Aug. 5, 1924. 1,503,995

J. L. PERKINS ET AL

UNIVERSAL TURNING FIXTURE

Filed May 23, 1922 2 Sheets-Sheet 1

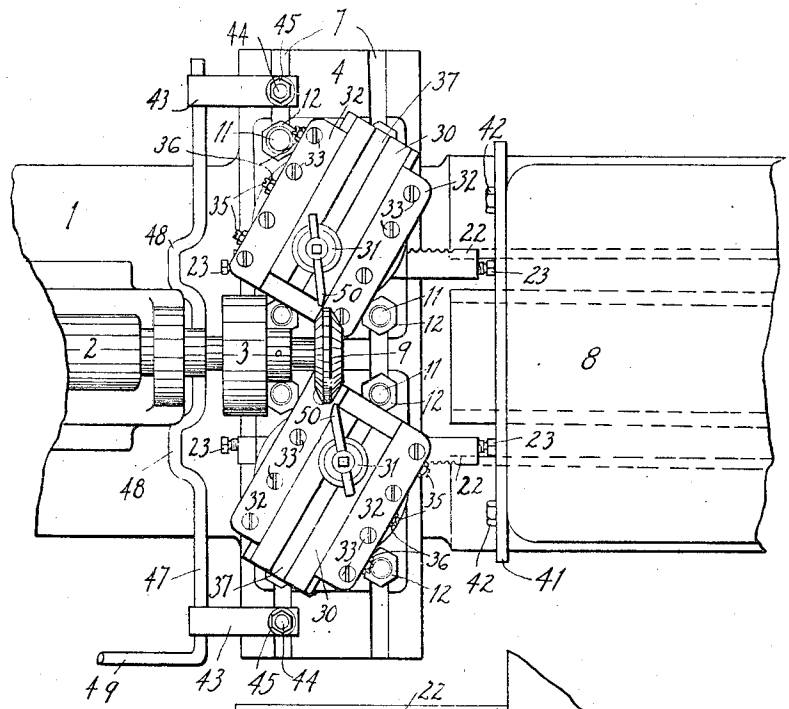


FIG. 1.

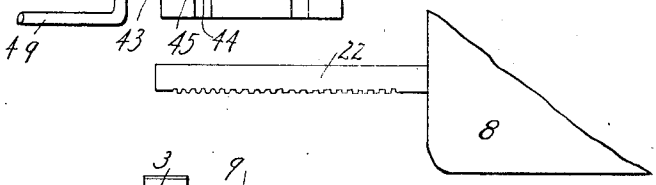


FIG. 2.

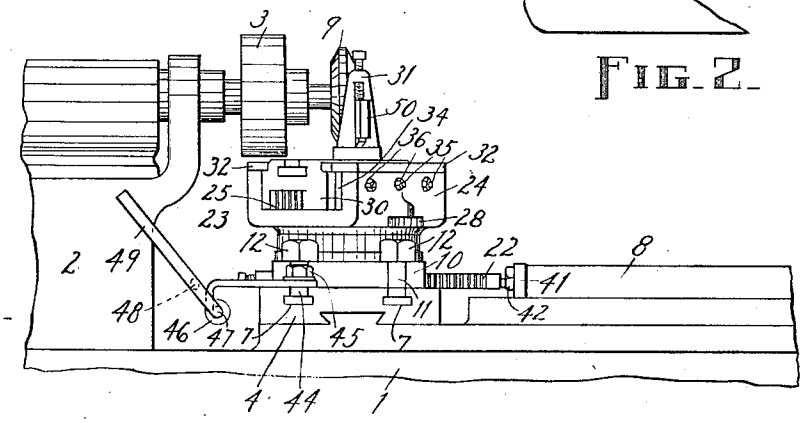


FIG. 3.

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FIG. 4.

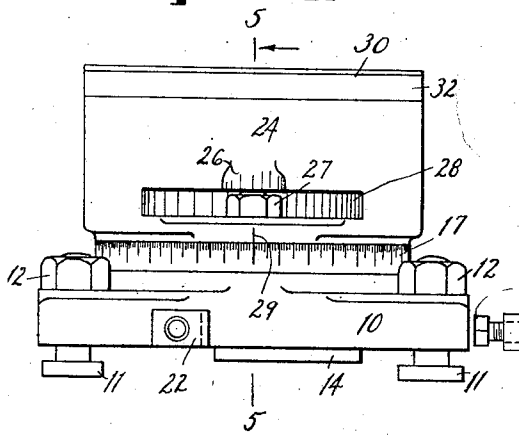
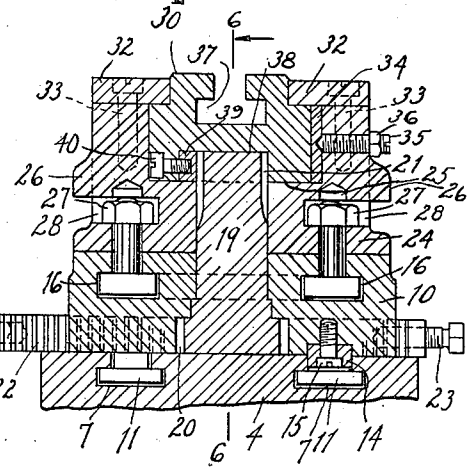


FIG. 5.



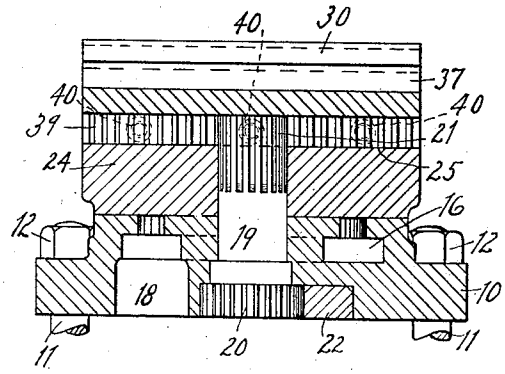


FIG. 6.

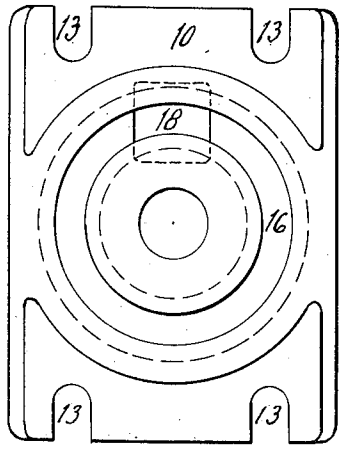


FIG. 7.

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Patented Aug. 5, 1924. 1,503,995

UNITED STATES PATENT OFFICE.

JULIAN L. PERKINS, OF WEST SPRINGFIELD, AND LOUIS E. DELOGHIA, OF AGAWAM, MASSACHUSETTS, ASSIGNORS TO PERKINS APPLIANCE COMPANY, OF SPRINGFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

UNIVERSAL TURNING FIXTURE.

Application filed May 23, 1922. Serial No. 562,975.

To all whom it may concern:

Be it known that we, JULIAN L. PERKINS, a citizen of the United States of America, and a resident of West Springfield, in the county of Hampden and State of Massachusetts, and LOUIS E. DELOGHIA, a subject of the King of Italy, residing at Agawam, in said county and State, have invented a new and useful Universal Turning Fixture, of which the following is a specification.

Our invention relates to improvements in attachments or fixtures for turret lathes, and other machines of a more or less similar character, and resides in rotatably adjustable, supporting means adapted to be adjustably mounted on the transverse bed-plate of the machine to which the fixture is applied, a reciprocable, tool-post or tool-holder, sliding member mounted in said supporting means, and actuating or operating mechanism for said sliding member, said mechanism being adapted to be operated by a reciprocating member of said machine, together with retracting means when required, and any other parts and members that may be necessary or desirable in order to render the fixture complete and serviceable in every respect, the elements which enter into the construction of the fixture, and the auxiliary and subsidiary parts and members being peculiarly constructed and arranged to form new and novel combinations, all as hereinafter set forth.

The primary object of our invention is to produce a fixture of the class described which is comparatively simple in construction and operation, can be applied to practically any turret lathe, or chucking and turning machine, wherein there are rotary work-holding means, a reciprocable member such as a turret, and a supporting member located for adjustment between the said work-holding means and said reciprocating member, and wherewith a tool is held in proper position for action on either cylindrical or conical surfaces, such, for example, as the periphery of a cylindrical object, on the one hand, or the oppositely-disposed, beveled surfaces of a bevel-gear blank, on the other hand, and automatically moved through the cutting field, whereby the surface to be turned down receives the required cut. The utility of a machine equipped with this fixture is greatly enhanced and the field or range of operation of the machine enlarged.

Another object is to provide a fixture of this character with means whereby the same may be easily and quickly attached to the machine in connection with which it is to be used, and as easily and quickly detached and removed therefrom, and which, furthermore, is operated by and in connection with the old machine elements, so that it is unnecessary materially to alter or change the structure of the machine or of its elements in order to utilize said fixture. Thus two valuable and important advantages are found—one, that the machine undergoes practically no change or alteration in its structure and functions, because of the application thereto of the fixture, and the other, that the fixture can at will be attached to and detached from said machine, whereby the latter is made to function with the additional advantages imparted to the same by the fixture, or, in the absence of said fixture, is able to function in the usual manner and as though the fixture had never been applied thereto.

A further object is to provide the fixture with adequate means of adjustment to endow the same with a range of operation that is of the widest character.

Still another object is to provide a fixture that can be reversed so as to be capable of being used either side of the vertical plane in which the axis of the work is located.

Other objects and advantages will appear in the course of the following description.

It is usual to furnish for each lathe or machine two of the fixtures proper, but frequently only one is used at a time, especially when peripheral surfaces of cylindrical objects are to be turned.

We attain the objects and secure the advantages of our invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top plan of a pair of turning fixtures, each of which embodies a practical form of our invention, such fixture being mounted on the transverse bed-plate of a turret lathe, the retracting device, which is auxiliary to said fixtures, and the necessary cooperating elements of such lathe also appearing; Fig. 2, a detail in top plan illustrating a modification in the operating mem-

ber of the fixture; Fig. 3, a front elevation of the lathe elements and a corresponding end elevation of the front fixture and of said retracting device; Fig. 4, an enlarged, right-hand side elevation of the rear fixture shown in Fig. 1; Fig. 5, an enlarged, transverse, vertical section through said rear fixture, taken on lines 5—5, looking in the direction of the associated arrow, in Fig. 4; Fig. 6, an enlarged, longitudinal, central, vertical section through said fixture, on lines 6—6, looking in the direction of the associated arrow, Fig. 5; and, Fig. 7, an enlarged top plan of the base block of said fixture.

Similar characters of reference designate similar parts throughout the several views.

The parts of the machine or lathe illustrated in connection herewith, and to which our fixture is attached, comprise portions of a frame or bed 1, a work-head 2 mounted on said bed and carrying a chuck 3, a transverse bed-plate 4 mounted in the usual manner for adjustment longitudinally and transversely on said bed, and having therein inverted T-slots 7—7, and a turret base-plate 8 mounted to reciprocate longitudinally on said bed. In Figs. 1 and 3 a bevel-gear blank 9 is shown supported from the chuck 3.

Mounted on the bed-plate 4 are two base blocks 10, one behind the other. These blocks form parts of the two fixtures hereinbefore referred to, and which are just alike, but used and illustrated in relatively reverse positions. It follows, therefore, that a detailed description of one of the fixtures is sufficient, and this we will now give, the same being applied to the rear fixture, or to a fixture disposed as is said rear fixture.

The rear base block 10 (and the front one as well, of course), is secured to the bed-plate 4 by means of four bolts 11, which have their heads and portions of their shanks in the T-slots 7, and the same number of nuts 12, the ends of said block being slotted, as shown at 13 in Fig. 7, to receive said bolts. Upon loosening the nuts 12 the block 10 can be adjusted longitudinally of the bed-plate 4. A spline 14 is let into the underside of the block 10 and projects below the bottom of said block to be received into the upper portion of one of the T-slots 7, said spline being secured to the block by means of one or more screws 15 which pass upwardly through the spline and are tapped into the block—see Fig. 5. The head of each screw 15 is countersunk in the spline 14 above. The spline 14 holds the block 10 in exact alignment with the bed-plate 4, but does not prevent said block from being adjusted on said bed-plate.

The bottom portion of the base block 10 is approximately rectangular, but a cylindrical part rises in the center of the same and has therein opening through the top thereof an annular, inverted T-slot 16, while on the outside of such cylindrical part is a scale 17, such scale here being on the side nearest to the turret base-plate 8. A rectangular recess 18 opens through the bottom of the block 10 and into the T-slot 16. Centrally journaled in the block is a vertical spindle 19 which is provided at the lower terminal base with gear-teeth 20, and at the upper terminal with gear-teeth 21. The spindle 19 rests at the base on the bed-plate 4, and the length of said spindle is such that the gear-teeth 21 are located some distance above the plane of the top of the block. The T-slot 16 is concentric with the spindle 19. Slidingly arranged transversely in the block 10 and on the bed-plate 4 is a rack 22. The rack 22 intermeshes with the gear-teeth 20, and is on the side of the spindle 19 which is toward the vertical, longitudinal, central plane of the machine. The rack 22 is long enough to extend at both ends beyond the block 10, and may have tapped into each of said ends a bolt 23. The actuating force for the rack 22 is applied to the heads of the bolts 23, and the length of the stroke of said rack may be increased or decreased by proper adjustment of said bolts, as presently will be fully explained.

Mounted on the raised, cylindrical portion of the base block 10 is a head 24. This head has a cylindrical base portion above which it is approximately rectangular. The spindle 19 with the gear-teeth 21 extends upwardly through the center of the head 24, and projects into a slot 25 which opens through the top of said head and extends longitudinally through the center of the rectangular portion of the same. The head 24 may be adjusted on the block 10 and about the spindle 19 so as to locate the slot 25 at any desired angle. Oppositely-disposed bolts 26 and nuts 27 are provided to secure the head 24 rigidly in place on the block 10, after said head has been properly adjusted on said block. The heads and portions of the shanks of the bolts 26 are located in the T-slot 16, and oppositely-disposed recesses 28 in the head 24 receive the upper terminals of said shanks and the nuts 27. An indicator mark 29 is provided on the outside of the circular base of the head 24 to cooperate with the scale 17, whereby means are provided for determining the proper amount of adjustment of said head on the block 10. The recess 18 is provided in the block 10 to enable the bolts 24 to be introduced into the T-slot 16.

Arranged to reciprocate in the slot 25 in the head 24 is a slide 30 for a tool-post 31, or other tool holder. The slide 30 is held down on the bottom of the slot 25 by a pair of gibs 32, which gibs are secured to the top of the head 24 by means of bolts 33, and extend inwardly onto shouldered parts of said

slide. A gib 34 and a plurality of screws 35 and set-nuts 36 afford lateral takeup means for the slide 30, said gib being introduced between one side of said slide and the adjacent side of the slot 25, said screws being tapped into and through said side to engage the gib, and said set-nuts being mounted on the protruding terminals of the screws outside of the head 24. This takeup means is of the same general character as that usually employed in connection with the sliding machine elements. Extending lengthwise through the center of the slide 30 and opening through the top thereof is an inverted T-slot 37. There is a longitudinal slot 38 in the bottom of the slide 30 to accommodate the upper, serrated terminal of the spindle 19, and to receive a rack 39. The rack 39 extends the entire length of the slot 38, and intermeshes with the gear-teeth 21. A plurality of screws 40 is employed to hold the rack 39 in place in the slot 38, said screws passing through the side of the slide 30 with which said rack is in contiguity, and being tapped into said rack. Obviously, the rack 39 is always in engagement with the gear-teeth 21, regardless of the amount of adjustment which may be given to the head 24 around the spindle 19 as an axis.

It will now be seen that, when the rear rack 22 is actuated to the left, it carries with it the gear-teeth 20 on the spindle 19, and thus causes said spindle to be rotated or partially rotated in the same direction, with the result that a forward movement is imparted to the slide 30, through the medium of the gear-teeth 21 on said spindle and the rack 39 attached to said slide; and that similar results are attained when the forward rack 22 is actuated to the left, except that the slide 30 associated with said last-named rack is actuated rearwardly. And that when the two racks 22 are actuated to the right, the front and rear slides 30 are respectively actuated forwardly and rearwardly, or away from, instead of toward as in the first instance, the vertical, longitudinal, central plane of the lathe.

The bolts 23 in the right-hand ends of the racks 22 are in the path of the base-plate 8, or of a bar 41 secured to the forward end of said base-plate by bolts 42—42. The bar 41, or an equivalent member, is provided in the event the forward end of the base-plate 8 is uneven or otherwise unsuitable for properly contacting with the bolts 23 at the adjacent ends of the racks 22. The bar 41 affords a suitable contacting member for the right-hand bolts 23, regardless of the amount of adjustment that may be given the base blocks 10 longitudinally on the bed-plate 4.

The retracting device for either or both racks 22 is described below.

Two angular brackets 43 are secured to the bed-plate 4 adjacent to the ends thereof by means of a pair of bolts 44 and of nuts 45, the heads and portions of the shanks of said bolts being received in the left-hand T-slot 7, and said nuts being screwed onto said bolts above said brackets. The brackets 43 extend to the left beyond the bed-plate 4, and then turn downwardly to form bearings, as represented at 46 in Fig. 3, for a rock-shaft 47. The rock-shaft 47 is provided between the brackets 43 with offsets 48—48, and has at the front end a handle 49. The offsets 43 are in the paths of the left-hand bolts 23, and long enough to be operative on said bolts when the positions laterally of said bolts are changed, and the arrangement and construction of the parts are such that, after the racks 22 have been actuated to the left by the base-plate 8, said racks are actuated in the opposite direction by said offsets, when the handle 49 is grasped and the rock-shaft 47 actuated thereby to carry said offsets to the right. Normally the handle 49 and the offsets 48 are positioned with an upward inclination to the left, so that said offsets are out of the way of the left-hand bolts 23. In actuating the racks 22 to the right, the handle 49 is carried over in that direction and takes with it the rock-shaft 27 and the offsets 48. After the racks 22 have been returned by the retracting device to their right-hand or normal positions, the handle 49 is again thrown over to the left.

A turning tool 50 is shown in position in each of the tool-posts 31. These tools are arranged and positioned in the tool-posts in such a manner as to make the required cuts on the oppositely-disposed, beveled surfaces of the blank 9.

It is understood that the tool-posts 31 are mounted on and secured to the slides 30 in the usual manner, said slides being provided with the T-slots 37 to facilitate securing said tool-posts thereto.

In practice, assuming that the bed-plate 4 is properly located on the bed 1, that the blank 9 is supported in proper position by the chuck 3, that the tools 50 are in place in the tool-posts 31, which latter are secured at the required points on the slides 30, and that the base-plate 8 is at the right-hand end of its travel, the nuts 12 are loosened and the base blocks 10 moved toward or away from the longitudinal, central, vertical plane of the lathe to whatever extent may be required, when said nuts are retightened. These adjustments are for the purpose of locating the cutting ends of the tools 50 quite near the blank 9, when the racks 22 are in their normal positions. It should be noted here, perhaps, that the tools 50 are so arranged in the tool-posts 31 that the cutting ends of said tools are properly presented to the work, and in readiness to cut the right- and left-hand, beveled surfaces of the blank 9, which are the surfaces to be

turned down by said tools. Next the nuts 27 are loosened and the heads 24 are rotatably adjusted so as to locate, with the aid of the index mark 29 and the scale 17, the slides 30 at the angles required to carry the tools through the cutting fields, after which said nuts are retightened. The aforesaid angles are those which correspond with the angles of the beveled surfaces to be cut, or which determine the directions of movements of the slides 30, when actuated by the spindles 19 through the medium of the gear-teeth 21 and the racks 39, necessary to cause the tools 50 to cut said surfaces at the required angles. The moving parts of the lathe are now set in motion, so that the blank 9 is caused to revolve, and the base-plate 8 is caused to advance. As the base-plate 8 advances, the bar 41 is carried into contact with the right-hand bolts 23, if not already in contact therewith, and forces the racks 22 to the left. The racks 22, through the medium of the intervening parts and members, cause the slides 30 to be actuated inwardly or toward the central, longitudinal, vertical plane of the lathe, with the result that the cutting ends of the tools 50 are carried into contact with and actuated across and beyond the beveled surfaces of the revolving blank 9, thus cutting such surfaces to the required sizes and at the required angles. These cuts are made and the cutting ends of the tools 50 carried inwardly beyond the beveled surfaces of the blank 9 by the time the base-plate 8 has completed its forward stroke. The continued action of the lathe elements now retracts the bed-plate 8, and the operator throws the handle 49 over to the right to force the racks 22 in the same direction and into their normal positions, with the right-hand bolts 23 either against the bar 41, or in readiness to be contacted with by said bar, as the case may be, when the base-plate 8 advances again. Meanwhile the lathe is stopped, and the finished blank 9 is removed, after which another blank may be placed in position ready to be cut or turned in the same manner as was the first, when said lathe is started again.

The travel of each slide 30 and therefore of the tool 50 carried thereby is determined by the length of the stroke of the associated rack 22, and such stroke is determined by the amount of travel of the base-plate 8, but may be regulated or varied more or less by means of the bolts 23 at the ends of said rack. Upon turning in the right-hand bolt 23, the stroke imparted to the rack by the base-plate is necessarily and correspondingly decreased, and, upon turning out said bolt, said stroke is necessarily and correspondingly increased. The left-hand bolt 23 must be adjusted outwardly to the extent that the right-hand bolt is adjusted inwardly, and vice versa, otherwise the rack would not be returned to normal position when actuated to the right by the adjacent offset 48.

The parts and members of each fixture are capable of being adjusted to meet practically any other condition required, and either of the two fixtures can be used without the other, as previously observed.

Both fixtures and the brackets 43 can, when no longer required, be easily and quickly removed from the bed-plate 4. The bar 41 can also be removed without difficulty should occasion require.

The retracting device which includes the rock-shaft 47, if not considered as an actual part of the fixture, is an important auxiliary thereto, inasmuch as this or some other means must be provided for retracting the racks 22, unless the same be attached to the base-plate 8, as explained below.

One or both of the racks 22 may be rigidly attached to the base-plate 8, so that they travel in both directions with said plate. In Fig. 2, we have shown one of the racks attached to the base-plate. In this case the racks perform the same functions as in the other case, but the base blocks 10 could not be adjusted longitudinally on the bed-plate 4, unless the means for attaching said racks to said bed-plate were of an adjustable character.

When the head 24 of either fixture is rotatably adjusted, the rack 29 is moved or partially rotated on the intermeshing gear-teeth 21, without disconnecting or otherwise disturbing the driving connection for the slide 30 carried by said head.

More or less change in the shape, size, construction, and arrangement of some or all of the parts of our invention, in addition to those hereinbefore specifically pointed out, may be made without departing from the spirit of said invention or exceeding the scope of what is claimed.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, in a turning fixture, with supporting means adapted to be mounted on a turning machine provided with a moving member, and a rack slidingly arranged in said means, said rack being provided at one extreme end with a lengthening and shortening member which is in the direct path of said moving member, and at the other extreme end with a lengthening and shortening member, and retracting means adapted by a lever action to act on said last-named lengthening and shortening member, of a tool-carrying slide adapted to be reciprocated in said supporting means, and provided with a rack, and a spindle

journaled in said supporting means, and provided with teeth to intermesh with the teeth of said racks.

2. The combination, in a turning fixture, with supporting means adapted to be mounted on a turning machine provided with a moving member, a rack arranged to slide in said means, and provided at the ends with bolts for the purpose of increasing or decreasing the length of said rack over all, the bolt at one end of said rack being in the direct path of said moving member, and means adapted to be actuated into engagement with said bolt at the other end of said rack to retract the latter, said last-named means having a lever action on said last-named bolt, of a tool-carrying slide arranged to be reciprocated in said supporting means, and provided with a rack, and a spindle journaled in said supporting means, and provided with teeth to intermesh with the teeth of said racks.

3. The combination, in a turning fixture, with supporting means adapted to be mounted on a turning machine provided with a moving member, and a rack arranged to slide in said means, one end of said rack being in the path of said moving member, a tool-carrying slide arranged to be reciprocated in said supporting means, and provided with a rack, and a spindle journaled in said supporting means and provided with teeth to intermesh with the teeth of said racks, of brackets secured to said machine, and a rock-shaft journaled in said brackets, said rock-shaft having a handle and an offset, which latter is adapted to act on the opposite end of said first-named rack to retract the same, when said handle is swung in one direction.

4. The combination, in a turning fixture, with a base block adapted to be mounted on a turning machine, said block having an inverted T-slot therein, and a rack slidingly arranged in said block, of a head mounted on said block, bolts and nuts to secure said head to said block, the heads and portions of the shanks of said bolts being in said T-slot, a slide mounted to be reciprocated in said head, and provided with a rack, and a spindle journaled in said block and head, and provided with teeth to intermesh with the teeth of said racks, the construction and arrangement of parts being such that, when said nuts are loosened, said head can be adjusted on said block about said spindle as an axis.

5. The combination, in a turning fixture, with a base block adapted to be adjustably and detachably mounted on the bed-plate of a turning machine having a moving member, a head mounted on said block, a slide mounted to be reciprocated in said head, and provided with a rack, a rack slidingly arranged in said block and having one end in the path of said moving member, and a spindle journaled in said block and head, and provided with teeth to intermesh with the teeth of said racks, of brackets adapted to be detachably connected with said bed-plate, and a rock-shaft journaled in said bracket, said rock-shaft having a handle and an offset, which latter is adapted to act on the other end of said second-named rack to retract the same, when said handle is thrown over in one direction.

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LOUIS E. DELOGHIA.

Witnesses:
R. E. ALLBEE,
F. A. CUTTER.