

(No Model.)

F. L. FELGER & R. D. SHAFER.
PIPE WRENCH.

No. 545,424.

Patented Aug. 27, 1895.

Fig. 1.

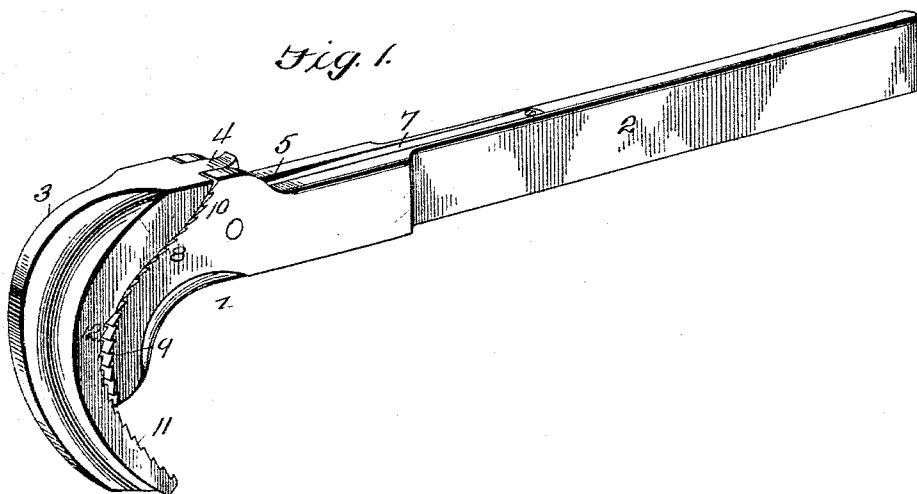


Fig. 2.

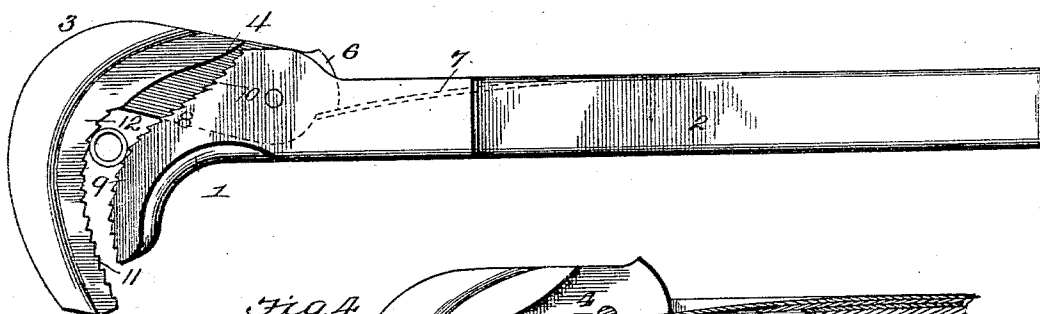


Fig. 4.

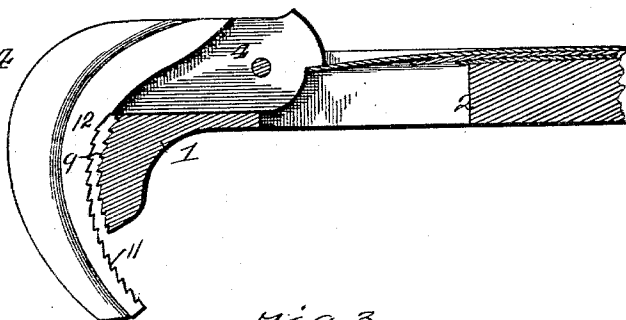
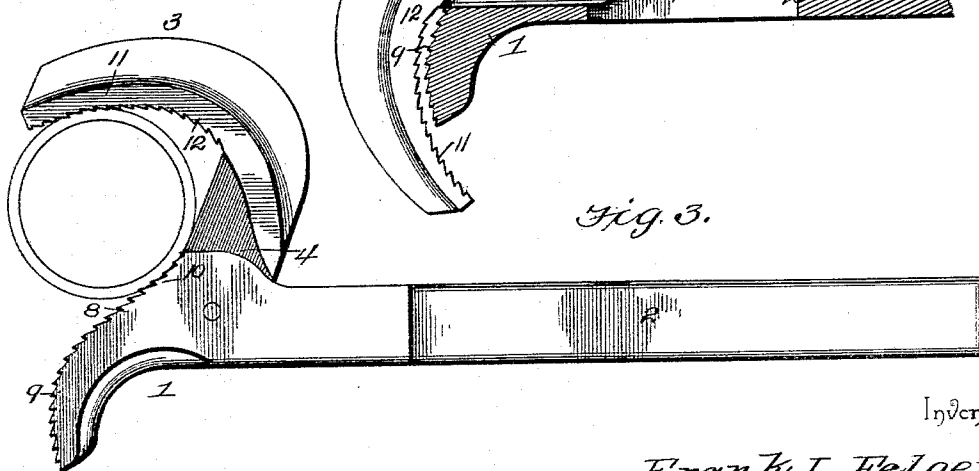


Fig. 3.



Inventors

Frank L. Felger
and

By their Attorneys, Robert D. Shafer.

Witnesses

Jos. A. Stack.
R. D. Shafer

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

FRANK L. FELGER AND ROBERT D. SHAFER, OF FAYETTE, OHIO.

PIPE-WRENCH.

SPECIFICATION forming part of Letters Patent No. 545,424, dated August 27, 1895.

Application filed November 30, 1894. Serial No. 530,464. (No model.)

To all whom it may concern:

Be it known that we, FRANK L. FELGER and ROBERT D. SHAFER, citizens of the United States, residing at Fayette, in the county of Fulton and State of Ohio, have invented a new and useful Pipe-Wrench, of which the following is a specification.

Our invention relates to an improvement in pipe-wrenches, and the objects in view are to provide a simple, inexpensive, and efficient wrench adapted for use with equal facility and security upon large and small pipe, rods, and burrs. Wrenches for engaging pipes or rods of small diameter have been constructed heretofore, as also have wrenches for engaging both large and small pipes and rods; but it is difficult to secure a wrench of simple construction which will engage pipes of all sizes with equal facility and which will engage the large pipes with the same security as small pipes.

The object of our invention, therefore, is to so construct the fixed and swinging jaws with relation to each other that when the latter is deflected to the greatest extent the wrench is still adapted to engage securely with a pipe of the greatest size which can be passed between said jaws, and that the effect in operating the wrench is, as with small pipes and rods, to increase the clamping action in proportion as greater power is applied, and, furthermore, to adapt the wrench for engaging pipes of all sizes between the largest and smallest sizes with equal efficiency.

Further objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claim.

In the drawings, Figure 1 is a perspective view of a wrench embodying our invention. Fig. 2 is a side view showing the relative positions of the jaws when engaging a pipe of small diameter. Fig. 3 is a similar view showing the relative arrangement of the jaws and engaging a pipe of the largest diameter which can be received therebetween. Fig. 4 is a side view, partly in section, of the wrench with the jaws closed.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates the fixed jaw, which is attached rigidly to and is preferably integral with the handle 2, and 3 represents the swinging jaw, provided with a shank 4, which is pivotally connected to the fixed jaw, said fixed jaw being slotted, as shown at 5, for the reception of the reduced tongue 6 on the movable jaw, and a spring 7 being arranged in said slot and bearing at its free end against said tongue to hold the swinging jaw normally in its closed position. The tongue 6 of the movable jaw is an extension of the shank 4 beyond the pivotal point of said shank, and it extends beyond the rounded extremity of the shank to form a single abrupt shoulder, against which the extremity of the spring 7 bears, said shoulder being approximately in the plane of the axis of movement of the jaw and the pressure of the spring against said shoulder being in a direction perpendicular to the plane of the shoulder when the jaws are in the closed position indicated in Fig. 4. The spring remains permanently in engagement with this shoulder of the swinging jaw in all positions of the latter, and hence exerts a constant tension in the direction of closing the jaws, whereby when the object is engaged between the jaws the serrated faces thereof are held permanently in engagement with the surfaces of said object. The spring being located in the slot of the handle and being pressed downwardly or into the slot as the swinging jaw is moved from the fixed jaw, it is obvious that the spring remains permanently in the slot and is concealed and protected thereby against contact with objects during the use of the wrench. By reason of the extension of the shank and the peculiar relative position of the spring the pressure of the latter has substantially the same effect upon the jaw in all positions of the latter.

The fixed jaw has a gripping-face of compound curvature, the outer portion thereof being convexed and the general direction thereof being at right angles to the length of the handle, and the inner portion thereof being concave and the general direction thereof being oblique with relation to the handle. The convex curve of the outer portion of the face merges into the concave portion without forming an abrupt angle, and hence a portion of the gripping-face, as shown at 8, is approxi-

mately straight, and is arranged at an angle of approximately forty-five degrees to the longitudinal axis of the handle. Beyond this point 8 the face of the jaw is convex, as shown at 9, and on the opposite side of said point 8 the face is concave, as shown at 10. The swinging jaw is provided with a continuously-concaved gripping-face, the outer portion of which, as shown at 11, being but slightly concaved, while the inner portion thereof, as shown at 12, is abruptly concaved. The gripping-face of the swinging jaw has its initial point or inner end at a greater distance from the pivotal point of connection of the jaws than the inner or initial point of the gripping-face of the fixed jaw, and therefore when the jaws are closed, as shown in Fig. 1, the abruptly-concaved portion 12 of the swinging jaw is located opposite the outer convexed portion 9 of the fixed jaw. When the jaws are separated sufficiently to receive a small pipe or rod, the abruptly-concaved portion 12 of the swinging jaw engages one side of the pipe or rod and the convexed portion 9 of the fixed jaw engages the other side of said pipe or rod. Hence the abruptly-concaved portion 12 is adapted to engage a greater portion of the surface than if the curve were less abrupt. As the swinging jaw is moved from the fixed jaw, it will be seen that the abruptly-concaved portion 12 comes opposite, first, the approximately straight portion 8 of the fixed jaw and then the concaved portion 10, but when the jaw reaches its outermost position, as shown in Fig. 3, the abruptly-concaved portion 12 of the swinging jaw has receded too far to engage a pipe, and the slightly-concaved portion 11 of said jaw is opposite the concaved portion 10 of the fixed jaw. When the parts are in this position, the straight obliquely-set portion 8 of the fixed jaw inclines from the portion 11 of the swinging jaw and thus provides for the easy insertion of any pipe or rod which can be passed between the jaws, and as the two surfaces between which the pipe or rod is received are both concaved—namely, the surfaces 10 and 11—a sufficient extent of the surface of the pipe is engaged to insure proper manipulation. Furthermore, when the jaws are opened to their greatest extent the concave portion 10 of the gripping-face of the fixed jaw merges into the line of the adjacent edge of the shank of the swinging jaw, and therefore, as shown in Fig. 3, said inner edge of the shank does not interfere with the engagement with the surface of the pipe of the innermost portion 10 of the face of the fixed jaw. This is of special advantage in view of the fact that the entire gripping-faces of both jaws are toothed or serrated, the teeth of the fixed jaw inclining outward, while those of the swinging jaw incline inward. Thus when the wrench is set for engagement with a pipe of small diameter the abruptly-concaved portion 12 insures the engagement of a plurality of teeth with the pipe, and as the swinging jaw is moved outward from the fixed jaw the

engaging portion of the swinging jaw is brought successively opposite a portion of the fixed jaw, having less and finally no convexity, and is then brought opposite a portion of the fixed jaw which is concave, thus still further increasing the engaging-surfaces. When the jaws are extended to receive a pipe of the greatest size which can be gripped by a wrench, the surfaces 11 and 10 agree at portions of their length with the curvature of the surface of said pipe. The longitudinal slotting of the fixed jaw, said slot extending approximately to the center of the serrated face of the jaw, and the pivoting of the shank of the swinging jaw in advance of the rear end of the serrated face of the fixed jaw provides for the front edge of the shank serving as a stop to limit the insertion of an object between the jaws. Thus the front edge of the shank forms a third point of contact of the wrench with an object grasped thereby and serves to steady the wrench upon the object and insure the proper engagement of the serrated faces of the jaws. In other words, the shank is in a position to bear against the side of an object grasped between any two points of the jaws, the point of engagement being determined by the diameter of the object, and hence the separation of the jaws. The extremity of the swinging jaw projects beyond that of the fixed jaw when the jaws are in their normal positions, and said swinging jaw is provided with an abrupt or flat-faced terminal which is adapted to be pressed against a pipe or other object in order to force the swinging jaw back sufficiently to allow said object to slip between the jaws. In other words, this flat extremity of the swinging jaw provides for the separation of the jaws to admit an object to be grasped without repressing the jaw by hand, and hence a projection of the swinging jaw adapted to be grasped by the hand of the operator is unnecessary in the wrench embodying our invention, thus enabling the latter to be used in a confined space with facility. A further advantage derived from the use of a shank 4, pivoted in advance of the rear end of the serrated portion of the fixed jaw, is that the jaws may be separated sufficiently to disengage the teeth thereof from an object arranged therebetween preparatory to removing the wrench from the object. In order to accomplish this the wrench is pushed forward or toward the object, and hence the resistance offered by the object presses the shank back and thus increases the interval between the jaws, whereupon the wrench may be turned laterally by swinging the handle to either side and thereby removed from the object without special manipulation of the swinging jaw.

Having described our invention, what we claim is—

A wrench having a fixed jaw integral with a handle and provided with a compoundly-curved serrated face, said fixed jaw and handle being longitudinally slotted and the slot

extending in the jaw from the rear end to a point approximately at the center thereof, a swinging jaw having a concave serrated face and a reduced shank pivoted within said slot, the pivotal point of the shank being in advance of the rear end of the serrated face of the fixed jaw and said shank being extended beyond its pivotal point to form a tongue of which one side provides an abrupt shoulder located within the slot of the handle in all positions of the swinging jaw and arranged approximately in the plane of the axis of movement of the jaw, the extremity of the swinging jaw being abrupt and being adapted to project beyond the end of the fixed jaw when the swinging jaw is in its normal position, and the front edge of the shank being adapted to form a stop to limit the insertion of an object between the jaws and determine

the points of engagement of the serrated faces of the jaws with the object, and a spring located within the slot in the handle and permanently engaging said shoulder on the extension of the shank, said spring being concealed within the slot and the pressure thereof against the shoulder being approximately perpendicular to the plane of the shoulder in all positions of the swinging jaw, substantially as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

FRANK L. FELGER.
ROBERT D. SHAFER.

Witnesses:

CHAS. SHERIFF.
SAML. SHEFFER.