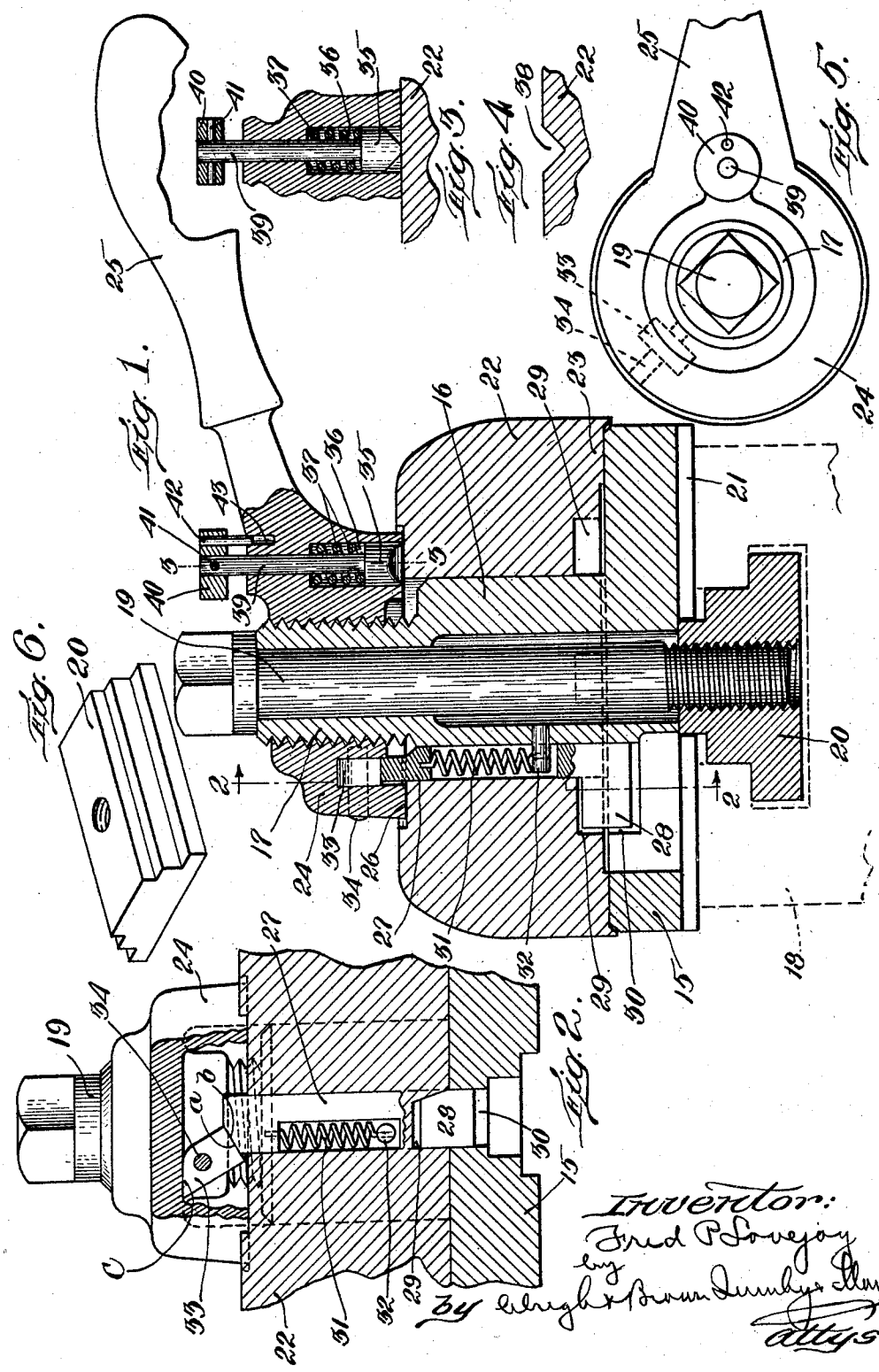
F. P. LOVEJOY.

TURRET ATTACHMENT FOR METAL WORKING MACHINES.

APPLICATION FILED NOV. 6, 1919.

1,400,614. Patented Dec. 20, 1921.

2 SHEETS—SHEET 1.



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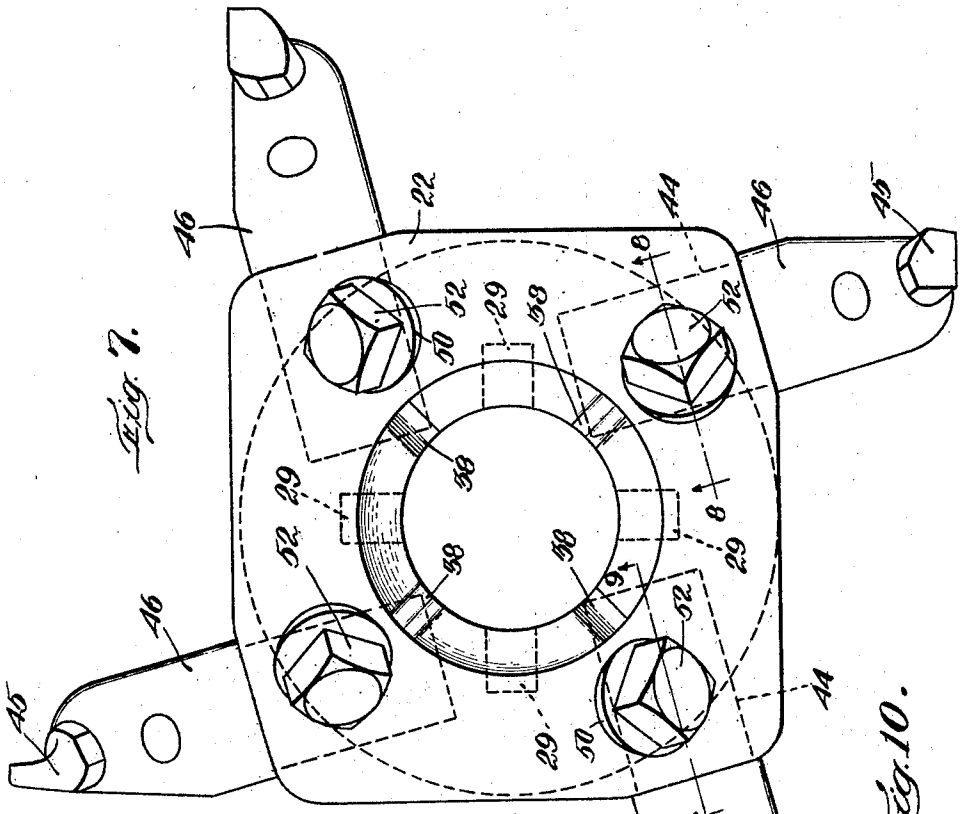


Fig. 7.

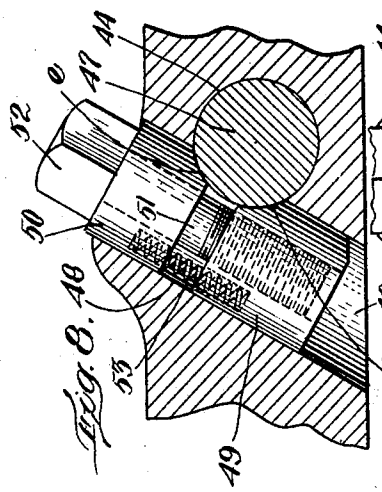


Fig. 8.

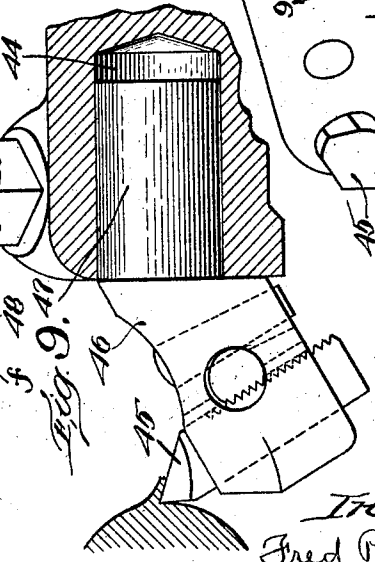


Fig. 9.

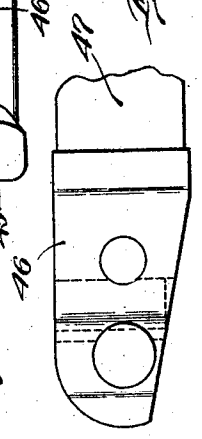


Fig. 10.

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UNITED STATES PATENT OFFICE.

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TURRET ATTACHMENT FOR METAL-WORKING MACHINES.

1,400,614. Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed November 6, 1919. Serial No. 336,070.

To all whom it may concern:

Be it known that I, FRED P. LOVEJOY, a citizen of the United States, residing at Springfield, in the county of Windsor and State of Vermont, have invented new and useful Improvements in Turret Attachments for Metal-Working Machines, of which the following is a specification.

This invention has for its object to provide a fixture or attachment, for use on metal-working machines, such as engine lathes, planers, shapers, boring mills and the like, by which the cutters may be easily and accurately located in operative position and rigidly held against the cutting strains.

The attachment comprises a cutter-holding turret, and a tool post therefor, together with means for indexing the turret and locking it to the post. The indexing means includes a handle or binding lever, which carries a member for moving a turret bolt into inactive position, when the handle is shifted, and also a member for moving the turret when the latter is unlocked.

On the accompanying drawings, which illustrate one embodiment of the invention,—

Figure 1 represents in section the attachment as being mounted upon the tool slide of an engine lathe and the tool slide being indicated in dotted lines.

Fig. 2 represents a section on the line 2—2 of Fig. 1 and illustrates the turret-locking bolt and the means for moving it to unlocked position.

Fig. 3 represents a section on the line 3—3 of Fig. 1 and shows the spring-operated plunger for engaging and indexing the turret.

Fig. 4 shows in section a fragment of the upper portion of the turret ring and illustrates one of the notches formed therein for coöperation with the plunger last referred to.

Fig. 5 represents a plan view of the binding lever or handle in its operative position upon the tool post.

Fig. 6 illustrates a clamping member for use in clamping the tool post to the tool slide.

Fig. 7 illustrates one of the interchangeable turrets.

Fig. 8 represents a section on the line 8—8 of Fig. 7.

Fig. 9 represents a section on the line 9—9 of Fig. 7 and shows the cutter as being engaged with the work.

Fig. 10 illustrates one of the cutter holders detached.

As previously indicated, the attachment or fixture, which will now be described in detail, may be used in various forms of metal-working machines. It is the purpose to provide the attachment with a plurality of interchangeable turrets or turret rings having tools of various kinds. For example, each turret ring may have a series of tools for internal work while other turret rings may be provided with sets of turning or facing tools of different shapes for outside work, so that, after the tools of one turret have performed their functions upon the work, the turret may be replaced by another having another set of tools for performing other operations on the work. The fixture or attachment is so constructed that the turrets or turret rings may be very quickly removed and replaced by others.

The fixture as a whole comprises a center post having a base 15 and a central upstanding cylindrical member 16, the upper end of which is reduced and threaded as at 17. The base of the post may be constructed to fit upon the tool slide of an engine lathe such as indicated in dotted lines at 18. For securing it in place, the post is hollow as shown and a bolt 19 is projected therethrough into threaded engagement with a clamping block 20 located in an undercut groove in the carriage or slide 18. The base of the post may be provided with transverse ribs 21 to fit complemental grooves in the upper face of the tool slide. Upon the non-threaded or cylindrical portion of the post is placed a turret 22 which is substantially ringlike as shown in Fig. 7. It has a close fit upon the post but is capable of rotating thereon. The under face of the turret has an annular rib 23 which rests upon the upper face of the base 15 of the post. A clamping lever, comprising a hub 24 and a handle 25, is utilized to bind the turret against the base of the post. To this end, the hub 24 is internally threaded so as to be screwed upon the threaded end of the post, and its under face is provided with an annular flange or rib 26 to engage the upper portion of the turret. I do not rely, however, solely upon the binding action of the hub for holding the turret against dislocation. On the contrary, I provide the fixture with a locking bolt by which the turret may be accurately and positively locked against

rotative movement. This bolt is indicated at 27 and it consists of a bar located in a vertical groove formed in the side of the post 16. At its lower end, this bar is provided with a lateral extension 28 which is adapted to lie within any one of a series of four radial sockets 29, 29, formed in the under face of the turret. The lower end of the bolt, including the extension 28, extends into a groove 30 formed in the base 15 of the post so that the bolt may be depressed into a position below the horizontal plane of the lower face of the turret so as to be free from engagement with the turret and thus permit the latter to be rotated. The bolt, however, is normally forced upwardly into locking position by a compression spring 31 located in a recess formed in the bolt, as shown in Fig. 2, one end being engaged with the bolt and the other end with a pin 32 secured to the post. By an examination of Fig. 2, it will be noted that the operative locking portion of the bolt is wedged-shaped and that the sockets 29 in the turret are complementally formed so that the bolt will accurately locate the turret when it is in interlocked relationship therewith.

It is necessary to provide some means for unlocking the turret before it is indexed, and for this purpose the hub 24 is provided with a pivoted member indicated at 33 which is hung upon a pin 34. The hub is recessed to receive the member 33, as indicated in Figs. 1 and 2. The member 33 is provided with a flat end *a* adapted to engage a flat face *b* on the upper end of the bolt, and also with a face *c* for engaging the upper end of the recess in the hub. Assuming that the parts are in the position shown in Fig. 2, it will be seen that, if the hub be moved in an anti-clockwise direction, the pivoted member 33 will ride over the upper end of the bolt and force it downwardly far enough so that the locking lug or projection 28 will be depressed from engagement with the socket 29; and also that, if the hub be rotated in a clockwise direction, the member 33 will be lifted as it passes over the projecting upper end of the lock without depressing the latter. It is evident from this description that, if the binding lever, including the hub 24 and the handle 25, be rotated in a clockwise direction so as to screw the hub downwardly on the threaded end of the post, the hub will eventually tightly clamp and bind the turret against the face of the tool of the post base. When, however, the handle is rotated in a direction anti-clockwise, the first movement of the handle will tend to unclamp the turret, and that, when the member 33 engages the bolt, the latter will be depressed so as to unlock the turret and permit its rotation.

The binding lever is provided also with means for effecting the indexing of the turret. In the illustrated embodiment of the invention, this consists of a plunger 35 which is located in a cylindrical socket 36 formed in the under side of the hub 24. A spring 37, placed in said socket, exerts a constantly downward pressure upon the plunger. The lower end of the plunger is oppositely beveled, as shown in Fig. 3, and it is adapted to engage any one of a series of four radial V-shaped grooves or recesses 38 formed in the end of the turret. These grooves are so located that the plunger will not enter any one of them until after the hub has been rotated a sufficient distance to effect the unlocking of the turret by the means hereinbefore described, the lower end of the plunger in the meantime riding on the upper face of the turret. The plunger is provided with a stem 39 which extends upwardly through the hub and is provided on its upper end with a knob 40 secured thereto by a pin 41. For the purpose of holding the plunger against rotation under normal conditions, the knob 40 has a depending pin 42 extending into a socket or recess 43 formed in the upper part of the hub 24. If desired, the plunger may be drawn upwardly against the pressure of the spring 37 far enough to lift the pin 42 from the recess 43, and the knob 40 is rotated slightly so that the pin 42 will rest upon the upper face of the hub and thus hold the plunger in inactive position.

In operation, when the clamping lever has been moved in an anti-clockwise direction sufficiently to unclamp the turret and move the bolt in to an inactive position, the plunger 35 enters one of the radial grooves 38, and thereafter the continued movement of the handle 25 effects the rotation of the tool. Thus the turret may be advanced or rotated one step to bring another tool into operative position. At this point the bolt again moves into locking position and holds the turret against further movement. Thereupon the handle 25 may be moved in a clockwise direction so as to bind the turret firmly against the face of the base 15.

On sheet 2 of the drawings, I have illustrated a turret provided with tools such as may be employed for performing certain operations upon the work. The turret is shown as having a series of sockets in the sides thereof, said sockets being indicated at 44. Such sockets may be radial of the axis of the turret or may be tangential to an imaginary circle inscribed about such axis, so as to locate the tools in the proper relation to the work in accordance with the functions to be performed thereby. The tools comprise cutters, such as indicated at 45, which are secured to cutter holders 46. I shall not attempt to herein describe the particular mechanism which is utilized for securing cutters in their holders, as such

means are illustrated and described in Letters Patent No. 1,242,708, previously granted to me. Each of the cutter holders may be provided with a shank 47 to fit one of the sockets 44 in the turret. When the shanks are cylindrical as illustrated, I may employ the following mechanism for clamping them in position. The turret is provided with cylindrical apertures 48 which are transverse in respect of the sockets 44 and which intersect the same as shown in Fig. 8. In the recesses 48 I provide two cylindrical clamping members 49, 50, which may be drawn together by a bolt 51, the head 52 of which engages the clamp 50 and the threaded end of which is screwed into the clamp 49. A compression spring 53 may be placed between the two clamps with its ends arranged in sockets therein for the purpose of forcing the clamps apart when the bolt 52 is unscrewed. The two clamps are provided with concave faces *e* and *f* for engaging the cylindrical shank 47. From this description, it will be apparent that, when the shank has been inserted in the socket 44 and loosely into engagement with the clamps 49 and 50, the bolt 52 may be rotated so as to draw the clamps together, and, by their combined wedging action on the shank 47, bind it firmly in its socket against danger of rotation. On loosening the clamping mechanism, each tool holder may be rotatively adjusted and then secured after such adjustment.

I have not deemed it necessary to show more than one turret with the proper equipment of tools, for those skilled in the art will readily understand that other turrets having other forms of tools for turning, threading or facing the work, may be readily provided to replace the turret which I have shown.

Having thus explained the nature of my said invention and described a way of making and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, what I claim is:

1. An attachment for a metal-working machine, comprising a vertical non-rotary post provided with a base and having a reduced upper externally-threaded portion and an enlarged non-threaded lower portion, a tool-carrying turret journaled directly on the unthreaded portion, a lever in threaded engagement with said post and overlapping the turret and adapted to swing about the axis of said post to clamp said turret against said base, means on said lever for indexing the turret, and means controlled by said lever as it moves about said axis for positively locking and unlocking said turret.

2. An attachment for a metal-working machine, comprising a post, a tool-carrying turret thereon and having spaced grooves or recesses on the upper end, a lever mounted on said post and adapted to swing about the axis thereof, means controlled by said lever for locking and unlocking said turret, and a spring-stressed plunger carried by said lever for engaging said grooves and indexing the turret when said lever is moved in the proper direction.

3. An attachment for a metal-working machine, comprising a tool-carrying turret, a post provided with a base and having a non-threaded portion on which said turret is journaled, and having an external threaded end portion, a clamp lever in threaded engagement with the end portion of said post for clamping the turret against said base, and means mounted on and movable with said lever for engaging and indexing the turret.

4. An attachment for a metal-working machine, comprising a tool-carrying turret, a post provided with a base and having a non-threaded portion on which said turret is journaled, and having a threaded end portion, a clamp lever in threaded engagement with said post for clamping the turret against said base, a lock for locking said turret to said post and base, and means mounted on said lever for engaging and moving said lock to inactive position when the lever is rotated to unclamp said turret.

5. An attachment for a metal-working machine, comprising a tool-carrying turret, a stationary post provided with a base and having a non-threaded portion on which said turret is journaled, and having a threaded end portion, a clamp lever in threaded engagement with said post for clamping the turret against said base, means mounted on and movable with said lever for engaging the upper end of and indexing the turret, a lock extending through said turret for locking said turret to said base, and means mounted on and movable with said lever for disengaging the lock from said turret.

6. An attachment for metal-working machines, comprising a post having a base, an unthreaded portion and a threaded end portion, a turret journaled on the unthreaded portion of said post and resting on said base, said turret having spaced recesses in its upper end, a clamp lever screwed on the threaded portion of said post for clamping said turret against said base, a handle on said clamp member for rotating it, and a spring-pressed plunger on said member for engaging said recesses and indexing the turret when the handle is operated to release said clamp member.

7. An attachment for metal-working machines, comprising a non-rotary post having a base, a turret journaled on said post and resting on said base, a clamp lever threaded on said post for clamping said turret against said base, a handle on said

clamp member for rotating it, a spring-stressed locking member slidably mounted in said post for automatically locking said turret to said post, and a movable member on said clamp member for engaging and moving said locking member to unlocked position.

8. An attachment for metal-working machines, comprising a post having a base and also having a non-threaded portion and a threaded end portion, a turret journaled on the unthreaded portion of said post and resting on said base, a clamp member threaded on the end portion of said post for clamping said turret against said base, a handle on said clamp member for rotating it, a locking member seated in the post for locking said turret to said post, and a pivoted wedge member on said clamp member for moving said locking member to unlocked position when said clamp member is rotated to release said turret.

9. An attachment for a metal-working machine, comprising a tool-carrying turret having a series of recesses, a post on which said turret is journaled and having a base, a lever hinged on said post, a locking member arranged to slide in said post and engage any one of said series of recesses, and means carried by said lever for moving said locking member to inactive position.

10. An attachment for a metal-working machine, comprising a tool-carrying turret having a series of recesses, a post on which said turret is journaled and having a base, a lever hinged on said post, a locking member arranged to slide in said post and engage any one of said series of recesses, and a member pivoted to said lever and arranged to engage and move said locking member to inactive position when the lever is moved in one direction, and to ride over the said locking member when the lever is moved in the opposite direction.

11. An attachment for a metal-working machine, comprising a tool-carrying turret having a series of recesses, a post on which said turret is journaled and having a base, a lever hinged on said post, a locking member arranged to slide in said post and having a lug extending into said base and adapted to enter one of said recesses to lock the turret to said base, and means on said lever for moving said locking member to inactive position to release said turret.

12. The combination with a support, of a cutter post having a base adapted to rest on said support, means for removably clamping said post on said support, a handle lever having a hub in threaded engagement with the post, a tool-carrying turret journaled on said post between said hub and said base, and adapted to be clamped against said base by said support, means on said hub for indexing the turret, a normally active turret lock, and means on said hub, operable by the movement of said hub in releasing the turret, to move the lock to inactive position.

13. An attachment for metal-working machines, comprising a center post having a base adapted to be secured to a suitable support, a ringlike tool-carrying turret journaled on said post, a handle lever hung on said post to rotate thereon, said turret having a series of recesses and said lever having a spring-pressed plunger for engaging said recesses and indexing the turret, a turret lock seated in a groove in said post and arranged to engage recesses in the turret to lock it against rotation, and means on said lever arranged to move said lock to inactive position.

14. An attachment for metal-working machines, comprising a center post having a base adapted to be secured to a suitable support, a ringlike tool-carrying turret journaled on said post, a handle lever hung on said post to rotate thereon, said turret having a series of recesses and said lever having means for engaging said recesses and indexing the turret when said lever is rotated, a spring-stressed turret lock seated in a groove in the post and normally engaging said turret, and a pivoted wedge on said lever for moving said lock to inactive position when the lever is moved in one direction, and to pass freely over said lock when the lever is moved in the opposite direction.

15. An attachment for metal-working machines, comprising a vertical non-rotary center post having an integral base adapted to be secured upon a suitable support and also having its upper end externally threaded, and a clamp adapted for threaded engagement with said post, and having means for indexing the hereinafter-mentioned turret, of a ringlike turret removably journaled on said post, seated on said base so as to be clamped thereagainst by said clamp and having a set of cutters secured thereto, said turret being removable from said post on unscrewing said clamp, whereby it may be replaced by a like turret having a different set of tools.

16. An attachment for metal-working machines, comprising a vertical non-rotary center post having a base adapted to be secured upon a suitable support and having its upper end externally threaded, a clamp adapted for threaded engagement with said post, a ringlike turret removably journaled on said post between the base thereof and said clamp so as to be clamped against said base by said clamp and having a set of cutters secured thereto, said turret being removable from said post on unscrewing the clamp, whereby it may be replaced by a like turret having a different set of tools, and a vertically movable turret lock mounted on

said post and controlled by said clamp for automatically locking either turret in indexed positions.

17. An attachment for metal-working machines, comprising a vertical non-rotary center post having a base adapted to be secured upon a suitable support and having an externally threaded portion at its upper end, a clamp adapted for threaded engagement with said threaded portion of said post, of a ringlike turret removably journaled on said post between the base thereof and said clamp so as to be clamped against said base by said clamp and having a set of cutters secured thereto, said turret being removable from said post, whereby it may be replaced by a like turret having a different set of tools, means on said clamp for indexing each of such turrets when said clamp is rotated to unclamp the turret, a vertically movable lock on said post for automatically locking each of such turrets to said base in indexed positions, and means on the clamp for depressing said lock when said clamp is rotated to unclamping position.

In testimony whereof I have affixed my signature.

FRED P. LOVEJOY.