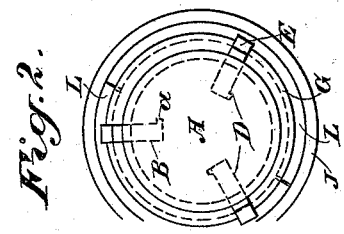
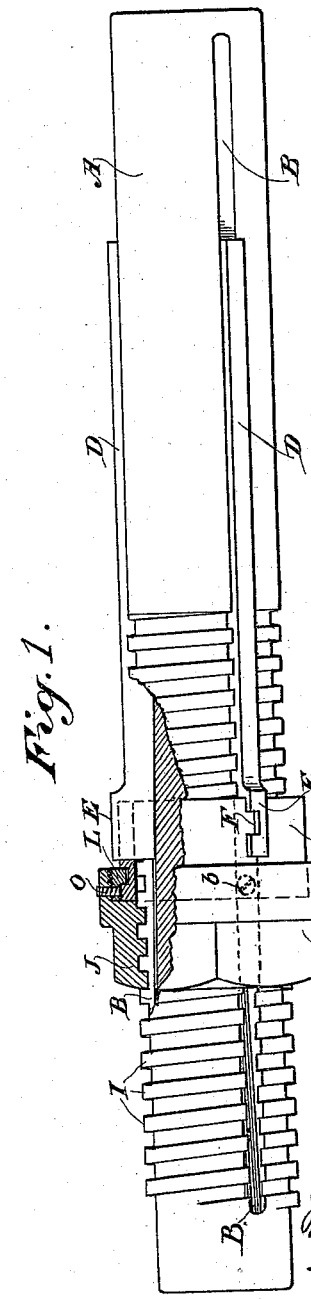
(No Model.)

# J. P. SIMMONS.

## EXPANDING LATHE ARBOR.

No. 547,188. Patented Oct. 1, 1895.

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# UNITED STATES PATENT OFFICE.

JOHN P. SIMMONS, OF SAN FRANCISCO, CALIFORNIA.

## EXPANDING LATHE-ARBOR.

SPECIFICATION forming part of Letters Patent No. 547,188, dated October 1, 1895.

Application filed July 26, 1894. Serial No. 518,674. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN P. SIMMONS, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Expanding Lathe-Arbors; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a lathe arbor or mandrel and an expansible mechanism connected therewith and adapted to receive and hold any articles—such as pulleys, &c.—which are to be turned.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved arbor, showing some of the parts broken away. Fig. 2 is an end view.

The object of my invention is to provide an arbor or mandrel having movable keys or feathers fitting in channels longitudinally made in the mandrel and a means for connecting these feathers with a longitudinal movable collar, whereby they are moved in either direction either to reduce the diameter of a circle of which they are radii or to increase it and cause the feathers to fit within the hollow hub of anything which is to be secured to the arbor or mandrel to be turned or for other purposes.

A is the mandrel or arbor, which is made cylindrical and of essentially the same size from end to end. It is made of such length and size as is necessary to support any piece of work which is to be turned in the lathe. Radial slots B are made in this mandrel, extending longitudinally nearly from end to end, the slots commencing at approximately the periphery of the mandrel at one end and extending gradually deeper from this point toward the opposite end. I have preferably shown three of these slots, and within them are fitted feathers or keys D. These feathers or keys are made tapering, so that their inner edges rest upon the bottom of the slots, while the outer faces are turned off, so as fit exactly inside a cylindrical hole when expanded therein by moving the feathers along the keyways, and they thus serve as a support for a pulley, which is central and locked upon the arbor by expanding these feathers within it. The ends of these feathers terminate in heads E, having radial channels or slots made in their sides.

G is a collar fitting loosely upon the mandrel and having radial slots made through it adapted to receive the heads of the keys which fit therein, so as to slide to and from the center of the mandrel without obstruction; but by reason of the slots in the feathers and the corresponding projections on the collar to engage these slots the feathers are forced to move longitudinally with the collar. When the collar is moved in the direction toward the deeper part of the channels in the mandrel, the feathers will correspondingly move toward the center and have a less exterior diameter; but when moved in the opposite direction these feathers are forced outwardly by the inclined bottoms of the keyways or channels until they simultaneously form contact with the opening made through the pulley or other piece of work which is to be fixed upon the mandrel, and as the outer edges of these feathers are parallel with the axis of the mandrel they will have a bearing the full length of the interior of the hole which fits upon them, and by drawing the collar forcibly toward the shallower part of the keyways they would be made to fit so tightly that the work will be held sufficiently rigid for any turning or other work that is necessary to do upon it. When it is to be released, it is easily done by moving the collar in the direction which allows the keys or feathers to be depressed in the keyways. In order to move the collar conveniently, I have formed screw-threads I upon the arbor or mandrel, and a nut J fits upon these screw-threads. The collar G has a cylindrical groove or channel made around it, and an annular ring L is formed, with a corresponding inwardly-projecting ring or flange which enters this groove or channel, as shown. This ring is made in two halves, as shown in Fig. 1, and its outer periphery is screw-threaded and adapted to fit in a screw-threaded portion of enlarged diameter within the nut. It will thus be easy to apply the ring to the collar by setting the two parts over the grooved portion of the collar, so that the inwardly-projecting ring will enter the groove. The ring is then screwed

into the enlarged portion of the nut, which holds it firmly in place, and it may be permanently fixed by a locking-screw O, passing through it as shown. It will now be seen that this nut can be turned and caused to advance upon the screw-threads on the arbor, and by reason of the annular groove in the collar and the ring or flange on the nut fitting into it the collar will be moved in either direction by the turning of the nut and will carry with it the keys or feathers which, moving along upon the inclined bottoms of their respective key-ways, will either be expanded or contracted, according to the direction in which they are moved.

The inner edges of the keys have ribs or projections extending outwardly, as shown at *a*, and these ribs enter corresponding channels made in the sides of the grooves or channels in which the feathers slide. The keys are introduced from the shallow ends of the channels, and the ribs, following the grooves, serve to lock the keys and prevent their being lifted or falling out of the slots, while they are easily moved in the direction of their length. A small screw *b* passes through the collar, and its point enters one of the grooves or channels, and when the collar is slipped outward it strikes a stop and prevents its slipping entirely off the mandrel. If the collar and key are to be removed, this screw is loosened enough to permit the removal.

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

1. An improved cylindrical mandrel having tapering key-ways formed longitudinally in it, a non-rotary collar slidable loosely upon the arbor, having radially tongued and grooved slots made in one end, an opening through its periphery, and an annular groove or channel in the opposite end, keys or feathers having radially grooved and tongued heads to be fitted to the collar, a nut adapted to be screwed upon the arbor, having a supplemental flanged two-part ring screwed into one end, with the flange fitting the annular groove in the collar, and means for retaining the collar on the mandrel.

2. A mandrel or arbor made cylindrical and of essentially the same size from end to end, longitudinal key-ways formed therein increasing in depth from one end toward the other, keys or feathers fitting and slidable within said key-ways having head portions whose sides are channeled to form radial grooves and tongues, a non-rotary collar slidable longitudinally upon the mandrel and having its inner portion slotted radially to form tongues and grooves adapted to engage the radially grooved sides of the heads whereby the keys are movable with the collar and allowed a radial motion, a nut adapted to be screwed upon the arbor, having a supplemental flanged two-part ring screwed into one end, with the flange fitting a corresponding groove or channel in the collar whereby the rotation of the nut will advance the collar and feathers or keys in either direction, and a stop pin or screw extending through the collar into one of the inclined key-ways so that its point strikes the bottom near the shallow end to prevent the collar from being removed from the mandrel.

In witness whereof I have hereunto set my hand.

JOHN P. SIMMONS.

Witnesses:
S. H. NOURSE,
H. F. ASCHECK.