

(No Model.)

F. W. NELSON.
WRENCH.

2 Sheets—Sheet 1.

No. 527,181.

Patented Oct. 9, 1894.

Fig. 1.

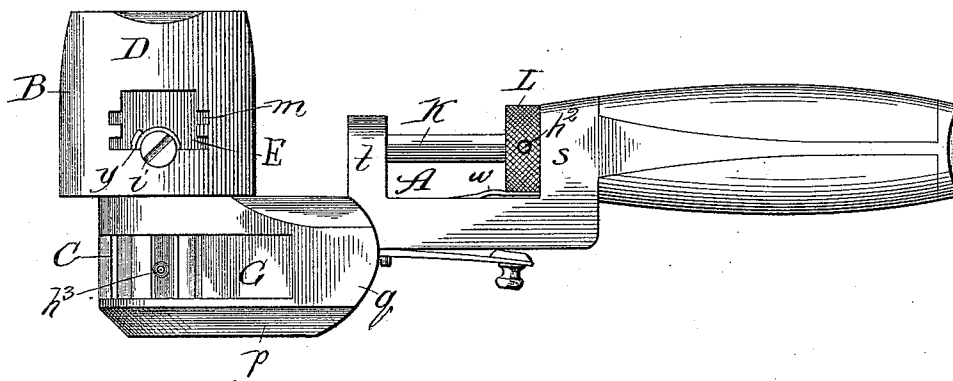


Fig. 2.

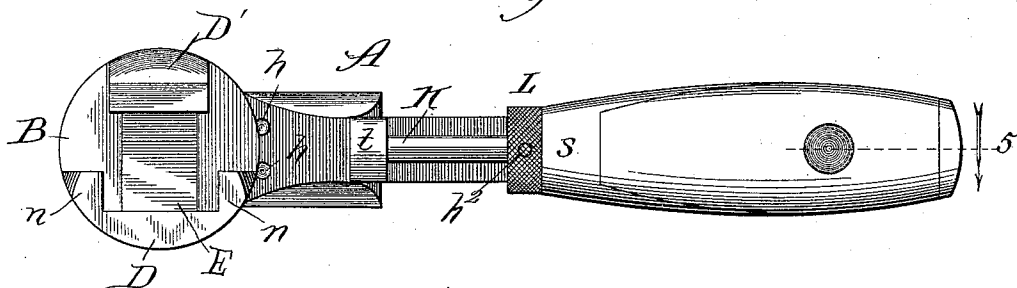


Fig. 3.

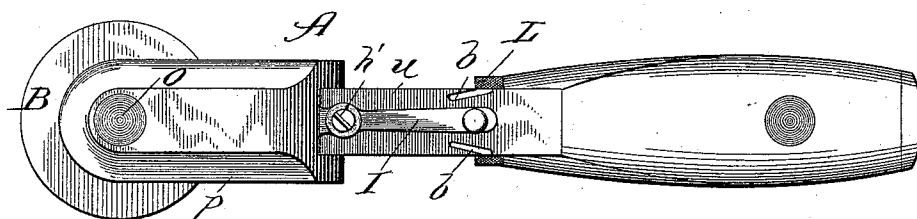
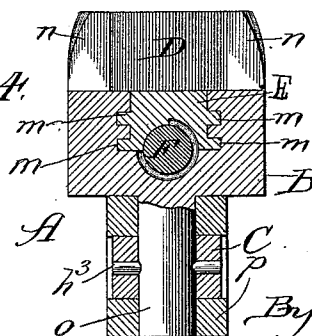


Fig. 4.



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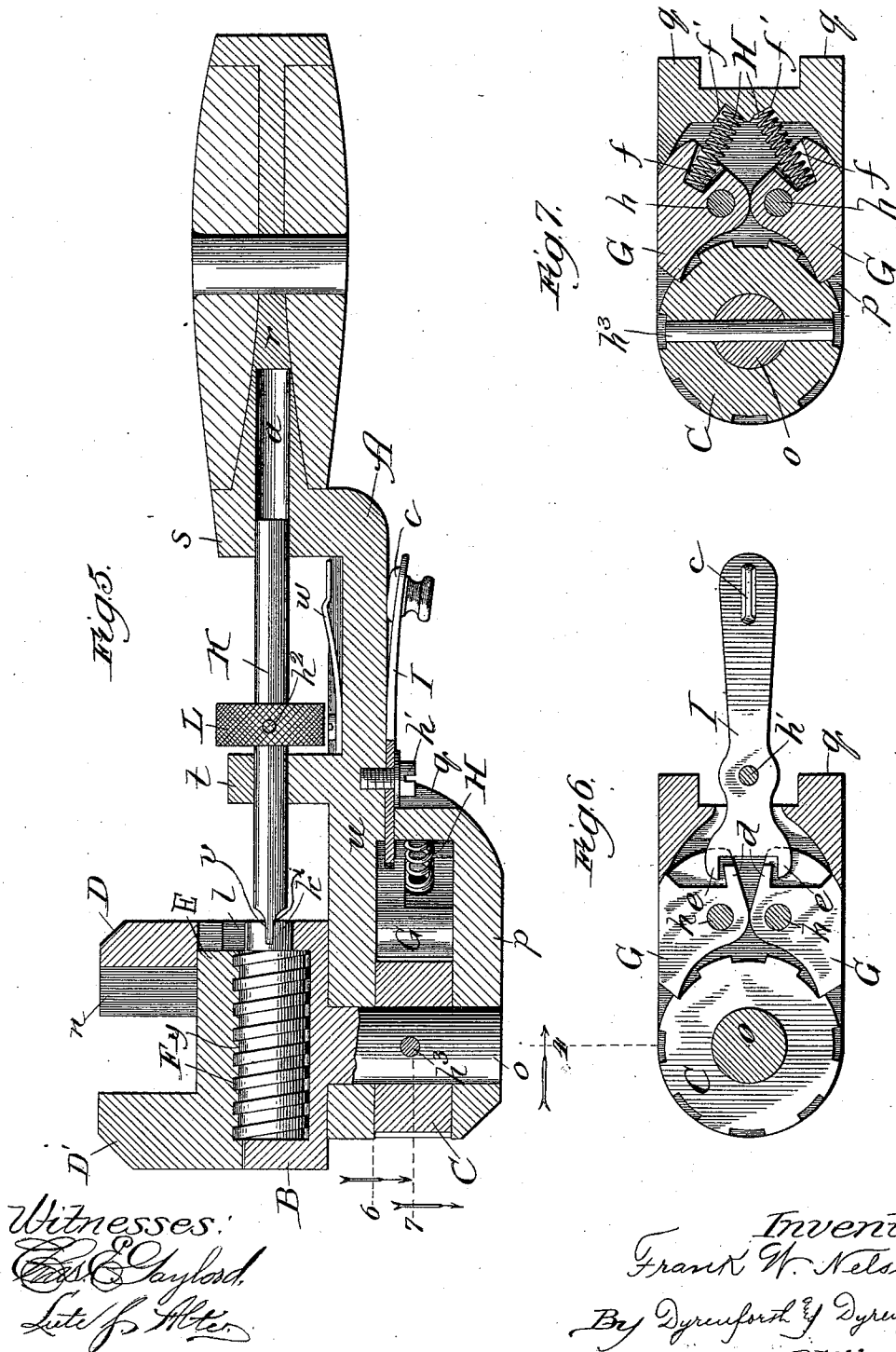
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

FRANK W. NELSON, OF CHICAGO, ILLINOIS.

WRENCH.

SPECIFICATION forming part of Letters Patent No. 527,181, dated October 9, 1894.

Application filed May 1, 1894. Serial No. 509,694. (No model.)

To all whom it may concern:

Be it known that I, FRANK W. NELSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Wrenches, of which the following is a specification.

My invention relates to wrenches of the kind known as ratchet-wrenches, and in the particular embodiment herewith presented, my improved wrench is especially adapted for turning leg-screws and the nuts of bolts and the like; but by merely modifying the shape of the jaws it may be adapted to perform any of the functions of a monkey-wrench.

The nature of my improvements, and their advantages, will be made clear by the following description, reference being had to the accompanying drawings, of which—

Figure 1 is a side elevation of my wrench; Fig. 2, a top view and Fig. 3 a bottom view of the same; Fig. 4, a vertical sectional view taken on the line 4 of Fig. 5 and viewed in the direction of the arrow; Fig. 5, a vertical longitudinal section of the device, taken through the center; Fig. 6, a horizontal section taken on the line 6 of Fig. 5 and viewed in the direction of the arrow; and Fig. 7, a horizontal section taken on the line 7 of Fig. 5 and viewed in the direction of the arrow.

A is a metal stock, which I prefer to cast in one piece, and which carries the operating parts. It comprises a plate *u*, having upon its upper side a vertical lug *l*, at or near its center, and a vertical flange *s* at its rear end, provided with an extension *r* for the handle, and having on its lower side a recessed projection *q*, from the lower end of which a bearing-plate *p* extends forward parallel with the plate *u*.

B is a circular head carrying the jaws. It is suitably recessed to serve as a bearing for certain operating parts, hereinafter to be described, and is provided on its lower side with a shaft, *o*.

C is a ratchet disk, which fits between the plates *u* and *p* of the stock A, and which has an opening through its center, corresponding with openings through the plates *u* and *p*, for the passage of the shaft *o*.

One of the jaws, D, is fixed, and consists of

a vertical projection upon the circular head, B, and when the wrench is designed for lag-screws and nuts, I prefer to provide this jaw with side flanges, *n*, as shown. The other jaw, D', is movable, and is provided with an extension E at right angles to it, having ribs, *m*, on its sides, fitting corresponding channels, *l*, in the sides of the recess provided for it in the head, B, and having its under face recessed out and provided with female screw-threads *y* to receive the threads of the screw F below it. To accommodate this screw, the recess in the head B is suitably deepened along its center, to form a housing within which the screw is confined and held firmly against displacement. Thus housed, no journals and journal-bearings are required; but the screw is provided at its forward end with a reduced extension, *k*, in the form of a journal, projecting through the housing and provided with a recess *z*, the function of which is to permit turning of the screw for adjusting the movable jaw, as hereinafter described.

G, G, are two pawls, pivoted within the recess in the part *q*, by means of pins, *h*, and H, H, are two springs fitting within recesses *f* in the pawls, and within branch recesses *f'* in the part *q*, and tending to maintain the pawls in engagement with the cogs of the ratchet-wheel C. To permit either pawl to be disengaged, a forked lever, I, of spring metal is pivotally connected to the plate *u* on its under side, by means of a screw, *h'*, the forked end of the lever extending within the part *q*, and the prongs, *e*, engaging with projections, *d*, on the rear ends of the pawl. The rear end of the lever I is provided with a boss, *c*, and the plate *u* is provided with recesses, *b*, to receive it. Thus, when the lever I is in line with the center of the plate *u* both pawls are held by the springs H in engagement with the ratchet disk C; but by throwing the handle of the lever I either way the pawl on that side is released, and the ratchet disk left free to turn one way.

It will be observed that the projections *d* of the pawls G are placed at the inner edges of the latter, and this allows the forked end of the lever to be of small size, with a short space between the prongs *e*, whereby it is possible to place the forked end of the lever wholly within the compass of the stock.

Thus placed it is less liable to injury than when the forked end extends beyond the confines of the stock, and the advantage is most apparent when working on a scaffold or ladder. The purpose of making the lever of spring metal is to render it less liable to shift after being set.

K is a shaft provided with a milled disk L for turning it. The function of this shaft is to operate the screw F, and thereby adjust the jaw D'. The shaft is provided with a beveled end *v*, to enter the recess *i*, and it slides longitudinally in an opening through the lug *t*, and within a recess *a* formed in the flanges and extension *r* thereof. To hold the shaft K in retracted position, the plate *u* is provided with a spring *w*, with which the disk L engages.

To put the parts of the wrench together, the screw-driving shaft K and the springs H and pawls G must be placed in position before the ratchet disk C and circular head B. The screw-driving shaft is inserted backward through the lug *t* and disk L, and the latter is secured to it by a pin *h*², which is driven through a hole extending through the disk and shaft. Next the ratchet disk C is inserted, and then the casting B, carrying the screw F and sliding jaw D', is placed in position by inserting the shaft *o* through the openings provided for it in the plates *u* and *p* and ratchet disk C, and securing it by a pin, *h*³, driven through a hole extending through the disk and shaft.

To adjust the sliding jaw, one of the pawls G is first released by throwing the lever I to one side. The part B is then turned until a certain cog is reached, which brings the head of the screw into line with the screw-driver, which latter is then advanced, operated in the direction required, and again retracted. Which of the pawls G is to be released depends, of course, whether the wrench is to be applied for screwing or unscrewing. In some cases it may be found desirable to have both pawls in engagement with the ratchet disk, and in such cases the lever, after the adjustment of the jaw, only requires to be thrown back into a straight line with the stock.

My improved wrench will be found very convenient where work has to be done in close proximity to a joist or wall. This advantage is due largely to the fact that the head B is round, and receives the nut or screw-head substantially in its center. Moreover, the construction is such that when the jaws are once adjusted to an object there is no play, and hence they cannot move or spring back when pressure is applied. It will furthermore be seen that every detail of my wrench is designed with a view to effectiveness and convenience. Thus, the ratchet can be turned with the thumb of the same hand that is engaged in holding the handle; also, the lever which operates the pawls, being itself a spring, automatically engages with one of the notches in the stock when thrown either way, and is

thus held in place; and the shape of the stock is such that the pressure upon the handle is exerted almost directly in a plane with the object to be turned, leaving room enough only to clear the hand. Incidentally, this position of the handle renders it a most convenient receptacle for the rear end of the screw-driver. However, in matters of mere mechanical detail, my wrench is susceptible of more or less modification without affecting the leading features and the general operation, and hence without departing from the invention.

The expressions "upper" side and "lower" side are used only for convenience of description, and have reference to the position of the wrench as shown in the leading figures of the drawings.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a wrench, the combination with the stock of a rotary jaw-head B having the fixed jaw D and recessed to afford a guide extending entirely through it for the extension of the movable jaw, and also to afford a housing below the guide for the adjusting-screw, the walls of said housing forming the bearings for the adjusting-screw; movable jaw D', having the extension E sliding in said guide, and made concave and screw-threaded on its under surface, screw F housed in the recess in the jaw-head below the guide, and engaging with the screw threads on the extension E of the movable jaw, means on the stock for turning the screw, and pawl and ratchet mechanism for turning the jaw-head, substantially as described.

2. In a wrench, the combination with the stock of the rotary jaw-head B carrying the fixed jaw D, and having extending through it a guide recess for the movable jaw, deepened between its ends to serve as a housing for the adjusting screw, movable jaw D' having at a right angle to it the screw-threaded extension E sliding in the guide recess in the jaw-head, adjusting-screw F, housed within the jaw-head below the guide and engaging with the extension E, extension *k* of said screw projecting through an opening in the housing and provided with a recess *i*, sliding and rotary shaft K mounted in bearings on the stock in line with the extension *k*, and provided with the disk L and with the beveled end *v* to enter the recess *i* for adjusting the movable jaw D', and pawl and ratchet mechanism for turning the jaw-head, substantially as described.

3. In a wrench, the combination with the stock provided on its under side with recesses *b*, and having the upper plate *u*, lower plate *p* and recessed projection *q*, of the ratchet-disk C, between the plates *u* and *p* and rigidly fixed to a rotary shaft *o* journaled in said plates, jaw-head B also rigid upon the shaft *o* and carrying the fixed jaw D and movable jaw D' with means for adjusting the latter, spring pawls G pivoted in the projection *q*

of the stock and normally engaging the ratchet disk on opposites sides of the center thereof, projections *d* at the inner edges of the pawls *G*, and spring lever *I*, pivoted upon
5 the stock and provided with prongs *e* to engage the projections *d*, and with a lug *c* to enter the recesses *b*, substantially as described.

4. In a wrench, the combination with the stock of the rotary jaw-head *B*, having extending through it a recess provided with side
10 channels *l* and carrying a fixed jaw *D*, movable jaw *D'* having the extension *E* provided with ribs *m* fitting the channels *l* and concave on its under side and provided with female screw-threads *y*, screw *F*, engaging the
15 screw threads of the extension *E*, and having the journal-like extension *k* provided with a

recess *i*, rotary sliding-shaft *K* mounted in bearings on the stock and carrying the disk *L* for operating the screw *F* to adjust the
20 movable jaw *D'*, and pawl and ratchet mechanism for turning the jaw-head, substantially as described.

5. In a wrench, the combination with the movable jaw *D'* and screw *F* for adjusting it,
25 of the sliding and rotary shaft *K* supported in projections upon the stock in line with the screw and carrying the disk *L*, and a spring *w* on the stock for engaging the disk *L*, substantially as described.

FRANK W. NELSON.

In presence of—

W. U. WILLIAMS,
J. N. HANSON.