G. S. RADFORD.

TOOL HOLDER.

APPLICATION FILED JULY 10, 1915.

1,154,804.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

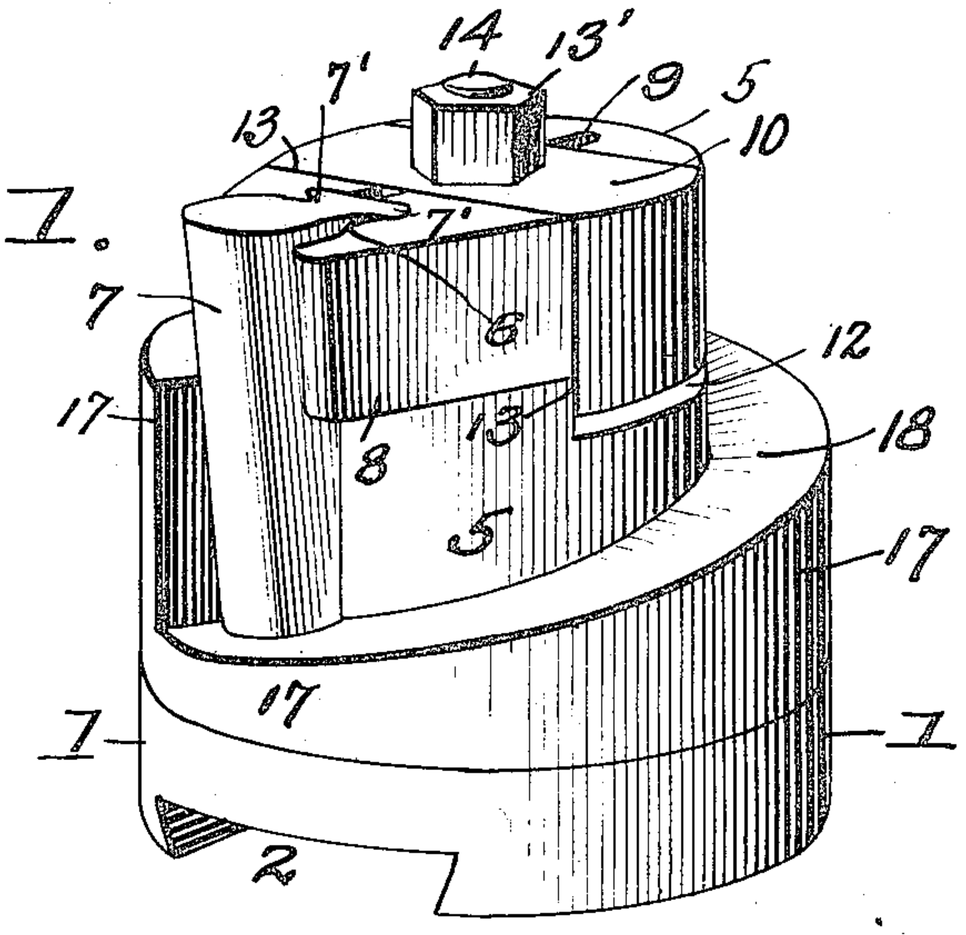


Fig. 2.

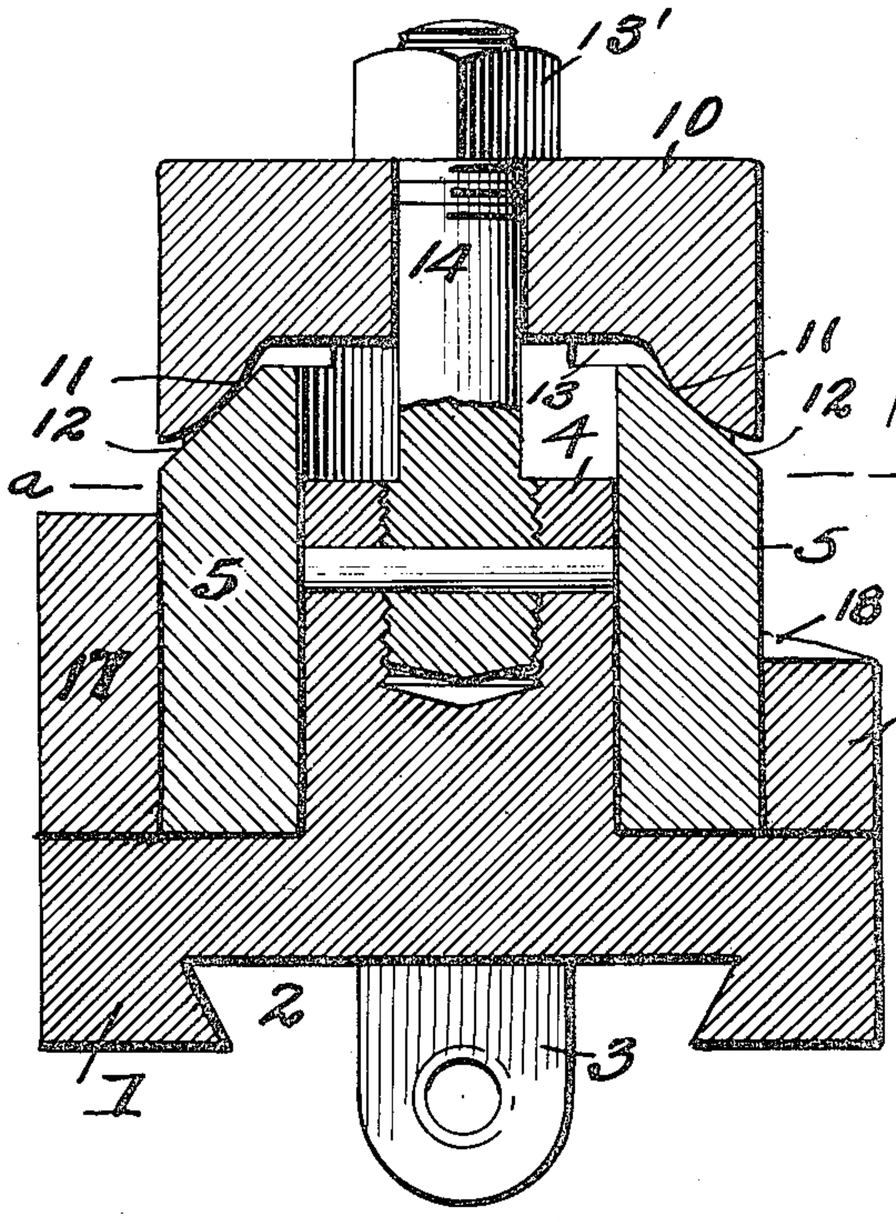
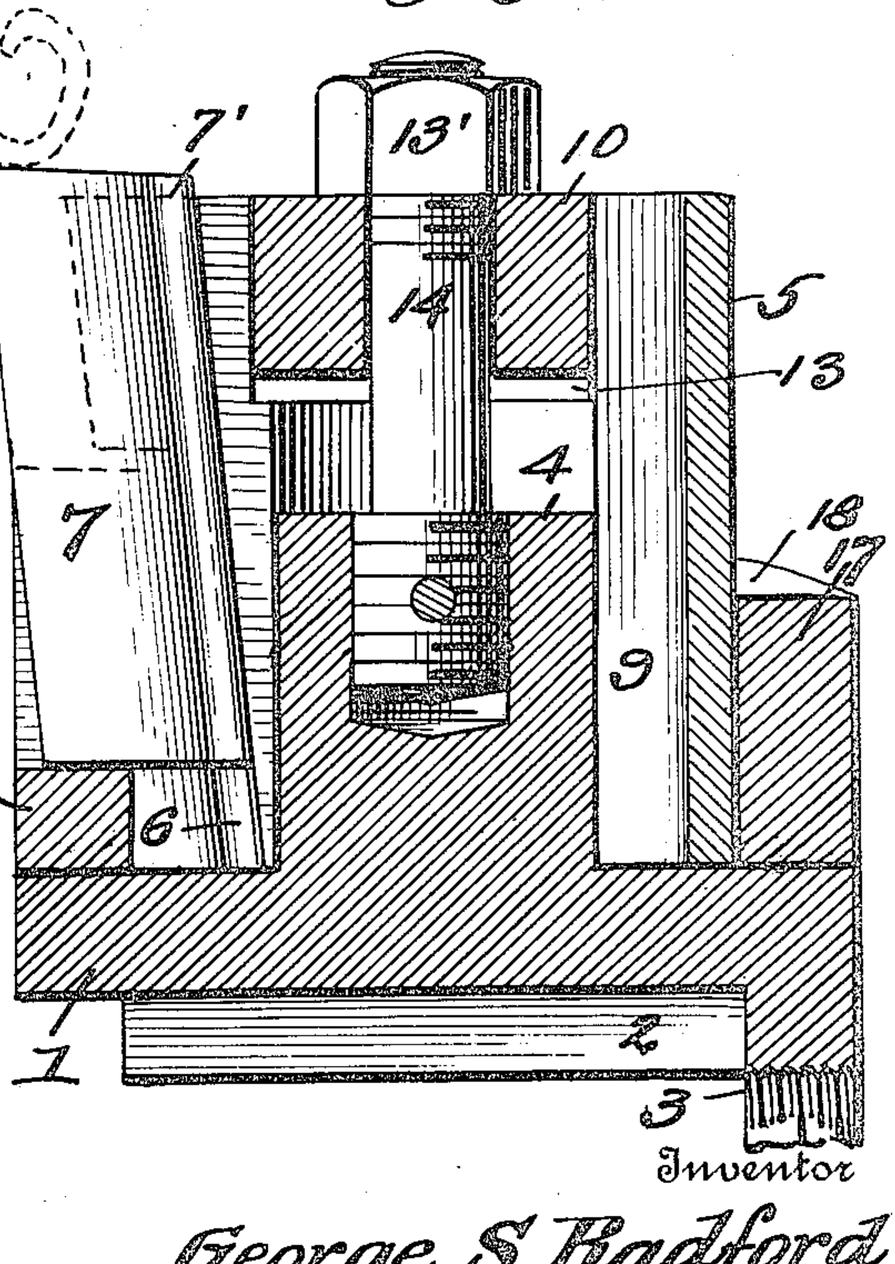


Fig. 3.



Inventor

George S. Radford

Witnesses

M. E. Hitchcock

F. F. Whitehead

By Marcus D. Blount

Attorney

G. S. RADFORD.

TOOL HOLDER.

APPLICATION FILED JULY 10, 1915.

1,154,804.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 2.

Fig. 4.

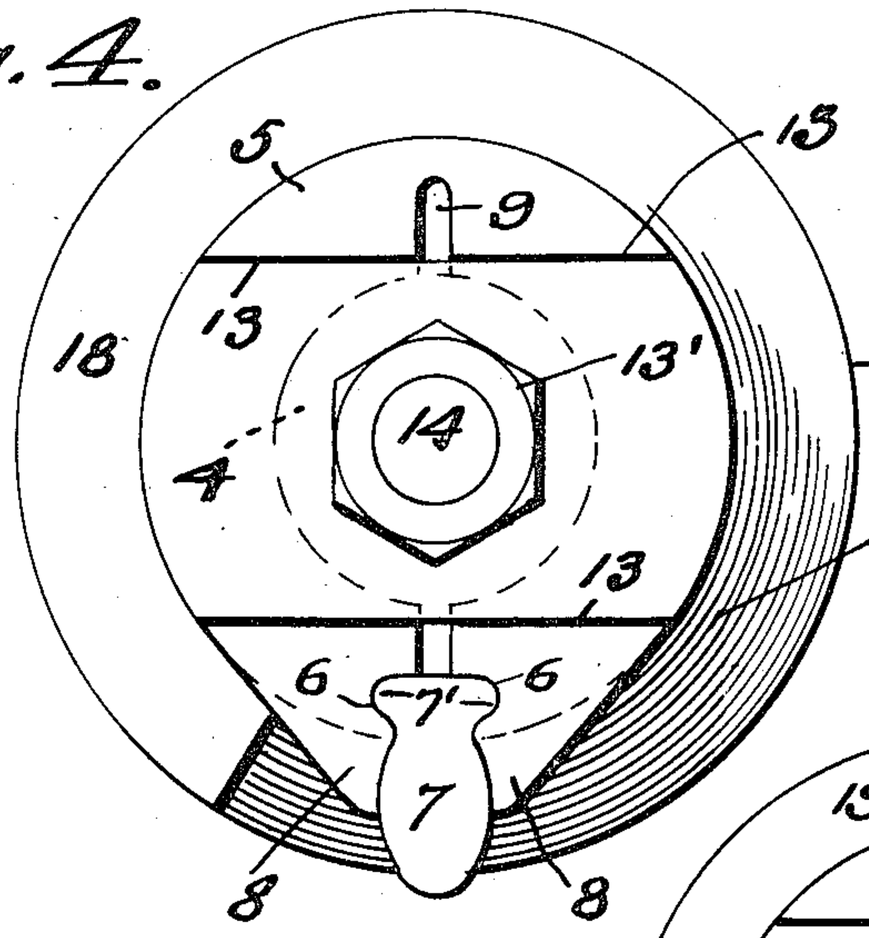


Fig. 6.

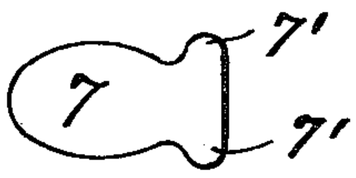


Fig. 7.

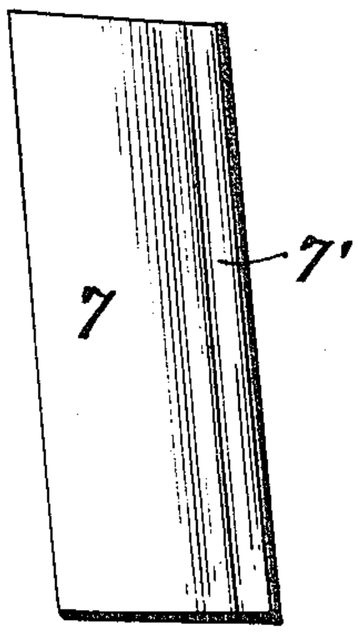


Fig. 8.

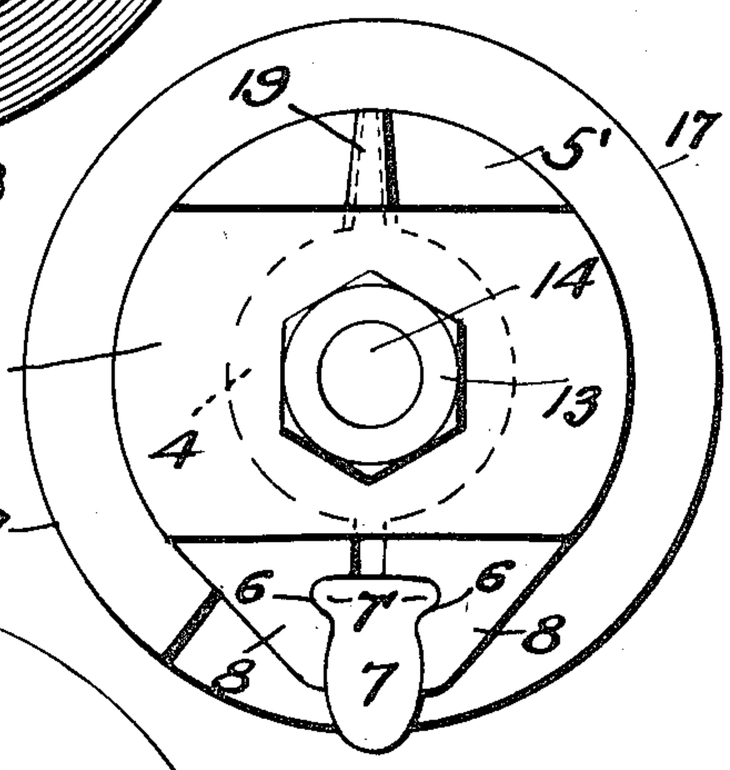
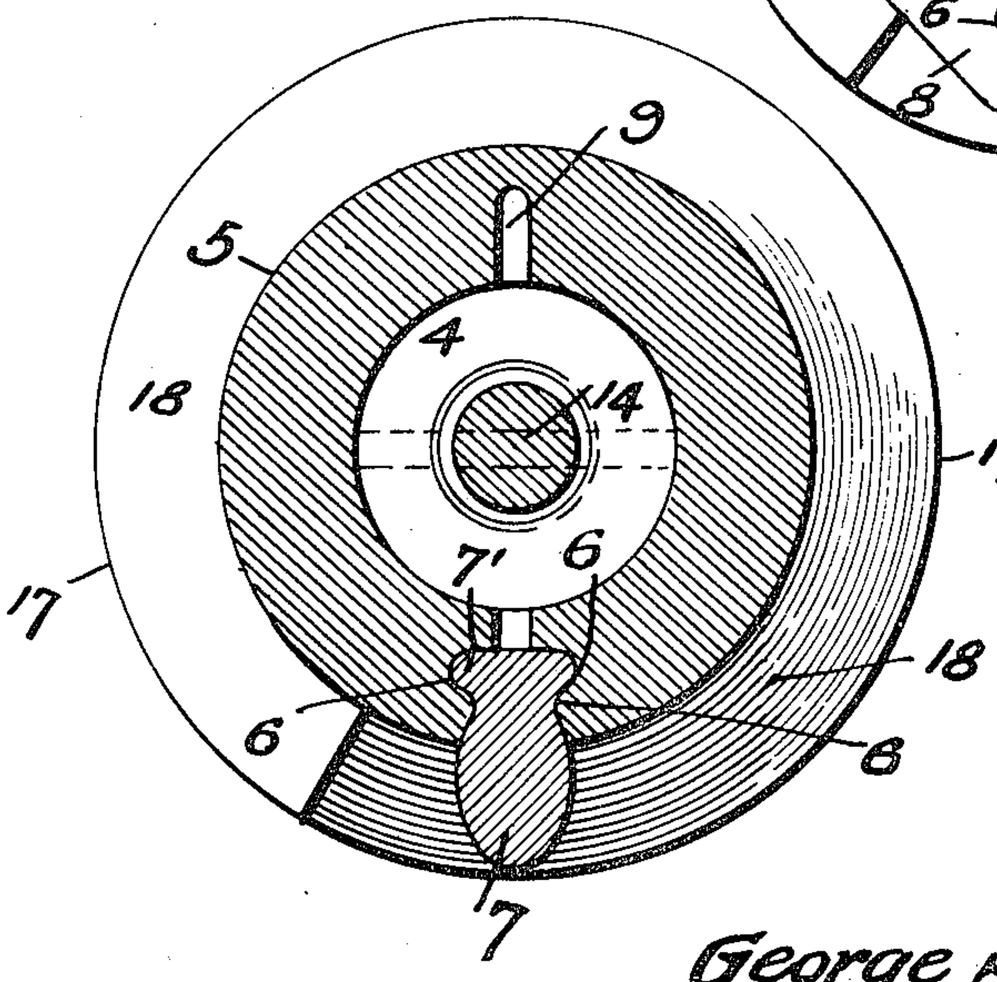


Fig. 5.



Witnesses
M. E. Hitchcock
F. F. Whitehead

Inventor
George S. Radford

By Mercer D. Randell.
Attorney

UNITED STATES PATENT OFFICE.

GEORGE STANLEY RADFORD, OF BRIDGEPORT, CONNECTICUT.

TOOL-HOLDER.

1,154,804. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed July 10, 1915. Serial No. 39,076.

To all whom it may concern:

Be it known that I, GEORGE STANLEY RADFORD, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Tool-Holders, of which the following is a specification.

The object of the invention is to provide a tool holder for lathes and machines using similar cutting tools by which the tool is held upon a firm foundation, and in such position that the cutting face is arranged upon the longitudinal end thereof so that the pressure upon the cutting surface or edge will be lengthwise of the tool instead of upon the top of the same, as when the tool is held in a horizontal position, thus necessitating grinding only throughout the life of the tool without reforging and retempering in order to resharpen the tool; and in so constructing the holder that the tool may be readily adjusted as it wears down, and further in providing a simple means for clamping the tool in position so as to avoid vibration; secure strength, and good thermal conductivity.

The invention consists in providing a holder having a base carrying a tool holding member for holding the cutting tool in such position that the cutting pressure thereon will be exerted upon the top of the tool in lengthwise direction; in a novel arrangement of the holder for firmly supporting the tool immediately adjacent to the work, and which serves to take up the heat of the tool, thus prolonging the life thereof through retaining the temper of the tool; in means for readily elevating the tool or adjusting it into operative position as the cutting edge is ground down, and in the novel construction of the cutting tool proper.

These and other features germane thereto constitute the invention, as will be described fully hereinafter, and then claimed.

In the drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a perspective view of my tool holder illustrating a cutting tool clamped therein. Fig. 2 is a vertical transverse section of the same. Fig. 3 is a vertical longitudinal section of the same, illustrating in dotted lines, the position of a shaft or other cylindrical body or central post relative to the cutting edge of the tool, the severed portions of the metal of the work being operated upon being shown in dotted lines coiled upon the top of the cutting tool. Fig. 4 is a plan view of the tool holder and tool. Fig. 5 is a horizontal section of the same drawn on the line *a*—*a* of Fig. 2. Fig. 6 is a plan view of the cutting tool. Fig. 7 is a side elevation of the cutting tool. Fig. 8 is a plan view of the holder illustrating a slightly modified construction of the sleeve for clamping the tool in position.

1 designates the base of the tool holder having a dovetail groove 2 upon its lower face to fit the correspondingly shaped rib (not shown) formed upon the upper side of the cross slide of a lathe or similar cutting machine, and having a cross feed nut 3 to receive a feed screw (not shown) by which the base is fed in the usual manner toward or away from the work. Extending upwardly from the base, is a central cylindrical post 4 over which is fitted a split sleeve 5, the opposed faces thereof being grooved lengthwise as at 6, Figs. 4 and 5, to form the clamping jaws for holding a cutting tool 7 of substantially the same cross sectional diameter throughout its length, having its inner vertical portion or back provided with ribs 7′ to snugly fit the grooves 6 in the opposed faces of the sleeve 5, and it may be stated here that the grooves are arranged at an angle with respect to the vertical center of the holder so that the tool will be presented at the proper angle to the work, thus permitting necessary clearance. It may be noted that this construction permits of obtaining the proper clearance angle instead of the too great clearance angle required by the construction of the ordinary tool holder where they are held in other permanent holders. It may be noted further, that the clearance angle may be altered to suit various kinds of work, such as differences in the physical characteristics of the metal being cut, by changing the jaws only. The sides of the tool are, of course, shaped to fit the grooves of the sleeve. The upper end of the sleeve 5, adjacent to the slot, is formed with lugs or jaws 8 (Figs. 1 and 4), forming clamping jaws which are adapted to extend around the sides of the tool immediately adjacent to its upper cutting end, whereby to not only firmly hold the tool in position, but also to hold the metal of the holder or

sleeve into intimate contact with the tool immediately adjacent to its cutting edge, to thus provide a large mass of metal with correspondingly large heat radiating surfaces and greater rigidity so as to take up the heat from the tool due to its cutting through the metal of the work being operated upon, thus lengthening the life of the tool. Diametrically opposite the slot of the sleeve, the latter is formed with a groove 9 (Figs. 4 and 5), so as to provide sufficient spring in the sleeve to permit of the tool being readily inserted in and withdrawn from the clamping jaws when the clamping bridge (hereinafter referred to) of the tool clamping and holding sleeve is released from its clamping position.

The jaws and the sides of the sleeve are firmly clamped against the body of the tool by a bridge 10 having downwardly extending beveled ends 11, which are designed to be forced into engagement with beveled surfaces 12, Fig. 2, formed upon the sides of the sleeve 5 at the base of recesses 13 formed in said sleeve 5. In practice, the recesses will be of such depth that when the bridge is in position, its top will be substantially flush with the front and rear top sections of the sleeve. The beveled lugs of the bridge are forced into contact with the beveled surfaces 12 of the sleeve by means of a nut 13′ threaded upon the upper end of a stud bolt 14, carried by or formed integral with the central post 4, and which extends upwardly through the bridge 10. By this arrangement it will be apparent that when the tool is in position and the nut 13′ is screwed downwardly upon the stud bolt 14, the bevels 11 of the bridge will ride down upon the beveled surfaces 12 of the sleeve to thus force the opposed faces of the latter toward each other and into firm contact with the cutting tool, and also clamping the entire mechanism to the base. Surrounding the lower end of the sleeve is a rotatable collar 17, having an upper spiral end or cam surface 18, as shown, and against which the lower end of the cutting tool 7 is designed to rest, so that as the tool is ground down, it is only necessary to rotate the collar 17, or the split sleeve 5, in order to bring the base of the tool against a higher portion of the cam and thus elevate the tool to the height of the lathe center as will be best understood from the general description of the operation of the device.

As shown, the cross sectional area of the tool is substantially the same throughout its entire length, and that the tool is arranged in substantially a vertical position so that pressure thereupon in cutting through a piece of metal, such as a shaft or cylinder, is brought against the tool in a lengthwise direction instead of upon the top of a tool when held horizontally in a holder, and as the base of the tool rests firmly against the upper beveled surface of the collar 17, it will be apparent that I provide a solid foundation for the tool, and avoid the springing or yielding movement of the tool due to bending movement, as when held horizontally to the work, it being understood, of course, that the lower or base end of the tool will be beveled corresponding to the bevel of the cam surface.

One of the principal advantages of my special construction of a cutting tool is that I am able to resharpen the tool by simply grinding the upper end thereof, thus eliminating the necessity of reforging and then retempering the tool, as is necessary with other cutting tools, and especially those held horizontally to the work, and as the tool wears down through resharpening, it is only necessary to rotate either the clamping sleeve 5, or the collar 17, so as to bring a highe surface of the upper bevel or cam edge thereof under the tool, thus pushing the latter upwardly and raising its upper cutting end above the tops of the jaws 8. After the tool has been thus adjusted, the nut 13′ is screwed down upon the bridge so as to force the beveled ends of the bridge into engagement with the beveled surfaces of the sleeve, thus forcing the sides of the split end of the sleeve together to tightly clamp the tool in position.

It will be understood that any shape of cutting tool may be employed to meet the class of work being done. The construction shown places the tool in the vertical position. In certain cases, however, where the cutting is all toward the right-hand or toward the left-hand, as the case may be, a support more in line with the normal pressure may be secured by inclining the vertical axis of the tool into line with the pressure by slightly altering the angle of the jaws, and the angle of the supporting cam or collar.

It will be further understood that the tool is made of tempered steel throughout its entire length, therefore, necessitating grinding only in order to resharpen the same.

In Fig. 8, I illustrate a slightly modified arrangement for clamping the cutting tool in position upon the holder. In this arrangement, I construct the clamping sleeve in sections, said sections being designated by the numeral 5′, and I force the jaws 8 and the sides of the clamping surfaces of said sections 5′ against the sides of the cutting tool 7 by means of a wedge-shape key 19, which is driven down between the opposed faces of the sections 5′ of the sleeve diametrically opposite the gripping surfaces thereof. In this construction the beveled surfaces 11 of the bridge will be omitted so that the lower face of the bridge 10 will rest upon flat surfaces of the sleeve 5, to

thus prevent any possibility of the cutting tool being thrown out of alinement with the work being operated upon.

It will be understood that the upper surface of the base 1 and the lower surface of the rotatable collar, and the bottom of the tool and the upper edge of the collar may be provided with radial or other corrugations, if necessary, to positively prevent the sleeve, the collar, and the tool from slipping. As this detail will present itself to any one skilled in the use of my invention it is not thought necessary to illustrate the same.

What I claim is:—

1. A tool holder, comprising a base, a split sleeve carried thereby adapted for holding a cutting tool in upright position, means for clamping the sleeve to the tool, said means also serving to hold the sleeve in position, and a collar surrounding the lower end of the sleeve providing a base for the cutting tool.

2. A tool holder for lathes, comprising a base, a split sleeve carried thereby adapted for holding a cutting tool in upright position and having lugs or jaws at its upper end extended around the sides of the tool adjacent to its upper end, for the purpose specified, means for clamping the sleeve to the tool, said means also serving to hold the sleeve in position upon the base, and a rotatable collar having an upper spirally formed end providing a rest for the tool.

3. A tool holder for lathes, comprising a base having a central cylindrical post, a split sleeve mounted upon the base and surrounding said post having obliquely arranged grooves in the opposed faces of the slot thereof, a cutting tool of uniform cross sectional diameter throughout its length having ribs adapted to fit within said grooves, means for clamping the sleeve to the tool, and a rotatable collar mounted upon the base and surrounding the lower end of said split sleeve, said collar having an upper spirally formed end providing a rest for the base of the tool, substantially as and for the purpose specified.

4. A tool holder for lathes, comprising a base adapted to be mounted upon the cross slide of the lathe, a split sleeve mounted thereon adapted for holding a cutting tool in upright position and obliquely with respect to the vertical axis of the holder, said tool being of uniform cross sectional diameter throughout its length, a collar mounted upon the base surrounding the lower end of said sleeve providing a rest for the tool, said collar having a spirally formed upper end, and means for clamping the opposed faces of the split sleeve to the tool.

5. A tool holder for lathes, comprising a base adapted to be mounted on the cross slide of the lathe, a split sleeve mounted thereon adapted for holding a cutting tool in upright position, a bridge for engaging said split sleeve, said bridge serving to clamp the sleeve to the tool and to hold said sleeve upon the base, and a collar rotatably mounted upon the base having an upper spiral edge providing a support for the tool, substantially as and for the purpose specified.

6. A tool holder for lathes, comprising a base adapted to be mounted on the cross slide of a lathe, a split sleeve mounted upon the base adapted for holding a cutting tool in upright position so that the cutting edge of the tool will be at the upper longitudinal edge or top thereof, said sleeve having oppositely disposed cam surfaces, a bridge having cam faces adapted to engage the cam surfaces of said sleeve, a stud bolt carried by the base and extending through said bridge, a nut threaded upon the upper end of said bolt whereby to clamp the tool in position, as specified, a rotatable collar mounted upon the base and surrounding the lower end of said sleeve, said collar having an upper spiral edge providing a rest for the base of the tool and adapted for elevating the tool above the upper end of the said collar, as specified.

7. A tool holder, comprising a base, clamping means carried thereby for holding a cutting tool in substantially upright position and in line with the downward pressure upon the cutting face of the tool, and a common means for holding the clamping means in position upon the base and into engagement with the cutting tool.

8. A tool holder, comprising a base, a clamping sleeve carried thereby adapted for holding a cutting tool in substantially upright position and in line with the downward pressure upon the cutting face of the tool, as specified, said sleeve having clamping jaws at its upper end to engage the sides of the tool adjacent to its cutting edge, and a collar surrounding the lower end of said clamping sleeve providing a support or rest for the cutting tool.

9. A tool holder of the kind described, comprising a base, a clamping sleeve carried thereby adapted for holding a cutting tool in such position that the strain imposed upon the cutting face of the tool will be in the lengthwise direction thereof, a collar surrounding the lower end of said clamping sleeve providing a rest for the cutting tool, and a common means for holding the said clamping sleeve into engagement with the said tool and for holding the said clamping sleeve in position upon the base.

10. A tool holder for lathes, comprising a base, a clamping member mounted thereon adapted for holding a cutting tool in such position that the cutting strain upon the tool is imposed lengthwise thereof, a common means for holding the clamping sleeve

in position upon the base and for holding the cutting tool in position, and a collar surrounding the lower end of the clamping member providing a rest for the cutting tool.

11. A tool holder for lathes, comprising a base, a clamping member mounted thereon adapted for holding a cutting tool in such position that the cutting strain upon the tool is imposed lengthwise thereof, a rest for the base of the cutting tool, and a common means for holding the clamping member in position upon the base and for holding the cutting tool in position.

12. A tool holder for lathes, comprising a base, a clamping member mounted thereon adapted for holding a cutting tool in upright position so that the strain upon the tool is imposed lengthwise thereof, and means for holding the clamping member in position upon the base and for holding the cutting tool in position.

In testimony whereof I have hereunto set my hand this seventh day of July, A. D. 1915.

GEORGE STANLEY RADFORD.

Witnesses:
M. E. HITCHCOCK,
J. ARTHUR PEASE.