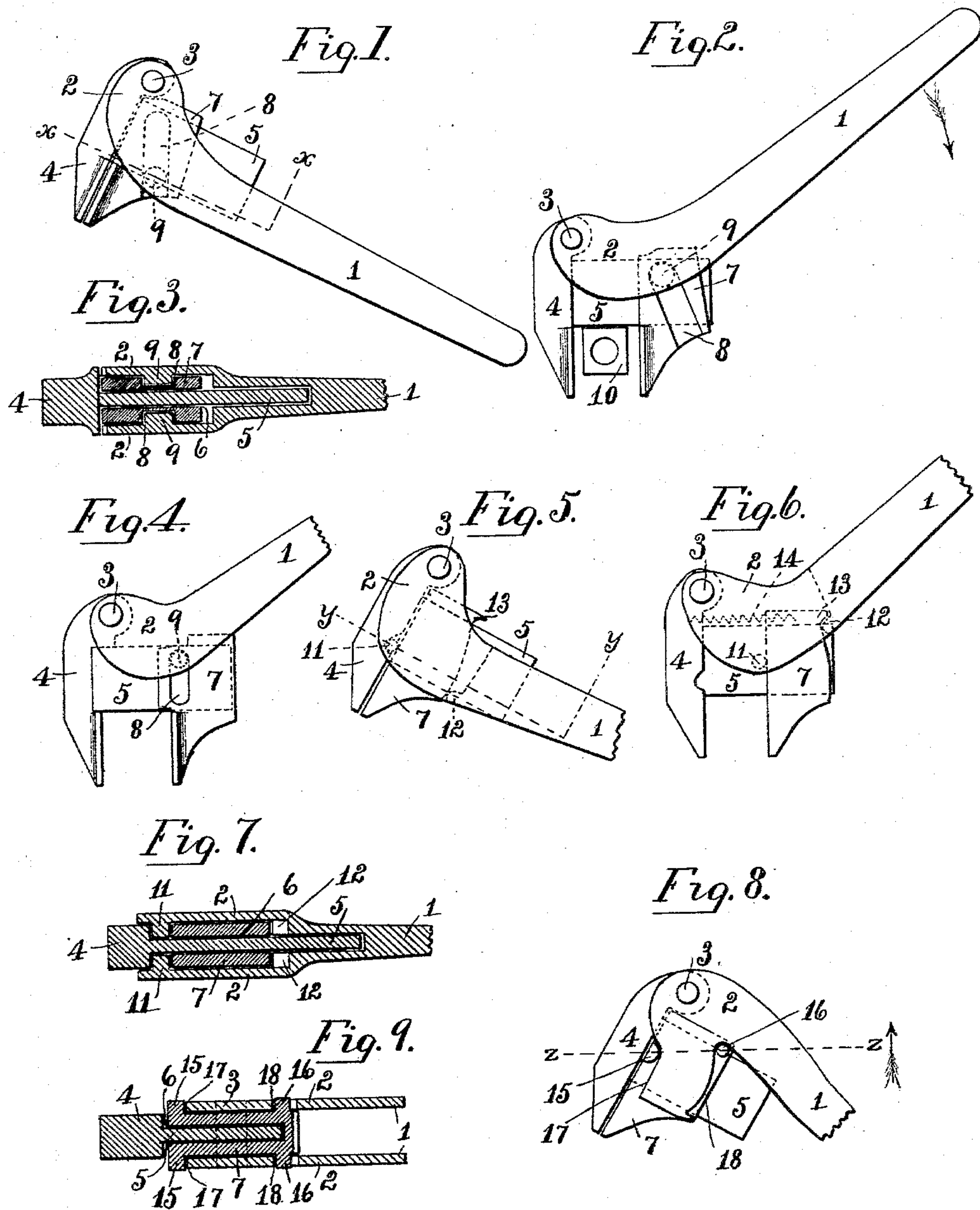


(No Model.)

J. PUSEY.
WRENCH.

No. 597,741.

Patented Jan. 25, 1898.



Witnesses.

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SPECIFICATION forming part of Letters Patent No. 597,741, dated January 25, 1898.

Application filed January 7, 1897. Serial No. 618,252. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA PUSEY, a citizen of the United States, and a resident of Lima, in the township of Middletown, county of Delaware, and State of Pennsylvania, have invented certain new and useful Improvements in Wrenches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

10 Figure 1 is a side elevation of a wrench in which my invention is embodied, the jaws being closed; Fig. 2, a similar elevation, the jaws being open; Fig. 3, a section on line *xx*, Fig. 1; Fig. 4, a side elevation of a modification in a detail, part of the handle being broken off; 15 Fig. 5, a side elevation of a modification of the invention, the jaws being closed and part of the handle broken off; Fig. 6, a similar elevation, the jaws being open; Fig. 7, a section on line *yy*, Fig. 5; Fig. 8, a side elevation of another modification of the invention, part of the handle being broken off; Fig. 9, a section on line *zz*, Fig. 8, looking in the direction of the arrow in said figure.

25 This invention relates to that general kind or class of sliding-jaw wrenches wherein the jaws are caused to open and close by a cam-like action through the rotary movement of a handle pivoted to one of the jaws or to a part 30 connected to the jaw.

The object of the invention is to provide a wrench of this class that shall be efficient, simple in construction and in operation, and whose jaws shall be readily and quickly adjustable to a nut or bolt-head of any size within 35 their scope.

The invention, which may be embodied in various specific forms, consists of the combination of two jaws with a connecting stem or 40 guide upon which one of the jaws is adapted to slide, and a handle, usually bifurcated at its forward end, that is pivoted to one of said jaws and having parts or projections bearing directly and adapted to slide against edge 45 portions of the other or sliding jaw, whereby the use of cam-slots in the handle (in connection with a pin connected to the latter jaw and passing through said slots) heretofore employed in wrenches of the said general class 50 is obviated.

The invention consists also in the combina-

tion, with the said jaws and their connecting guide-stem, of a handle pivoted to the upper part of the outer jaw and having parts or projections bearing directly and adapted to slide 55 against edge portions of the other or sliding jaw, whereby certain advantages are secured, as hereinafter pointed out.

The invention consists, further, in a certain construction and relative arrangement of the 60 foregoing parts or elements, whereby when the wrench is held by the hand about in the usual position preparatory to applying the jaws to a nut or the like to be screwed up or unscrewed the inner one of the jaws will be 65 caused by the action of gravity to slide away from the other or pivoted jaw, and also whereby when the jaws, thus opened, are applied to a nut and the handle is rotated, as in the act of turning the nut, the movable jaw will be 70 caused to automatically, so to say, advance toward the outer jaw and to firmly grip the nut between the jaws, and whereby also the wrench is adapted to operate in a manner analogous to a ratchet-wrench. 75

The invention consists, finally, in certain minor features or details hereinafter pointed out.

Referring first to Figs. 1, 2, and 3 of the accompanying drawings, which figures illustrate the usually-preferred form of the invention, 1 is the handle of the wrench, which may be of any suitable or convenient shape and bifurcated at the forward end, as shown. 80 To the free end of and between the bifurcations 2 is pivoted on a pin 3 a jaw 4, hereinafter referred to as the "outer" jaw. This jaw is provided with a guide-stem 5, that passes through a corresponding slot or mortise 6 in a similar jaw 7, hereinafter termed the "inner" jaw. 85 This latter jaw is adapted to slide upon the said stem, or (although usually not recommended) the said jaw may be fixed to the inner end of the stem and the latter passed through a mortise in the outer jaw. In each 90 of the sides of jaw 7 is a groove or slot 8, into which is entered a stud or projection 9, that is fixed to and projects from the inner side of the bifurcation 2. 95

The operation and manner of using or applying the wrench thus constructed are as follows: Premising that the frictional parts 100

are made to work freely, the wrench is held in the hand about in position for applying the tool to a nut in the ordinary way—say as in Fig. 2—whereupon, if the jaws have been closed by reason of the center of gravity of the jaws and stem as a whole being to the rear of the vertical line of the center of the pivot-pin 3, the inner jaw 7 will drop down, and, obviously, by reason of the described groove-and-stud connection the said jaw will be caused to slide back and separate from the outer jaw, as in Fig. 2. If now the jaws be placed over the nut 10 with the stem against the edge or face of the nut, as in Fig. 2, and the handle be then rotated on its pivot toward the inner jaw—that is, in the direction of the arrow in Fig. 2—with a slight pressure, so as to press the stem against the face of the nut, the said jaw will, owing to the front walls of the grooves 8 pressing against the studs 9, advance toward the outer jaw, and thus the nut will be firmly and squarely gripped between the jaws. The movement of the handle being continued, the nut will be turned. In taking a fresh hold upon the nut it will not be necessary to remove the jaws off the latter unless the full scope of the jaws is less than the diagonal of the nut, but upon reversing the movement of the handle the jaws will open and slide over or around the corners of the nut. The handle being then again rotated toward the inner jaw with a slight pressure of the stem against the nut, the jaws will automatically, as it were, grip parallel sides of the nut, and so on until the nut has been sufficiently screwed up or unscrewed.

I remark that, the stem or a sufficient portion thereof being to the rear of the line of the pivot of the handle, if the parts should not work so freely that the jaws will open by gravity, as hereinbefore described, they may be opened by the hand, and then when they are applied to the nut and the edge of the stem in contact with the face of the nut is pressed against the latter the inner jaw will be caused to advance toward the nut, while on reversing the movement of the handle to take a fresh hold on the nut the jaws will thereby open.

It will be observed that in the described form of my invention the grooves or slots 8 are closed at their upper ends, but are open at their lower ends. The closed upper ends serve as a stop to limit the outward throw of the handle, thus preventing the jaw 7 from sliding off the stem. The purpose of having the lower ends of the grooves open is to permit of a very simple construction and putting together of the parts of the wrench—that is to say, the studs may be cast or forged integral with the handle and the former entered into the open ends of the grooves and the handle be then secured to the outer jaw by the pivot-pin 3. As the jaws will then be closed, the studs cannot escape from the

grooves. In this way the wrench may be made of but three separate parts connected or held together by the pivot-pin. It will also be observed that the grooves are inclined, as shown. This is to secure a greater throw of the jaw relatively to the throw or movement of the handle than would result if the grooves were at right angles to the stem. In order to secure the said automatic or ratchet-like action, there is of course a limit to the acuteness of the inclination of these grooves, or, more precisely, of the edges thereof that advance the sliding jaw, and consequently a limitation of the extent of movement of the latter. There may, however, be a very considerable inclination of the grooves, and thus a relatively much greater throw of the jaw; but in such case it necessitates the adjustment of the jaws so as to embrace the nut before the handle is rotated to turn the same.

In Fig. 4 I show a construction wherein the grooves 8 are at right angles to the stem. As will be observed, the location of these grooves with relation to the pivot-pin is such that a considerable throw of the jaws is secured, yet the aforesaid automatic or ratchet-like action is retained. This form of the invention may be composed of but three separate parts cast or forged integrally, readily put together, and held together by the pivot-pin.

In the modification illustrated in Figs. 5, 6, and 7 the said grooves are not used, but in lieu of the studs which in the previous form bear against the rear edge or wall of the grooves in opening the jaws and against the front edge or wall thereof in closing the same I employ projections or studs 11 and 12, secured to or integral with the handle, one of which studs, 11, bears and slides against the forward edge of the inner jaw when the latter is being retracted and the other, 12, against the rear edge of the said jaw when it (the jaw) is being advanced. The relative location of said studs and the form of the edges of the jaw are preferably such, as shown, to permit of none or but little lost motion—that is, so that while the one stud is sliding against the front edge of the jaw the other is sliding against or close to the rear edge of the jaw. The outward throw of the handle, and consequently the backward movement of the jaw 7, may be arrested by a rear projection 13 of the top part of the jaw, against which projection stud 12 will impinge. Although it is desirable that the retraction of the jaw 7 should be of a positive character, it (the retraction of the jaw) may sometimes be secured by means of a light spring 14, as indicated by dotted lines in Fig. 6, which spring, although it may be of various forms and applied in different ways, is in the present instance an open helical spring placed between the heads or upper ends of the two jaws immediately above the stem and serves to maintain the jaws normally in the open position, as in said Fig. 6. Obviously, when the spring

is used it takes the place of the bearing parts hereinbefore described for retracting the jaw, and also that in the hereinbefore described automatic construction of the wrench the spring may assist or take the place of gravity in separating the jaws.

In the modification shown in Figs. 8 and 9, instead of having studs on the handle, I, so to say, transfer the same to the sliding jaw and provide the handle with suitable edges or surfaces to bear and act upon the studs—that is, I provide a stud or projection 15 at a suitable point adjacent to the front edge of the jaw 7 and a stud 16 near the upper end of the rear edge of the jaw. The forward edge 17 of a part or downward extension of the handle engages the rear side of the stud 15 and the rear edge 18 engages the stud 16, the said edges being so formed and arranged, as shown, that when the handle is rotated on its pivot-pin 3 in a direction away from the sliding jaw the edge 18, bearing and sliding against the stud 16, will retract the jaw, and when the movement of the handle is reversed the jaw will be advanced by the bearing of the edge 17 against the forward stud 15 and with little or no lost motion.

Each of the foregoing described modifications of my wrench is capable of the same automatic and ratchet-like operation as that hereinbefore explained of the first form thereof.

I have made and used a wrench of substantially the same construction as that of Figs. 1, 2, and 3, but with the handle pivoted (on a rearward extension of the upper end or head of the outer jaw) at a point to the rear of the line of the center of gravity of the jaws and stem as a whole, but I found that although the wrench was operative and the sliding jaw had a comparatively great throw it was comparatively undesirable, for the reason that it was incapable of the aforesaid automatic or ratchet-like operation.

It will be obvious that although it is usually more desirable that positive means, such as hereinbefore described, should be employed for causing the inner or sliding jaw to move back from the other jaw through the reverse rotation of the handle on its pivot such means may be dispensed with, in which case the said jaw may be slid back by the hand, and when the wrench is capable of the described ratchet-like operation and the jaws are once opened to take in the nut and applied thereto the reverse movement of the wrench will cause the jaws to open in passing over the corners of the nut.

I am informed that long prior to my invention a cam pipe-wrench had been described, in which were combined a jaw of approximately U-shape for receiving a pipe or rod, a bifurcated handle pivoted to the inner limb of the U-jaw, and a rectangular stem or jaw beveled at the forward end and passing through a mortise in said limb, the handle being also

provided with long curvilinear slots, with which engaged a pin that was connected to the handle and also to the rear or inner end of said stem, whereby the latter was moved to and from the outer limb of the U of the first jaw by the rotation of the handle on its pivot.

I also learn that prior to my invention a wrench had been described wherein were combined a front or outer jaw having a bifurcated stem, an inner jaw having a stem placed between the bifurcations of the first stem and provided with an interior longitudinal groove in which was entered a tongue upon the other stem, together with a bifurcated handle pivoted to a lug or projection on the upper edge and adjacent to the forward end of the stem of the inner jaw, and having also long cam-slots through which passed a pin, which pin also passed through lugs or projections on the upper edges of and adjacent to the rear end of the bifurcated stem of the outer jaw, whereby the latter was caused to slide toward and from the inner jaw by rotating the handle on its pivot.

In neither of the foregoing construction of wrenches, however, nor any other that I am aware of obtain all the advantages that are combined in a wrench in which my hereinbefore-described invention is embodied—among others economy, simplicity, convenience, efficiency, and strength, relatively to size and weight.

As stated, both of the aforesaid prior wrenches employ a cam-slot in the bifurcation of the handle to the rear of the pivot-point. This requires the use of very considerable length and consequent increase in the size and strength of the handle and a comparatively long throw of the handle to open and close the jaws to their full extent, together with a long reach and consequent loss of leverage between the pivot of the handle and the pin engaging the cam-slot, which cannot be avoided in that construction. I do not, however, wish it to be understood that my invention may not include the use of slot or groove in the handle in connection with a stud or pin secured to the inner or sliding jaw, for it will be obvious that the slot or groove 8 may be in the bifurcations of the handle and the stud or pin 9 project from the side of the inner jaw into the said groove, in which case the stud would be fixed to the upper part of said jaw and would be at the upper end of the slot when the jaws are at their nearest approach. Owing to the handle being pivoted to the head of the outer jaw, a certain throw or movement of the inner jaw may be had by a comparatively short throw of the handle on its pivot, yet preserving the automatic or ratchet-like action which is the main object of my invention.

I have been able to secure a predetermined throw or movement of the sliding jaw in some forms of my wrench by a movement or throw

of the handle through an arc of but about twenty-five degrees or thirty degrees, while in the aforesaid prior wrenches it would require the movement of the handle through
 5 an arc of from about eighty to ninety degrees in order to have the same movement of the jaws as that of my wrench.

Having thus described my invention, I claim as new and desire to secure by Letters
 10 Patent—

1. In a wrench of the recited class, the combination of two jaws, one having a guide-stem upon which the other is adapted to slide, and a handle pivoted to one of said jaws and having
 15 projections in direct cam-like sliding engagement with edge portions of the sliding jaw, substantially as described, and for the purpose set forth.

2. In a wrench of the said class, the combination of the outer jaw, the inner sliding jaw, the connecting guide-stem, and the handle pivoted to said outer jaw and having parts or
 20 projections in cam-like sliding engagement with the inner jaw; whereby, when the handle is rotated on its pivot in a direction toward the inner jaw, the latter will be caused to move positively toward the outer jaw, together with means for causing the retraction
 25 of said inner jaw when the handle is rotated on its pivot in a direction away from the inner jaw, substantially as set forth.

3. In a wrench of the said class, the combination of the outer jaw, the inner sliding jaw, the connecting guide-stem, and the handle
 35 pivoted to said outer jaw and having parts or projections in cam-like sliding engagement with the inner jaw; whereby when the handle is rotated on its pivot in a direction away from the inner jaw, the latter will be caused,
 40 positively, to slide back from the outer jaw, and when said handle is rotated on its pivot in a direction toward the inner jaw, the latter will be caused, positively, to slide toward the outer jaw, substantially as set forth.

4. In a wrench of the said class, the combination of the outer jaw, the sliding inner jaw, the connecting guide-stem, the bifurcated handle pivoted to the outer jaw, and having
 45 inwardly-projecting studs or the like, in cam-like sliding engagement with said inner jaw, substantially as and for the purpose set forth.

5. In a wrench of the said class, the combination of the outer jaw, the sliding inner jaw, the connecting guide-stem, and the handle
 55 connected to the upper portion of said outer jaw, at a point forward of the line of the center of gravity of said jaws and stem as a whole, and having parts in cam-like engagement with the inner jaw; whereby when the
 60 wrench is held in suitable position for applying the jaws to a nut, or the like, said inner jaw will be caused by gravity to rotate the outer jaw on its pivotal connection with the handle and thereby cause said inner jaw to

slide away from the outer jaw, and when the
 65 jaws are applied to a nut and the handle is rotated toward the inner jaw, said jaw will be caused to advance and firmly grip the nut between the jaws; and whereby, also, the wrench is adapted to operate similarly to a
 70 ratchet-wrench, substantially as set forth.

6. In a wrench of the said class, the combination of the outer jaw, the inner sliding jaw, the connecting guide-stem, the grooves in the
 75 sides of the inner jaw, and the bifurcated handle pivoted to the outer jaw and having studs engaging said grooves, respectively, substantially as set forth.

7. In a wrench of the said class, the combination of the outer jaw, the inner sliding jaw, the connecting guide-stem, the grooves or
 80 slots in the sides of the latter jaw open at their lower ends, and the bifurcated handle pivoted to the outer jaw, and provided with studs integral with the handle and engaging
 85 said grooves or slots, substantially as and for the purpose specified.

8. In a wrench of the said class, the combination of the outer and the inner jaw, the former having secured thereto a stem upon
 90 which the inner jaw is adapted to slide; together with the handle pivoted to the outer jaw and provided with parts adapted to engage and slide against parts of the portion of the inner jaw through which the said stem
 95 extends, whereby when the handle is turned on its pivot toward the outer jaw the inner jaw will be caused to slide on the said stem away from the outer jaw, and when the handle is turned on its pivot toward the inner
 100 jaw, said jaw will be caused to advance toward the outer jaw, substantially as described.

9. In a wrench of the class recited, the combination of the outer jaw and the sliding
 105 inner jaw, the connecting-stem, and the handle pivoted to the outer jaw at a point which shall be forward of the working face of the inner jaw when the jaws are open to the full extent and having parts adapted to bear and
 110 slide against the inner jaw, whereby when said handle is rotated on its pivot in one direction said inner jaw will be caused to slide toward the outer jaw by a cam-like action, and when the handle is rotated in the reverse
 115 direction, the inner jaw is free to be slid back away from the outer jaw, substantially as set forth.

10. In a wrench of the said class, the combination of the outer jaw, the inner sliding jaw, the connecting-stem, the handle pivoted to
 120 the outer jaw at a point which shall be forward of the working face of the inner jaw when the jaws are open to the full extent and having projections adapted to bear and slide
 125 against faces of the inner jaw that are at a suitable angle to the line of movement of said inner jaw, the construction and relative

arrangement of the said parts being substantially as shown and described whereby when the jaws are open and are applied to a nut and the stem is pressed against the edge of the nut and the handle is at the same time rotated on its pivot, the jaws will thereby be caused to automatically grip the nut, substantially as set forth.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

JOSHUA PUSEY.

Witnesses:

JOHN R. NOLAN,
WALTER C. PUSEY.