J. M. STRYHAL.

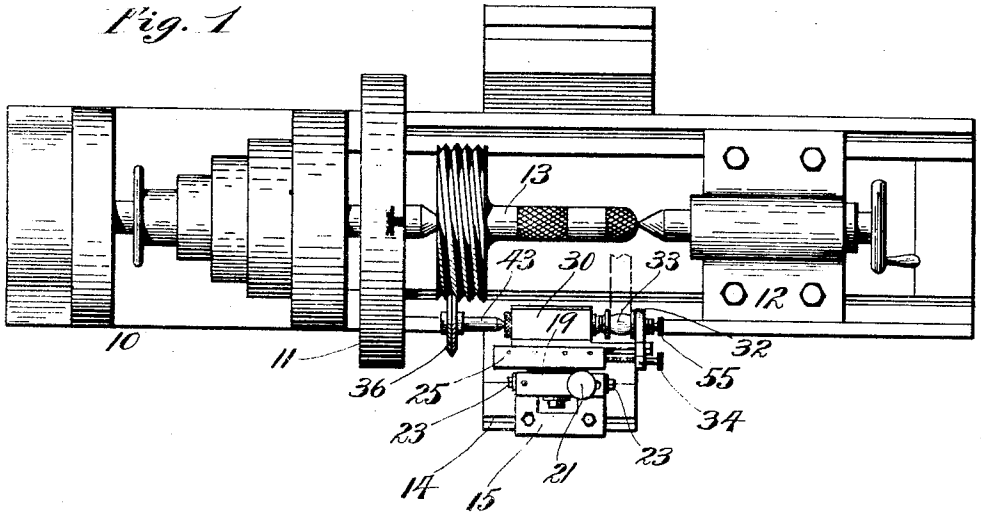
ATTACHMENT FOR GRINDING SCREW THREADED ARTICLES.

APPLICATION FILED JULY 20, 1918.

1,350,044. Patented Aug. 17, 1920.

4 SHEETS--SHEET 1.

Fig. 1



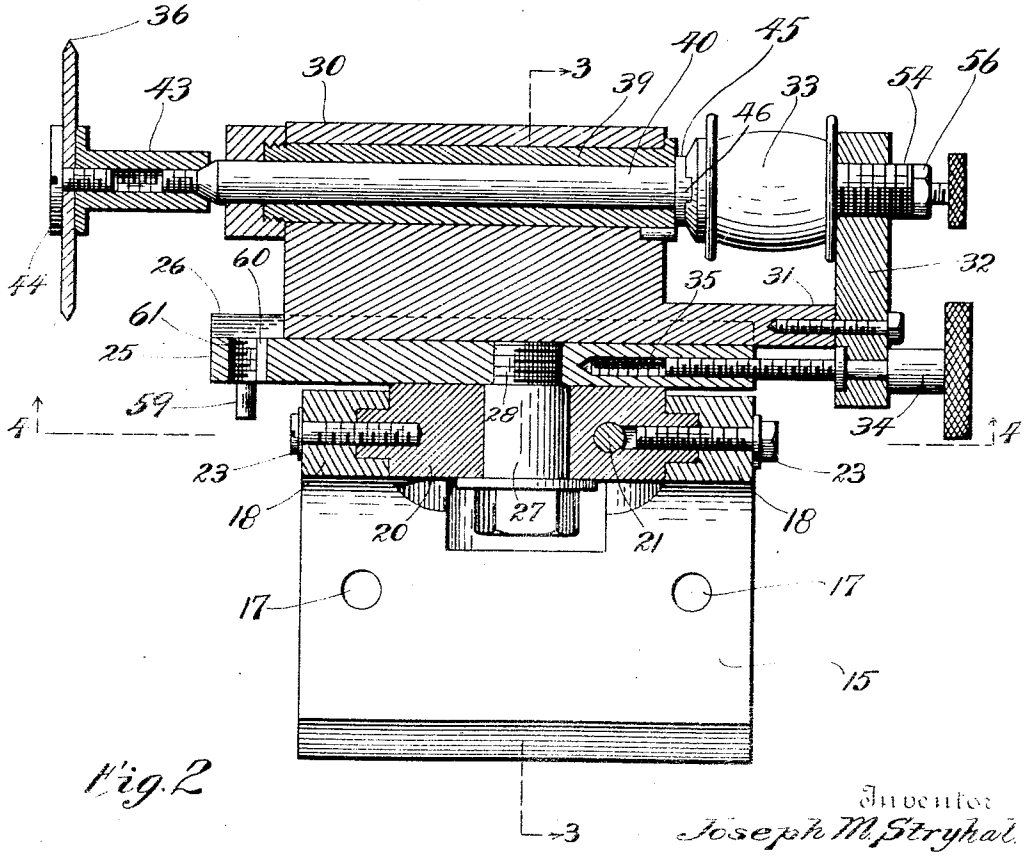




Fig. 2

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4 SHEETS—SHEET 2.

Fig: 3

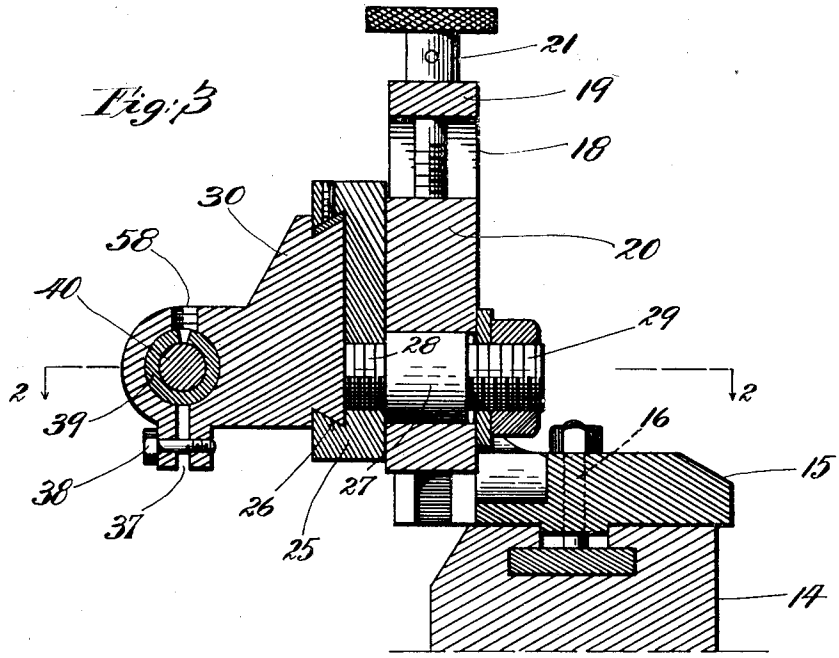
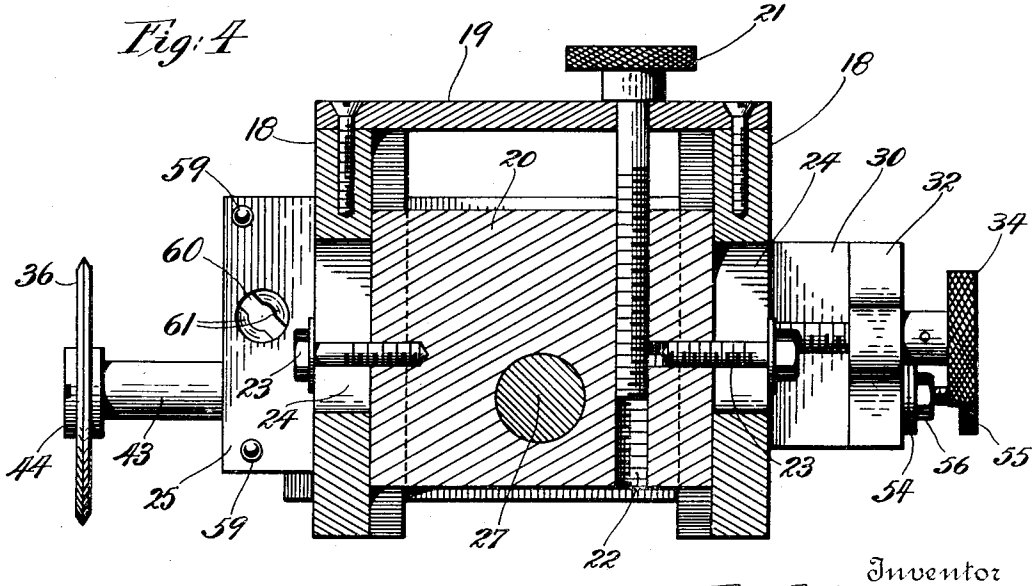



Fig: 4




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4 SHEETS—SHEET 3.

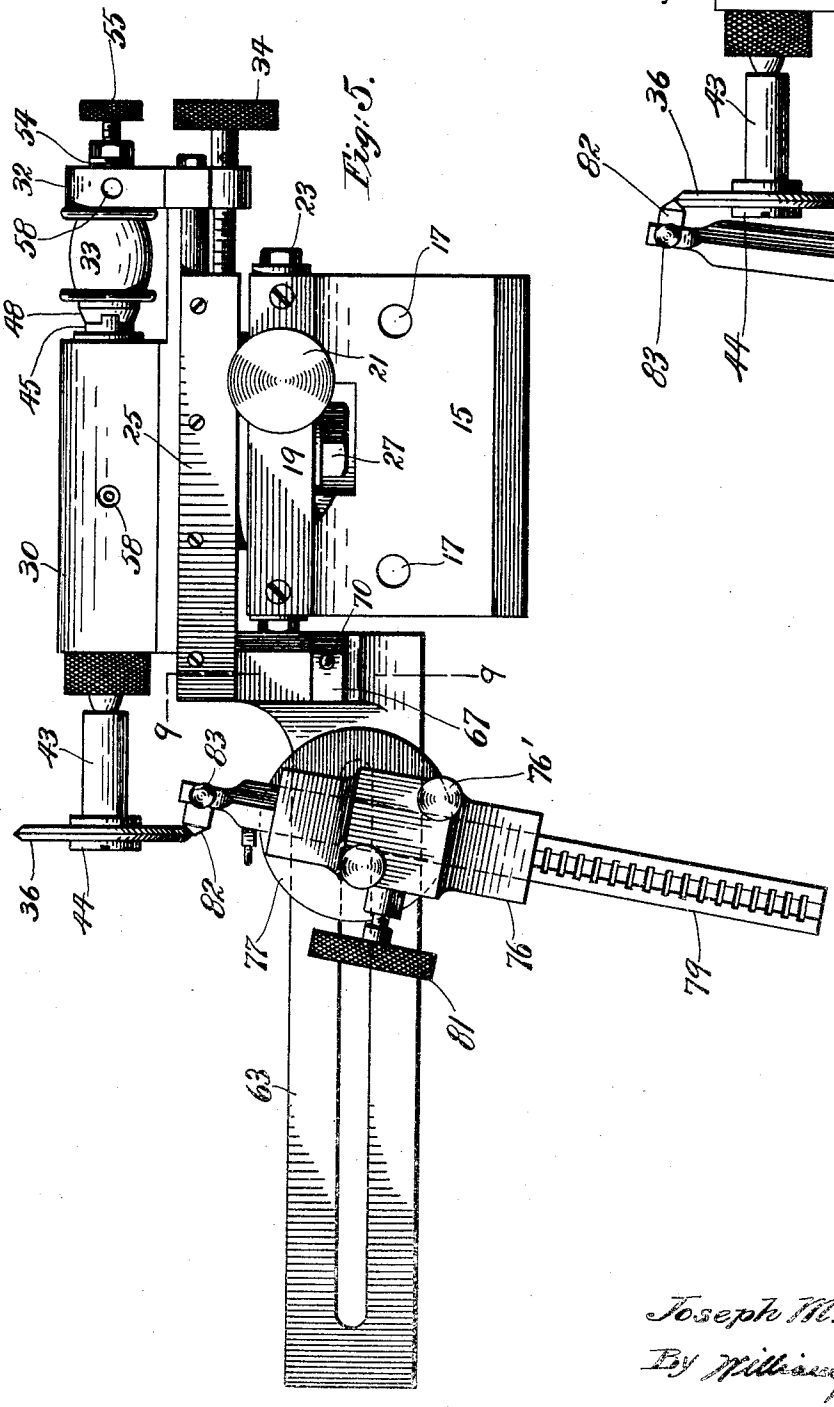



Fig. 5.




Fig. 6.

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4 SHEETS—SHEET 4.

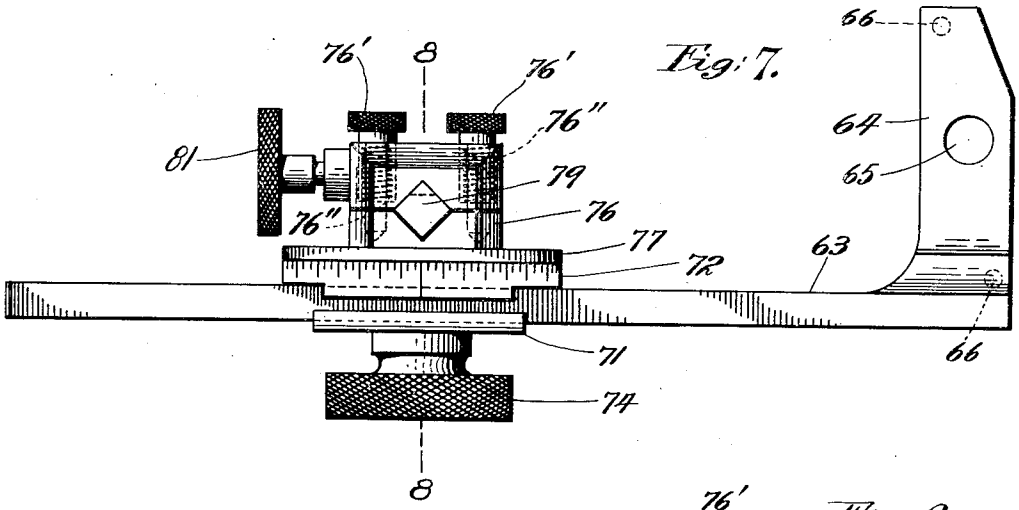



Fig. 7.

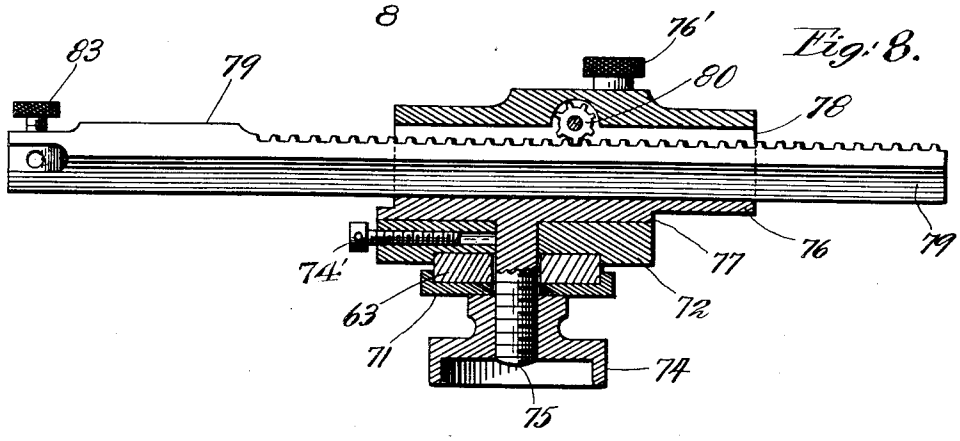



Fig. 8.

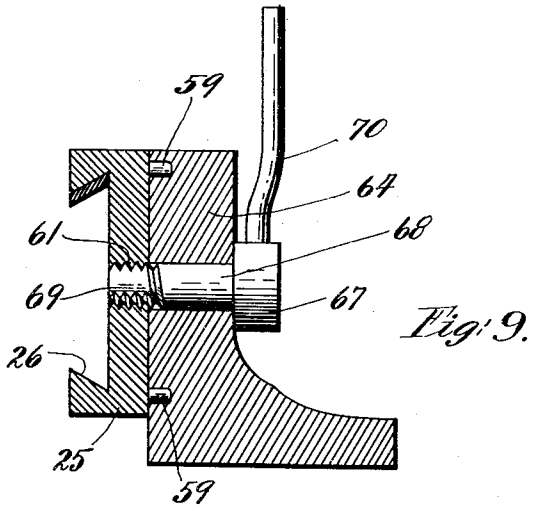



Fig. 9.

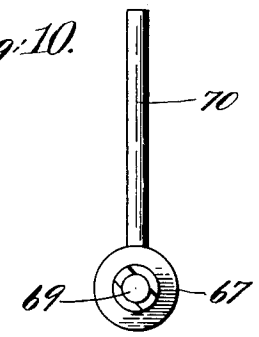



Fig. 10.

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# UNITED STATES PATENT OFFICE.

JOSEPH M. STRYHAL, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-HALF TO WILLIAM M. MANION, OF PHILADELPHIA, PENNSYLVANIA.

## ATTACHMENT FOR GRINDING SCREW-THREADED ARTICLES.

1,350,044. Specification of Letters Patent. Patented Aug. 17, 1920.

Original application filed June 23, 1917, Serial No. 176,610. Divided and this application filed July 20, 1918. Serial No. 245,827.

*To all whom it may concern:*

Be it known that I, JOSEPH M. STRYHAL, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a certain new and useful Attachment for Grinding Screw-Threaded Articles, of which the following is a specification, this being a division of application filed June 23, 1917, and serially numbered 176,610.

The present invention relates to an attachment for grinding and truing screw-threaded articles and has more particular relation to an attachment for grinding and truing male and female thread-gages, taps, hobs, dies and other screw-threaded articles and worm gears after the same have been cut and hardened or tempered.

Considerable difficulty has been experienced in the past in the manufacture of screw-threaded articles due to the warping of the screw-threads which invariably occurs during the hardening or tempering process, it being understood of course that the screw-threads are cut while the metal is relatively soft. To true the screw-threads after hardening, as now practised, by means of lapping with emery, is a slow, expensive and altogether unsatisfactory and doubtful or uncertain procedure.

The principal object of the present invention is to overcome the above recited disadvantageous features and provide an attachment in the form of a grinding device commercially adapted for the rapid, efficient, accurate, reliable and certain truing of male and female screw-threads after hardening thereof so that the same conform to the original contour or shape. A further object of the present invention is to provide a simple, efficient and comparatively inexpensive attachment, portable in character, which may be readily used in conjunction with a lathe or the like and which is so shaped and proportioned that it may replace the conventional tool post during a grinding and truing operation. A still further object of the present invention resides in the providing of an attachment of this character having a maximum range of adjustment in order to grind and true in an accurate and commercially satisfactory manner objects of large as well as small diameter. A still further object of the present invention is to provide an attachment of the character stated equipped with a disk of abrading substance, as carborundum, revoluble at a high rate of speed for coöperatively engaging with screw-threads to true the same rapidly, accurately and in a thoroughly reliable manner. A still further object of the present invention is to provide for such an attachment a detachable device for shaping to required pitch the periphery of the truing edge of the carborundum disk prior to a grinding operation. A still further object of the present invention is to provide a new and novel form of detachably connecting the two attachments or devices together upon a lathe or the like.

With these and other objects in view as will hereinafter fully appear, the invention consists of the improvements hereinafter described and finally claimed.

The nature, characteristic features and scope of the invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, and in which:

Figure 1 is a top or plan view of a lathe with a grinding attachment of the invention in position upon the tool carriage ready for use.

Fig. 2 is a detached view of the attachment in section taken upon the line 2—2 of Fig. 3.

Fig. 3 is a view in section taken upon the line 3—3 of Fig. 2.

Fig. 4 is a view in section taken upon the line 4—4 of Fig. 2.

Fig. 5 is a top or plan view of the combined grinding attachment and disk-shaper in operative position but detached from a lathe.

Fig. 6 is a fragmentary view illustrative of another position of the disk-shaper.

Fig. 7 is an elevational view of the disk-shaper detached.

Fig. 8 is a view in section taken upon the line 8—8 of Fig. 7.

Fig. 9 is a view in section taken upon the line 9—9 of Fig. 5, and

Fig. 10 is a detached view of the clamping-tool shown in Fig. 9.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has

been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In the following description, for illustrative purposes, reference will be had to the grinding and truing of thread-gages and in Fig. 1 there is shown the application of the attachment of the invention to a lathe for grinding and truing a thread-gage. However, I wish it understood that the attachment of the invention is applicable for internal and external grinding of other objects of various kinds. Referring now to Fig. 1, 10 designates a lathe of conventional type 11 representing the head-stock and 12 the tail stock thereof. The work, which in the present instance is a thread-gage 13, is operatively positioned between the respective stocks. The tool-carriage 14 of the lathe is shown in Fig. 3. In using the present attachment the conventional tool-post is removed from the tool-carriage 14 and the base-plate 15 of the grinding and truing attachment bolted thereto as at 16, the base-plate being apertured as at 17 for the reception of the bolts. The base-plate has formed integral therewith a pair of spaced uprights 18 connected across their tops by a horizontally disposed strip 19. Adjustable vertically between these uprights 18 in a slidable manner is a block 20, the uprights being grooved and the block provided with tongues engaging said grooves, as clearly shown in Fig. 2, to prevent lateral movement of the block. To permit of such vertical movement an adjusting nut 21 is employed which is rotatable through the strip 19 and has screw-threaded engagement with the tapped portion 22 of the block 20. To clamp the block in adjusted position, bolts 23 are employed which pass horizontally through slots 24 in the uprights 18 and engage tapped portions of the block 20. So mounted upon the front face of the block 20 as to be capable of being adjusted in an arc of a circle is a plate 25, the front of which is mortised as at 26. To secure the proper adjustment of plate 25, use is made of a stud having an annular bearing face 27 and a pair of threaded extensions 28 and 29 of reduced diameter. The part 27 is rotatably seated in the block 20, the threaded extension 28 engaging a tapped portion of the plate 25 and the threaded extension 29 being engaged by a nut for clamping the plate in fixed position against the block 20 after proper adjustment has been secured. Adjustable endwise through the mortised portion of the plate 25 is a member 30 provided with tenons for coöperatively engaging the said mortised plate. The member 30 has removably fixed to an extension 31 thereof a laterally disposed piece 32 which forms a U-shaped opening to accommodate a pulley 33 to be presently described. Rotatably positioned with respect to the piece 32 is an adjusting screw 34, see Fig. 2, the threaded end of which engages the tapped portion 35 of plate 25 whereby endwise adjustment of member 30 including piece 32 may be effected with respect to plate 25. The free or front portion of member 30 constitutes a bearing for the driving shaft of the grinding or truing wheel 36. This bearing is split as at 37, bolts 38 being present to clamp the split parts together to sustain against rotation a bushing 39 in which the shaft 40 is rotatable. One end of this bushing is provided with a shoulder which abuts against the member 30 and the other end is threaded to receive a nut for clamping the bushing against endwise movement. The shaft 40 is provided at one end with a screw-threaded portion to detachably receive the internally threaded stem, which in turn removably holds, by means of a screw 44 in engagement with the screw-threads of the stem 43, the grinding or truing disk 36. In practice the disk is made of carborundum. The other end of the shaft 40 has formed integral therewith a disk 45 provided with a projected cross-piece 46 upon its face, making a driving connection with a pulley 33 rotatable upon a sleeve 54, the end of which has screw-threaded relation with the extension 32 upon the member 30, and is fixed in respect thereto. That end of plate 25 adjacent the disk 36 is provided with dowel-pins 59 and with an opening 60 provided with mutilated screw-threads 61. These parts coöperate with certain parts about to be described whereby a disk-facing attachment may be removably supported by the plate 25 when desirable and reference will now be had to Figs. 5 to 10 inclusive.

The disk-facing attachment embraces, generally stated, an L-shaped tool-support and an adjustable tool-holder. The tool-support consists of an elongated, horizontally disposed and slotted arm 63 terminating in a vertically disposed extension 64 apertured as at 65 and 66. When the apertured parts 66 are fitted to the dowel-pins 59 of plate 25, apertures 65 and 60 are in register, see Fig. 9. To clamp the extension 64 to plate 25, use is made of the device shown in Figs. 9 and 10. The clamping device consists of an annular member 67 extended from which is a cylindrical member 68, the free end of which is provided with an extension 69 having mutilated screw-threads. A handle 70 is provided on member 67 for operating purposes. To clamp extension 64 to plate 25, the exten-

sion 59 and member 68 are inserted through the registering apertures above mentioned and in this connection it is to be observed that the mutilated parts of screw-threads of extension 69 are caused to be inserted past the mutilated parts of screw-threads 61 or in other words the intact portions of screw-threads of extension 69 are in register with the cut away portions of screw-threads 61 By moving the handle 70 in the proper direction, a quick clamping of parts may be effected, since the intact portions of the screw-threads will be caused to cooperatively engage. It will be understood that the attachment under consideration may remain connected to plate 25 during a grinding or truing operation, if desired, or may be removed therefrom as convenient. Slidably mounted along the slotted supporting arm 63 is the tool dresser proper, consisting first of a supporting means in the form of an apertured dial plate 72, preferably recessed on its under surface to provide a guide way for its lengthwise movement along said arm 63, and a coöperating clamping member 71 arranged beneath the arm 63 and likewise provided with a central aperture for a purpose hereinafter described. This plate 72 preferably terminates at its top in a flat circular support provided with an annular series of graduations for determining the proper angular position of the facing tool. Superimposed upon this flat bearing face is a tool carrier 76 which is provided at its lower portion, with a disk portion 77 resting upon the top of plate 72. The tool carrier is also formed with an integral depending stem 75 adapted to pass through the alined central apertures in the dial plate 73, the slot in the arm 63, and the central aperture in the clamp 71, and is provided with a knurled thumb nut screwed on to the threaded end thereof. The dial plate 73 is also provided with an adjustment securing screw 74′ adapted to thread through the radial bore in said plate, and to have its end clampingly engage the depending stem 75.

The tool carrier 76 is preferably provided with upper and lower blocks or housings adapted to slidably receive the rack bar. The lower housing is preferably elongated to form a longitudinal bearing and provided with two threaded apertures to receive the ends of thumb screws 76′ passing freely through corresponding bores in the upper housing which corresponds in shape to the elongated portion of the lower block or housing. As shown in Fig. 7, the bores in the upper block are somewhat greater in diameter than the thumb screws 76′ to provide a housing for springs surrounding said screws. The ends of these springs abut between shoulders formed in these bores in the upper block and the heads of said screws 76′. The upper and lower blocks are channeled longitudinally to provide a square bore to slidably receive the dressing tool support, preferably in the form of an elongated rack 79, the teeth of which mesh with a pinion 80 on the shaft journaled in the upper block, and provided with a hand wheel 81. The springs surrounding the thumb screws within the bores of the upper block serve to firmly force the blocks together and clamp the rack bar, preventing any movement of the same when the dressing tool is apertured upon the grinding wheel. It will also be evident that the rack bar 79 is placed diagonally or at an angle to the plane of the dial plate. By means of this construction, and the yieldable mounting within the housings or blocks, any play between the rack bars and housings is taken up and accuracy in alinement with the rack bar is assured. One end of the rack bar is apertured upon opposite sides to receive the facing tool 82 having a diamond point, the set screws 83 being present to secure the tool in position. The tool 83 may be inserted upon opposite sides of the bar 79 as shown in Figs. 5 and 6 so that the tool may be adjusted to face the disk 36 upon opposite sides in the proper manner for obtaining the required pitch for screw threaded grinding.

By means of the above construction, it will be evident that by loosening the thumb nut 74, the tool dresser as a whole may be slid longitudinally along the arm 63 in the guideways of the clamping plate 71 and dial plate 73, and, furthermore, the tool carrier 76 is also free to be angularly adjusted on the flat upper circular surface of the dial plate 73, the proper angular adjustment being indicated by the graduations provided on these two abutting elements. By now tightening the thumb nut 74, these two adjustments, that is, the angular adjustment of the tool carrier 76 and the longitudinal adjustment of the whole device along the arm 63 may be secured. Such a single clamping means, common to both angular and longitudinal adjustment, provides a very speedy and simple means for securing the tool 82 in proper dressing position. In some instances, it may be desirable to provide a separate securing means for holding the tool carrier 76 in a fixed angular position relative to the dial plate 73, in which case, the thumb screw 74′ is threaded inwardly to engage the depending stem 75 of said tool carrier 76 so that after the angular adjustment of the tool carrier 76 is made, it can be held in such position relative to the dial plate 73 and the latter may then be independently secured in adjusted position along the arm 63 by manipulating the thumb nut 74.

It will also be evident that in providing

an attachment of the above character, having longitudinal and angular adjustments for the tool carrier, combined with the quick feeding movement for the tool formed by the rack and pinion, there is provided a construction whereby the dressing tool may be set in any desired position and given a quick feeding movement up to the face of the object to be ground, and also a feeding movement across the surface of the object to be ground during the dressing operation.

It is thought that the operation and mode of using the above described attachments may be readily understood from the above description without resorting to a further and detailed account thereof except to state that in practice the work is placed in operative position upon a rotatable work holder, for instance, a lathe and the attachment mounted upon the tool-carriage. As the tool-carriage is fed along the work at a predetermined rate, the grinding-disk is rotated independently of the work and at a greater rate.

What I claim is:

1. A dressing attachment for a grinding device comprising a supporting arm detachably connected to said grinding device, a plate capable of longitudinal adjustment therealong, a tool carrier angularly adjustable on said plate, and common means for securing adjustments of said plate and tool carrier relative to said supporting arm.

2. A dressing attachment for a grinding device comprising a supporting arm detachably connected to said grinding device, a plate capable of longitudinal adjustment therealong, a tool carrier angularly adjustable on said plate, and clamping means for securing adjustments of said plate and tool carrier relative to said supporting arm.

3. A dressing attachment for a grinding device provided with a rotatable grinding shaft adjustably mounted thereon, comprising a supporting arm detachably connected to said device and adjustable with said arm, a plate capable of longitudinal adjustment therealong, a tool carrier angularly adjustable on said plate, and clamping means for securing adjustment of said plate and tool carrier relative to said supporting arm.

4. A dressing tool for an abrasive disk comprising a supporting arm, a plate mounted on said arm for longitudinal adjustment, a tool carrier mounted on said plate for angular adjustment thereon, clamping means for securing relative adjustment of said slotted arm, plate and carrier, a dressing tool rack slidable through said carrier, a dressing tool carried thereby, and a pinion on said carrier engaging said rack for giving said tool support a longitudinal feeding movement during the dressing of the abrasive disk.

5. A dressing tool for an abrasive disk comprising a supporting arm, a plate mounted on said arm for longitudinal adjustment, a tool carrier mounted on said plate for angular movement thereon, a dressing tool rack slidable through said carrier, a dressing tool carried thereby, and a pinion on said carrier engaging said rack for giving said tool a quick longitudinal feeding movement.

6. A device of the class described comprising a supporting arm adapted for attachment to a support carrying an abrasive disk, supporting means longitudinally adjustable on said arm, a lower housing oscillatably adjustable on said means, an upper housing mounted on said lower housing, a tool carrying arm adjustable longitudinally through said housings, said upper housing being apertured to receive adjustable screws threading into said lower housing, and springs in said upper housing about said screws whereby to hold said arm in adjusted position.

In testimony whereof, I have hereunto signed my name.

JOSEPH M. STRYHAL.