

Dec. 28, 1926.

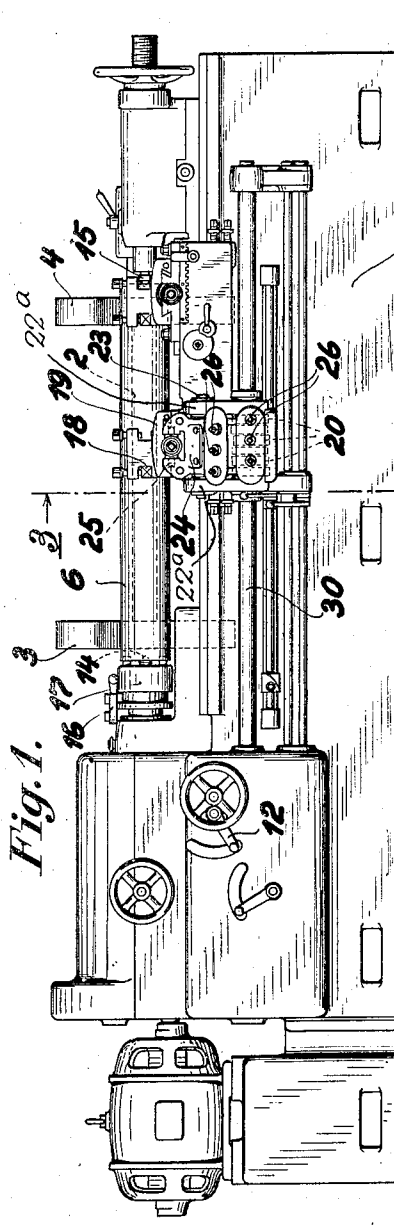
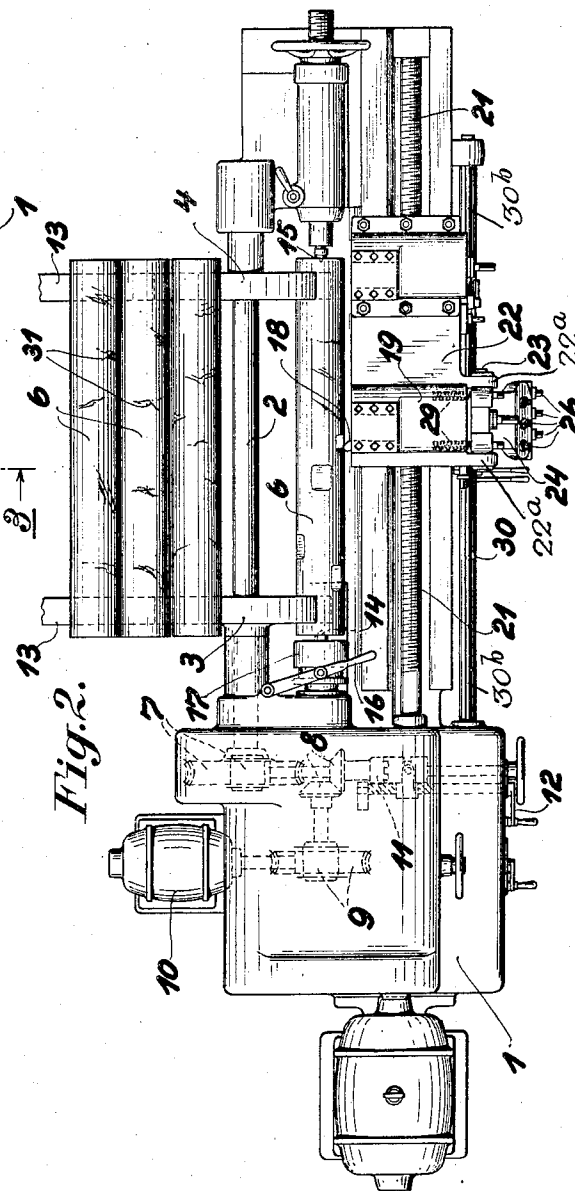
1,612,758

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APPARATUS FOR TRIMMING SHAFTS, ROLLS, AND LIKE STOCK

Filed July 27, 1926

2 Sheets-Sheet 1



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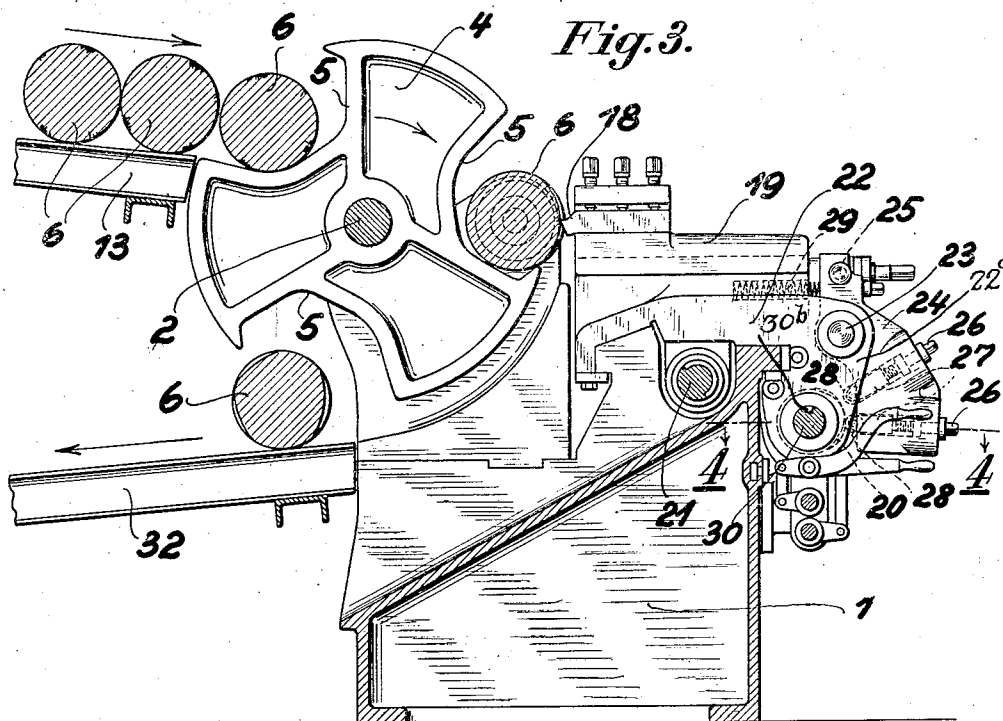
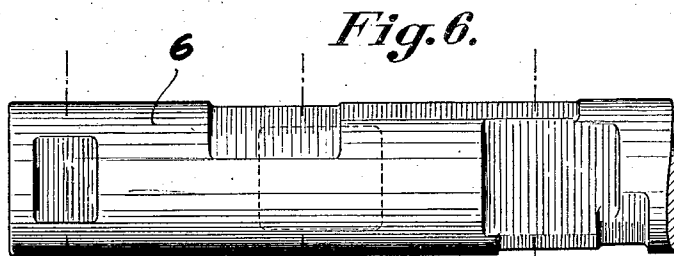
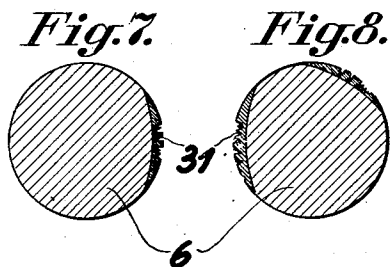
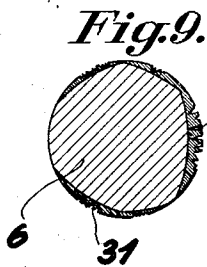
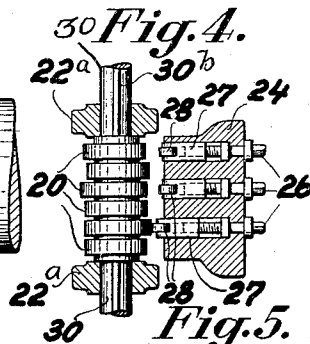
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APPARATUS FOR TRIMMING SHAFTS, ROLLS, AND LIKE STOCK

Filed July 27, 1926

2 Sheets-Sheet 2



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Patented Dec. 28, 1926.

1,612,758

UNITED STATES PATENT OFFICE.

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APPARATUS FOR TRIMMING SHAFTS, ROLLS, AND LIKE STOCK.

Application filed July 27, 1926, Serial No. 125,228, and in Germany March 11, 1925.

This invention refers to apparatus for trimming shafts, rolls, etc., whereby very perfect, uniform and substantially faultless articles may be obtained by mechanical means and in a very simple manner. Among other objects and advantages the invention provides means for the partial trimming of rolled stock, in order to remove therefrom breaks and fissures which in the rolling operation would become deeper and broader. The invention, moreover comprises means for the continuous feeding of the approximately uniform pieces of work of substantially equal shape to the point of treatment by means of feeding drums or discs adapted to move the pieces of work to the point of treatment, and to further propel the piece of work, after it has been treated and released, so that all special devices heretofore necessitated for the feeding and discharge of the piece of work are dispensed with. The device according to this invention is therefore particularly suitable for the continuous treatment of large quantities which on account of their high individual weight and for other reasons could only be fed and discharged heretofore by means of special manipulating devices, such as for instance elevating instrumentalities and with great loss of time.

The invention and the mode of operation thereof will be more particularly described with reference to the accompanying drawing, showing by way of illustrative exemplification a kind of apparatus, adapted for the carrying out of the principles of the invention in Figure 1 in side view, and in Figure 2 in plan view. Figure 3 is a cross sectional view on the line 3—3 of Figure 1. Figure 4 is a horizontal section along the line 4—4 of Figure 3. In Figure 5 a detail is shown corresponding to Figure 4. Figure 6 is a representation of part of the treated piece of work, and Figures 7—9 are transverse sections of the piece of work.

On a lathe 1 of otherwise well-known construction two feeding discs 3 and 4 are mounted by means of a common shaft 2, the said discs being provided with cut-out portions or recesses 5 for the reception of the shaft, roll or other piece of work 6. The discs 3, 4 are intermittently moved by a worm gear 7, a train of bevel gears 8 and another worm gear 9 and by means of an electric motor 10. The gear 8 is provided with a coupling device 11 adapted to be en-

gaged and disengaged by means of a hand-operated lever 12. The pieces of work are fed along an inclined pathway 13, and roll by gravity one after another into the recesses 5 of the discs 3 and 4. Upon the rotation of these discs the pieces of work are carried along and are moved into position between the centering points 14 and 15 of the lathe. As soon as the piece of work is being retained between these centres, the feeding discs 3, 4 are still rotated for a short distance, so as to release the piece of work all around its periphery, and then the lever 16 is operated and causes the driver 17 of the lathe to be operated by means of which the piece of work 6 is rotated. Now the treatment of the piece of work is effected in such a manner that the transverse support 19 carrying the turning tool 18 is caused to be moved in a radial direction with relation to the piece of work by a group or series of cam discs 20 rotated with the same angular velocity as the piece of work 6. Each of the cam discs operates on a corresponding portion of the periphery of the piece of work, and, inasmuch as each cam disc may be thrown in and out of operative engagement, any desired number of sections of the peripheries of the work pieces may be turned to become either circular or non-circular.

The support 19 carrying the turning tool 18 is itself mounted upon the carriage 22 adjustable longitudinally of and parallel with the work piece by the lead screw 21, so that the tool may be brought into position for operation on the work piece at any point along the length of the latter. Upon the carriage 22 a rocking member 24 is disposed upon a stub shaft 23, and is connected at its upper part by the pivoting stud 25 to the support 19, while the lower portion of the rocking member 24 carries two alternately disposed groups of a plurality of adjacently disposed bolts or studs 26 equal in number to the cam discs 20 and each of which is provided with screw threads upon which an unrotatable nut 27 with a roller 28 is mounted. By rotating the bolts 26 the rollers 28 may thus be moved away or towards the cam discs 20. Springs 29 are adapted to force the support 19 away from the piece of work 6, while at the same time they force the rollers 28 against the cam discs 20 in front of them by means of the rocking member 24. The carriage 22 includes a pair of arms 22^a slidably engaging a

shaft 30 and the cam discs 20 are mounted between said arms upon said shaft 30 which is driven with the same angular velocity as the piece of work, each cam disc having a tongue or projection 30^a engaging a groove 30^b in said shaft 30, whereby the cams are feathered to slidably engage the shaft and to rotate therewith. The cam discs 20 are alternately arranged with relation to each other and in such a manner that those parts of the periphery thereof farthest away from their axis are distributed as uniformly as possible along the periphery, as appears particularly from Figures 4 and 5 of the drawing.

In setting the device for operation upon any certain defective part of the work piece the carriage 22 is adjusted by means of the lead screw 21 to bring the tool 18 into alignment with the defective part, in which operation the cams of the group and their adjusting devices, mounted with the tool 18 on the carriage 22, are moved with the carriage, whereby the working relationship of the tool, cams and cam adjusting devices is always maintained. The depth of the defective surface to be removed then having been suitably determined, a cam disk 20 having the high part of its periphery at a proper angle with relation to the shaft 30 is selected and adjusted to the required degree by means of its adjusting bolt or screw 26, so that the selected cam will advance the cutting tool to the proper extent for the required cutting action. It will thus be seen that the tool and cams may be adjusted to operate upon the periphery of the work piece at any point along its length, and that any one of the cams of the group may then be selected for action to advance the cutting tool to the degree required according to the depth of the surface of the work piece which is to be trimmed off or removed.

When all the rollers 28 are withdrawn the rocking member 24 is not influenced by the cam discs 20 and the piece of work 6 is turned with a circular periphery. As soon, however, as one of the bolts 26 has been advanced sufficiently, so that its corresponding cam disc 20 will engage and act upon the rocking member 24, the said cam disc causes the support 19 carrying with the turning tool 18 to be projected or advanced toward the work and during this time the said tool is forced into the piece of work for a greater or less depth, so that the work is turned off non-circularly at this point. The more the said bolt is screwed forward, the deeper will the tool penetrate into the work, and the more material will be turned off at this point. If it is desired to turn off parts to a greater depth at another point also or on several point, as shown for instance in Figures 8 and 9, the rollers 28 arranged in alignment with those points of the periphery

of the piece of work 6 to be operated upon are adjusted to make contact with their corresponding cam discs 20. It is thus possible to remove defective portions, breaks, fissures and the like, indicated at 31, without chipping off unnecessary amounts of material, and it is possible to impart a smooth unbroken surface free from fissures and other defects to the block to be rolled, as shown in the representation of the finished piece of work in Figure 6. After the work has been finished, it is released from the centering points 14, 15, and by continuing the rotation of the discs 3, 4 the work is delivered onto the inclined chute or pathway 32, while at the same time the next succeeding piece of work is admitted between the centering points 14, 15 of the lathe.

Although the invention has been heretofore described in connection with a specific example of its application, the details thereof are not intended to be regarded as limitations of the spirit and scope of the invention, except in so far as included in the annexed claims.

I claim:—

1. In an apparatus of the character described, means for rotating the work to be treated, a work tool movable toward and from the work and shiftable longitudinally of the work, a group of cams rotatable with the work and shiftable longitudinally of the work with the work tool, said cams having the high points of their peripheries at different points in the orbit of rotation of the group, and means for bringing any cam of the group into action for controlling the first-named motion of the work tool in any working position of the latter along the length of the work.

2. In an apparatus of the character described, means for rotating the work to be treated, a longitudinally shiftable carriage, a work tool movable longitudinally with the carriage and radially with relation to the work, a group of cams shiftable longitudinally with the carriage and rotatable with the work and having the high points of their peripheries disposed at different points in the orbit of rotation of the group, and selective means for bringing any cam of the group into action at any point in the path of travel of the carriage for controlling the radial motion of the work tool.

3. In an apparatus of the character described, means for rotating the work to be treated, a carriage mounted to travel longitudinally of the work, a work tool on the carriage movable toward and from the work, a group of cams mounted on the carriage for travel therewith, said cams being rotatable with the work and having the high points of their peripheries disposed at different points in the orbit of rotation of the group, and coupling devices on

the carriage for selectively bringing any cam of the group into action at any point in the path of travel of the carriage for controlling the motion of the work tool toward and from the work, each of said devices being adjustable for varying the degree of working motion of the work tool under the action of the selected cam.

4. In an apparatus of the character described, means for rotating the work to be treated, a carriage mounted to travel longitudinally of the work, a work tool on the carriage movable toward and from the work, a group of cams mounted on the carriage for travel therewith, said cams being rotatable with the work and having the high points of their peripheries disposed at different points in the orbit of rotation of the group, a motion transmitting member on the carriage, and means for selectively connecting any of said cams with said member for imparting motion to the work tool toward and from the work, said means being adjustable for varying the degree of working motion of said member and of the work tool under the action of any selected cam.

5. In an apparatus of the character described, means for rotating the work to be treated, a carriage mounted for travel longitudinally of the work, a tool on said carriage movable radially with relation to the work, a group of cams mounted upon the carriage for travel therewith, said cams being rotatable with the work and having the highest points of their peripheries disposed at different points in the orbit of rotation of the group, a pivoted motion transmitting member on the carriage for transmitting working motion to the work tool, and a series of adjustable coupling devices, one for each cam, carried by said motion transmitting member, whereby any cam of the group may be coupled to said member at any point in the path of travel of the carriage for variably controlling the motion of the work tool toward and from the work.

6. In an apparatus of the character described, means for rotating the work to be treated, a carriage mounted for travel longitudinally of the work, a work tool on the carriage radially movable with relation to the work, a group of cams mounted on the carriage for travel therewith, said cams being rotatable with the work and having the highest portions of their peripheries arranged at different points in the orbit of rotation of the group, a pivoted motion transmitting member mounted on the carriage for transmitting radial motion to the work tool, and a group of coupling devices, one for each cam, carried by said motion transmitting member, each of said devices comprising an adjusting screw and a member adjustable thereby, the adjustable members being provided with friction rollers for contact with the peripheries of the cams.

7. In an apparatus of the character described, a frame including head and tail stocks provided with means for engaging and rotating the work, upper and lower inclined trackways arranged at one side of the frame, a rotatable pocketed carrier disposed at the same side of the frame and between said trackways for receiving and delivering the work from the upper trackway to the head and tail stocks and delivering the work from the latter to the lower trackway, a carriage mounted for travel longitudinally of the work at the opposite side of the frame, a work tool mounted on the carriage for travel therewith and movable radially with relation to the work, a group of cams on the carriage and rotatable with the work, said cams having the highest points of their peripheries disposed at different points in the orbit of rotation of the group, and selective means on the carriage for operatively connecting any cam of the group with the work tool at any point in the path of travel of the carriage for controlling the motion of the work tool toward and from the work.

In testimony whereof I affix my signature.
HANS BECKER.