(No Model.)

J. G. POPE.

EXPANDING MANDREL.

No. 258,598. Patented May 30, 1882.

Fig. 1.

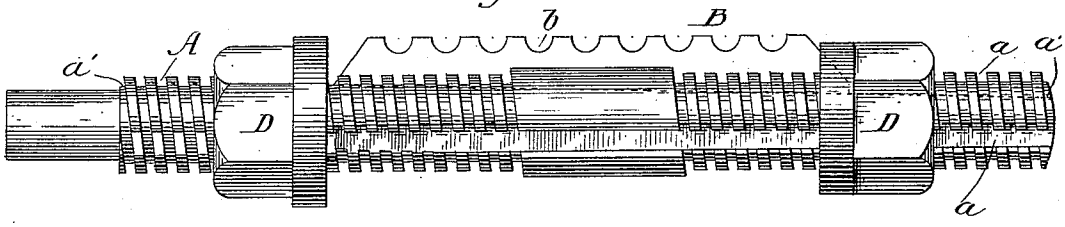


Fig. 2

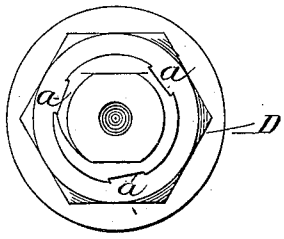


Fig. 3.

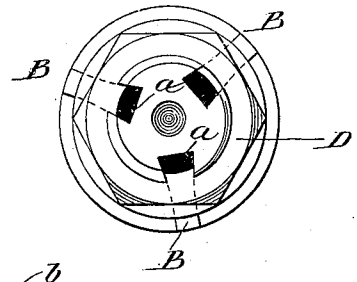


Fig. 4.

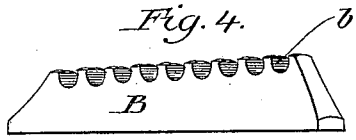
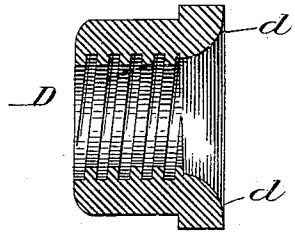


Fig. 5.



Fig. 6.



Witnesses:

Frank S. Blanchard.

D. H. Fletcher.

Inventor.

John. G. Pope

By Hill & Dixon

Attorney.

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

UNITED STATES PATENT OFFICE.

JOHN G. POPE, OF BLOOMINGTON, ILLINOIS.

EXPANDING MANDREL.

SPECIFICATION forming part of Letters Patent No. 258,598, dated May 30, 1882.

Application filed December 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. POPE, of Bloomington, in the county of McLean and State of Illinois, have invented a new and useful Improvement in an Expanding Mandrel, of which the following is a description, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view. Figs. 2 and 3 are plan views of the respective ends. Fig. 4 is a perspective view of one of the detachable mandrel-plates; Fig. 5, the same view of a detachable reamer-plate; and Fig. 6 is a transverse longitudinal section of one of the burrs or nuts used for expanding or contracting the tool when employed as a reamer or mandrel.

Like letters of reference refer to like parts in the different figures.

The object of my invention is to construct a mandrel having detachable keys or plates capable of such adjustment that the diameter of the mandrel may readily be increased or diminished, and at the same time give the greatest strength and solidity both to the arbor and the adjustment of the keys therein, as well as to guard against contact with the cutting-tool when used as a mandrel.

My invention consists in providing an arbor with screw-threads cut from at or near each end of the same nearly to the centers, leaving preferably uncut a portion midway between the ends for greater strength. I then cut in the arbor radial longitudinal slots, the bottom of each being inclined toward the axis of the arbor, and so arranged that at one end of the arbor they gradually approach toward the center thereof. I make these slots preferably wider at the bottom than at the top, in dovetail form, in order that the keys, when inserted therein, may have a wider base and a more solid and permanent adjustment, and may thereby do more accurate work. This arrangement also imparts greater strength to the entire tool.

A, Fig. 1, represents the arbor of my improved tool with the screw-threads cut therein, *a*, Figs. 1, 2, and 3, showing the slots, and the dotted line *a' a'*, Fig. 1, showing the incline of the same with respect to the axis of the arbor. At *a a*, Figs. 2 and 3, may be seen the manner in which the bases of the slots are widened or dovetailed. The keys B and C, Figs. 4 and 5, are correspondingly expanded at the base to fit accurately in the slots *a*. It is obvious that this adjustment of itself must prevent any deflection of the keys from their normal radial line, even though no other support is provided.

It will be seen that the bases of the keys are on an angle to their outer surface corresponding to that of the slots in the arbor, so that when the keys are inserted in the slots with the thickest portion of each key in the deepest portion of each slot the outer edge of each key is on a line parallel to that of each of the others.

It is further apparent that the simultaneous sliding of the keys in the slots in one or the other direction must increase or diminish the diameter of the tool, according to the direction in which they are moved. To accomplish this purpose I place nuts D upon the respective ends of the arbor, as shown in Fig. 1, and screw the same against the ends of the keys C, which are beveled, as shown in Figs. 1, 4, and 5, so that the nuts, when screwed tightly against them, may serve as an auxiliary to the dovetailed base of the keys and slots to hold the former rigidly in position.

It is evident that when one nut is loosened the turning of the other in a corresponding direction will slide the keys against it, and thus the diameter of the tool may be readily adjusted to any required size.

In order to avoid too great a friction upon the nuts and permit them to be placed with greater solidity against the keys, as well as to exert an inward pressure thereon, I so curve the flanged portion of the nuts that they may touch only a limited portion of the beveled ends of the keys. This curvature is shown at *d*, Fig. 6.

I provide the mandrel keys or plates upon their outer edges with a series of inward curves or scallops, as clearly shown in Figs. 1 and 4, which permits the "work" upon the tool to be so adjusted that the cutting-tool may be brought to the extreme inner edge of the work, passing down within the adjacent scallop upon the reamer-key. This form of construction gives a very decided advantage to my improved tool.

To further adapt this tool to work of differ-

ent sizes I preferably construct one of the nuts D smaller than the other, so that the work, while held by the mandrel, may extend over the smaller nut when occasion requires. In case the tool is employed as a reamer, this feature is indispensable, as the smaller diameter of one of the nuts permits the reamer-keys to be inserted within the work.

It should be mentioned as an incidental advantage of the construction above described that the tool may, if preferred, be provided with two sets of keys or plates, fitting within the arbor and nuts thereon and interchangeable with each other, one being a set of reamer-keys and the other a set of mandrel-keys, either of which sets may be adjusted within the tool as occasion may require and without any alteration in its construction.

It is obvious that in the above construction, with nuts at each end of the arbor, the keys or plates are held in place much more securely and rigidly than in a construction in which there is only a single nut, and the keys are adjusted from one end of the arbor only.

It is apparent that the dovetailed slot described weakens the tool much less than a lateral extension of the slot at its base, accompanied by a corresponding flange upon the base of the key.

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

1. An expanding mandrel provided with sliding keys or plates held in place upon the arbor by nuts at the ends of the keys, the keys or plates being provided upon their outer edges with a series of inward curves or scallops, substantially as and for the purpose set forth.

2. A mandrel key or plate provided upon its outer edge with a series of inward curves or scallops, substantially as and for the purpose set forth.

JOHN G. POPE.

Witnesses:
P. H. GILCHRIST,
E. H. JACKMAN.