

No. 656,410.

Patented Aug. 21, 1900.

N. LARSEN.
WRENCH.

(Application filed Jan. 24, 1900.)

(No Model.)

Fig. 1.

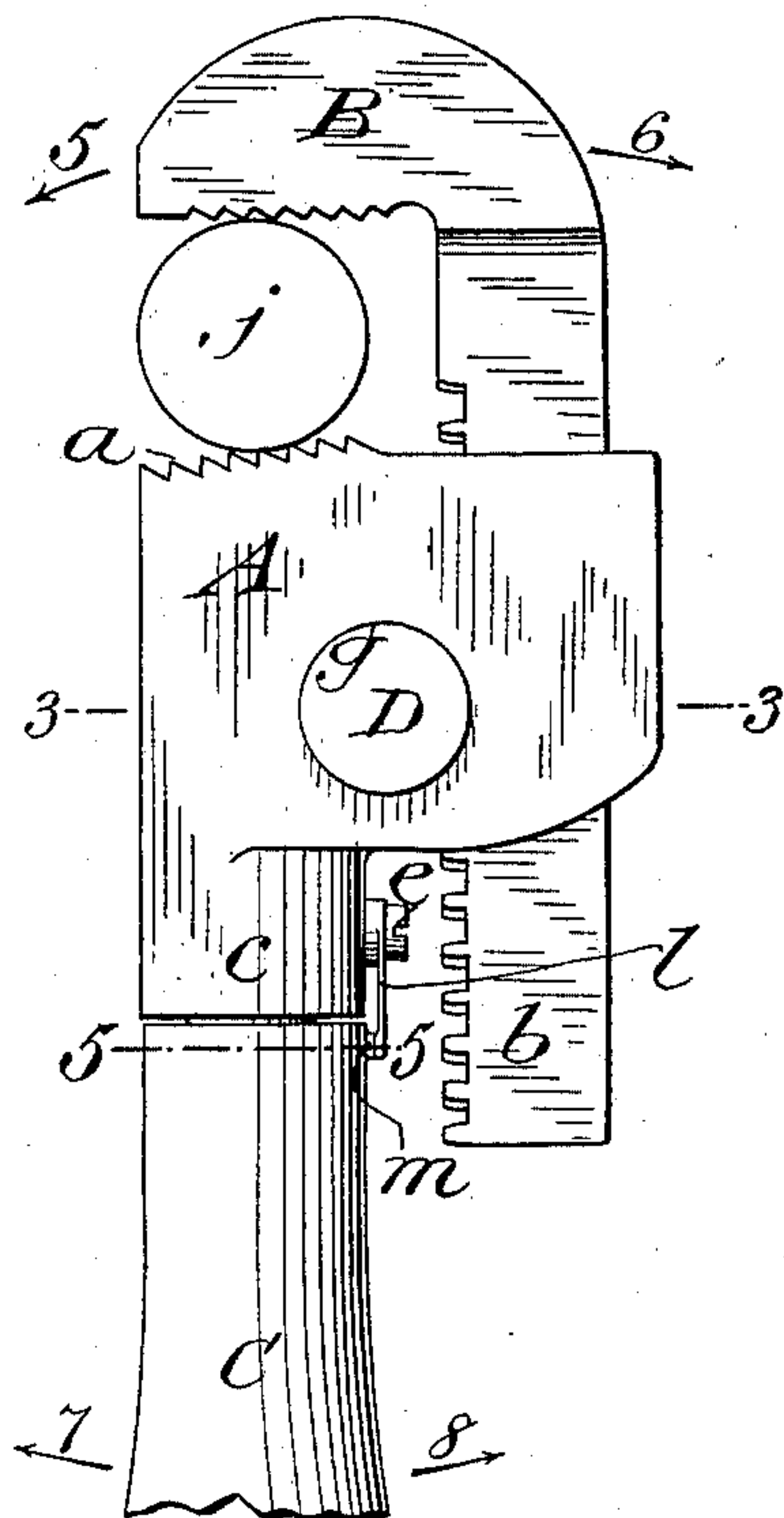


Fig. 2.

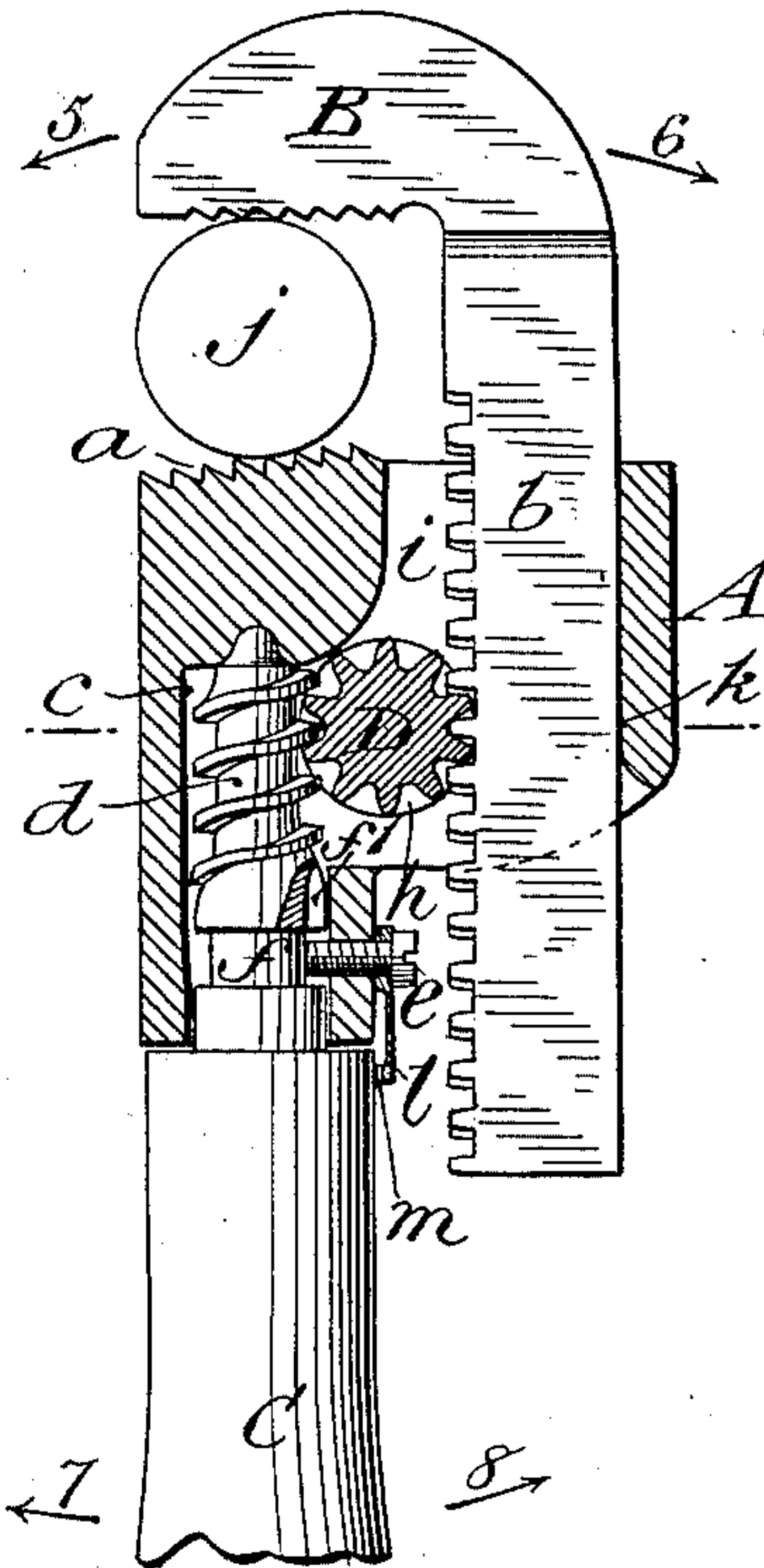


Fig. 5.

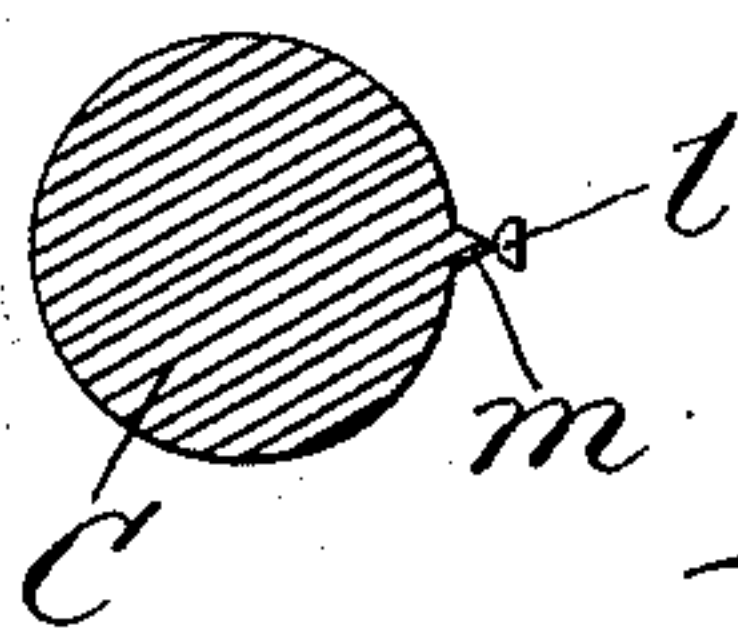


Fig. 3.

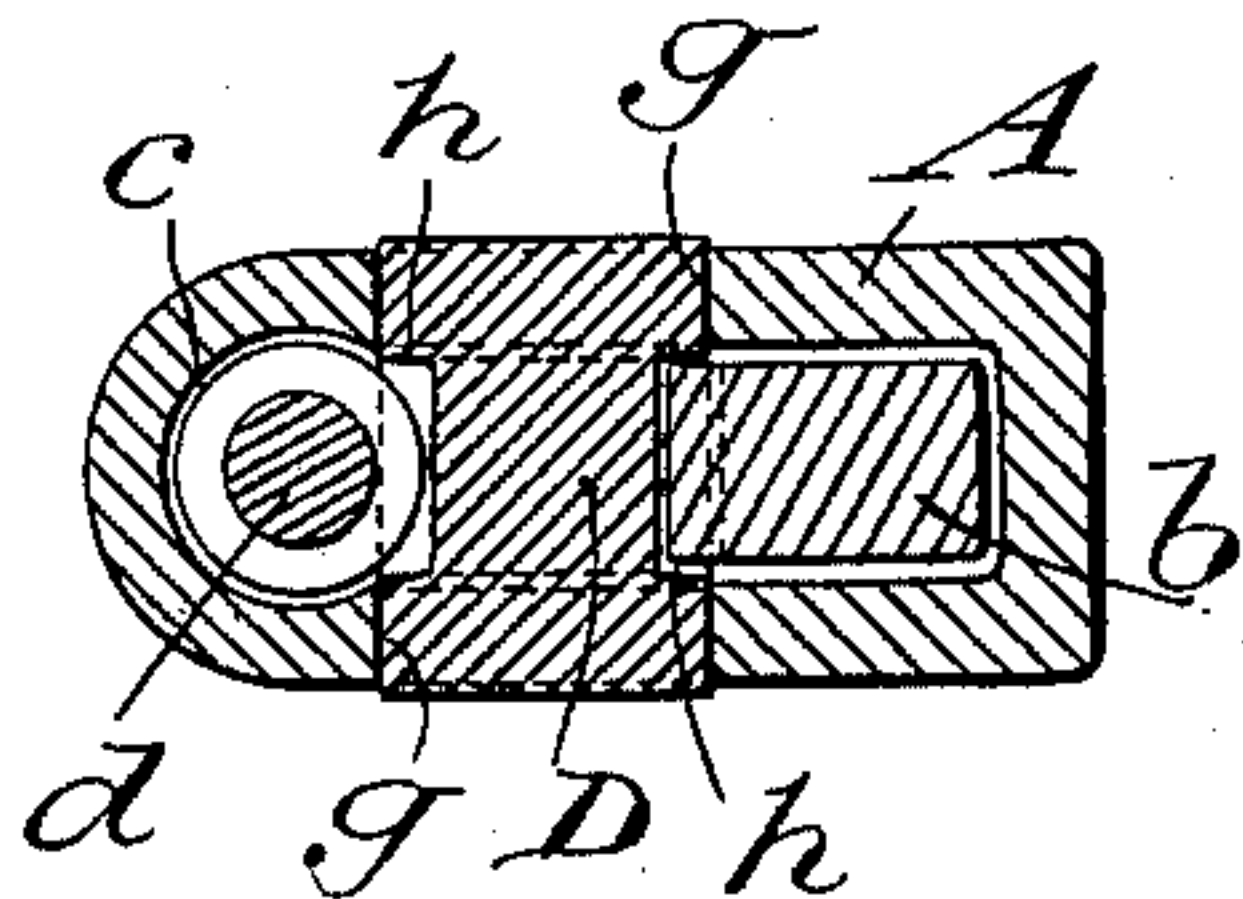


Fig. 4.

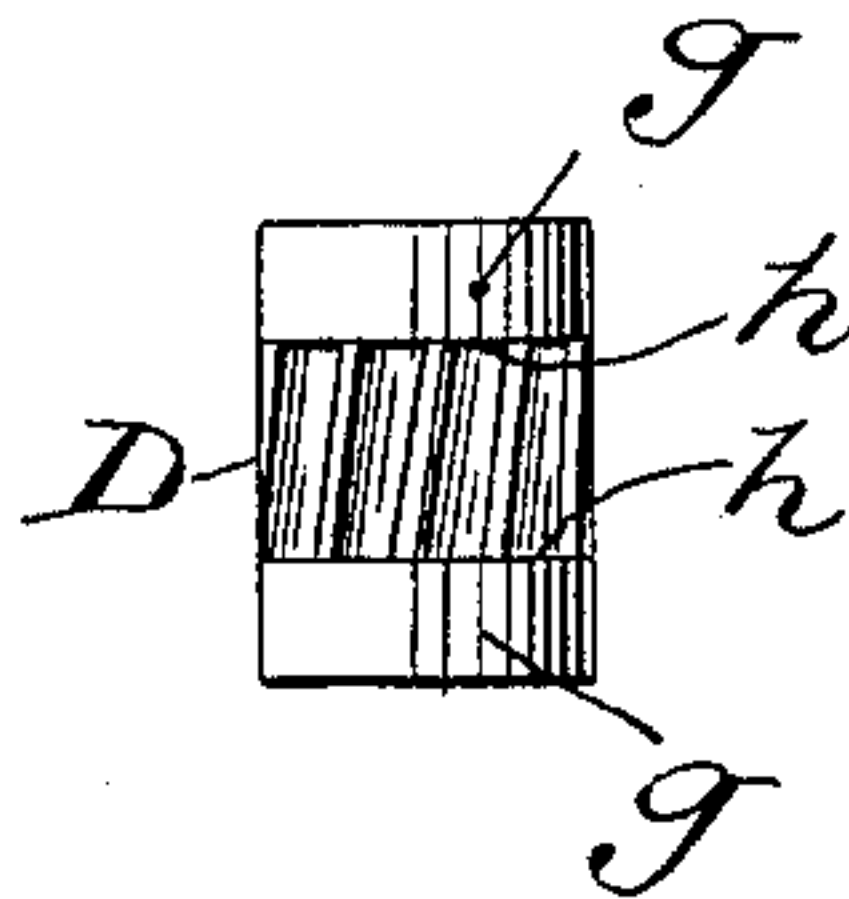
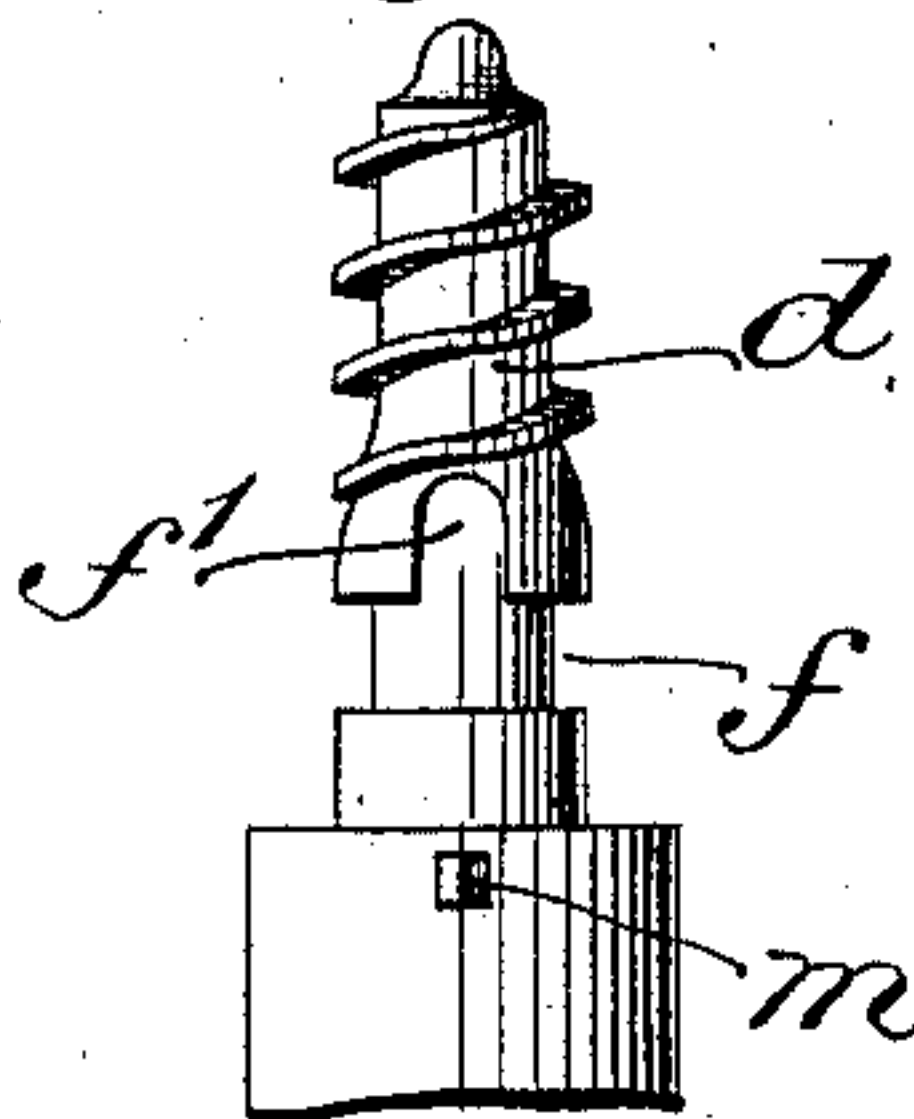


Fig. 6.



Witnesses:-

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UNITED STATES PATENT OFFICE.

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WRENCH.

SPECIFICATION forming part of Letters Patent No. 656,410, dated August 21, 1900.

Application filed January 24, 1900. Serial No. 2,592. (No model.)

To all whom it may concern:

Be it known that I, NILS LARSEN, a citizen of the United States, and a resident of New York, borough of Brooklyn, State of New York, have invented a new and useful Improvement in Nut-Bolts and Pipe-Wrenches, of which the following is a specification.

The object of this invention is to provide a wrench which is equally suitable for use either on nuts, bolt-heads, or other objects of polygonal or flat-sided form or on pipes or other objects of round form.

I will first describe the improvement with reference to the accompanying drawings and afterward point out its novelty in the claims.

Figure 1 is a side view of a wrench embodying the improvement. Fig. 2 represents in part a side view and in part a section taken parallel with the side; Fig. 3, a cross-section in the line 3 3 of Fig. 1; Fig. 4, a view of a pinion through which the movement of the adjustable jaw is effected; Fig. 5, a cross-section in the line 5 5 of Fig. 1. Fig. 6 is a longitudinal view of part of the handle of the wrench, taken at right angles to Fig. 2.

Similar letters of reference designate corresponding parts in all the figures.

A is a stock on which the fixed jaw *a* of the wrench is formed.

B is the adjustable jaw, having formed with or attached to it a toothed rack *b*, which passes through the stock A.

C is the handle, fitted to a socket *c* in the stock and having upon its inner end within the said socket a screw *d*.

D is a pinion journaled in the cheeks of the stock between the rack *b* and the screw *d* and engaging with both the thread of the screw and the teeth of the rack.

e is a pin screwed through one side of the socket *c* of the stock and entering a circumferential groove *f* in the handle for retaining the latter in proper connection with the stock and, while permitting the turning of the handle, keeping the screw *d* in engagement with the pinion D. The movement of the adjustable jaw B is effected by turning the handle. The screw *d*, turning with the handle, turns the pinion D, which by its action on the toothed rack moves the adjustable jaw B.

To simplify the construction of the wrench

and to afford facility for the assemblage of its parts and the taking of them apart, if necessary, the pinion D has journals *g* of a size not less than the circle which circumscribes the crowns of its teeth, so that the holes provided in the cheeks of the stock A as bearings for said journals are large enough for the passage of the pinion bodily through them. The pinion thus inserted is held in place in the direction of its axis by the rack *b*, which enters between the shoulders *h*, formed at the inner ends of the large journals between the teeth of the pinion.

Provided that a little room is left, as shown at *i* in Fig. 1, between the teeth of the rack *b* to permit a certain amount of oscillation of the adjustable jaw B in the direction of the arrows 5 6 and that the construction of the faces of the jaws *a* B is such that when the back of the rack *b* comes to a bearing against the upper or outer part of the stock A, as shown in the same figure, the opening between the jaws has its greatest width at its entrance. This wrench will serve most effectively as a pipe-wrench, because it will not only be self-tightening, but, what is more important, self-freeing in its operation. In explanation of this I will suppose the jaws to have been brought to grip a pipe *j* by turning the handle C. Now by moving the handle in the direction of the arrow 7 to turn the pipe the resistance between the pipe and the adjustable jaw B will cause the said jaw to move in the direction of the arrow 5, relatively to the fixed jaw *a*, and so tend to contract the space between the faces of the jaws and further tighten them upon the pipe. Then in moving the handle in the opposite direction (indicated by the arrow 8) preparatory to taking a new hold the opposite effect will be produced, the jaw B moving in the opposite direction (indicated by the arrow 6) and so increasing the opening between the jaws sufficiently and slackening the grip on the pipe.

While in the above-mentioned operation there is a slight movement of the back of the rack from and to the upper part of its bearing in the stock that will not impair the relation between the screw *d* and pinion D to the jaws of the wrench, as the rack will always

bear against the lower part of the bearing at *k* which is directly opposite the pinion.

In order to provide for the easy disconnection of the parts of the wrench, and especially to provide while at work for a quicker change from a very wide to a very narrow opening of the jaws, and vice versa, than can be made by turning the handle, I form in communication with the circumferential groove *f* in the handle a short longitudinal groove *f'*, as shown in Figs. 2 and 6. When by turning the handle far enough the longitudinal groove *f'* is brought opposite the retaining-pin *e*, the handle, with its screw *d*, can be quickly pulled out of gear from the pinion and the adjustable jaw quickly shifted by taking hold of it with the hand. In order to obviate the liability of the screw *d* to be accidentally pulled out of gear from the pinion whenever the groove *f'* in the ordinary use of the wrench comes opposite the retaining-pin *e*, I provide on the handle opposite said groove a small projecting tooth *m*, having inclined sides, and I attach to the socket *c* of the stock by means of the said pin *e* a spring-pawl *l*, the end of which projects over the handle as far as the said tooth. As this pawl is opposite the retaining-pin *e* and the tooth *m* is opposite the longitudinal groove *f'*, when the handle is turned to bring the tooth *m* under the point of the pawl the latter indicates that the retaining-pin is opposite the said groove *f'* and that the handle and the screw *d* can be pulled out of gear from the pinion; but the accidental stoppage of the handle in that position is prevented, because owing to the inclined sides of the tooth and the rounded end of the spring pawl the pawl will operate to turn the handle a little in one direction or the other. In the turning of the handle for the adjustment of the wrench the projecting tooth *m* will lift and pass the pawl. The pawl *l* is shown attached to the socket *c* by the same screw *e* which serves as the retaining-pin.

What I claim as my invention is—

1. The combination in a wrench, of a stock on which is a fixed jaw, an adjustable jaw having an attached toothed rack which works through said stock, a handle turning in said stock and carrying a screw, and a pinion which is located within and journaled in said stock and the teeth of which engage both with the screw on the handle and with the teeth of the rack of the adjustable jaw, substantially as herein described.

2. The combination in a wrench, of a stock on which is a fixed jaw, an adjustable jaw having an attached toothed rack which works through said stock, a handle turning in said stock and carrying a screw, and a pinion which is located within the stock between said screw and the teeth of the rack and in engagement with both and the journals of which fitted to bearings in the sides of the stock have shoulders overlapping the sides of the rack for retaining the pinion in place, substantially as herein described.

3. The combination of the stock *A* having the fixed jaw *a* thereon, the adjustable jaw *B* having the attached toothed rack *b* which passes through said stock, the handle *C* carrying the screw *d* and having in it a circumferential groove *f* and a communicating longitudinal groove *f'*, the pinion *E* journaled in the stock between said screw and toothed rack and engaging with both, the retaining-pin *e* in the stock engaging with said grooves *f f'*, the spring index-pawl *l* attached to the stock and the inclined projection *m* on the handle for engaging with and lifting said pawl, substantially as herein described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 15th day of January, 1900.

NILS LARSEN.

Witnesses:

FREDK. HAYNES,
GEORGE BARRY, Jr.