

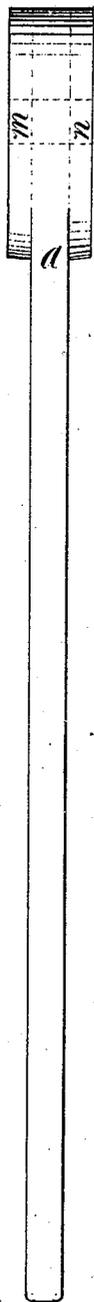
*J. Richards,*

*Manf. Wrenches.*

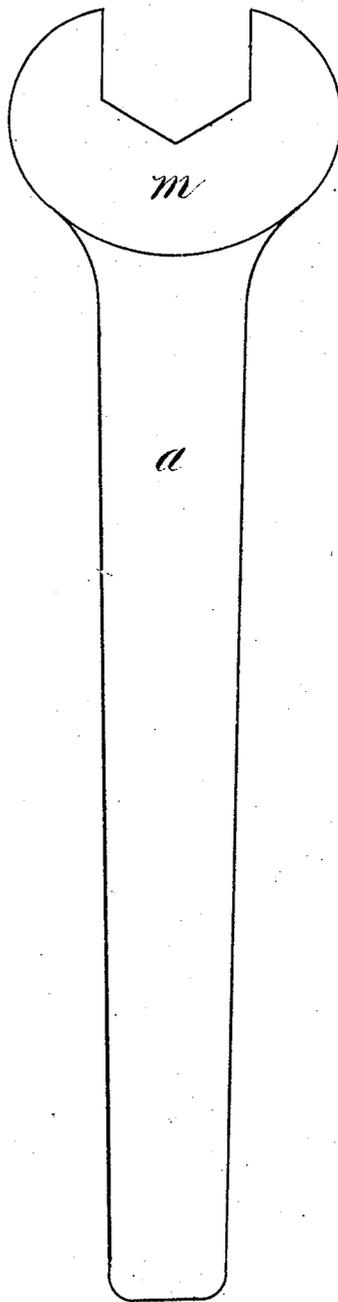
*No. 109665.*

*Patented Nov. 29, 1870.*

**FIG. 2.**



**FIG. 1:**



*Witnesses,*  
*Wm. S. Kelley*  
*A. D. Umsted.*

*Inventor,*  
*John Richards*

# United States Patent Office.

JOHN RICHARDS, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 109,665, dated November 29, 1870.

## IMPROVEMENT IN THE MANUFACTURE OF WRENCHES.

The Schedule referred to in these Letters Patent and making part of the same.

I, JOHN RICHARDS, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain improved Method of Making Wrenches, of which the following is a specification.

### *Nature and Object of the Invention.*

This invention relates to an improved mode of manufacturing common wrenches, and to a combination of soft iron and hardened steel in such wrenches, giving greater strength and endurance, without increasing the amount of material or the cost of their manufacture, and consists in forming a wrench with its central part and the lever or handle of soft or malleable iron, and in facing the jaws or head on each side with plates of steel or other material, stamped out of sheets of metal, and joined by brazing, welding, or other process, in such manner that the plates can be tempered or case-hardened, to prevent wear and give greater strength to the jaws, while the central part, with the handle, can be soft, to withstand the strain and concussion that occurs in the use of such wrench.

### *Description of the Accompanying Drawing.*

Figure 1 is a side view of a common wrench, constructed on my improved plan, and

Figure 2 is an edge view of fig. 1.

Similar letters of reference indicate corresponding parts.

### *General Description.*

The central part, *a*, is of soft or malleable iron, made of a sufficient thickness to form a proportionate handle for the wrench.

This part is parallel in its thin section, and can be punched from sheets or plates of iron prepared for the purpose, the outline conforming to fig. 1, or other modification to suit diagonal or square nuts or bolts or it can be made with an inclosed eye when greater strength is required.

The scales or plates *m* and *n* are of steel, having a thickness equal to about one-half of the central plate *A*.

These plates can also be punched from plates of steel, with an outline to correspond with the head of the wrench.

These plates or scales are then welded or brazed to the part *a*, giving the form shown in fig. 2.

The head of the wrench is then hardened and tempered in the usual manner, the central part between the dotted lines, fig. 2; and the handle, remaining soft, while the hardened facings prevent wear, and give great strength to the jaws, as will be readily understood by those skilled in such arts.

The plates *m* and *n* can be made of iron when it is not necessary to harden them, the whole being malleable and soft, or, when composed entirely of iron, the whole can be case-hardened in the usual manner to prevent surface-wear.

The proportionate thickness of the central part *a* or the plates *m* and *n* can, of course, be varied to suit the conditions of use without affecting the nature of the invention.

A wrench formed in this manner may also be case-hardened by the usual process, by which means the plates *m* and *n* will be tempered throughout, and the malleable part *a* be only surface-hardened to prevent wear.

### *Claim.*

I claim as my invention—

The within-described manner of manufacturing wrenches from pieces stamped or punched from sheets of metal, combined as herein specified.

JOHN RICHARDS.

Witnesses:

WM. S. KELLEY,  
A. O. UMSTED.