May 6, 1930. O. DOUTT 1,757,175

GRINDING MACHINE

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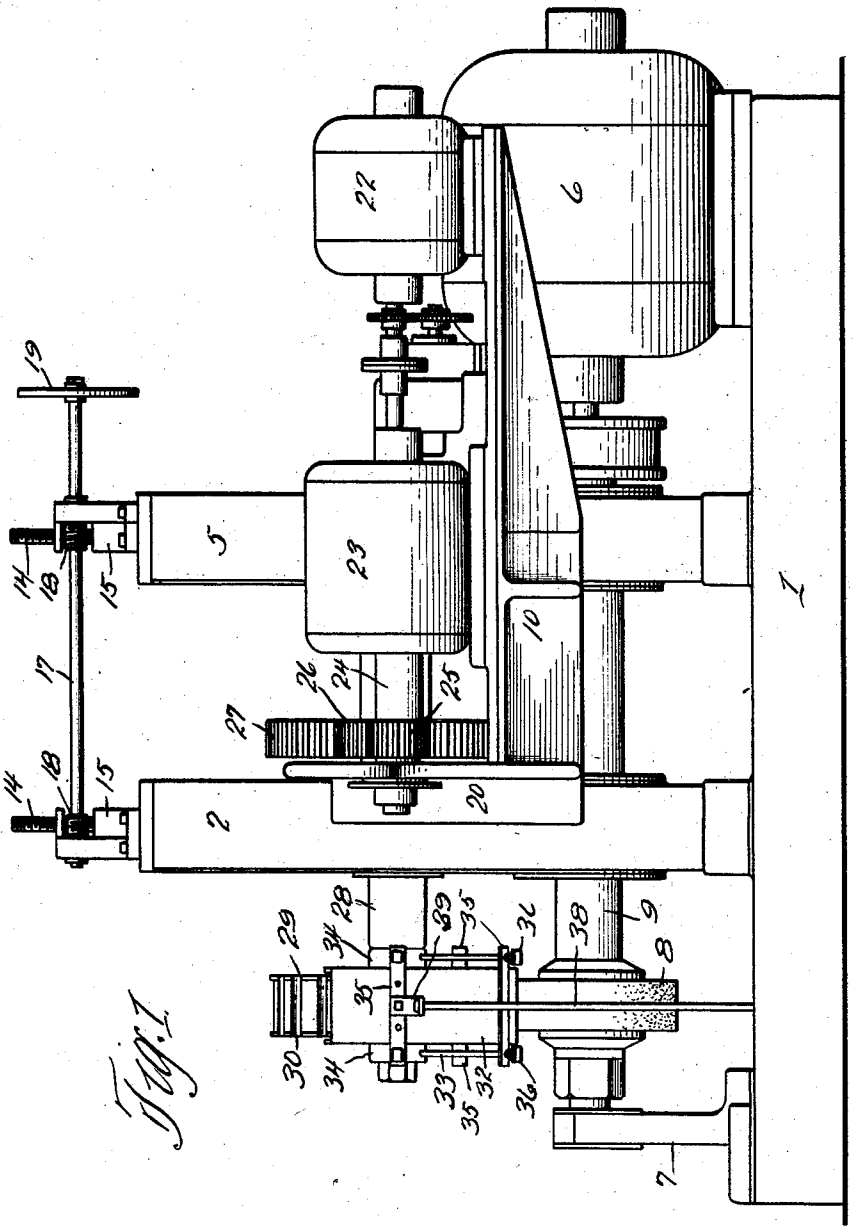


Fig. 1.

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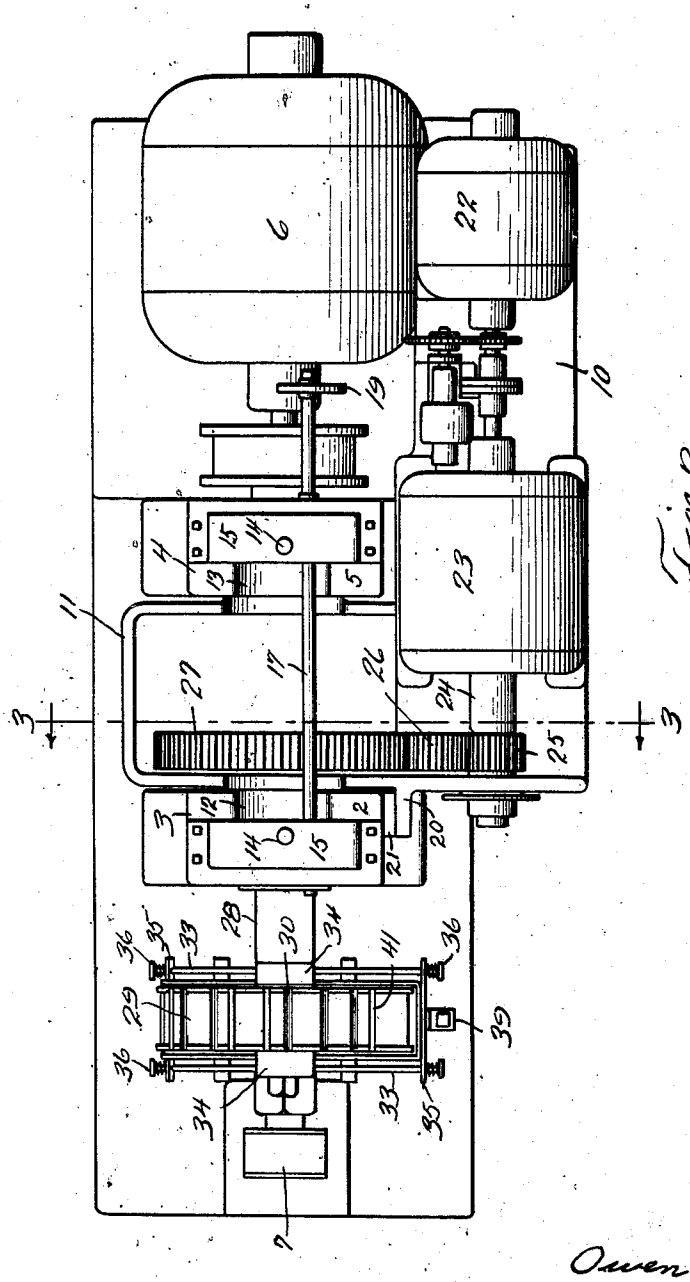


Fig. 2.

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GRINDING MACHINE

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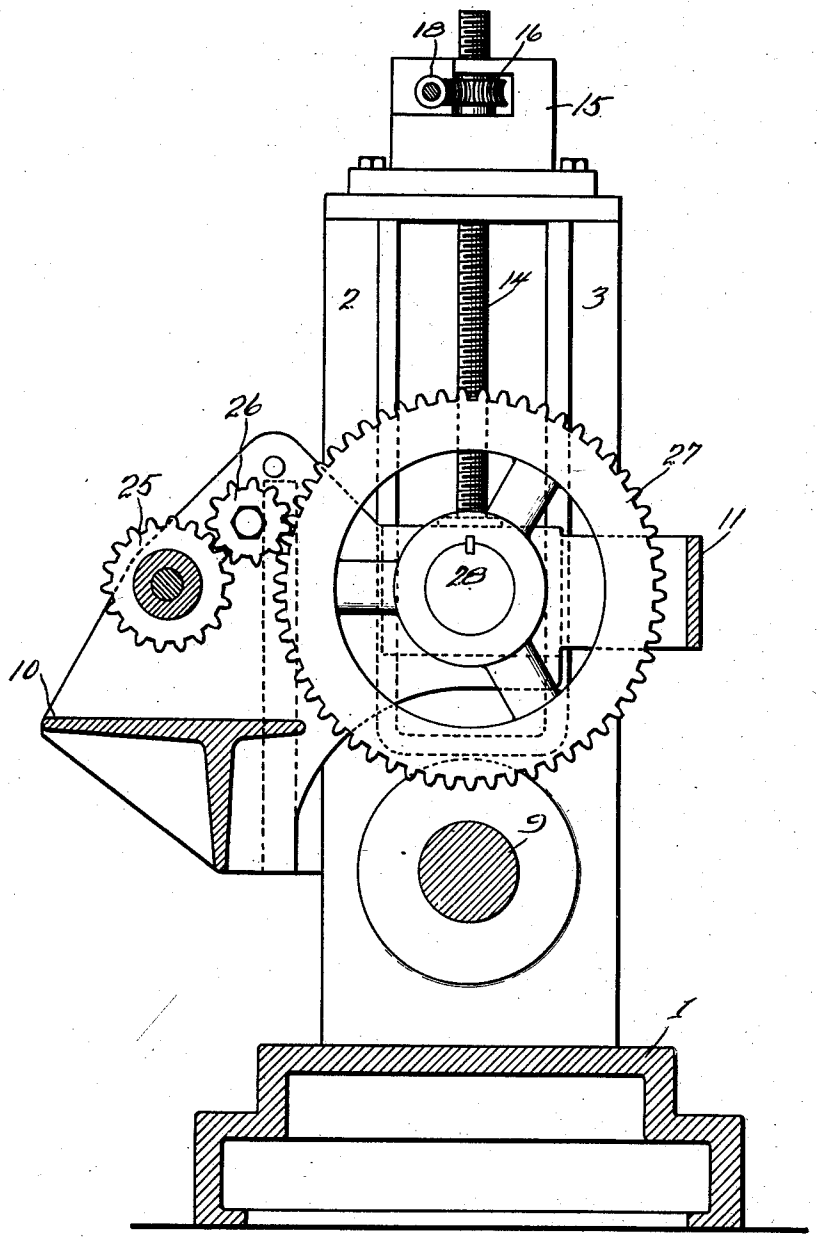


Fig. 3

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GRINDING MACHINE

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Fig. 6

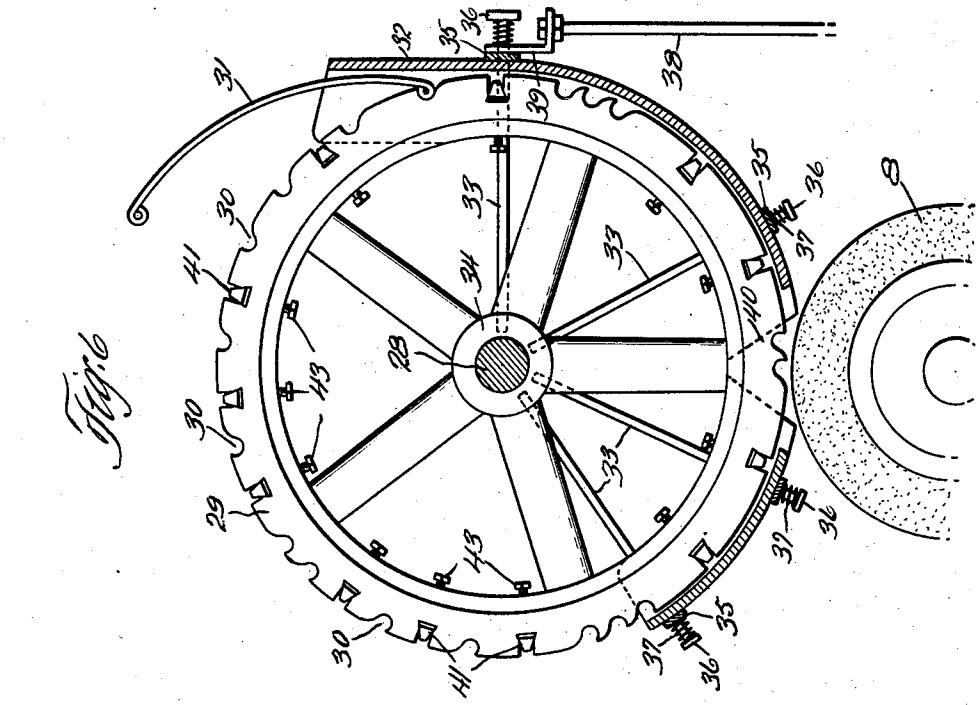


Fig. 4

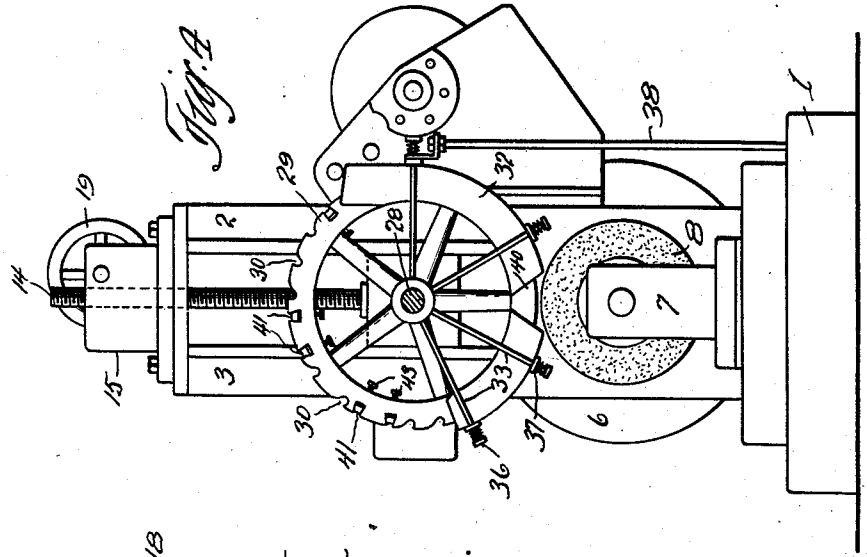
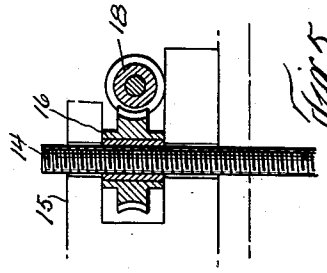


Fig. 5



Inventor
Owen Doutt

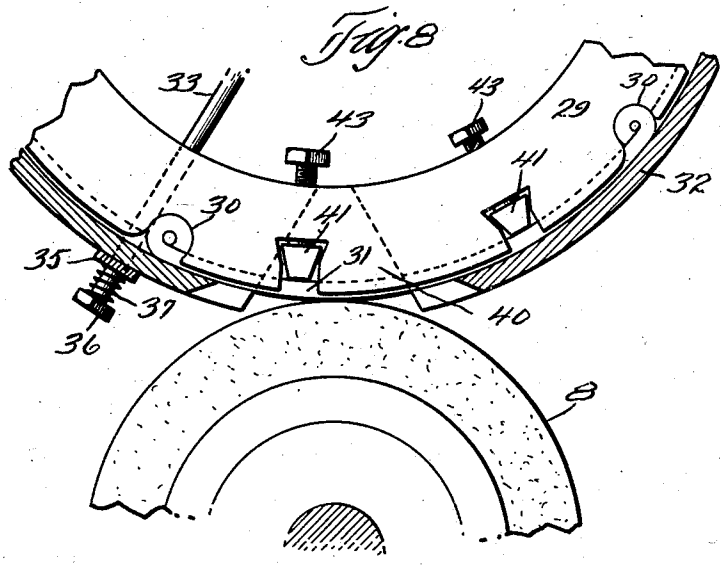
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GRINDING MACHINE

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Fig. 8



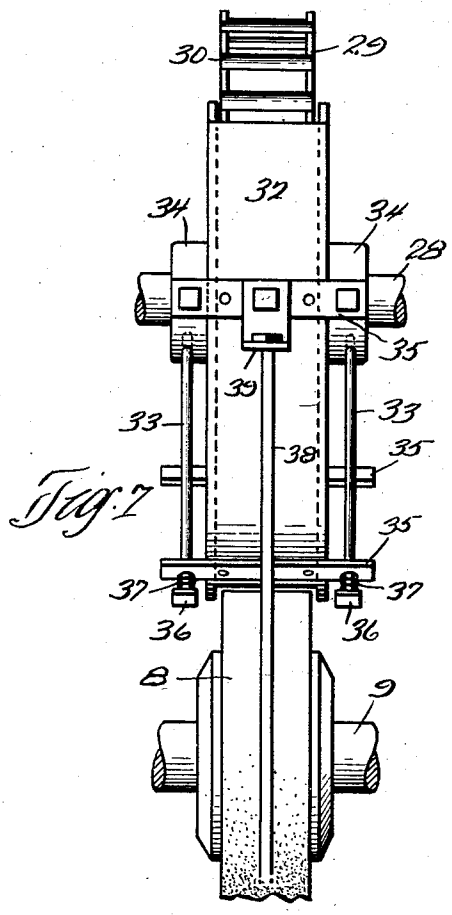


Fig. 7

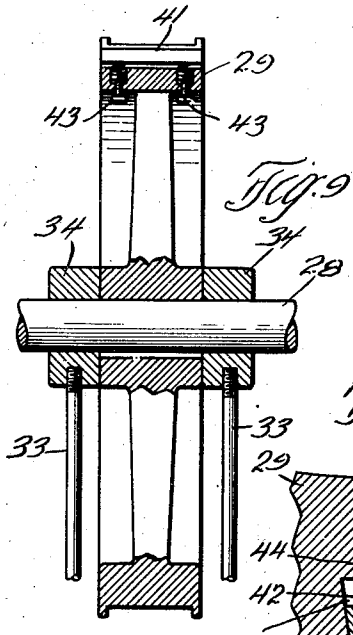


Fig. 9

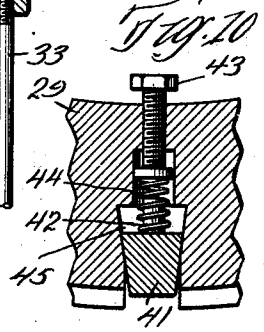


Fig. 10

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GRINDING MACHINE

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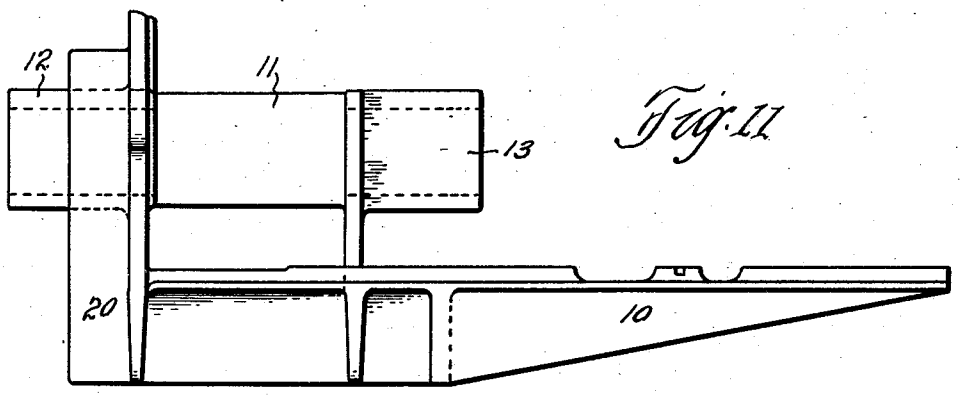


Fig. 11

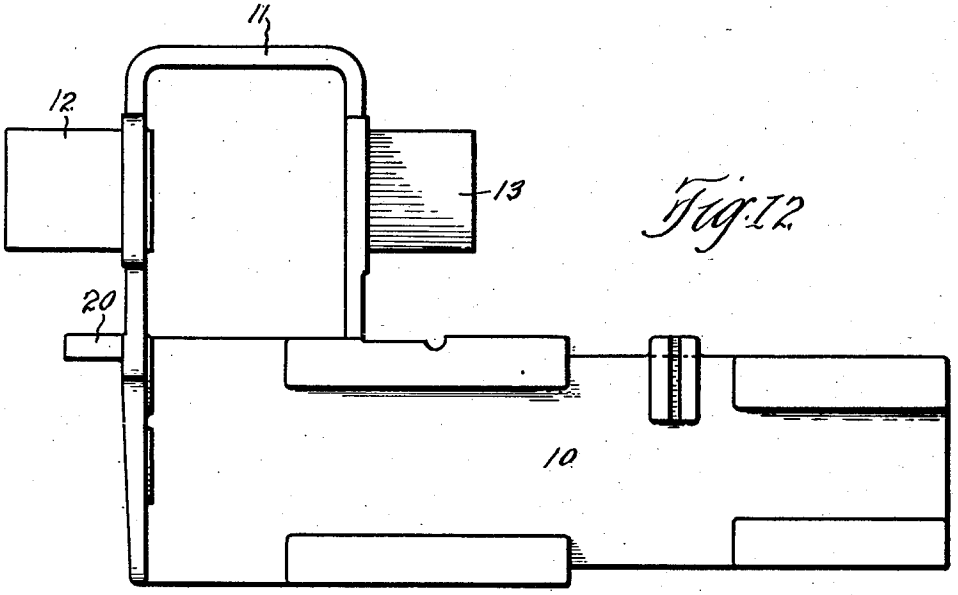


Fig. 12

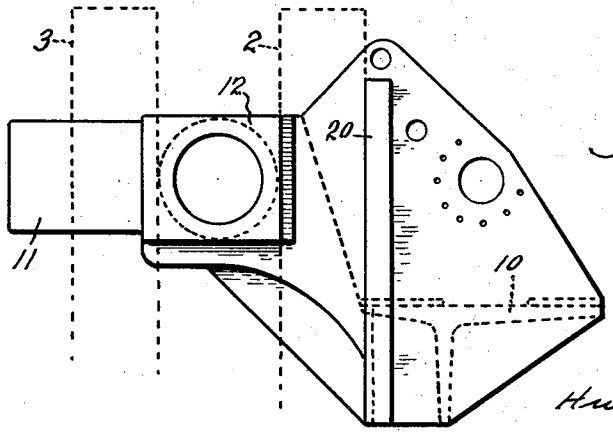


Fig. 13

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Patented May 6, 1930 1,757,175

UNITED STATES PATENT OFFICE

OWEN DOUTT, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL SPRING BUMPER CORPORATION, A CORPORATION OF MICHIGAN

GRINDING MACHINE

Application filed September 7, 1927. Serial No. 217,951.

This invention relates to grinders and more particularly to the provision of a machine for grinding, polishing or buffing bars having curved surfaces such as the bars used in making up vehicle bumpers. In the following description and in the claims the term "grinding" is intended to include polishing and buffing since it will be apparent that by merely applying an element of suitable abrasive qualities to my machine any one of these operations may be performed thereon.

An object of the invention is to provide a grinding for curved bars which will be adapted to grind thereon a surface having a substantially constant radius of curvature. Further objects are to provide means for automatically feeding such bars to the grinding element and to provide means for exerting a constant pressure upon the bars at the point of contact with the grinding element. Another object is to provide means for allowing for variations in the thicknesses of bars fed to the machine, and for irregularities in the grinding element.

Further and more limited objects will be apparent from the drawings and description, and from the use of articles including the combinations of elements defined in the claims.

Drawings

Of the several drawings Figs. 1 and 2 show a side elevation and plan view, respectively, of my grinder; Fig. 3 represents a sectional view taken on line 3—3 of Fig. 2 and Fig. 4 a front elevation of the grinder; Fig. 5 shows an enlarged detailed view of a portion of the mechanism for adjusting the height of the shelf upon which the feed wheel is supported; Fig. 6 is an enlarged detailed front elevation of the grinding element and feed wheel and Fig. 7 is a side elevation of the same; Fig. 8 is a front fractional view of the lower portion of the feed wheel and the upper portion of the grinding element; Fig. 9 is a section through the center of the feed wheel; Fig. 10 is a detailed fractional view of the mechanism for regulating the pressure applied to the bars; Figs. 11, 12 and 13 show a side elevation, a plan view and an end elevation, respectively, of a shelf adapted to support the feed wheel shaft and the driving mechanism therefor.

Description

Upon the base 1 are mounted standards 2, 3, 4 and 5, the motor 6 and the removable bearing support 7. A grinding or polishing element 8, of suitable abrasive material, is fixed to the shaft 9 which is rotated by the motor 6 and supported on bearings carried by the support 7 and the standards 2, 3, 4 and 5.

The bar feeding drive mechanism is supported as a unit upon the shelf 10, said shelf having a laterally projecting portion 11 extending between the standards 3 and 4 from which longitudinal projections 12 and 13 extend between standards 2 and 3 and standards 4 and 5, respectively. The shelf 10 and its projecting portions provide bearing surfaces upon the standards 2, 3, 4 and 5 and is adapted to slide up and down thereon. The threaded shafts 14, 14 are fixed to the projecting portions 12 and 13 and adapted to support the shelf 10. These shafts pass through blocks 15, 15 within each of which a gear 16, threaded to fit the threads of the shafts 14, is rotatably retained, as more clearly shown in Fig. 5. The shaft 17 has fixed thereto worm gears 18, 18 adapted to rotate with said shaft and, by means of the gears 16, 16 and the shafts 14, 14, to raise and lower the shelf 10. The hand wheel 19 is fixed to the shaft 17 to facilitate the turning of the same. The plate 20, fixed to the shelf 10, together with the plate 21 (Fig. 2) provide an extended bearing surface upon the standard 2, to prevent binding of the surfaces adapted to slide upon the several standards.

The motor 22 is mounted on the shelf 10 and, through the transmission 23, drives the shaft 24. The gear 25 is fixed to the shaft 24 and said shaft, through the gear 25 and the idle gear 26, drives the ring gear 27, keyed to the shaft 28.

The feed wheel 29 is fixed to the shaft 28 for rotation therewith but may be removed from the end of that shaft and replaced by other feed means to handle bars of a different curvature or straight bars. This wheel is

provided with laterally extending depressions 30 adapted to receive an end of a bar 31 and presenting a hooked recess adapted to draw the bar in the desired direction of rotation across the grinding element.

The curved channel shaped shield 32 is attached to the shaft 28 by means of rods 33, projecting from collars 34, 34 which are slidably mounted on the reduced end portion of the shaft 28, and cross members 35, fixed to said shield 32 and slidably mounted upon rods 33. The nuts 36 on the rods 33 and the springs 37, between them and the plates 35, exert the desired yieldable pressure upon the shield 32. The rod 38, connected to the end portion of the upper rod 33 and the upper plate 35 by means of an L shaped plate 39, is supported from the base 1 and serves to prevent rotation of the shield 32 with the shaft 28. The shield 32 has a V shaped portion 40 cut out to permit contact between the bar being ground and the surface of the grinding element 8.

In order that variations in the thickness of the bars being ground may be allowed for and a uniform product may result from grinding bars of uneven thickness throughout their length, the resiliently supported wedges 41 are adapted to press against and support the portions of the bars intermediate the ends of the same. As is clearly shown in Fig. 10, the wedge 41 has at its inner end a pin 42. The screw 43 is threaded into the wheel 29 and it, with the spring 44 between the pin 42 and the adjacent end of the screw 43, exert an adjustable yielding pressure against the wedge 41. The slanting surface of the recess 45, cooperating with the slanting surface of the wedge 41, limits the outward movement of the latter.

Operation

A grinding, polishing, or buffing element 8, of the desired abrasive qualities, is fixed upon shaft 9 for rotation therewith. A feed wheel 29, of suitable diameter and configuration to receive the bars 31, is fixed to the shaft 28 for rotation therewith and a shield 32, of suitable configuration, is resiliently mounted upon the shaft 28. The shelf 10 is lowered until the desired contact is had between the bars 31 on the feed wheel and the grinding element 8, and the support 38 for the shelf 32 may be put in place. The grinding element and the feed wheel are then rotated in the same direction (clockwise) and a pair of bars are supplied to the recesses in the feed wheel as shown in Fig. 6. The shield 32 will yield resiliently to the outward pressure from the surface of the bars 31 and will serve to hold them in place against the wheel 29.

By varying the pressure at the screws 43 and by varying the distance between the feed wheel 29 and the grinding element 8 the desired pressure upon the bars may be obtained. The resiliently mounted wedges 41 will compensate for irregularities in the bars and, by an increase of pressure due to increased compression of the springs 44, will cause greater grinding at the thicker portion of the bar and thereby yield a bar of more nearly uniform thickness.

It is apparent that the particular means shown for holding the bars in place on the wheel 29 are not essential to my invention. It is also apparent that other driving and supporting means might be used without avoiding the scope of the invention and it is not intended to hereby limit the invention to the particular embodiment herein shown and described.

It is intended that a pair of bars should be applied to the same section of the periphery of the feed wheel at one time but one or more than two may be supplied if such operation be more convenient.

Having thus described my invention, what I claim is:—

1. In a machine for grinding curved bars, the combination with a rotary grinding element, of a feed wheel having recesses in its periphery for the reception of the end portions of bars to be ground, and means for regulating the pressure applied to the intermediate portions of the bars, said means including resiliently supported plates adapted to press upon the inner surfaces of the bars, and a segmental guide member having the same curvature as said wheel, resiliently held adjacent the outer periphery of said wheel and cooperating with said wheel to hold the bars thereon.

2. In a grinder the combination with a grinding element, a rotary feed wheel adapted to supply the work to the grinding element, means for carrying said work upon the periphery of said feed wheel, said means including recesses on the peripheral surface adapted to receive the end portions of the work, and a guide adapted to bear upon the outer surface of the work, said guide being resiliently and radially supported from a member arranged in concentric relation to the center of the feed wheel.

3. In a machine for grinding curved bars, the combination with a grinding element, of a shelf movably mounted relative to said grinding element, a rotatable shaft carried by said shelf, a feed wheel mounted on said shaft, means for supporting bars on the periphery of said wheel including means for engaging the ends of the bars on said wheel, and a guide member yieldingly supported from said shaft and of a curvature corresponding to the curvature of said wheel, said guide member cooperating with the means on said wheel to hold the work thereon, said guide having a cut-out portion on its outer periphery into which the grinding element

extends, and means for moving said shelf toward and from said grinding element.

4. In a machine for grinding curved bars, the combination of a rotating grinding element, a support movably mounted relative to said grinding element, a rotatable shaft journaled on said support, means for rotating said shaft carried by said support, a feed wheel carried by said shaft and rotatable therewith, means for supporting the bars to be ground on the periphery of said wheel including means for engaging the ends of the bars on said wheel, and a channeled guide member of the same curvature as said wheel, and in which the wheel rotates, said guide being yieldably supported from said shaft and spring means in the periphery of said wheel for yieldably pressing the bars against said guide member.

5. In a machine for grinding curved bars, a base member, a rotary grinding element mounted on said base member, upstanding guide posts secured to said base, a shelf member slidably supported on said guide posts, a shaft journaled on said shelf, a feed wheel carried by said shaft and rotatable in the plane of said grinding element, means for supporting the bars to be ground on the periphery of said wheel including notches for the reception of the ends of said bars on said wheel, spring pressed members arranged in the periphery of said wheel and a guide member cooperating with the means on said wheel, said guide being of channel cross section in which the said wheel revolves, said guide being of a curvature corresponding to the circumference of the wheel and encasing the same for a material distance against which the bars are yieldingly pressed, said guide being supported by means extending from the said shaft, means extending from said base to prevent rotation of said guide on said shaft, and means for adjusting said shelf relative to said grinding element.

6. In a grinding machine for curved bars having eyes at their ends, the combination with a rotary grinding element, of a rotary feed wheel having recesses in its periphery into which the eyes of the bars may be received, and resilient means for holding the bars onto said feed wheel, said means including spring means for urging said bar toward said wheel, and spring means for opposing said first spring means.

7. In a grinding machine for curved bars, the combination with a rotary grinding element, of a rotary feed wheel the periphery of which has the same curvature as the bars to be ground, means on the periphery of said feed wheel for engaging the ends of said bars, spring means for engaging said bars to urge them toward said feed wheel, and spring means on the periphery of said wheel against which said bars are yieldingly held.

8. In a feed wheel for a grinding or buffing machine, the combination of means adapted to retain the ends of articles to be ground or buffed, and resiliently actuated means intermediate the ends of said articles for resisting movements thereof toward said wheel.

9. In a feed wheel for simultaneously supplying a plurality of curved bars to a grinding or buffing machine, the combination with means for holding said bars adjacent the periphery of said wheel, of resiliently actuated means for resisting movement of said bars toward said periphery, said resisting means operating separately on each bar.

10. In a feed wheel for a grinding or buffing machine, the combination with means for retaining bars upon the surface of said wheel, of adjustably resilient means for resisting movement of said bars toward said wheel, said resisting means comprising rests resiliently supported from a base adjustably mounted in said wheel, and means for varying the compression of the resilient support for said rest.

In testimony whereof, I hereunto affix my signature.

OWEN DOUTT.