No. 748,726. PATENTED JAN. 5, 1904.

B. M. W. HANSON.

TOOL AND BACK REST HOLDER.

APPLICATION FILED SEPT. 25, 1902.

NO MODEL.

Fig. 1

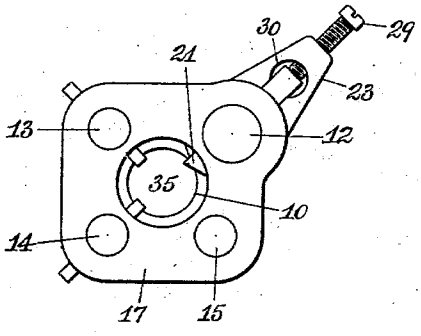


Fig. 2

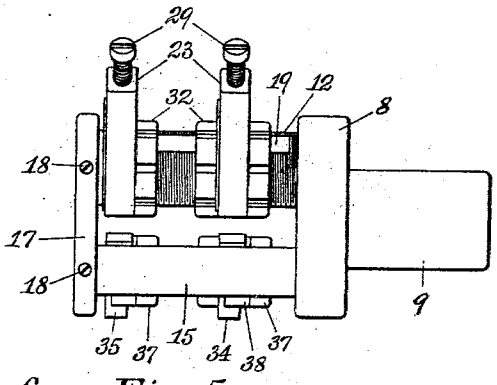


Fig. 6

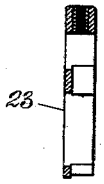


Fig. 3

Fig. 5

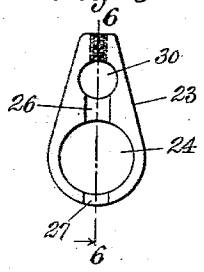


Fig. 4

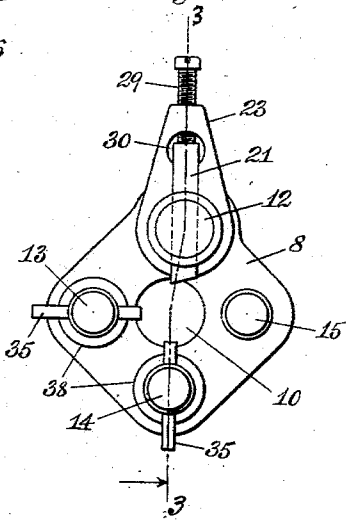
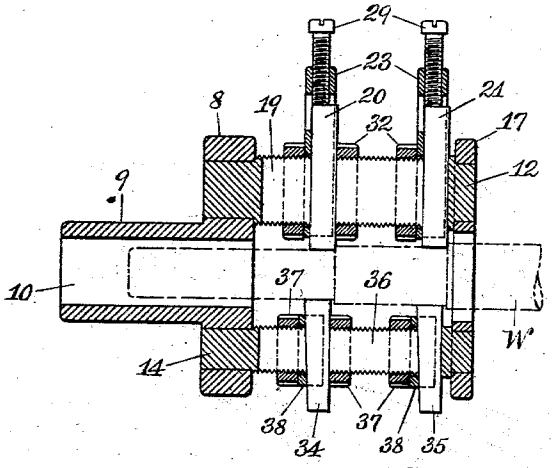


Fig. 7



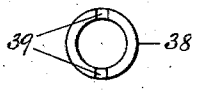


Fig. 8



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 748,726. Patented January 5, 1904.

UNITED STATES PATENT OFFICE.

BENGT M. W. HANSON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO PRATT & WHITNEY COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF NEW JERSEY.

TOOL AND BACK-REST HOLDER.

SPECIFICATION forming part of Letters Patent No. 748,726, dated January 5, 1904.

Application filed September 25, 1902. Serial No. 124,780. (No model.)

To all whom it may concern:

Be it known that I, BENGT M. W. HANSON, a citizen of Sweden, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Tool and Back-Rest Holders, of which the following is a full, clear, and exact specification.

This invention relates to improvements in tool-holders of the class commonly known as "box-tools," which are usually employed in tool-turrets of lathes, screw-machines, and similar machines. As heretofore commonly used these tool-holders are of box-like form cut out of a solid piece of metal, the tools and other appurtenances being secured to the walls of the box, which walls more or less interfere with the examination of the work while under operation, the application of oil thereto, and the egress of the chips cut from the work. Moreover, these tools as heretofore made are difficult to adjust and limited in the extent of adjustment, besides being limited to the number of tools for which each device is originally planned.

The principal object of the present invention is to provide a simple and inexpensive tool-holder of this class which shall be open on all sides to permit of the ready inspection of the work being operated upon, to permit the ready and ample application of oil while allowing the free escape of the chips, and to permit the greatest number possible of tools to be employed when required, and to be readily adjusted and be rigidly held when in operation upon the work.

The invention further comprises other details of improvement, which will be hereinafter described, and pointed out in the claims.

Figure 1 of the drawings is an end view, and Fig. 2 a side view, of one of these improved tools. Fig. 3 is a side view in section, taken substantially along the line 3 3 of Fig. 4, while Fig. 4 is an end view similar to that of Fig. 1, but with the yoke-plate removed to show the parts behind it. Fig. 5 is an end view, and Fig. 6 a side view, in section, taken on the line 6 6 of Fig. 5, showing the details of my improved tool-clamp. Fig. 7 is an end view, and Fig. 8 a side view, of one of the collars employed for clamping the tapering back-rest jaws.

The supporting base-plate 8 of this device is provided with means, as the stem or shank 9, for securing it to the tool-holding turret of the lathe or other machine with which it is to be employed. An aperture 10 is preferably made through the plate and the stem concentric with the position of the work W to allow the latter when of extended length to pass through the tool, as indicated by dot-and-dash lines in Fig 3. A series of posts 12, 13, 14, and 15 are rigidly secured to the plate 8, projecting forwardly therefrom in parallel relation with each other and with the work, and the forward ends of these plates when of extended length are preferably provided with a yoke-plate 17, which serves to connect and firmly support the outer ends of the posts against the strains due to the action of the cutting-tools and their coöperating back-rests, those strains being mainly radial or tangential, according to the character of the cut and the form of the tool employed. So far as these strains are radial they are balanced in opposite directions by the reaction of the tool and the back-rest jaws upon each other, and in that case the yoke-plate sustains the tool-posts against the outward thrust. The tangential strains are resisted by the circumstance that the posts are tied firmly together by the yoke-plate substantially as though integral, and being thus held against springing outwardly they are maintained in concentric relation to the work even though the tangential strain should be sufficient to twist all four posts slightly, so that these strains would not appreciably affect the accuracy of the work. As the invention is herein illustrated only three of the posts—namely, the posts 12, 13, and 14—are occupied by tools or back-rests, the fourth post 15 serving merely as a stiffening or sustaining member for the fourth or unoccupied corner of the rectangle formed by the four posts. Obviously, however, this post 15 may be utilized for supporting a back-rest jaw or may be utilized either in connection with or independently of the post 12 for supporting some of the tools, or this post may be dispensed

with and the three remaining posts be arranged at substantially equal intervals around the work. Each of the posts 12, 13, and 14 are provided with diametrically-disposed slots extending substantially from end to end of the space between the plates 8 and 17 and these slots serving to receive the tools and maintain them in proper radial relation to the work, while allowing the tools to be readily adjusted longitudinally of the posts. The outside circumferential surfaces of these posts are also threaded substantially from end to end of the space between the plates 8 and 17 and are provided with threaded nuts, which serve for adjusting the tools and jaws longitudinally and for clamping them in their adjusted positions.

The tool-post 12 is provided with a slot 19, which extends longitudinally of the post to the extent required for the desired range of adjustment of the tools. The cutting-tools 20 and 21 are fitted closely in the slot 19 with only sufficient freedom to allow them to be moved as required, so that the tools are firmly held by the posts against the tangential strains due to the cutting operations. As a means for holding the tools against movement longitudinally they are provided with a clamping device consisting of the tool-clamp 23. (Shown in detail in Figs. 5 and 6.) This tool-clamp has an aperture 24, which fits upon the outside of the threads of the post 12, so that it may slide longitudinally thereon, and is also provided with the recesses 26 and 27 for receiving the tools 20 and 21 at the points where those tools project from the slot 19 on opposite sides of the tool-post, so that the tools serve to maintain the tool-clamp in its radial or other desired relation to the work. The tool-clamps are extended beyond the rearward ends of their respective tools and are provided with the adjusting-screws 29, which abut against the ends of the tools and serve to adjust the tools radially to position, serving also to sustain the tools against the radial thrust due to the cutting operations. The tool-clamps 23 are also preferably provided with apertures 30, which facilitate the operation of planing or milling out the recess 26, and these apertures are preferably large enough to admit the finger or thumb of the operator to enable him to grasp the rearward ends of the tools, particularly when adjusting them away from the work. The tools and their respective clamps are adjusted longitudinally of the post and clamped in their adjusted positions by means of the screw-collars 32, two of which are employed upon opposite sides of the tool and its clamp, as in the case of the tool 20, where it is required to adjust the tool longitudinally of the work. It is, however, usually possible to clamp one of the tools permanently to place and adjust the remaining tools in proper relation thereto, and in that case the fixed tool may be clamped against the abutment formed by one end or the other of the slot, as shown by the tool 21 in Fig. 3, in which case one of the screw-collars 32 may be dispensed with. These collars are preferably made as thin as the required strength will permit and are notched or milled on their peripheral surfaces, as shown in Fig. 2, to receive a spanner-wrench or other tool suitable for adjusting and tightening them to place. In tools of this class it is customary and desirable to employ "back-rests" for opposing the strains due to the cutting operations of the tool, so as to prevent the work and the tool from springing away from each other. It is necessary to make these jaws readily adjustable toward and from the center of the work to adapt them to different diameters. It is also necessary to adjust the jaws longitudinally of the work in substantial conformity with the longitudinal position of the tool. These back-rests consist, as is customary, of two jaws 34 and 35, which, as shown in Fig. 3, are usually arranged slightly behind the longitudinal positions of their coöperating tools 20 and 21, respectively. These jaws are mounted in the diametrically-disposed slots 36 of the posts 13 and 14, extending substantially from end to end of that portion of the post which is between the plates 8 and 17, those slots serving to sustain the jaws in substantially radial relation to the work while permitting them to be adjusted both radially and longitudinally with relation to the work. The body portions of these back-rest jaws may be parallel, like the bodies of the tools 20 and 21, and may be adjustably supported and clamped in jaw-holders made substantially like the tool-clamps 23. On account of the position in which these back-rest jaws are usually employed—namely, at the lower and rearward sides of the tool—it is found that the projecting set-screws 29 and the projections of the clamps 23, in which those screws are seated, would sometimes interfere with each other or with the adjacent mechanism of the machine. Hence it is always desirable to have these back-rest devices as compact as possible. I therefore prefer to employ for these back-rest jaws the adjustable clamp devices shown in detail in Figs. 7 and 8. Those sides of the jaws which fit the walls of the slot 36 are parallel, and one edge of the jaw is preferably at right angles with the working end of the jaw, so as to rest squarely against the face of the clamping-collars 37, which, like the collars 32, are employed for adjusting and clamping the jaws to place. The other edge of each jaw is inclined, as best shown in Fig. 3, and is seated in a clamp-collar 38, which is slotted diametrically across one of its faces, as best shown in Figs. 7 and 8, the inclination of the bottom of the slot in the collar coinciding with that of the corresponding edge of the jaw, so that the rearward edge of the collar and the forward edge of the jaw will be parallel and at right angles with the axis of the posts 13 and 14, so as to be squarely clamped by the screw-collars 38. Where one of the tools, as the tool 21 in Fig. 6, is fixed permanently in place,

the corresponding jaw 35 may be similarly clamped against the end walls of the slot 36, thus dispensing with one of the screw-collars 37. For adjusting the tools to position the clamp-collars 32 are loosened and screwed along the posts 12, and while the collars are thus loosened the tool may be adjusted radially to its desired cutting position by means of the adjusting-screws 29, after which the collars are tightened. In adjusting the back-rest jaws the collars 37 are loosened and screwed longitudinally of the post to the desired position, and then after adjusting the jaw to the required place the clamp-nuts are tightened. When thus tightened, the inclined faces of the jaw and its seat in the collar 38 firmly opposes any backward movement from the jaw away from the work, since the jaw cannot be forced backwardly without either stripping the threads or stretching the posts.

The posts 13, 14, and 15 may be of any desired length to accommodate the required number of tools and back-rest jaws or to suit the length of work to be done. A larger or smaller number of posts may be employed, according to the character of the work or the number of tools employed, this feature of the devices being within the skill of workmen familiar with this art. Where the work is short or where only one set of tools and back-rests are required, the posts may by shortened to a corresponding extent, and in that case the yoke-plate 17 may be dispensed with. For convenience in readily removing the yoke for this purpose or for the purpose of enabling the tools and back-rests to be changed and adjusted the yoke-plate is preferably held in place by screws 18.

The outward taper of the back-rest jaw, by virtue of which it is clamped and sustained against rearward movement, may be obtained by inclining one edge or side of the jaw, as herein shown, or by inclining two opposite sides or edges. In the latter case it is desirable to employ a clamp-collar like the collar 38 upon each side of the jaw, the outer faces of the two collars serving to receive the threaded clamping-collars squarely. For most purposes, however, I prefer to have one edge of the jaw at right angles with the axis of the work, as herein shown, so as to maintain the longitudinal position of the jaw while adjusting it in or out. The degree of the taper or of the inclined side should be varied to suit the size of the jaw and the character of the work to be done by it. The greater the taper or the inclination of the edge or edges of the back-rest jaw the more firmly will it resist backward movement under pressure of the work.

An important advantage of this invention resides in the feature whereby several different diameters may be turned upon the work simultaneously by a number of the tools 20 21 held by the same tool-holder, since each of the tools may be independently adjusted both longitudinally and radially with relation to the work, so as to turn any desired diameter or length of shoulder independently of its associated tool or tools. In tools of this class as heretofore employed upon tool-turrets of screw-machines and similar machines in which this invention finds its chief utility it has been customary to provide a separate tool-holder and tool for each shoulder or diameter to be turned upon the work, thereby employing a corresponding number of tool-holding seats or faces of the turret and also requiring the turret to be indexed forwardly between each of the successive cuts, thereby not only monopolizing an undue amount of the turret capacity and requiring more time for the separate employment of the respective tools, but also employing more time because of the interruption of the work while indexing the turret to bring those successive tools into operation. In the tool-holder of the present invention as many tools may be employed as there are shoulders in the work to be turned, so that all the different diameters and shoulders are completed simultaneously, thus permitting the operations of the several tools to overlap to a greater or less extent.

In cases where it is desirable to adjust the back-rest jaws well toward their respective ends of the tool-post 36 the outermost screw-collars 37 may be dispensed with and the right-hand jaw 35, as shown in Fig. 3, may be clamped against the end wall of its slot in the post 36. Similarly the nut 37 at the left-hand end of that post may be omitted and the side of the adjacent collar 38 be seated directly against the plate 8. Any or all of the back-rest jaws and their respective clamping-washers and nuts may also be reversed from the relation shown in Fig. 8. When the back-rest jaws are to be set closely together, the two intervening nuts 37 may be omitted, and the back-rest jaws and their washers 38 may be clamped directly in contact by means of the nuts 37 on the outer sides of those jaws and washers. Various other adjustments and transpositions of these parts will obviously enable their positions to be adjusted to any desired extent to suit the character or the dimensions of the work to be done.

I claim as my invention—

1. In a tool of the class specified, the combination of a supporting-base, a tool-post rigidly secured thereto, and arranged in a substantially parallel and eccentric relation to the work, and provided with a slot extending diametrically through the post, a tool supported in said slot with its ends projecting from both sides of the post, and means for adjusting the tool longitudinally and transversely of the post, and clamping it in its adjusted positions.

2. The combination in a tool of the class specified, of a supporting-base, a tool-post rigidly connected therewith and extending

therefrom in substantially parallel relation to and at one side of the work, provided with a diametrically-disposed slot, and provided with a circumferential screw-thread, a tool mounted in the slot, a clamping-nut fitting the circumferential thread and bearing against the tool on both sides of the post to adjust and clamp it in its desired positions.

3. The combination in a tool of the class specified, of a supporting-base, a tool-post rigidly secured thereto and projecting therefrom at one side of the work, provided with a diametrically-disposed tool-slot, and provided with a circumferential thread, a tool mounted in the slot, and a plurality of nuts fitting the circumferential thread, for adjusting and clamping the projecting portions of the tool on both sides of the post.

4. The combination in a tool of the class specified, of a supporting-base, a series of posts rigidly secured thereto, and projecting therefrom in a substantially parallel relation with the work, and provided with diametrically-disposed tool-slots, a yoke-plate for connecting and sustaining the outer ends of the posts, a series of tools and back-rest jaws mounted in the said slots in a substantially radial relation to the work, and means for adjusting the tools and jaws longitudinally of the posts and clamping them in their adjusted positions.

5. The combination in a tool of the class specified, of a supporting-base, a series of tool-posts rigidly secured thereto and projecting therefrom in substantially parallel relation to the work, provided with diametrically-disposed tool-slots, and provided with circumferential screw-threads, a series of tool and back-rest jaws mounted in the said slots, and means for adjusting the said tools and jaws longitudinally of the posts and clamping them in their adjusted positions.

6. The combination in a tool of the class specified, of a supporting-base, a series of tool-holding posts rigidly secured thereto and projecting therefrom in a substantially parallel relation with the work, and provided with diametrically-disposed tool-holding slots arranged in substantially radial relation to the work, and provided with circumferential screw-threads, a set of tools and back-rest jaws mounted in the said slots of the posts, and clamping devices engaging with the screw-threads for adjusting the tools and jaws longitudinally of the work, and clamping it in its adjusted positions.

7. The combination in a tool of the class specified, of a tool-post provided with a diametrically-disposed tool-slot, a tool-clamp encircling the tool-base and provided with a recess for receiving the tool and provided also with a set-screw for abutting against the end of the tool to adjust it lengthwise.

8. The combination in a tool of the class specified, of a tool-post provided with a diametrically-disposed tool-slot, a tool-clamp encircling the tool-post, and provided with recesses for receiving the side of the tool on opposite sides of the tool-post, and devices for clamping the tool and its clamp together.

9. The combination in a tool of the class specified, of a tool-post provided with a diametrically-disposed tool-slot, and provided with a circumferential screw-thread, a tool in said slot, a tool-clamp encircling the tool-post, and provided with recesses for receiving the projecting portions of the tool on opposite sides of the post, and a screw-collar for clamping the tool and tool-clamp together.

10. The combination of a back-rest jaw, having a side inclined in the direction of its length, and clamping devices therefor coacting with the inclined side of the jaw.

11. The combination of a tapering back-rest jaw and means engaging with the tapering side of the jaw for supporting and clamping the jaw with its larger end toward the work.

12. The combination with a tapering back-rest jaw, of a slotted support for receiving the jaw, and clamping devices engaging with the support and with the tapering edges of the jaw.

13. The combination of a tapering back-rest jaw, a slotted post for supporting the jaw, and clamping devices encircling the support and clamping the tapering edges of the jaw.

14. The combination of a tapering back-rest jaw, a slotted post for supporting the jaw, having a circumferential screw-thread, a clamping-collar having an inclined seat for receiving an inclined edge of the jaw, and screw-collars fitting the circumferential thread of the post for coöperating with the clamping-collar to clamp the jaw.

15. The combination of a back-rest jaw having an inclined edge, a slotted post for supporting the jaw, provided with a circumferential screw-thread, a clamping-collar encircling the post and provided with a recess for receiving the inclined edge of the jaw, and screw-nuts fitting the circumferential thread of the post for clamping the jaw and its clamping-collar together.

16. The combination of a back-rest jaw having an inclined edge, a longitudinally-slotted post for receiving the jaw, provided with a circumferential screw-thread, a clamping-collar encircling the post and provided with a seat for receiving the inclined edge of the jaw to support its opposite edge at substantially right-angles with the post, and screw-collars fitting the circumferential thread of the post for adjusting the jaw and its clamping-collar longitudinally of the post, and clamping it in its adjusted positions.

Signed at Hartford, Connecticut, this 16th day of September, 1902.

BENGT M. W. HANSON.

Witnesses:
H. E. BAILEY,
WM. H. HONISS.