R. E. FLANDERS.

WORK REST ATTACHMENT FOR LATHES.

APPLICATION FILED JAN. 14, 1920.

1,368,252.

Patented Feb. 15, 1921.

2 SHEETS—SHEET 1.

Fig. 10.

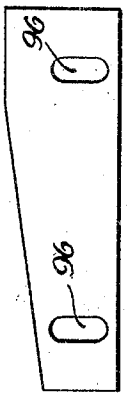


Fig. 11.

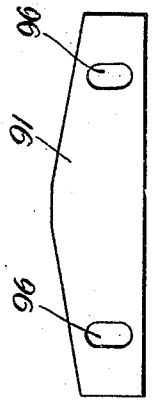


Fig. 2.

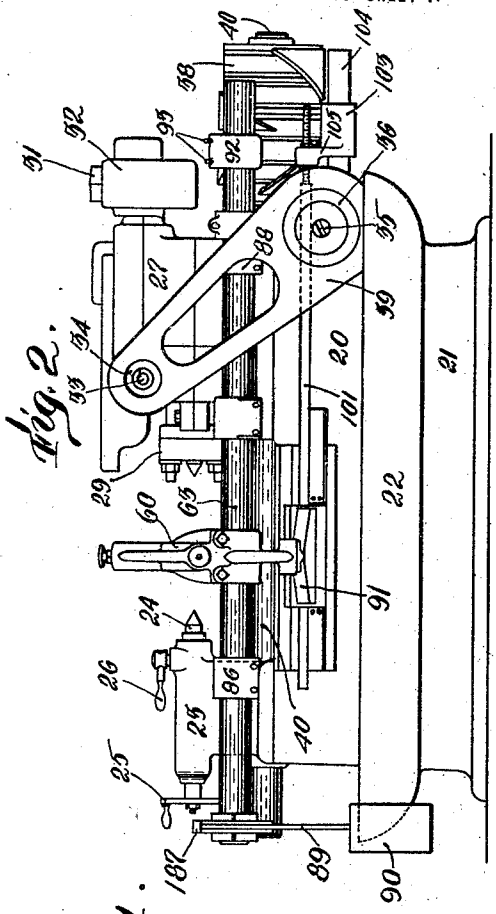


Fig. 1.

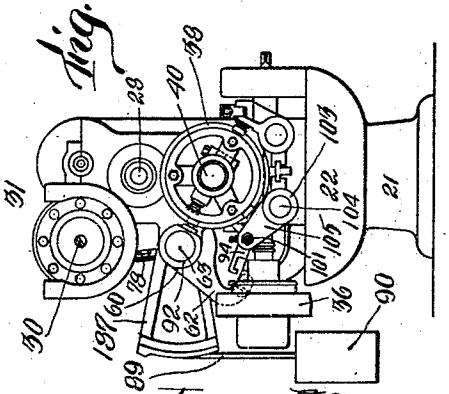
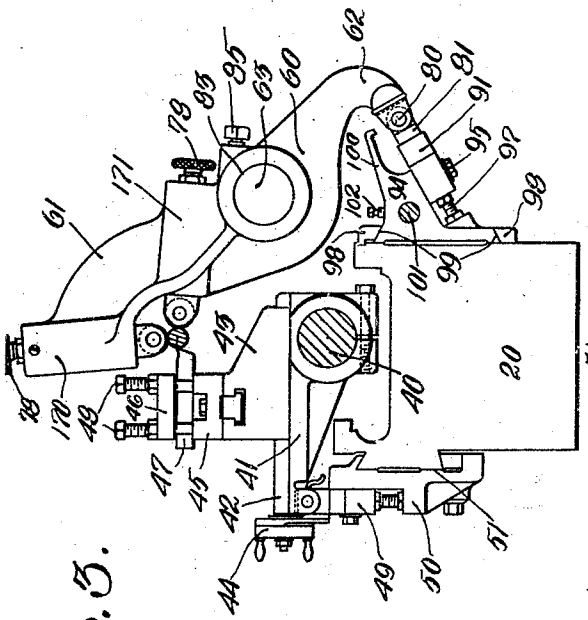


Fig. 5.



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2 SHEETS—SHEET 2.

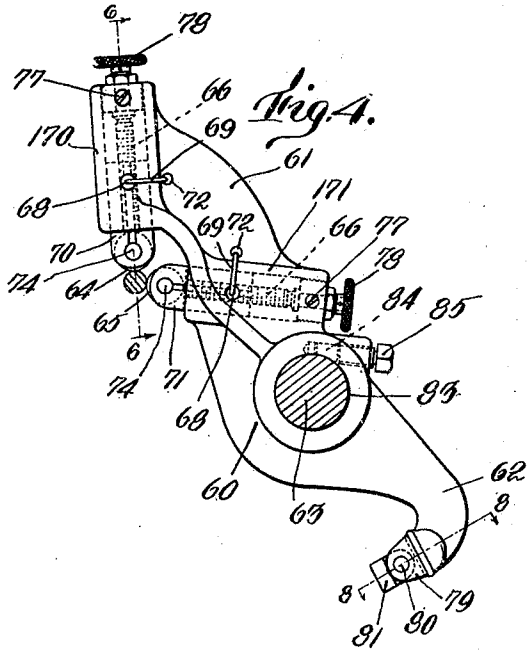


Fig. 4.

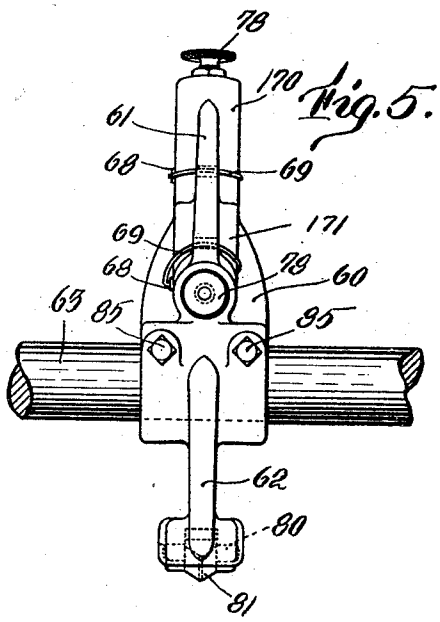


Fig. 5.

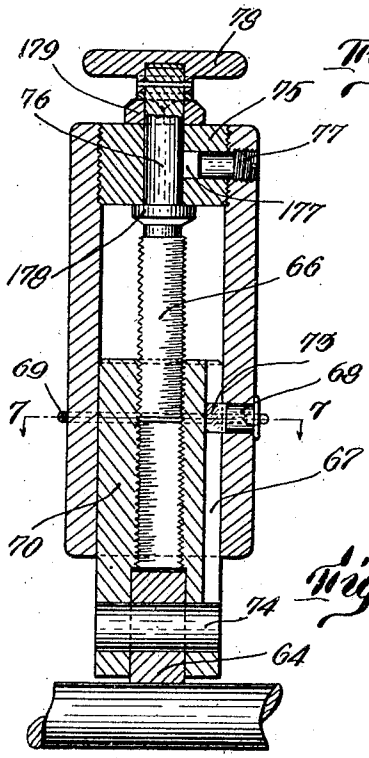


Fig. 6.

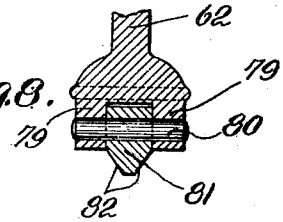


Fig. 8.

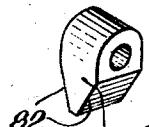


Fig. 9.

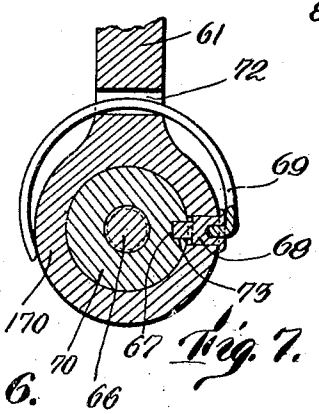


Fig. 7.

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UNITED STATES PATENT OFFICE.

RALPH E. FLANDERS, OF SPRINGFIELD, VERMONT, ASSIGNOR TO JONES & LAMSON MACHINE COMPANY, OF SPRINGFIELD, VERMONT, A CORPORATION OF VERMONT.

WORK-REST ATTACHMENT FOR LATHES.

1,368,252. Specification of Letters Patent. Patented Feb. 15, 1921.

Application filed January 14, 1920. Serial No. 351,469.

To all whom it may concern:

Be it known that I, RALPH E. FLANDERS, a citizen of the United States, residing at Springfield, in the county of Windsor and State of Vermont, have invented new and useful Improvements in Work-Rest Attachments for Lathes, of which the following is a specification.

My invention relates to lathes and especially to those of the Fay automatic type, such as illustrated in Letters Patent No. 1,219,813, dated March 20, 1917, and has for one of its objects to produce a rest for steadying the work and preventing it from springing or vibrating when being operated on by the cutting tools and also to provide automatic mechanism for moving said rest into and out of active position. My invention has the further object of providing means for coördinating the movement of the work rest with that of the cutting tool.

Referring to the drawings,—

Figure 1 is an end elevation of the lathe, viewed from the right end thereof as shown in Fig. 2, and provided with a rest embodying the invention.

Fig. 2 is a rear elevation of the machine showing my invention applied thereto.

Fig. 3 is an enlarged sectional view of part of the lathe showing my invention applied thereto.

Fig. 4 is a still further enlarged view of my device in side elevation thereof, shown detached from the machine, but showing its attachment to the rear tool bar of the lathe, and

Fig. 5 is a rear view of the same.

Figs. 6, 7, 8, 9, 10 and 11 illustrate details of construction.

The machine shown on the drawings belongs to that class of lathes in which the piece of work to be operated on by the cutting tools is held, if desired, between centers, and the tool holder or carrier is supported on a sliding bar which is journaled in the bed or in the headstock and tailstock, and has imparted thereto both an axial and a rocking movement for the length and cross feeds. The present invention comprises rests for steadying the work against the thrust of cutters and securing greater stability thereof, and mechanism for moving the rests automatically into and out of operative position in relation to the work, and for causing the rests to be fed lengthwise or crosswise of the work, as may be desired.

As will be subsequently explained, the rests have the advantage of being readily and quickly adjusted to the various kinds of work that may be mounted in this type of machine to be turned or faced, or otherwise cut.

Before proceeding to a detailed description of my invention, I should like it understood that the invention is capable of various other embodiments, and also that various changes may be made in the illustrated machine without departing from the spirit and scope of my invention as defined in the claims. It should be understood, too, that the drawings are more or less conventional and that the phraseology which I have employed is for the purpose of description and not of limitation.

Referring now to the drawings specifically, the machine illustrated comprises a bed 20, having a base 21, equipped with a pan 22. Upon suitable ways on the bed may be secured the tailstock 23, having the tail center 24 which is adjusted by means of the handwheel 25, and which may be clamped after adjustment by a suitable clamp operated by the handle 26. Affixed to the other end of the bed, is a headstock 27, having journaled therein a spindle 28 provided at its end with a chuck or work holder 29. Through mechanism, which need not be described in detail, power is imparted to the drive spindle to rotate it at any predetermined number of revolutions per minute, any convenient variable-speed power-transmitting mechanism for this purpose being interposed between the drive shaft 30 and said spindle. Attached to the end of the drive shaft is a belt pulley 31, whereby the drive shaft may be connected to a source of power through the intermediary of a belt (not shown). This pulley is incased for protection in a suitable guard member 32 extending about the greater part of its periphery.

Rotatably mounted longitudinally of the

machine is a cam drum 38, and for actuating the same and for causing it to rotate, there is connected to the drive shaft 30, by suitable gearing (not shown), and at right angles thereto, a shaft 33. Below the shaft 33 and parallel thereto is a shaft 35. These two parallel shafts have on their outer ends respectively, belt-wheels 34 and 36, which are connected by a belt or other suitable means whereby and through suitable worm gear connection with the shaft 35, drum and drum shaft are rotated. The belt and belt pulleys 34, 36, may be protected by a surrounding casing.

The tool carrier is mounted upon a bar arranged not only to move axially but also to rock about its axis, such a bar is indicated at 40. Adjustably mounted on this bar 40 is a tool carrier 41. The carrier is provided with a guideway 42, in which the slide 43, having on its under side a complementary groove coöperating with the guideway, is adjusted longitudinally thereof by means of suitable mechanism, operated by handwheel 44. Slide 43 has provision for reception of a tool holder.

The tool holder may be of any suitable or usual type. As shown, it consists of a block having a top plate 46, between which and the block may be inserted one or more cutters 47, which are held clamped in place by means of set screws 48 passing through the top plate and into the block. The tool holder is adjustable lengthwise of the axis of the bar 40, whereas slide 43 is adjustable transversely of the axis of the bar. The bar 40 is reciprocated axially and rocked about its axis to move the cutters, which are supported on the slide and tool carrier, lengthwise and crosswise of the axis of the work, the cutters being adjustable manually relatively to the carriers, by reason of the construction last described.

The tool carrier is laterally controlled as to position during its feeding and withdrawing movements by a templet or former 49 adjustably supported on a former support 50, slidable lengthwise of the machine on guideway 51. It is to be understood that the tool carrying bar 40 and the templet do not move longitudinally of the machine in unison, but preferably one member is fixed against longitudinal movement when the other is free so to move. By means of templets such as illustrated in Figs. 10 and 11, one is able to cause the cutters to operate on the work as may be desired. The specific construction and operation of these templets will not be set forth in detail, in the present application, except so far as is necessary in relation to those features which constitute my invention, as they are amply disclosed in said Letters Patent No. 1,219,813, hereinbefore referred to. When the machine is in operation the tool carrier may be moved forward and backward longitudinally of the work axis, by cams located on the cam drum and operating to actuate or move the bar 40.

I shall now describe a mechanism embodying the present invention. In its general outlines it comprises a carrier or frame 60 having a forwardly and upwardly extending arm 61 on which are mounted top and back rests adapted to contact with the work, and a downwardly extending arm 62, carrying a member adapted to contact with a templet or former, hereinafter to be described. The rest carrier 60 is mounted for sliding and rocking adjustment on the back bar 63.

On the forward arm 61 and adjustably placed so as to make proper contact with the work are a top rest 64 and a back rest 65, comprising rolls which are supported by cylindrical holders or carriers 70, 71 respectively. Said holders are placed approximately at right angles to each other and are mounted for sliding adjustment in longitudinally apertured cylindrical members 170 and 171 on arm 61. The rests are mounted for rotation on pins 74 arranged transversely of the holders, in the inner ends thereof and are placed in notches formed in the ends of the holders. These roll holders have longitudinal screwthreaded bores and exterior longitudinal grooves 67 and are adapted to be advanced or retracted, as the occasion may demand, by means of screws 66 coöperating with said screwthreaded bores. The roll holders are prevented from rotation by pins 68, having flattened ends 73 which ride in grooves 67. These pins are held in place by means of semi-circular springs 69 passing through apertures 72 in the arm 61 and about the cylindrical members 170, 171. In the rear end of the longitudinal apertures in members 170 and 171 are slightly enlarged internally screwthreaded portions into which are fitted externally threaded plugs or closures 75. The unthreaded stems 76 of screw bars 66 are journaled in the plugs and when the rests 64, 65 have been adjusted, are adapted to be locked in adjusted position by means of set screw pins 77 and blocks 177. On the rear end of the screw bars 66 are handwheels 78 whereby the roller rests may be advanced or retracted, the screw bars being held against axial movement by flanges 178, and washers 179 and the hubs of said handwheels.

The extreme lower end of the depending arm 62 is turned at an angle toward the rear side of the bed and has pivoted between short arms 79 and on a pin 80, a shoe 81 which is beveled at 82 so as to firmly contact with a templet without jerky or irregular movement.

The rest carrier 60 is mounted on the back bar, being provided with an aperture 83 for this purpose. Located at right angles to

aperture 83 are two other smaller screw-threaded apertures communicating therewith and through which plugs 84 may be inserted and held firmly in place by means of screws 85 to lock the rest carrier against rotation relative to bar 63.

Bar 63 is mounted on the back side of the lathe for axial and oscillatory movement in bearings 86 on the tailstock and 87 and 88 on the head stock. The bar may be rocked in its bearings or the rest carriage may be left free to rock about said shaft as may be desired. In the latter case the rest carriage may be held against longitudinal movement relative to the bar by means of collars (not shown) clamped on both sides of the rest carrying frame.

Fixed to one end of the bar 63 is a sector shaped member 187 grooved on its periphery and having attached thereto, and adapted to ride in said groove, a cable 89 carrying a weight 90 on the end thereof. By means of this mechanism, the shaft 63 tends to rock in a direction to swing the rest carriage upwardly and rearwardly and consequently when the rest frame is rigidly attached thereto, forces the shoe 81 firmly against the surface of a templet 91 to be described.

Mounted near the opposite end of the bar is a collar 92 adapted to be rigidly attached thereto by means of set screws 93. Mounted on this collar is a member adapted to cooperate with suitable cams of the cam drum 38. By this means, the shaft 63 may reciprocate longitudinally of the lathe. The collar 92 is so located, however, that the shaft may be rocked through a relatively short arc without disengaging the member located on the collar from the cams.

The templet 91 which controls the operation of the rest carriage may be made in various forms, two of which are illustrated in Figs. 10 and 11. It is adjustably mounted in a templet-carrying slide 94 which is adapted to be reciprocated longitudinally of the bed by means of a suitable connection with the cam drum 38. The templet is attached to the slide 94 by bolts 95 which pass through elongated apertures 96 in the templet designed to allow for adjustment of the templet relative to the slide. To effect this adjustment there are located in the slide abutment screws 97 whereby the angle and position of the templet relative to the slide may be adjusted. When adjusted the templet may be held in adjusted position by means of the bolts 95.

The slide is mounted for support in, and is adapted to be slid longitudinally of the lathe in suitable guideways 98 having undercut edges to fit the dove-tailed base 99 of the slide. The slide may be provided with a shield 100 adapted to overlie the contacting portions of the shoe 81 and templet 91 to protect them from chips and cuttings. The templet is adapted to be moved longitudinally by a bar 101 longitudinally adjustable in an aperture in the slide 94 and is held in adjusted position therein by means of set screws 102. The opposite end of bar 101 is attached to a sleeve 103, slidable on shaft 104. For this purpose the screw-threaded end of the bar 101 passes through an arm 105 projecting from the sleeve and is provided with adjusting nuts on both sides of the arm. The sleeve 103 has a suitable roll or stud to engage cams on the cam drum 38 whereby the templet may be reciprocated longitudinally of the axis of the work.

It is obvious that either or both the slide 94 or the shaft 63 may be actuated from the cam drum and that it might not be desirable to have both of them connected thereto at the same time. That is if the shaft 63 is to be slid longitudinally carrying the rest along with it, it might not be desirable to have the templet also moving in that direction, since if both move in the same direction at the same speed the templet would have no effect in causing the rest to rock about the axis of the shaft 63. However, it might be desirable to have the two members move at different speeds, the templet moving more slowly than the rest, and in such case there would be a rocking movement of the rest. It is also desirable under some circumstances especially when short pieces of work are to be formed or faced to have the rest stationed in the center of the work and free to have a rocking movement only.

For example, when the lathe is tooled with a forming or a grooving cutter, or with a facing cutter, the cams on the drum may be so arranged and located that the bar 63 will be held against axial movement, and the templet carrying slide operated merely to advance the rest carriage automatically into and out of work engaging position. In turning operations, the bar 63 may be fed synchronously with the front tool bar 40, to cause the rest to follow the tool in which case the templet slide may be stationary, or else may be operated just before and at the completion of each cut to advance the rests into and out of engagement with the work. In fact the mechanism as herein described provides rests which may be operated automatically in numerous ways to accommodate them to the character of the operation being performed by the cutter, so as to resist the thrusts of the cutters under varying conditions. In cutting shouldered or tapered work, the templets approximate in shape those which are utilized in controlling the cutters. The same cam drum or drums mounted on the same cam shaft may be utilized for controlling the operation of both the tool carrier and the rest carrier.

In setting up the lathe for any particular operation on the work, the rests are independently adjusted to bear on the work during the cutting operation, the rest carriage, as a whole being adjusted on the bar 63 as may be required to place it properly in relation to the cutters or the work.

It will be observed from the foregoing disclosure that I have provided features of decided advantage for employment in lathes of the character described, and while I have illustrated one embodiment of my invention, various changes may be made therein without departure from the invention as defined in the claims.

Having thus explained the nature of my said invention and described a way of making and using the same, although without attempting to set forth all of the forms in which it may be made or all the modes of its use, what I claim is:

1. In a metal-working machine, a tool-holder and a cutting tool thereon arranged on one side of the work axis and mounted so as to be fed longitudinally and transversely of said axis, one or more work rests, a carriage therefor mounted on the opposite side of the said axis and adapted to move longitudinally thereof and to move transversely thereof and automatic mechanism for simultaneously controlling the operation of both said cutting tool and said carriage.

2. In a metal-working machine, a bed, a longitudinally arranged bar, a pivotally supported carriage carried by said bar, work rests on said carriage, adapted to contact with the work, an arm on said carriage and a templet mounted on the bed for engagement with said arm to control the operations of said carriage.

3. In a metal-working machine, a bed, a longitudinally arranged bar, a carriage mounted to rock relative thereto, a templet supported on the bed, one or more work rests on said carriage adapted to contact with the work and means on said carriage contacting with said templet and for maintaining the work rests in contact with the work.

4. In a metal-working machine, a carriage having a forwardly projecting arm, work rests on said first mentioned arm, a templet for engaging said second mentioned arm, and means for pivotally supporting said carriage.

5. In a metal-working machine, a work rest, means for automatically moving said rest longitudinally of the work axis, and means for automatically moving said rest transversely of said work axis.

6. In a metal-working machine, a pivotally supported carriage movable about an axis substantially parallel with the work axis, a work rest therein adapted to contact with the work, a templet mounted on said machine, and a depending arm on said carriage contacting with said templet whereby the rest may be held in contact with the work.

7. In a metal-working machine, a pivotally supported carriage adapted to have rocking movement relatively to the work axis, a rest thereon adapted to contact with the work, a templet mounted on the machine, for controlling the rocking movement of said carrier, and mechanism for automatically effecting a relative movement of said carriage and templet longitudinally of the work axis.

8. In a metal-working machine, a work rest adapted to contact with the work, a carriage therefor adapted to have rocking and longitudinal movements relative to the work axis, a templet, a depending arm on said carriage contacting with said templet, and mechanism for effecting a relative movement of said carriage and said templet longitudinally of the work axis.

9. In a metal-working machine, a work spindle, a tool carriage, mechanism for moving said tool carriage lengthwise and crosswise of the axis of the spindle, a bar having its axis parallel with that of the work spindle, a carriage on said bar and adapted to move about the axis thereof, top and back work rests on said carriage, a templet arranged longitudinally of said last mentioned axis and engaged by said carriage, and mechanism for effecting a relative movement of said carriage and templet longitudinally of said axis.

In testimony whereof I have affixed my signature.

RALPH E. FLANDERS.