LE ROY KRAMER AND A. BOOME.

LATHE TOOL HOLDER.

APPLICATION FILED FEB. 28, 1918.

1,394,628. Patented Oct. 25, 1921.

6 SHEETS—SHEET 1.

Fig. 6.

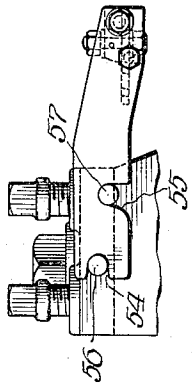
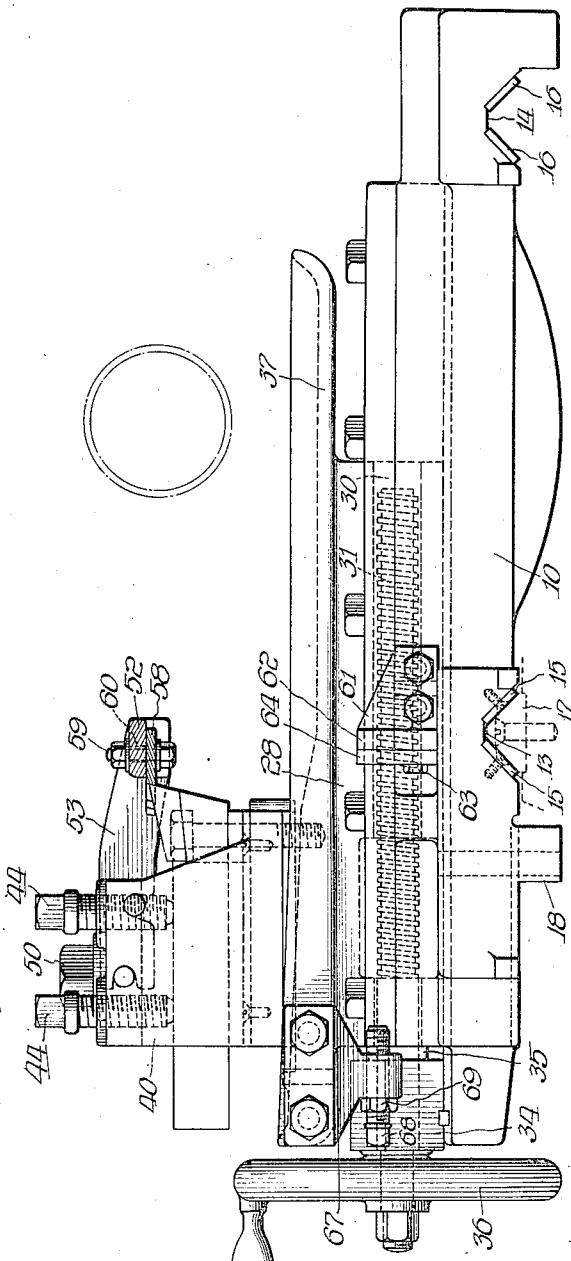


Fig. 1.



Witness:

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LATHE TOOL HOLDER.

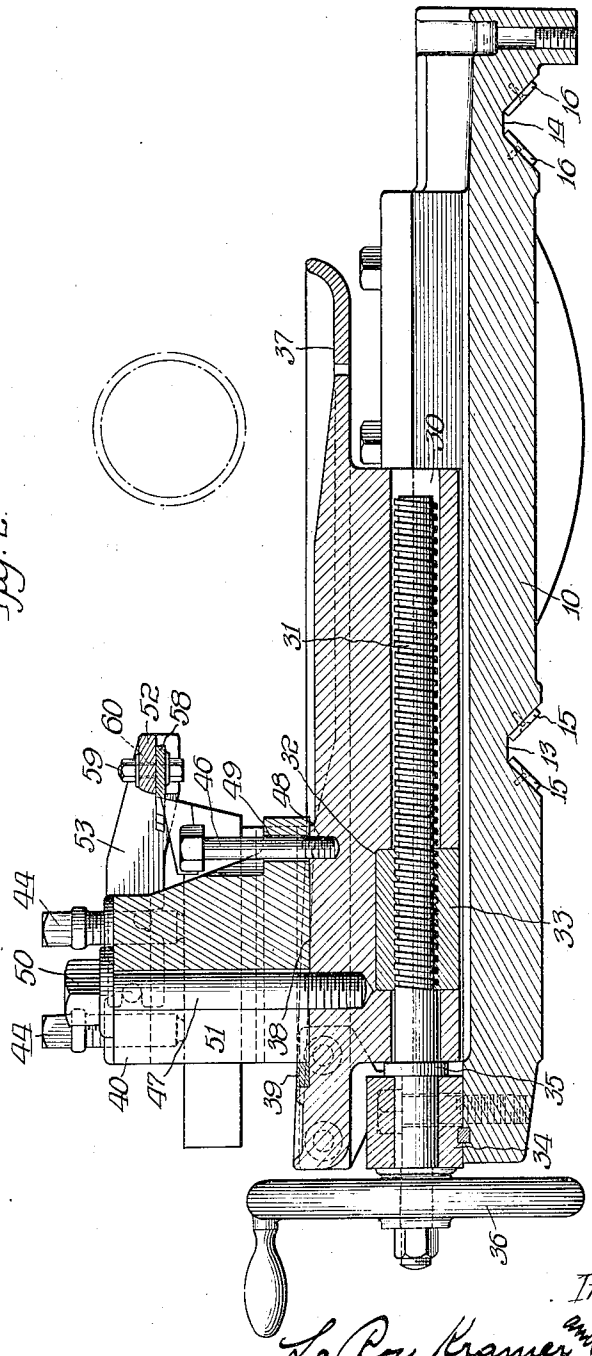
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6 SHEETS—SHEET 2.

Fig. 2.



Witness:

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1,394,628. **Patented Oct. 25, 1921.**

6 SHEETS—SHEET 3.

Fig. 3.

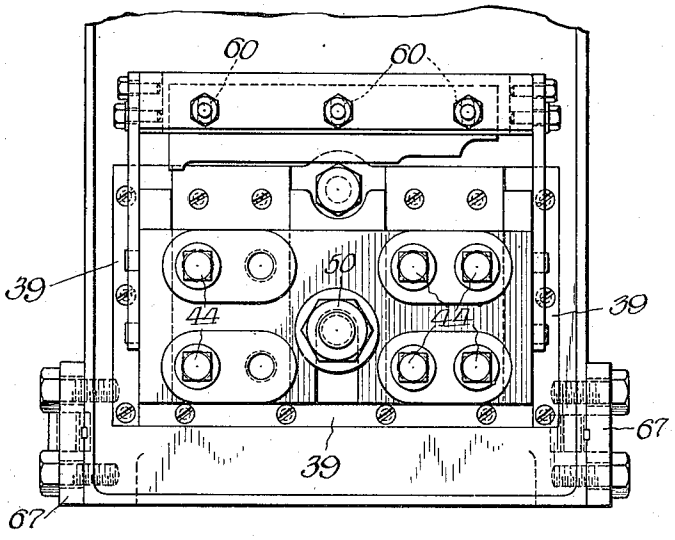
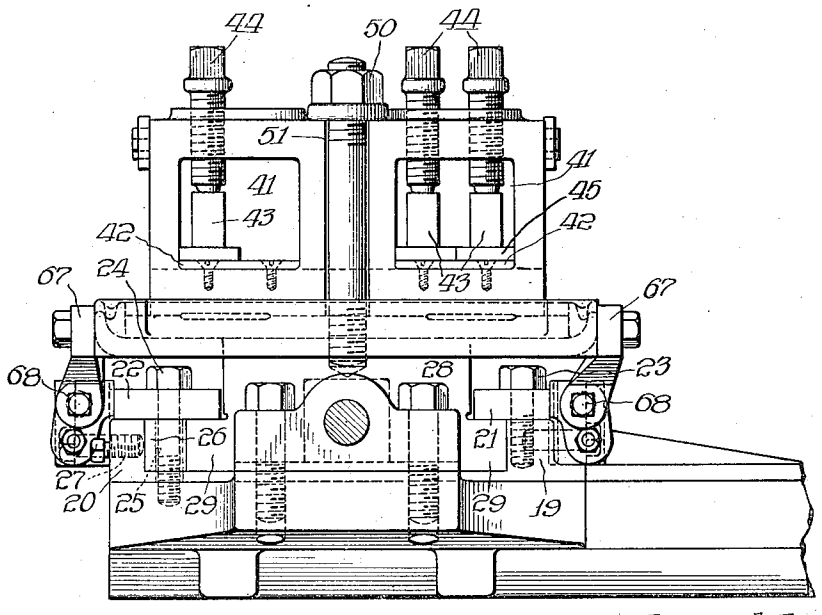


Fig. 4.



Witness:

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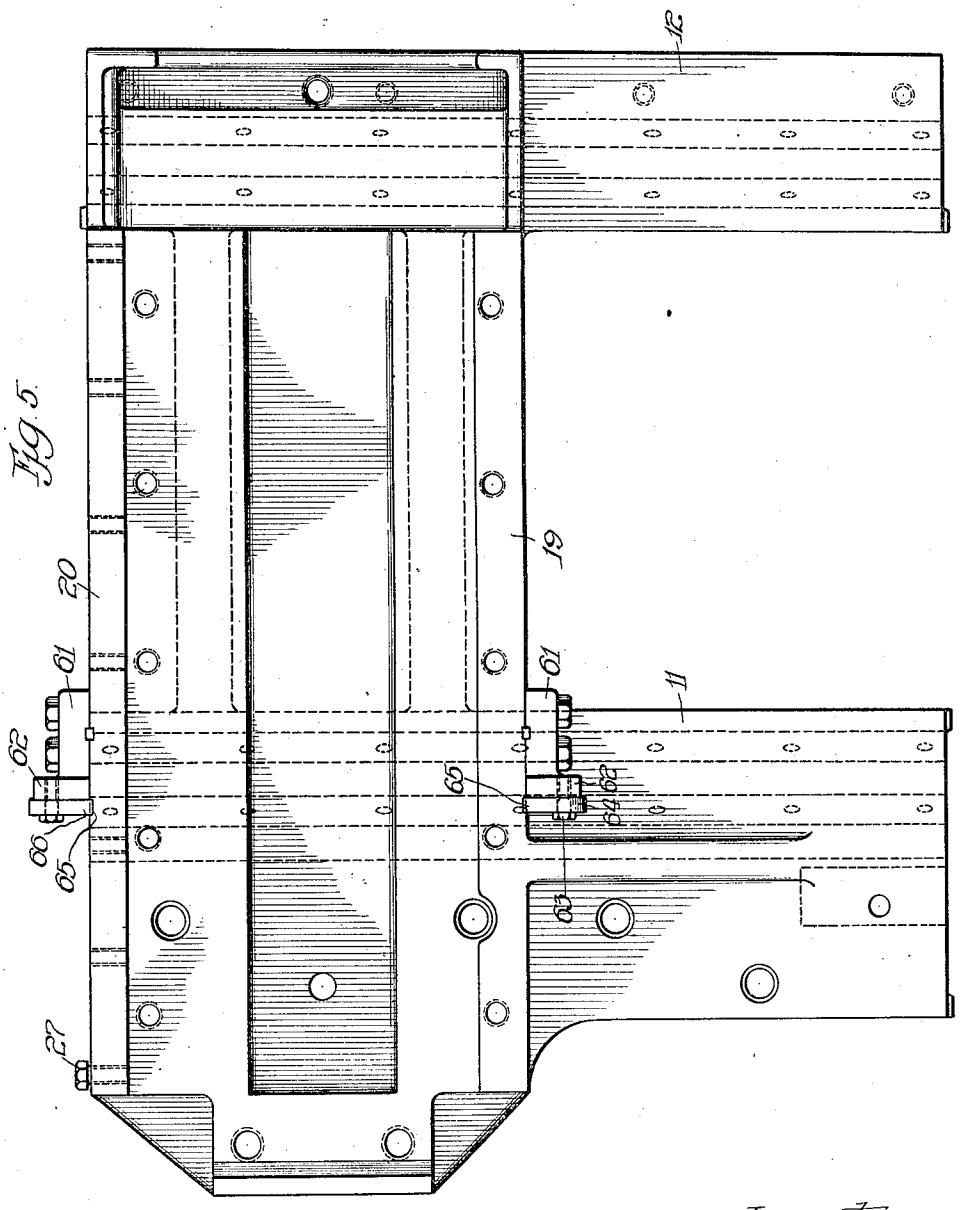
LATHE TOOL HOLDER.

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1,394,628. **Patented Oct. 25, 1921.**

6 SHEETS—SHEET 4.

Fig. 5.



Witness:

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LATHE TOOL HOLDER.

APPLICATION FILED FEB. 28, 1918.

1,394,628. **Patented Oct. 25, 1921.**

6 SHEETS—SHEET 5.

Fig. 7.

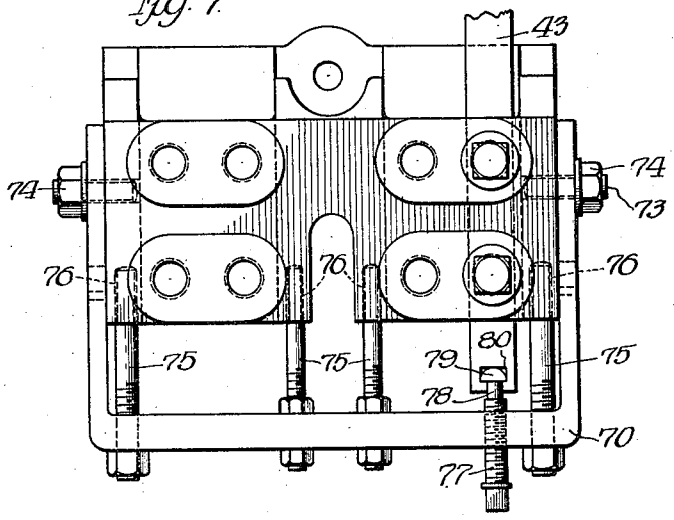


Fig. 8.

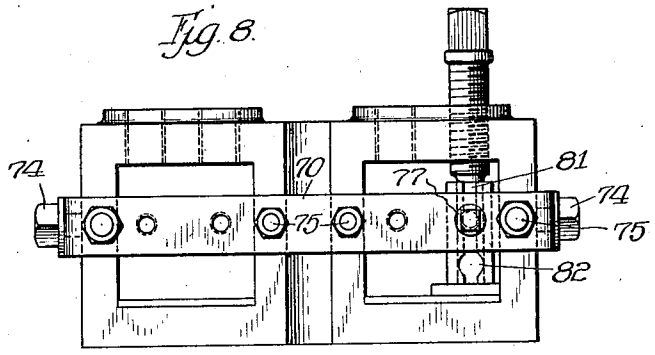
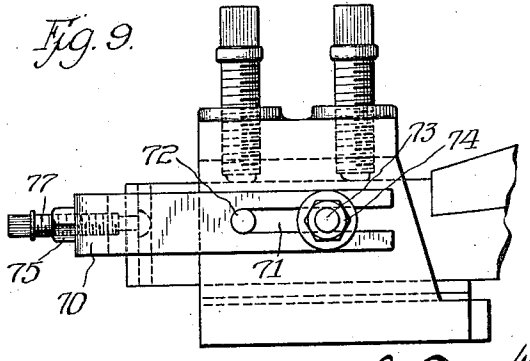


Fig. 9.



Witness:

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LATHE TOOL HOLDER.

APPLICATION FILED FEB. 28, 1918.

1,394,628. **Patented Oct. 25, 1921.**

6 SHEETS—SHEET 6.

Fig. 10.

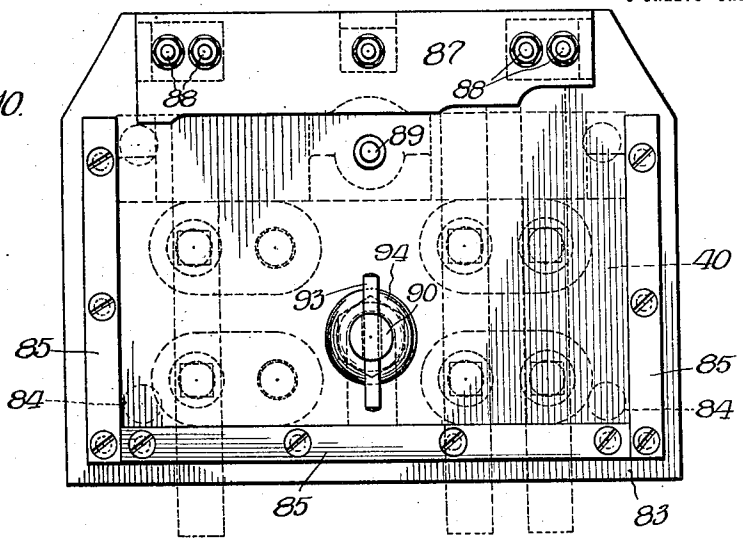


Fig. 11.

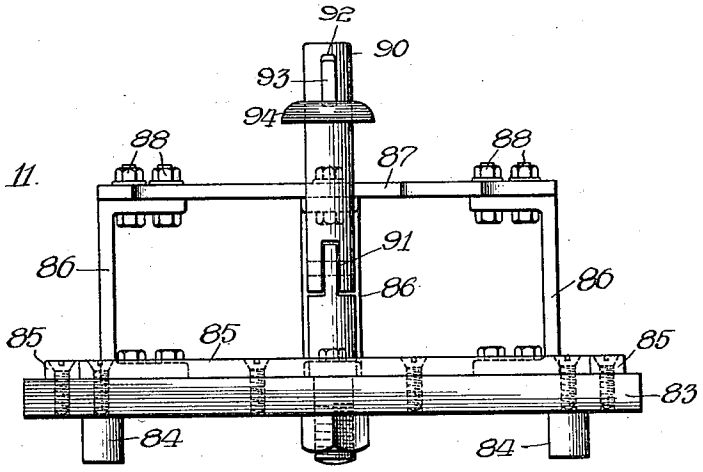
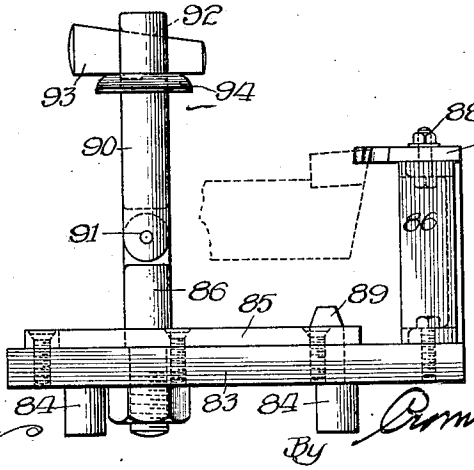


Fig. 12.



Witness:

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UNITED STATES PATENT OFFICE.

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LATHE-TOOL HOLDER.

1,394,628. Specification of Letters Patent. Patented Oct. 25, 1921.

Application filed February 28, 1918. Serial No. 219,551.

To all whom it may concern:

Be it known that we, LE ROY KRAMER and ALEXANDER BOOME, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lathe-Tool Holders, of which the following is a specification.

The present invention relates to tool holders for lathes, and is particularly concerned with holders employed with lathes for turning car axles.

The main and primary object of the invention is the provision of a tool holder which is adapted to receive a plurality of tools and properly support the same with such rigidity as to withstand the heavy pressure to which they are subjected during the operation of roughing the axles, thereby insuring stability to the holder and maintenance of the tools in their operative positions.

Furthermore, the invention seeks to provide a tool holder wherein is incorporated novel and efficient means for setting the tools to proper diameters of cut, the construction including provision for adjustment and interchange of the gaging instrumentalities to permit a ready positioning thereof in accordance with the different diameters to be turned.

The invention also contemplates the provision of means in the form of a novel diameter stop, designed to limit the movement of the tools as they are presented to the work, and thus insure the accurate positioning of the tools for action on the work in accordance with the predetermined diameter to be imparted thereto.

With these general objects in view, and others which will appear as the nature of the improvements is better understood, the invention consists substantially in the novel construction, combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and finally pointed out in the appended claims. The embodiment of the invention which is delineated herein is to be taken only as an illustrative one, so that the invention is not to be understood as limited to such specific form.

In the drawings—

Figure 1 is a side elevation of a tool holder constructed in accordance with the present invention, parts being slightly broken away;

Fig. 2 is a medial longitudinal sectional view thereof;

Fig. 3 is a top plan view of the tool block, and so much of the cross slide as is in immediate proximity thereto;

Fig. 4 is an end view of the tool block, cross slide and carriage, the latter being slightly broken away;

Fig. 5 is a top plan view of the carriage;

Fig. 6 is an end elevation of the tool-setting gage as applied to the head of the tool block;

Fig. 7 is a top plan view of the means for effecting horizontal adjustment of the tool;

Figs. 8 and 9 are end and side elevations, respectively, of the construction illustrated in Fig. 7.

Fig. 10 is a top plan view of an alternative form of tool-setting gage;

Figs. 11 and 12 are end and side elevations, respectively, of the construction illustrated in Fig. 10.

Referring now in detail to the accompanying drawings, the numeral 10 designates the carriage of a metal turning lathe, which carriage partakes generally of the construction of carriages usually found in such machines. In order to adapt the same, however, to the peculiar needs which arise in connection with the turning of car axles it is necessary to impart to the carriage a high degree of rigidity and strength, thereby to afford proper stability to the carriage and support for the tools. To this end, the carriage 10 is provided with a pair of parallel laterally projecting webs 11 and 12, arranged, respectively, at the front and rear ends of the carriage 10, said webs being provided with guide grooves 13 and 14, respectively, the sides of which are arranged in divergent relation. Wear strips 15 and 16, respectively, are applied to the sides of said grooves 13 and 14, and by referring to Fig. 5 it will be observed that the guide grooves 13 and 14 extend throughout the entire width of the carriage 10 and receive slide-

ways 17 carried by the bed of the machine and on which the wear strips 15 and 16 work. One of these slideways is illustrated in dotted lines in Fig. 1, it being unnecessary to illustrate further parts of the machine bed.

At the underside of the body 10 is a depending apron 18 for supporting the feed gears.

The upper side of the bed 10 is provided with longitudinally-extending marginal upwardly-directed flanges 19 and 20 to which are applied retaining strips 21 and 22, respectively, said strips 21 and 22 being of greater width than the width of the flanges 19 and 20, and thereby overhanging the inner edges of said flanges. This provides guides for the cross slide, to be hereinafter described, and thus insures proper movement of the slide as it traverses the carriage 10. The strip 21 is held in position on the flange 19 by a plurality of cap screws 23, which screws are threaded into said flange 19, while the strip 22 is likewise held in position on the flange 20 by a plurality of cap screws 24. These screws 24 take into the body of the carriage 10 and pass through slots 25 formed in a gib 26 which is arranged at the inner side of the flange 20 and interposed between the retaining strip 22 and the body of the carriage 10. The gib 26 may be adjusted inwardly by means of a plurality of screws 27, or their equivalents, to compensate for any wear which may arise in connection with the movement of the cross slide to be now referred to.

The numeral 28 designates the hereinbefore mentioned cross slide having at opposite sides of its base portion outstanding flanges 29 which fit beneath the retaining strips 21 and 22, the cross slide being thus held upon the carriage 10 but adapted to freely move in the guides formed beneath the retaining strips 21 and 22 and between the flanges 19 and 20. Extending lengthwise of the slide 28 is a bore 30 which receives an adjusting screw 31. At a point intermediate the ends of the bore 30 the latter is enlarged to provide a downwardly opening polygonal pocket or recess 32, which pocket or recess 32 receives a polygonal nut 33 the bore of which is screw-threaded to fit the threads of the adjusting screw 31. It will thus be apparent that the cross slide may be moved in either direction in the carriage 10 upon proper rotation of the screw 31. The forward end of the adjusting screw 31 is rotatably mounted within a head block or bracket 34 suitably bolted to the forward end of the carriage 10, and said adjusting screw is held against longitudinal movement in said block 34 through the medium of a fixed collar 35, which is carried by the screw 31 and arranged at the inner side of the block 34, and a hand wheel 36, of standard construction, which is arranged at the outer face of said block 34 and suitably secured to said screw 31. Thus, upon suitable operation of the hand wheel 36 the cross slide 28 is caused to traverse the carriage 10.

The upper portion of the cross slide 28 is enlarged to provide a dished receptacle or pan 37 for receiving the cuttings, but the forward end of said pan 37 is provided with a raised support 38 the surface of which is flattened, and surrounded by a plurality of guide strips 39 which are suitably secured to said support 38. A socket or pocket is thus provided at the support 38 for receiving a tool-supporting block 40. The pocket formed by the guide strips 39 is substantially rectangular in form, and said tool-supporting block 40 is correspondingly shaped and of such dimensions as to snugly fit within the space between the guide strips 39. Thus it will be seen that when the tool-supporting blocks 40 are placed upon the support 38 and fitted between the guide strips 39, the same will be afforded a firm and stable mounting upon the cross slide 28.

The block 40 is provided with a plurality, preferably two, of tool-receiving openings 41 which extend lengthwise of the block 40, the bottom of each opening 41 being provided with a wear strip 42 suitably secured therein, and preferably case hardened to afford the greatest resistance to wear. Upon the wear strip 42 the tools 43 are mounted, as clearly illustrated in Fig. 4, each of said tools being properly held within the openings 41 by means of a plurality of set screws 44. If it be desired to raise the tools 43 above the wear strip 42 the same may be accomplished by the interposition of shims or spacing strips 45.

It is, of course, necessary that when the block 40 is placed upon the tool slide 28 the same shall be held in firm position on the support 38. This is accomplished by two instrumentalities, to wit; a centering pin 46 and an anchoring stud 47. The centering pin 46 enters a threaded opening 48 which is formed in the support 38 at the rear end thereof, said pin 46 being received by an opening 49 formed at the rear end of the block 40 and adapted to register with the opening 48. When this registration has been effected the centering pin 46 may be passed through the opening 49 and screwed into the opening 48, thus serving to hold the tool supporting block 40 in proper position within the space between the strips 39. The relation of the centering pin 46 is, obviously, a removable one with respect to the cross slide 28 in order to permit removal of the tool supporting block 40 when such is desired. The anchoring post 47 rises upwardly from the forward end of the support 38 and is screw threaded at its upper end for receiving a fastening nut 50. At the forward end of

the block 40 is formed a U-shaped socket 51 which receives the anchoring post 47 when the block 40 is placed upon the cross slide 28. When so assembled the upper end of the anchoring post extends above the top of the tool supporting block 40, the diameter of the fastening nut 50 being sufficient to overlap the edges of the socket 51, thus permitting, when the fastening nut 50 is properly operated, a binding engagement between the fastening nut and the tool supporting block, and thereby locking the latter on the support 38.

It has been stated that one of the objects of the present invention is to provide a tool holder in which is incorporated novel and efficient means for setting the tools to proper diameters of cut. Such setting means are clearly disclosed in Figs. 1, 2, 3, and 6, and by referring to these figures it will be noted that a U-shaped gage is employed for this purpose. This gage includes a supporting bar 52 at the ends of which are arranged parallel attaching arms 53, the free end of each of said arms 53 being provided with a horizontal notch 54, and also having a vertical notch 55 formed in its under edge. These notches 54 and 55 are adapted to receive outstanding lugs 56 and 57, respectively, arranged in different planes at the upper portions of the ends of the block 40. When the notches 54 and 55 are engaged with the lugs 56 and 57 the attaching arms 53 embrace the tool supporting block 40, and said lugs 56 form pivots about which the gage may swing, while the lugs 57 support the gage in horizontal position, and thus limit the downward movement thereof when the same is swung about the lugs 56. At the underside of the supporting bar 52 is arranged a templet 58, that edge of the templet 58 which is nearest to the tool supporting block 40 being shaped as of the diameters of cut which it is desired to impart by the tools to the axle. Thus, the templet 58 will be so shaped and dimensioned that the diameters of cut desired to be imparted to the journal, wheel base, etc., of the axle will be attained by positioning the tools in relation to the templet in the manner hereinafter described. The templet 58 is connected to the supporting bar 52 by a plurality of bolts 59, or their equivalent, which are seated in slots 60 formed in said bar 52, as thus a degree of adjustment may be imparted to the templet 58 should it be necessary to adjust the same in relation to said bar 52. In this connection it should be observed that the U-shaped gage, through the medium of the lugs 56 and 57, holds the templet 58 at the proper elevation with respect to the cutting edges of the tools 43 so that these tools, when adjusted, may be properly presented to the axle in the proper relation to the center line thereof. This will be understood from Figs. 1 and 2, in which views the position of the axle is disclosed by the dotted lines.

By fastening the templet 58 to the supporting bar 52 through the medium of the bolts 59 and 60 it will be seen that the templets may not only be adjusted but there may be an interchange thereof.

It has also been stated that the invention further contemplates the provision of means designed to limit the movement of the tools as they are presented to the work and which will insure the accurate positioning of the tools in accordance with the predetermined diameter to be imparted to the work. The means by which this is accomplished are illustrated in Figs. 1, 3, 4, and 5. Such means comprise a stop block 61 which is suitably connected to each side of the carriage 10 at predetermined points, so as to be held in fixed relation to the movement of the cross slide 28. Each of these stop blocks is provided with an outstanding foot 62 to which is connected, as by a bolt 63, or its equivalent, a stop proper 64. The stop proper 64 has a nose 65 which fits within a groove 66 arranged in the contiguous portion of the carriage 10. Mounted at each side of the forward end of the slide 28 is a bracket 67 in which a set screw 68 is threadably mounted, and thus capable of adjustment within said bracket 67, and said set screw 68 may be held in this position of adjustment by means of a locking nut 69 associated therewith. It will be understood that the screw 68 is so adjusted in the supporting bracket 67 that when the end of said screw contacts with the stop proper 64 the cutting edges of the tools 43 will have approached the axle to the proper position for insuring the diameter of cut to be imparted to the axle. When these diameters vary in accordance with the different diameters of axles, the screws 68 will be set from time to time so as to provide for the presentation of the cutters in the manner above referred to.

The stop proper 64 has a loose pivotal connection with the bolt 63, and if occasion demands the same may be swung thereon so as to remove the nose 65 of the stop proper from the groove 66. When the stop proper is swung in this manner it is removed from the path of forward movement of the set screw 68, so that the cross slide 28 may be advanced toward the work to a greater extent than when the stop proper is in the immediate path of the set screw.

In Figs. 7, 8 and 9 is illustrated the means for effecting horizontal adjustment of the several cutters 43 when greater nicety is required than can be obtained by movement of the cutters directly by hand. To provide for this a U-shaped supporting yoke 70 is arranged at the forward end of the tool-supporting block 40, the side arms of said

yoke each being provided with an elongated slot 71, which is open at one of its ends, said slot receiving a fixed stud 72 which projects outwardly from the end of the block 40 adjacent to the arm, and each of said slots also receives a screw threaded stud or pin 73 having mounted thereon a clamping nut 74 which is adapted to embrace and bear against the outer side of each of the arms of the yoke. While the studs 72 will limit the movement of the yoke 70 toward the block 40 it is apparent that the outward movement, or movement away from the block, is limited only by the length of the slot 71, and when the proper positioning of the yoke with respect to the block 40 has been attained, the nuts 74 are tightened, thereby holding the yoke in such position of adjustment.

A plurality of guide pins 75 is mounted in the yoke 70, as by screw threading, the free ends of said pins being received by a plurality of sockets 76 formed in the block 40, said pins being capable of free movement within said sockets 76 so as to conform to the movement of the yoke 70 when the same is adjusted in relation to the block. Mounted in the yoke 70, one for each of the cutters 43, is a plurality of adjusting screws 77, the inner ends of which are provided with reduced necks 78 terminating in enlarged heads 79. The heads 79 fit within vertical channels 80 formed in the ends of the tools 43 which are contiguous to the screws 77, and each of said tools 43 is also provided with a vertically disposed slot 81 which communicates with the channel 80 of that cutter, the shank 78 of the screw 77 which engages the cutter being received by said slot 81. This slot is also provided with an enlarged opening 82 through which the head 79 is introduced to and removed from the channel 80. The manner of engagement of the screws 77 with their respective tools 43 is clearly illustrated in Fig. 7, and when so engaged it is obvious that as the screws 77 are adjusted the several tools 43 may be moved forwardly or rearwardly within the supporting block 40. It will, of course, be understood that this adjustment is effected only when the set screws 44 have been loosened, and when such adjustment has been made the screws 44 are again tightened to hold the tools in position.

As an alternative form of tool setting gage, the construction illustrated in Figs. 10, 11 and 12 may be employed. This includes a base plate 83 of sufficient dimensions to accommodate one of the tool supporting blocks 40. The plate 83 at its under face is provided with suitable supports 84, and at its upper face is provided with guide strips 85 which form a rectangular inclosure for the reception of the tool supporting block. At points opposite to the rectangular space referred to is provided a plurality of vertically extending pedestals 86 which support a templet 87 secured to said pedestals 86 through the medium of a plurality of cap screws 88 or their equivalent. At a point approximately the center of the plate 83, and in proximity to the templet-supporting pedestals 86, is an upstanding lug 89, which corresponds to the centering pin 46, shown in the other figures of the drawing. This lug 89 is designed to enter the opening 49 of the tool-supporting block 40 when the latter is positioned upon the plate 83. The numeral 90 designates the anchoring stud which is formed of upper and lower members, hingedly connected, as at 91, the lower member being fixedly connected to the plate 83, while the upper member may be swung upon the lower member to and from engaging positions with the tool-supporting block when the latter is placed upon the device. In the upper end of the upper hinged member of the stud 90 is a tapered slot 92 which receives a wedge 93, and surrounding the stud 90 is a washer 94 adapted to embrace the upper face of the tool-supporting block 40 and span the U-shaped socket 51 thereof. The dotted lines in Fig. 10 illustrate the tool-supporting block in position on the gage. By removing the wedge 93 and the washer 94 from the anchoring stud 90 the tool-supporting block 40 may be positioned in the space between the guide strips 85, the lug 89 entering the opening 49 of the block, while the U-shaped socket 51 receives the stud 90. If the upper member of the stud 90 be then swung into alinement with the lower member thereof, and the washer 94 positioned on the stud 90 so as to span the upper end of the socket 51, the insertion of the wedge 93 in the slot 92 will force the washer 94 into tight engagement with the upper end of the block 40, and thus anchor the latter onto the plate 83. The several tools may now be adjusted to the desired diameters of cut by presenting the same to the different portions of the templet 87, and when the tools are thus assembled and positioned the block 40 and the tools contained therein may be bodily removed from the gage and positioned on the cross slide 28 without further setting of the tools.

With the templet 58 positioned by the attaching arms 53 upon the tool-supporting block 40 as illustrated in Figs. 1, 2 and 6, it is evident that the several tools 43 can be set to the desired diameters of cut by presenting their cutting edges to the shaped edge of the templet 58, and when this has been done the set screws 44 are tightened to hold the respective tools in such adjusted position. The setting gage is now removed,

and by proper manipulation of the hand wheel 36 the cross slide 28 is advanced to the work, and the tools presented to the axle for the roughing operation. The set screw 68 of the diameter stop having been properly adjusted, the forward movement of the cross slide 28 is arrested by contact of the screw 68 with the stop proper 64. The longitudinal feed of the lathe is now thrown in, and when the required length of cut has been made such feed is discontinued by the usual mechanism of the lathe. Obviously, therefore, when the advance movement of the tools to the work is checked by the diameter stop hereinbefore described the tools are in proper position for obtaining cut of the axle to the predetermined diameters; furthermore, it will also be evident that the tools are properly supported with such rigidity as to withstand the heavy pressure to which they are subjected during the operation of roughing the axle and maintained in their operative positions with the required stability which should characterize a tool holder subjected to these conditions.

We claim:

1. In a lathe tool holder, the combination with a cross slide, of a gang-tool holder associated therewith, means associated with said gang-tool holder for positioning the tools therein in predetermined relation to the line of cut and to the center line of the work when presented to the work, and means for arresting movement of the tool holder at a predetermined point in the advance thereof with respect to the work whereby to effect in coöperation with said tool-positioning means a correctly proportioned final shaping of that portion of the work thus cut.

2. In a lathe tool holder, the combination with a cross slide, of a gang-tool holder associated therewith, displaceable means associated with said gang tool holder for positioning the tools therein in predetermined relation to the line of cut and to the center line of the work when presented to the work, and means for arresting movement of the tool holder at a predetermined point in the advance thereof with respect to the work whereby to effect in coöperation with said tool-positioning means a correctly proportioned final shaping of that portion of the work thus cut.

3. In a lathe tool holder, the combination with a cross slide, of a gang-tool holder associated therewith, means associated with said gang-tool holder for positioning the tools therein in predetermined relation to the line of cut and to the center line of the work when presented to the work, and variable means for arresting movement of the tool holder at a predetermined point in the advance thereof with respect to the work whereby to effect in coöperation with said tool-positioning means a correctly proportioned final shaping of that portion of the work thus cut.

4. In a lathe tool holder, the combination with a carriage, of a cross slide mounted thereon and movable with respect thereto, a gang-tool holder associated with said slide, means associated with said gang-tool holder for positioning the tools therein in predetermined relation to the line of cut and to the center line of the work when presented to the work, a stop associated with said carriage, and means associated with said cross slide and coöperating with said stop for arresting movement of the tool holder at a predetermined point in the advance thereof with respect to the work whereby to effect in coöperation with said tool-positioning means a correctly proportioned final shaping of that portion of the work thus cut.

5. In a lathe tool holder, the combination with a carriage, of a cross slide mounted thereon and movable with respect thereto, a gang-tool holder associated therewith, means associated with said gang-tool holder for positioning the tools therein in predetermined relation to the line of cut and to the center line of the work when presented to the work, a fixed stop associated with said carriage, and variable means associated with said cross slide and coöperating with said fixed stop for arresting movement of the tool holder at a predetermined point in the advance thereof with respect to the work whereby to effect in coöperation with said tool-positioning means a correctly proportioned final shaping of that portion of the work thus cut.

6. In a lathe tool holder, the combination with a cross slide, of a gang-tool holder associated therewith, and means associated with said gang-tool holder for positioning the tools therein in predetermined relation to the line of cut and to the center line of the work when presented to the work.

7. In a lathe tool holder, the combination with a cross slide, of a gang-tool holder associated therewith, and a displaceable gage associated with said gang-tool holder for positioning the tools therein in predetermined relation to the line of cut and to the center line of the work when presented to the work.

8. In a lathe tool holder, the combination with a cross slide, of a gang-tool holder associated therewith, a templet for positioning the tools in said holder in predetermined relation to the line of cut when presented to the work, a support for said templet, and means for connecting said templet and its support to said gang-tool holder.

9. In a lathe tool holder, the combination with a cross slide, of a gang-tool holder associated therewith, a templet for positioning

the tools in said gang-tool holder in predetermined relation to the line of cut when presented to the work, a support for said templet, attaching arms connected to said support and means for detachably connecting said arms with said gang-tool holder.

10. A setting gage of the class described, comprising a supporting base, a templet carried by said base, and means for anchoring the tool holder and its associated tools upon said base and in fixed relation to said templet.

11. A setting gage of the class described, comprising a supporting base, a templet associated with said base, means for centering a tool holder and its associated tools on said base and in respect to said templet, and means for anchoring the tool holder to said base when so centered.

12. A setting gage of the class described, comprising a supporting base, a templet associated with said base, centering means carried by said base for centering a tool holder and its associated tools with respect to said templet, and an anchoring stud carried by said base and coöperating with the tool holder for anchoring the latter to said base when centered with respect thereto.

13. In a lathe tool holder, the combination with a cross slide, of a gang tool holder associated therewith, a support associated with said gang tool holder and positioned thereon above the tools thereof, a templet carried by said support for positioning the tools in predetermined relation to the line of cut and to the center line of the work when presented to the work, and means for adjustably mounting said templet on said support.

14. In a lathe tool holder, the combination with a cross slide, of a gang tool holder associated therewith, a support associated with said gang tool holder and including a U-shaped frame, means for detachably mounting said support on said tool holder above the tools thereof, a templet carried by said support for positioning the tools in predetermined relation to the line of cut and to the center line of the work when presented to the work, and means for adjustably mounting said templet on said support.

15. In a lathe tool holder, the combination with a cross slide, of a gang tool holder associated therewith, a U-shaped support associated with said gang tool holder and positioned thereon above the tools thereof, said support having its sides notched, studs carried by the gang tool holder and with which the notches of said support are engaged to detachably hold said supports on said gang tool holder, and a templet carried by said support for positioning the tools in predetermined relation to the line of cut and to the center line of the work when presented to the work.

16. In a lathe tool holder, the combination with a cross slide, of a gang tool holder associated therewith and provided at opposite sides with outstanding studs, a U-shaped support associated with said gang tool holder, each side of said support having a horizontal notch formed in its end and a vertical notch formed in its lower edge for engagement with the outstanding studs of the gang tool holder, a templet carried by said support for positioning the tools in predetermined relation to the line of cut and to the center line of the work when presented to the work, and means for adjustably mounting said templet on said support.

17. In a lathe tool holder, the combination with a cross slide, of a gang-tool holder associated therewith, and a removable gage associated with said gang-tool holder for positioning the tools therein in predetermined relation to the line of cut and to the center line of the work when presented to the work.

In testimony whereof we have hereunto signed our names in the presence of two subscribing witnesses.

LE ROY KRAMER.
ALEXANDER BOOME.

Witnesses:
RACINE THOMPSON,
ROBT. A. MONSON.