Oct. 7, 1952 J. U. SHAGER 2,612,809

STEADY REST

Filed Dec. 10, 1948 2 SHEETS—SHEET 1

FIG 1

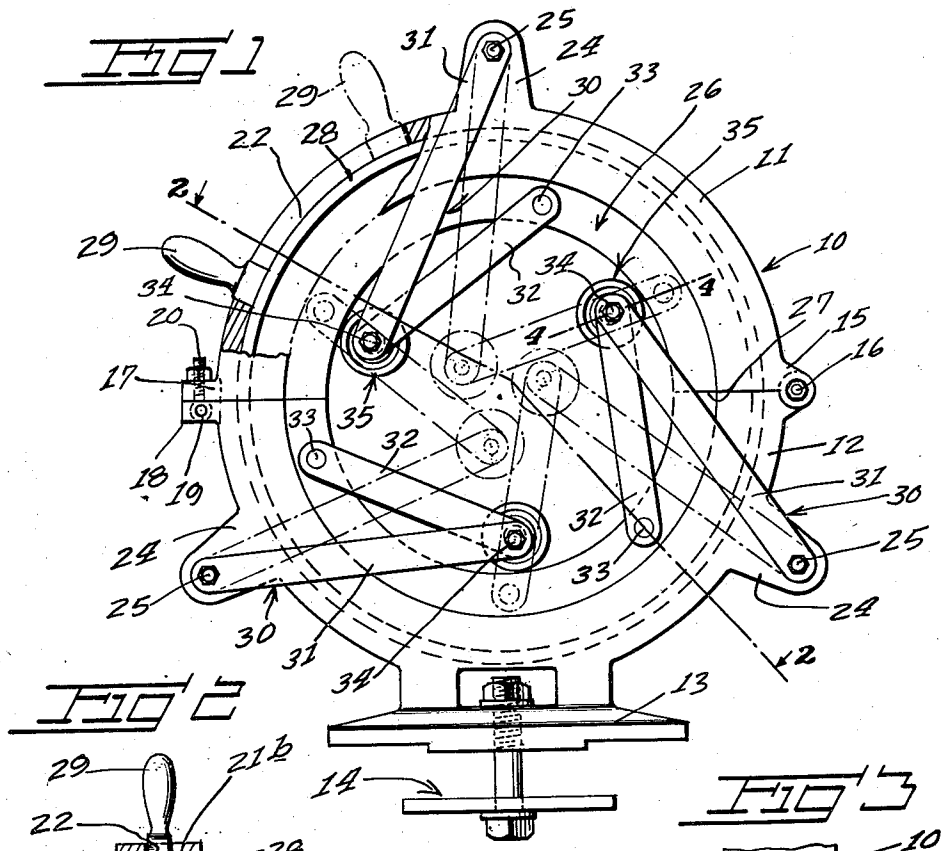

FIG 2

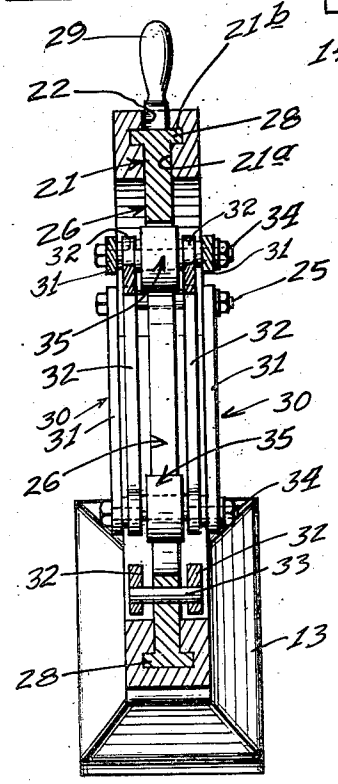

FIG 4

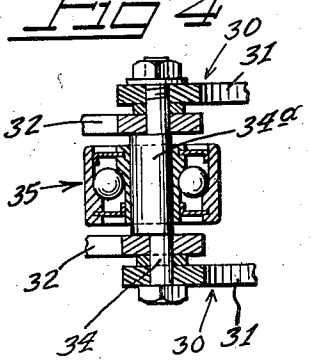

FIG 3

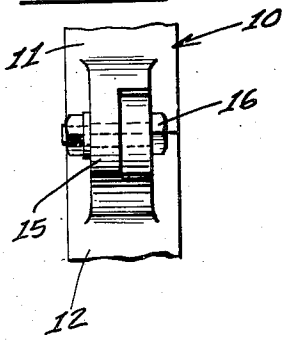

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FIG 5

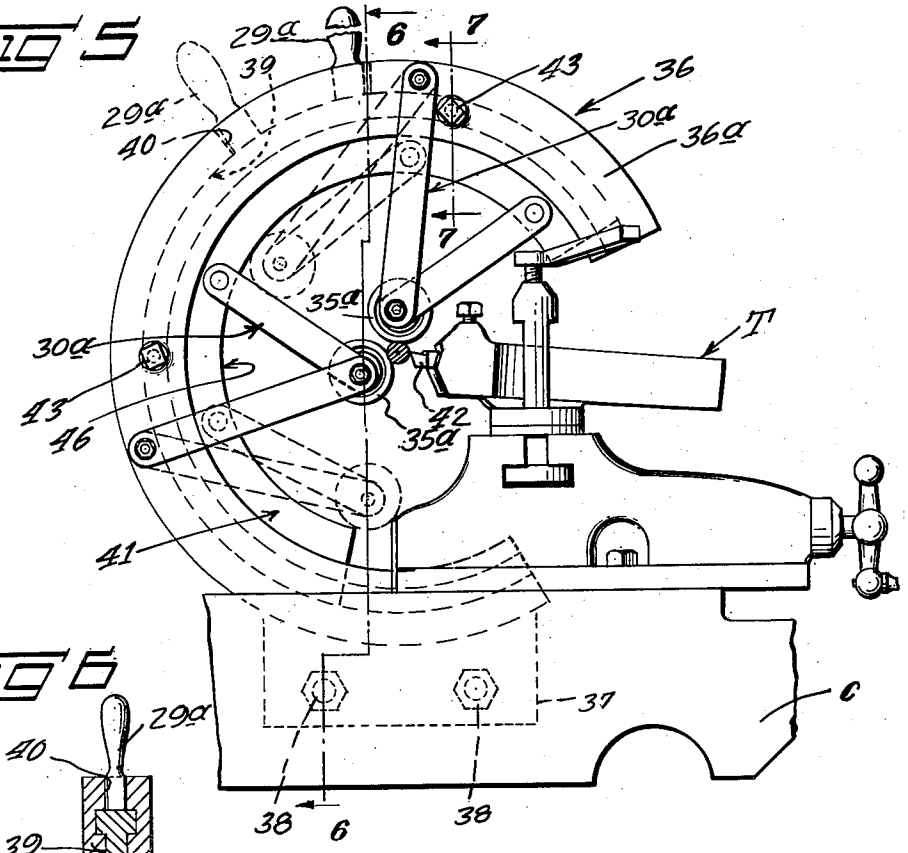


FIG 6

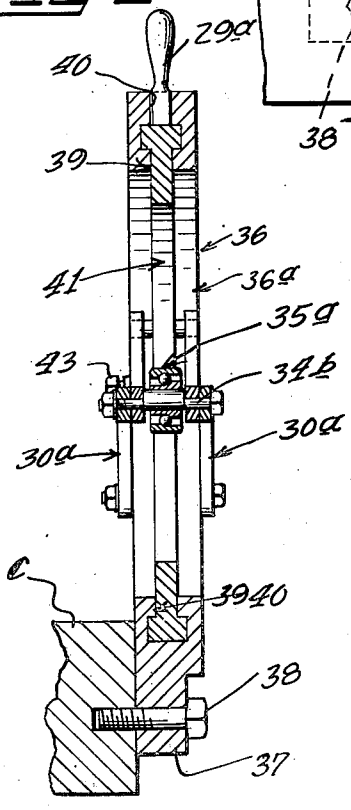
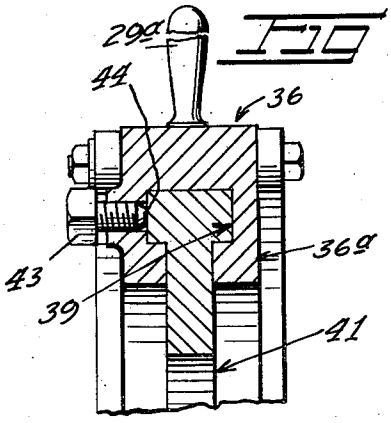


FIG 7



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STEADY REST

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6 Claims. (Cl. 82—39)

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The invention relates to steady rests adapted to be removably secured to a machine tool such as a lathe or the like and the primary object of the invention is to provide a rest adapted to support a piece of work being machined so as to reduce as far as possible vibrations set up in said piece of work.

Another object of the invention is to provide a steady rest adapted to be secured in a position of adjustment lengthwise of and on the bed or on the carriage of the machine tool and to support and hold the piece of work against whipping while at the same time permitting free rotation of the work and the lengthwise movement of the carriage supporting the cutting tool used on said piece work.

Another object of the invention is to provide a rest of the character indicated above adapted to true a piece of work more accurately in the machine.

A still further object of the invention is to provide a rest of the character indicated above adapted to hold and support the piece of work without marring the same.

An additional object of the invention is to provide a rest of the character indicated above adapted to support a heavy piece of work with a minimum of friction.

Another object of the invention is to provide a lathe rest of the character indicated above adapted to support a piece of work at all times as near as possible to the carriage supporting the cutting tool.

A further and more specific object of the invention is to provide an improved steady rest for use upon a lathe, wherein a single means is provided for adjusting the relative positions of cooperating supporting elements with respect to a piece of work whereby the work may be easily and quickly centered in the rest by a single movement or operation of the machine operator.

A still further object of the invention is to provide a steady rest for use in association with a lathe wherein the work supporting means comprises a plurality of rotatably supported heads carried by pivotally mounted supporting arms, the mounting for the arms being such that by movement of certain of the arms with respect to associated ones the said rotatably supporting heads will be moved as a unit toward or away from the center of the support.

Other objects of the invention not specifically mentioned will appear in the following specification describing the invention with reference to the accompanying drawings illustrating a preferred embodiment of the invention.

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In order that my invention may be better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:

Figure 1 is a view in side elevation of a steady rest constructed in accordance with one embodiment of the present invention.

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a fragmentary view showing, in elevation, the hinge coupling between the upper and lower sections of the rest frame.

Figure 4 is a detailed section taken substantially on the line 4—4 of Figure 1.

Figure 5 is a view in elevation of one side of a modified embodiment of the steady rest designed for attachment to one side of the tool carriage.

Figure 6 is a sectional view taken substantially on the line 6—6 of Figure 5.

Figure 7 is an enlarged detail section taken substantially on the line 7—7 of Figure 5.

In accordance with the present invention and referring particularly to the embodiment of the same as illustrated in Figures 1 to 4, the numeral 10 generally designates an annular frame which is divided diametrically into the upper and lower sections or halves 11 and 12 respectively. The rest as a whole is designed to be mounted upon the usual bed ways, not shown, of a lathe and to facilitate such mounting the lower section 12 of the frame 10 is provided with the foot plate 13 having connected therewith a conventional means, generally designated 14, for securing it in a position of adjustment on the bed ways.

The sections 11 and 12 are hingedly coupled together in a suitable manner as, by the provision of a pair of hinge ears 15 joined by a pivot bolt 16 at one side of the frame, while at the other side of the frame the ends of the two halves are provided with the upper and lower ears 17 and 18 respectively, the lower ear carrying upon the transverse pivot 19 a lock bolt 20 which enters in the well known conventional manner in a slot, not shown, in the upper ear 17. Thus the two halves of the frame are joined together to form the complete annulus.

The frame 10 has formed therein a continuous T-slot which is generally designated 21, the leg 21a of which is directed radially inwardly while the transverse portion or head of the slot 21b extends across the outer end of the leg portion in a direction paralleling the axial center of the frame. Through a portion of the circular extent of the upper half 11 of the frame there is provided the short outwardly opening slot 22

which communicates with the T-slot 21 as shown in Figure 1, for the purpose about to be described.

Equidistantly spaced around the annular frame 10 and forming integral parts of the same are the radially extending ears 24. Each of these ears carries and has extending transversely therethrough a pivot pin or bolt 25 the purpose of which is about to be described.

While this member 25 has been shown as a bolt having its ends projecting beyond the opposite sides of the ear through which it passes for the attachment of arms to the ear, it is to be understood that use may be made, if preferred, of studs or pins integral with the two side faces of the ears and adapted to receive retaining nuts.

Enclosed within the annular frame 10 is a split or two part ring 26 which is divided diametrically on the line 27. The division of the frame and ring is to facilitate the opening of the top half of the device for easy insertion and removal of work and it also permits ready placement of the ring in the frame 10. Many shafts have cranks or flanges which would not permit the use of a steady rest unless the rest could be opened. This ring has a cross sectional form conforming to the T-slot 21, the overall width of the ring between the inner and outer edges thereof being, however, materially greater than the total length of the slot 21 as shown in Figure 2, whereby a portion of the ring extends inwardly beyond the inner edge of the frame. Adjacent to its outer end the ring has the transverse head 28 which forms oppositely positioned flanges, which head engages in the transverse slot 21b of the T-slot, whereby the ring is maintained for free turning within the annular frame but the sections of the ring are prevented from coming away from the sections of the frame when the frame sections are separated.

Attached to the outer periphery of the ring 26 is a handle 29 which extends out beyond the slot 27, the base of the handle being disposed within the slot as shown in Figures 1 and 2. By this means rotary motion can be given to the ring 26 within the limits of the slot 27.

Swingingly attached to each of the radially extending ears 24, by means of the pivots 25 is an articulated unit which is generally designated 30. Each of these units comprises two cooperating pairs of arms, each two pairs of arms having the frame and ring between them as shown. Each pair of arms comprises a long link 31 which has one end pivotally attached to a pivot member 25, and a short link 32 which is pivotally attached at one end by means of the pivot pin 33 to the ring 26 as shown in Figure 1. Thus each two opposed or parallel pairs of links 32 has the ring 26 between the outer ends thereof and such outer ends are connected on the common pivot 33.

The opposite ends of each two adjacent links 31 and 32 are pivotally coupled together by engagement with one end of an arbor 34 which extends through the ring and thus couples together the inner ends of the two pairs of arms forming the unit 30.

Each arbor 34 is formed to provide the central eccentric bearing 34a and mounted upon each of these eccentric bearings is a ball bearing unit 35, as shown in Figure 4, which functions as an antifriction roller.

As will be readily apparent upon reference to Figure 1, when the lever 29 is in one end of the slot 22 the ring 26 will be in a position where the pivots 33 for the short links of the articulated units are as nearly in the radial line extending from the center of the frame to the adjacent pivot 25 as possible and when the units are in this position the rollers 35 will be at the maximum distance from the center of the rest as shown in Figure 1. By moving the lever 29 toward the opposite end of the slot 22 the pivots 33 will be shifted away from the adjacent pivots 25 and the connected ends of the links 31 and 32 will be caused to swing toward the center of the rest, thereby moving the rollers in a corresponding manner. Thus by this single movement of the ring the rollers can be moved as a unit toward or away from the center of the rest to be brought into working engagement with the body which the rest is to support while it is being worked upon in the lathe.

Figures 5 to 7 inclusive illustrate the application of the present invention to an open type of steady rest which is designed to be secured to one side of the tool carriage. In Figure 5 the tool carriage is generally designated C while the cutting tool mounted thereon is generally designated T.

The steady rest or follower rest of Figure 5 is generally designated 36 and as shown it comprises an open or incomplete ring frame 36a which has formed integral with it adjacent to one end, the mounting plate 37 which is secured to the rear side of the tool carriage C by bolts 38. This open frame 36a has a T-slot 39 formed therein and opening radially inwardly in the same manner as the frame 10 and in addition to the T-slot there is formed the radially outwardly opening slot 40, corresponding to the slot 22 of the construction shown in Figure 1.

Slidably engaged within the open frame 36a is an incomplete or open ring 41 which has a cross section in the form of a T, to fit the T-slot 39, as shown in Figures 2 and 3.

As is customary in the use of follower rests the open side of the frame or annulus 36a is directed toward the operator so that the work can be easily introduced and placed in position between the guide rollers 35a and the point of the tool 42.

The rollers 35a are supported on two pairs of arms in the same manner as the rollers 35 shown in Figures 1 and 2 and these pairs of arms constitute the supporting unit corresponding to the unit 30, and are here generally designated 30a. The supporting arbor for each of the rollers 35a is designated 34b and, as shown in Figure 6, has an eccentric central portion to facilitate adjustment of the rollers 35a as previously stated.

In view of the fact that the arm units 30a, the rollers 35a and the arbors 34b are all of the same construction as those previously described it is not believed necessary to give a repeated detailed description of the parts of these units.

In order that the open ring 41 may be held in desired position after it has been shifted by means of the handle 29a, for the purpose of moving the steady rollers 35a to the proper position with respect to the work, the ring is secured in place by means of one or more set screws 43, as particularly illustrated in Figure 7. As shown in this figure the set screw 43 has its inner end 44 engaging against the adjacent side of the head of the divided or open ring 41. By this means the ring will be firmly secured against movement after it has been turned to the desired extent to set the work positioning and holding rollers 35a.

From the foregoing description it will be readily apparent that there is provided in the present invention a novel and improved steady rest by

means of which the work can be easily and quickly centered and at the same time will be held or supported firmly so that it can rotate freely without whipping. When it is desired to put in a new piece of work or shift the steady rest to another position where the supporting rollers must be moved so as to accommodate a piece of larger or smaller diameter, such adjustment can be easily and quickly made by means of the handle 29, thereby avoiding the necessity of adjusting several thumb screws and contact fingers such as are employed in steady rests of the type generally used.

I claim:

1. A rest of the class described, comprising a frame adapted to be secured to a machine tool, an adjusting member carried by the frame for turning about a center, a plurality of two-part pivotally joined work steadying arms each pivotally coupled at one extremity to said frame and at the other extremity to the adjusting member, a ball bearing work contacting roller rotatably supported by each arm at the pivotal coupling between the parts thereof to turn on an axis paralleling the turning axis of the adjusting member, and means for turning the adjusting member to effect movement of said work contacting element relative to said center, said adjusting member being turnable between two positions in one of which positions said arms are folded with the roller separated from said center and in the other of which positions the arms are unfolded with the rollers closely grouped together around the said center

2. A lathe steady rest, comprising a circular frame adapted to be mounted on a lathe at one side of a tool carriage, a ring supported within the frame for rotation about a center corresponding to the center of a piece of work to be turned in the lathe, a plurality of pairs of parallel arms having spaced outer ends between which the ring is pivotally connected, a plurality of pairs of longer arms having spaced outer ends between which the frame is positioned, the said outer ends of the longer arms being pivotally attached to the frame, the inner ends of each of the first mentioned pair of arms being in overlapping relation with adjacent inner ends of a pair of longer arms, an arbor pivotally supported between the adjacent inner ends of the pairs of arms, a wheel rotatably supported on said arbor, and means for turning the ring in the frame to shift the pivots for the outer ends of the first mentioned pairs of arms relative to the pivots for the outer ends of the said pairs of longer arms.

3. A lathe steady rest of the character described in claim 2, in which the said arbors are eccentrically supported by the arms whereby the turning centers for the wheels may be altered relative to the center of the ring.

4. A lathe steady rest comprising a frame adapted to be mounted on a lathe at one side of a tool carriage, an adjusting frame mounted within the first frame to turn about a center corresponding to the center of a piece of work to be turned in the lathe, a plurality of two-part articulated arm units, one part of each unit being pivotally secured to the first frame and

the other part being pivotally coupled to the adjusting frame, the articulation of each unit being within the area defined by the adjusting frame, a roller supported on the articulation of each unit to turn on an axis paralleling the turning center of the work, and means for turning the adjusting frame, each of said rollers turning about and being supported by an arbor and each arbor in turn being supported to be adjustably turned on an eccentric center.

5. A lathe steady rest comprising a frame adapted to be mounted on a lathe at one side of a tool carriage, an adjusting frame mounted within the first frame to turn about a center corresponding to the center of a piece of work to be turned in the lathe, a plurality of two-part articulated arm units, one part of each unit being pivotally secured to the first frame and the other part being pivotally coupled to the adjusting frame, the articulation of each unit being within the area defined by the adjusting frame, a roller supported on the articulation of each unit to turn on an axis paralleling the turning of the work, means for turning the adjusting frame about said center within the first frame, each of said arm units consisting of two pairs of arms disposed in spaced parallel relation, the said one part of each unit constituting two arms having the first frame position between their outer ends and the said other part constituting said arms having the adjusting frame positioned between their outer ends, the inner ends of the two arms of the said one part being in overlapping relation with the two arms of the said other part and the said roller being supported between the inner ends of the arms of the two parts.

6. A lathe steady rest comprising an upright annular body, a ring supported by and concentric with said body for turning on the center of the body, a plurality of arms each pivotally joined to the body to swing on an axis paralleling the turning axis of the ring for swinging an end of the arm toward and away from the center of the ring and body, a link adjacent to each arm and pivotally coupled at one end to the adjacent arm, means pivotally coupling the other end of each link to the ring, a roller rotatably supported on the said end of each arm for turning on an axis paralleling the turning axis of the ring, and means connected with the ring for turning the same.

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