

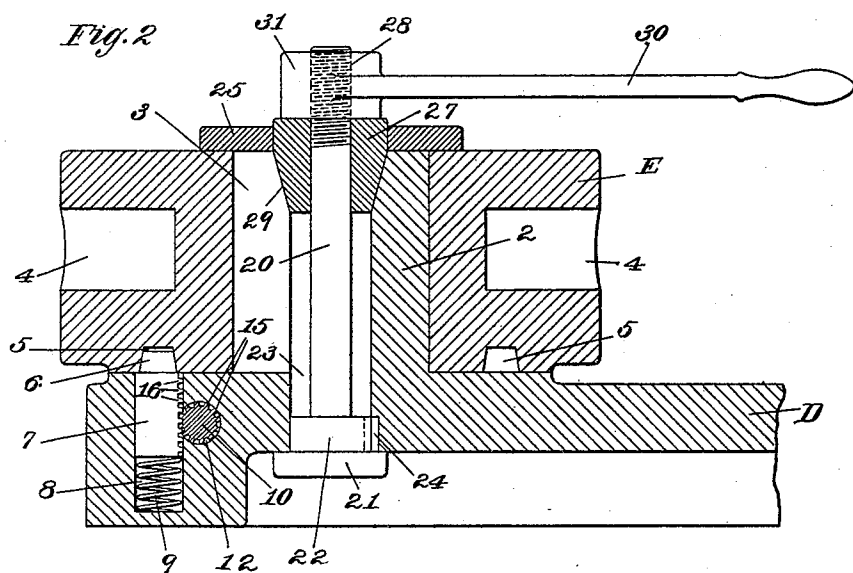
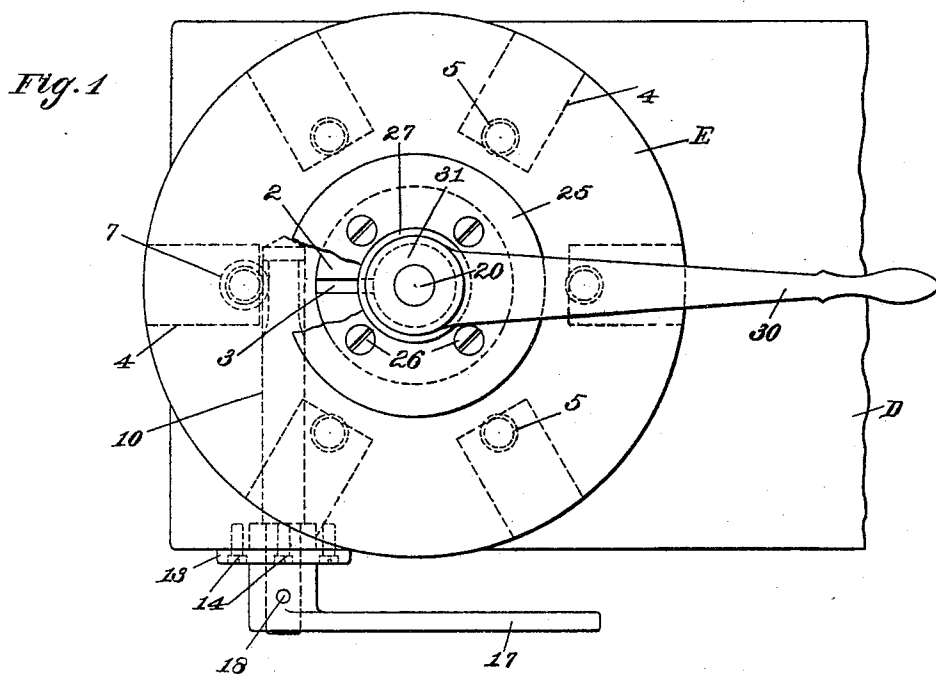
(No Model.)

2 Sheets—Sheet 1.

F. H. RICHARDS.  
TURRET CLAMPING DEVICE.

No. 480,962.

Patented Aug. 16, 1892.



Witnesses:

H. Mallner.  
Henry L. Rickard.

Inventor:

Francis H. Richards

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Fig. 3

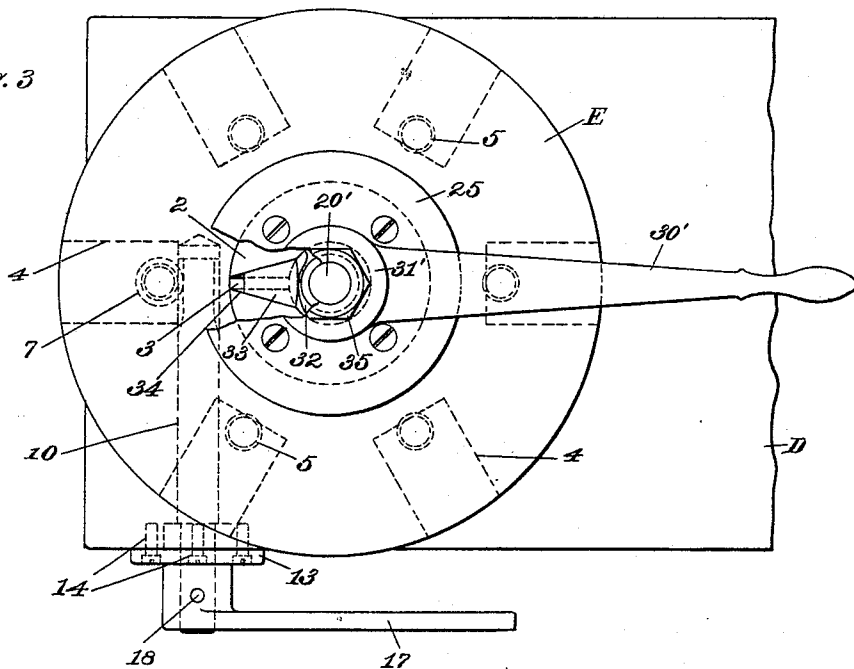
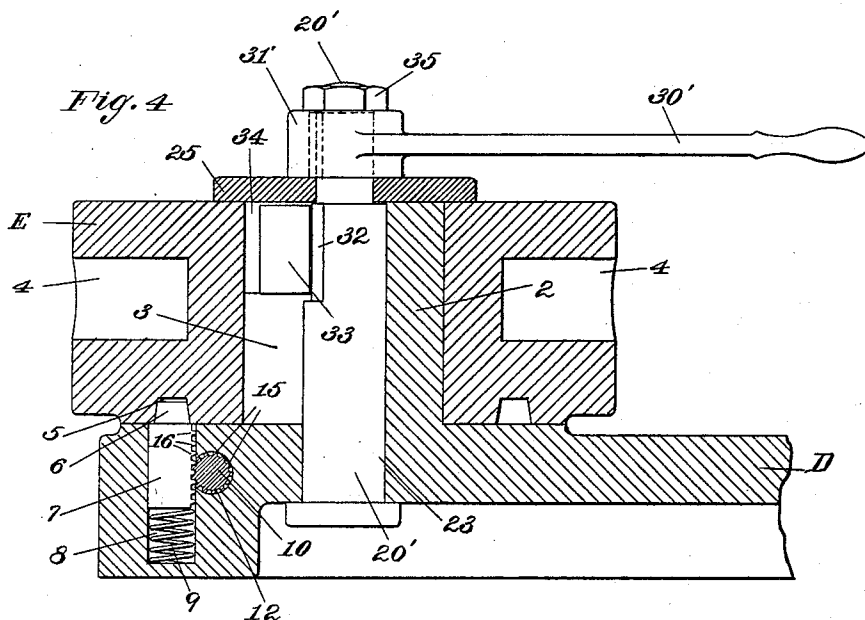


Fig. 4



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# UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO WALTER WOOD, OF PHILADELPHIA, PENNSYLVANIA.

## TURRET-CLAMPING DEVICE.

SPECIFICATION forming part of Letters Patent No. 480,962, dated August 16, 1892.

Application filed November 23, 1891. Serial No. 412,871. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Turret-Clamping Devices, of which the following is a specification.

This invention relates to clamping devices for turret-lathes, the object being to provide efficient means whereby the turret may be rigidly clamped in place by expanding the column or spindle on which the turret is mounted.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of the turret-slide of an ordinary turret-lathe with the turret located thereon and furnished with my improved turret-clamping apparatus. Fig. 2 is a vertical longitudinal section of the parts shown in Fig. 1. Fig. 3 is a view similar to Fig. 1, showing a modification of the apparatus. Fig. 4 is a vertical longitudinal section of the parts shown in Fig. 3.

Similar characters designate like parts in all the figures.

In the drawings, the turret-slide D is shown provided with the hollow turret-carrying column 2, which is preferably formed integral with said slide, and is split on one side thereof, as at 3, to permit of the required expansion thereof within the central bore of the turret E. Said turret is shown having the usual series of tool-holding sockets 4 formed in the periphery thereof and having in the lower side thereof a corresponding number of tapered holes 5, to receive the tapered upper end 6 of the turret-locking pin 7, which pin is or may be carried in a bore 8, formed in the slide D. The lock-pin 7 is normally held up in the position shown in Figs. 2 and 4 by means of the spring 9. As a means for drawing down the pin 7, and thus unlocking the turret, a shaft 10 is carried in a horizontal bearing 12, formed in the slide, said shaft being held in place longitudinally of the bore by means of the collar 13, fitted to the reduced outer end thereof, and secured to the front edge of the slide D by means of the screws 14. Gear-teeth 15 are formed on the inner end of the shaft 10 for engaging the corre-

sponding rack-teeth 16 that are formed on one side of the pin 7, and a suitable handle or lever, as 17, is fixed to the outer end of said shaft 10, (by means of a pin 18, or otherwise,) by means of which the operator may rotate the shaft 10 to raise or lower said lock-pin. By raising the lever 17 the pin 7 may be forced downward against the spring 9 to unlock the turret and allow this (when unclamped) to be revolved to bring another tool into position, when by lowering the lever 17 the pin 7 may be raised to again lock the turret, said spring then serving to keep the pin up into engagement with the turret. The method of clamping the turret after this has been locked in the desired circumferential position is by expanding within the central opening of the turret the aforesaid hollow column 2, on which the turret is fitted to normally turn closely, yet freely. For this purpose, as hereinbefore stated, the column should be split or slotted on one side thereof, and means are provided for expanding and releasing the column. The means for effecting the expansion aforesaid consists of a suitable wedge fitting within a correspondingly-shaped portion of the column and operated by devices which are actuated by the hand-lever 30. In the drawings one form of column-expanding wedge is shown in Figs. 1 and 2, while a second and improved construction of said wedge and of the combination thereof with its actuating devices is shown in Figs. 3 and 4.

In the turret-clamping apparatus shown in Figs. 1 and 2 the upper end of the column 2 is bored tapering to receive the conical wedge 27, which is centrally bored to receive the bolt or shaft 20, on whose threaded upper end is fitted the threaded hub 31 of the aforesaid hand-lever 30. The lower end 22 of the bolt 20 is keyed by suitable means, as by the key 24, to prevent the rotation thereof, and the bolt-head 21 prevents the hand-lever from drawing the bolt upward. A suitable cap, as 25, fitted on the upper end of the column 2 and extending outwardly over the turret E, serves to hold down the turret, said cap being secured to the column by suitable screws, as 26, or other equivalent means. The turret being unclamped and locked in the desired

circumferential position, the operator, by means of the handle 30, turns the hub or nut 31 to force downwardly the conical wedge 27 into the upper end of the column 2, thereby spreading or expanding said column within the central bore of the turret E with a force due to the combined power of the wedge, the nut, and the lever, which aggregate power, it will be obvious, is very great, being in practice sufficient to clamp the turret in place with extreme rigidity.

In Fig. 3 and 4 I have shown a modification of and improvement on the clamping device shown in Figs. 1 and 2. In this modification the shaft 20' (corresponding in a sense to the screw-shaft 20 of Figs. 1 and 2) fills the bore 23 of the column 2 and has a cam 32 formed thereon near the upper end thereof, the face of which cam engages with and forces outwardly the wedge 33 into the corresponding angular groove or slot 34, that is formed at the upper end of the aforesaid slot 3 to receive said wedge. The wedge 33 being thus actuated expands the hollow column 2 within the bore of the turret E, and thereby rigidly clamps said turret in place. The actuating-lever 30' (corresponding to the lever 30 in Figs. 1 and 2) for turning the shaft 20' in its bearing has its hub 31' keyed firmly to the upper end of its shaft, to which it may be further secured by a nut 35 in a well-known manner. The wedge 33 being forced outwardly by the cam 32 as a means for returning the wedge when the cam is retracted, the angle of the wedge is made greater than the angle of repose, as illustrated, for instance, in plan view in Fig. 3, so that the column by its elasticity and in closing onto the inclined sides of the wedge retracts the same.

The general operation of both forms of my improved turret-clamping apparatus is substantially the same in a general way. The operator by grasping the handle of the lever 30 or 30' and pulling said lever toward him

forces in the wedge to expand the turret-carrying column. Thus far, it is evident, said operation is similar in each instance.

Having thus described my invention, I claim—

1. The combination, with an expansible turret-carrying column, of the turret mounted on said column to normally turn freely thereon, a column-expanding wedge, and means for forcing the wedge to expand the column within the turret, whereby the turret may be clamped and unclamped, substantially as described.

2. The combination, with an expansible column, substantially as described, of the turret mounted on said column to normally turn freely thereon, a column-expanding wedge fitting in the column radially thereof, and means for forcing the wedge outwardly to expand the column within the turret, whereby the turret may be clamped and unclamped, substantially as described.

3. The combination, with an expansible turret-carrying column slotted on one side thereof and constructed to carry the wedge 33, of the turret mounted on said column to normally turn freely thereon, the wedge 33, fitting in the column and constructed to expand the column on the outward movement thereof, a cam bearing against said wedge, and means for operating the cam to actuate the wedge, substantially as described.

4. The combination, with an expansible turret-carrying column, of the turret mounted on said column to normally turn freely thereon and column-expanding means for expanding the column within the turret, whereby the turret may be clamped, substantially as described.

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