(No Model.) 2 Sheets—Sheet 1.

A. E. LYTLE.

EXPANDING MANDREL.

No. 292,167. Patented Jan. 22, 1884.

Fig. 1.

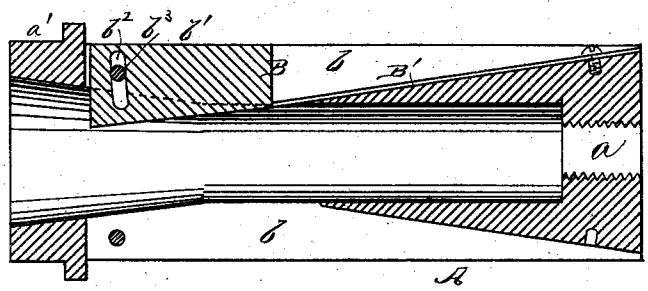


Fig. 2.

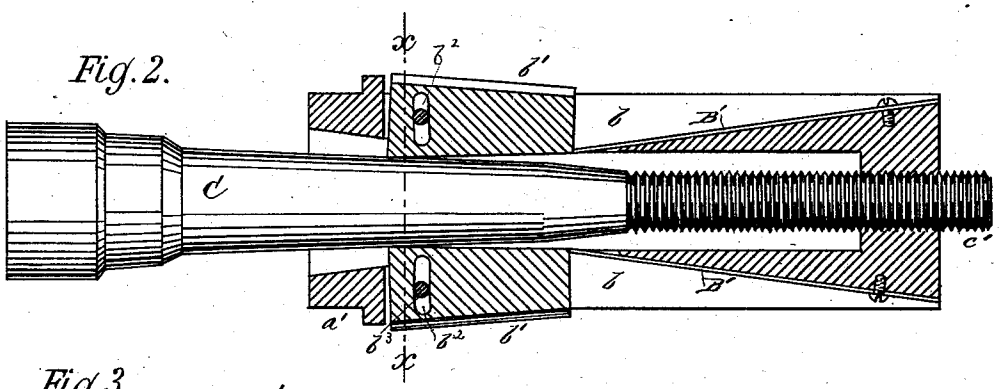


Fig. 3.

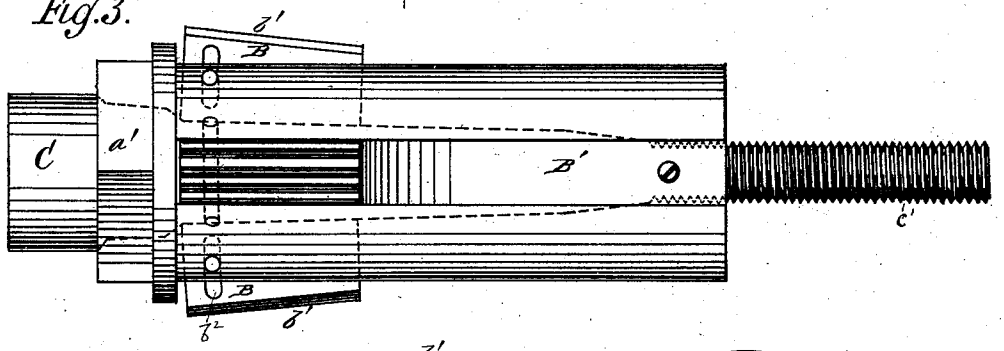


Fig. 4.

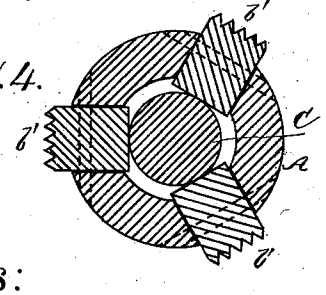
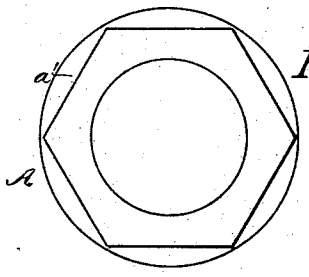


Fig. 5.



Witnesses:

Frank Johnson

H. C. McArthur.

Inventor:

Albert E. Lytle

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. E. LYTLE.

EXPANDING MANDREL.

No. 292,167. Patented Jan. 22, 1884.

Fig. 6.

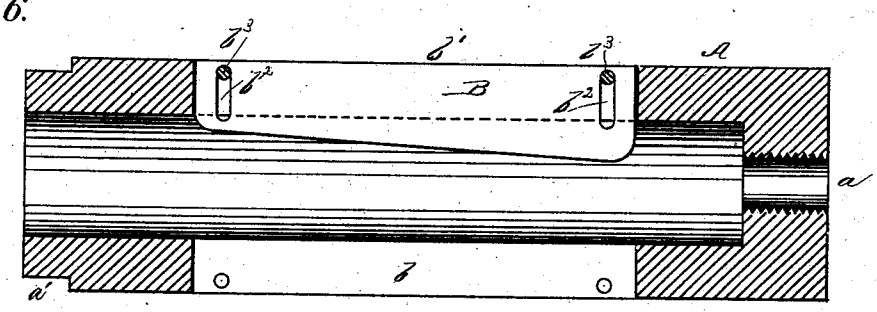


Fig. 7.

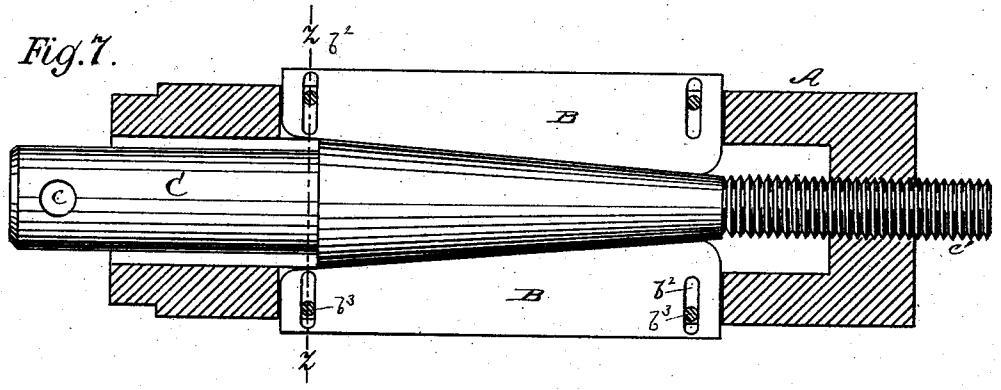


Fig. 8.

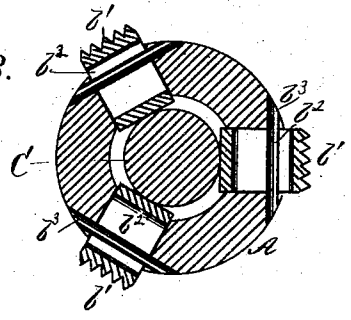
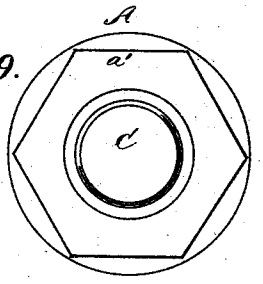


Fig. 9.



Witnesses:

Paul Johnson

H. C. McArthur.

Inventor:

Albert E Lytle

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

ALBERT E. LYTLE, OF DES PLAINES, ASSIGNOR OF ONE-HALF TO GEORGE H. ETON, OF CHICAGO, ILLINOIS.

EXPANDING MANDREL.

SPECIFICATION forming part of Letters Patent No. 292,167, dated January 22, 1884.

Application filed May 7, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALBERT E. LYTLE, a citizen of the United States, residing at Des Plaines, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Expanding Wrenches or Mandrels, of which the following is a specification, to wit:

This invention relates to an improvement in expanding wrenches or mandrels; and it consists in certain peculiarities of construction and arrangement, substantially as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the shell or cylinder. Fig. 2 is a similar view of the device complete. Fig. 3 is a side elevation of the same. Fig. 4 is a cross-section on the line *x x*, Fig. 2. Fig. 5 is an end view. Figs. 6 and 7 are sections of an expanding mandrel of this construction, and Figs. 8 and 9 are a cross-section and end view of the same.

A represents a cylinder or shell, which is formed hollow, as shown in the drawings, and at one end is closed and provided with a screw-threaded opening, *a*, and at the opposite end is formed square or octagonal, as represented at *a'*, for the reception of a wrench. This shell or cylinder is formed with two or more (preferably three) longitudinal slots, *b*, which pass through the shell and open into its interior, and in each of which is placed a steel dog, B, having its outer face serrated or formed with teeth *b'*. These dogs are of different form for different work. When intended for grasping conical or tapering surfaces, I prefer to form them short, as seen in Figs. 1 and 2, and provide them with a flat spring, B', secured to the shell, and having a tendency to always force them inward. When used for grasping straight or parallel surfaces, I prefer to make them as seen in Figs. 6 and 7, where they are of some length, and have their inner edges inclined or wedge-shaped. In either case I form them with one or more slots, b^2, through each of which passes a pin, b^3, to secure them in proper position in the shell.

C represents the expander, which is made tapering, as shown, for a large portion of its length, and provided in one end with a series of holes, *c*, for engagement with a spanner, or of other suitable shape to engage with a wrench. The opposite end is made straight, and screw-threaded, as seen at *c'*, for passing through the opening *a*.

The device is applicable as a bush-wrench, expanding mandrel, or any other use to which such a device can be put, or where it is desired to have an inside wrench or clutch. In Figs. 1 to 5, which show it as a bush-wrench, the operation is as follows: The shell having been inserted in the bush, the expander C is screwed in, thereby forcing out the dogs B B till they clutch the bush firmly by their serrations, the spring yielding and allowing the inner end of the dog to accommodate itself to the shape of the bush, if it be conical, and, while clutching firmly, it does not deface the surfaces with which it comes in contact, and cannot be released till the expander is reversed. In using it for mandrels or similar devices, the inner edges of the dogs are inclined to correspond with the taper of the expander, and are thus forced out evenly, clutching the surface with which it comes in contact its full length, and the slots and their pins guiding and holding it in proper position.

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

1. In an expanding wrench or mandrel, a shell or hollow cylinder formed with longitudinal openings or slots in its sides, and provided with two or more dogs having serrated faces, and formed with one or more guide-slots and pins passing through the same to secure them from displacement, in combination with an expander formed tapering, and provided with a screw-shank, and means for the engagement of a wrench or spanner, substantially as shown and described.

2. In an expanding wrench or mandrel, the

hollow cylinder A, open at one end and closed at the other, where it is provided with a screw-threaded hole, *a*, the longitudinal slots *b*, and a series of dogs, B, placed in these slots and secured by pins b^3, passing through slots b^2 in the dogs, in combination with the expander C, formed tapering for a suitable distance, and provided with a screw-shank, *c'*, and means for engagement with a wrench, all constructed and arranged to operate substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT E. LYTLE.

Witnesses:
CHAS. KRESSMANN,
FRANK JOHNSON.