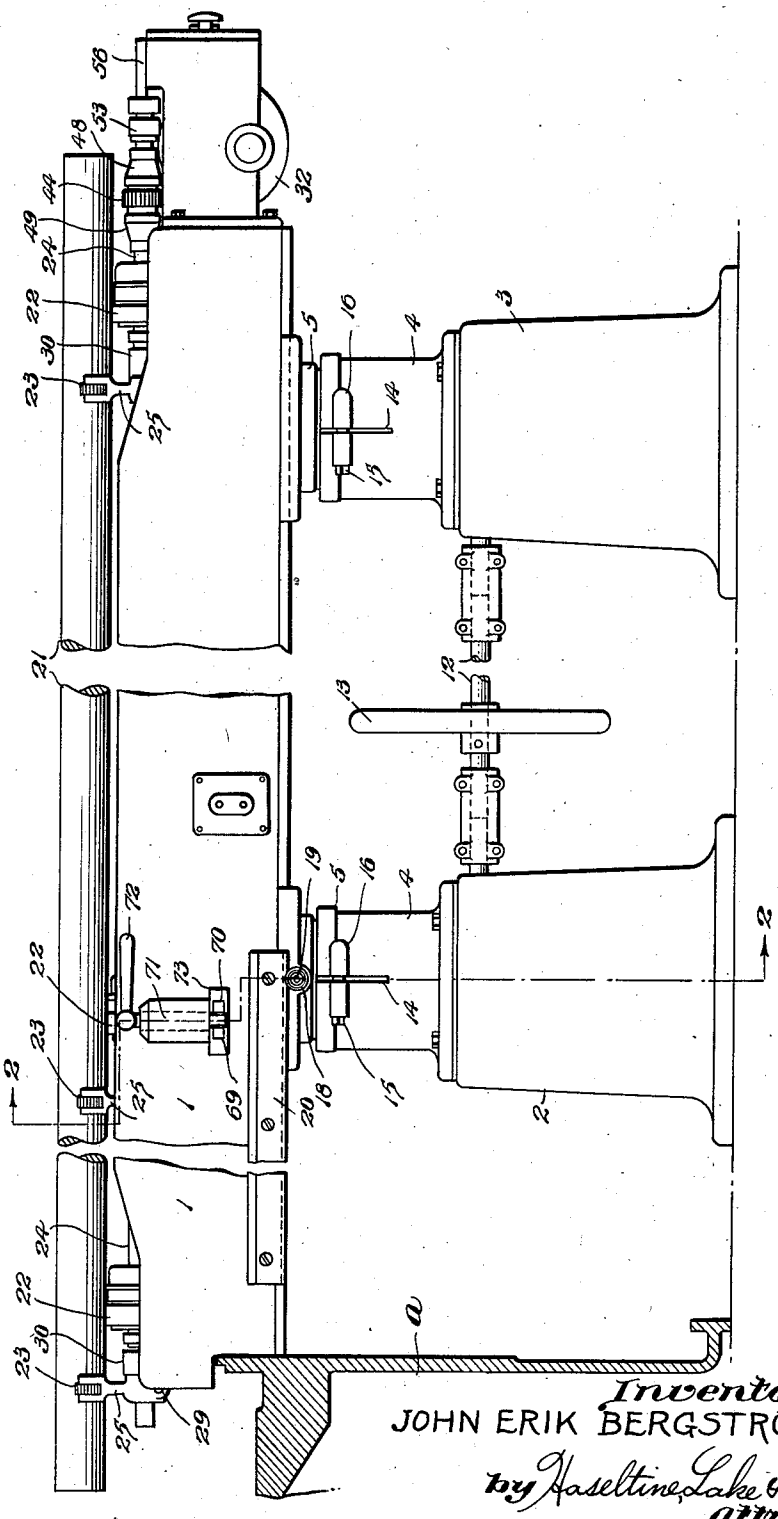
May 26, 1942. J. E. BERGSTRÖM 2,284,257

DEVICE FOR FEEDING RODS OR TUBES IN GRINDING MACHINES OR THE LIKE

Filed Dec. 21, 1939 3 Sheets-Sheet 1

Fig. 1.



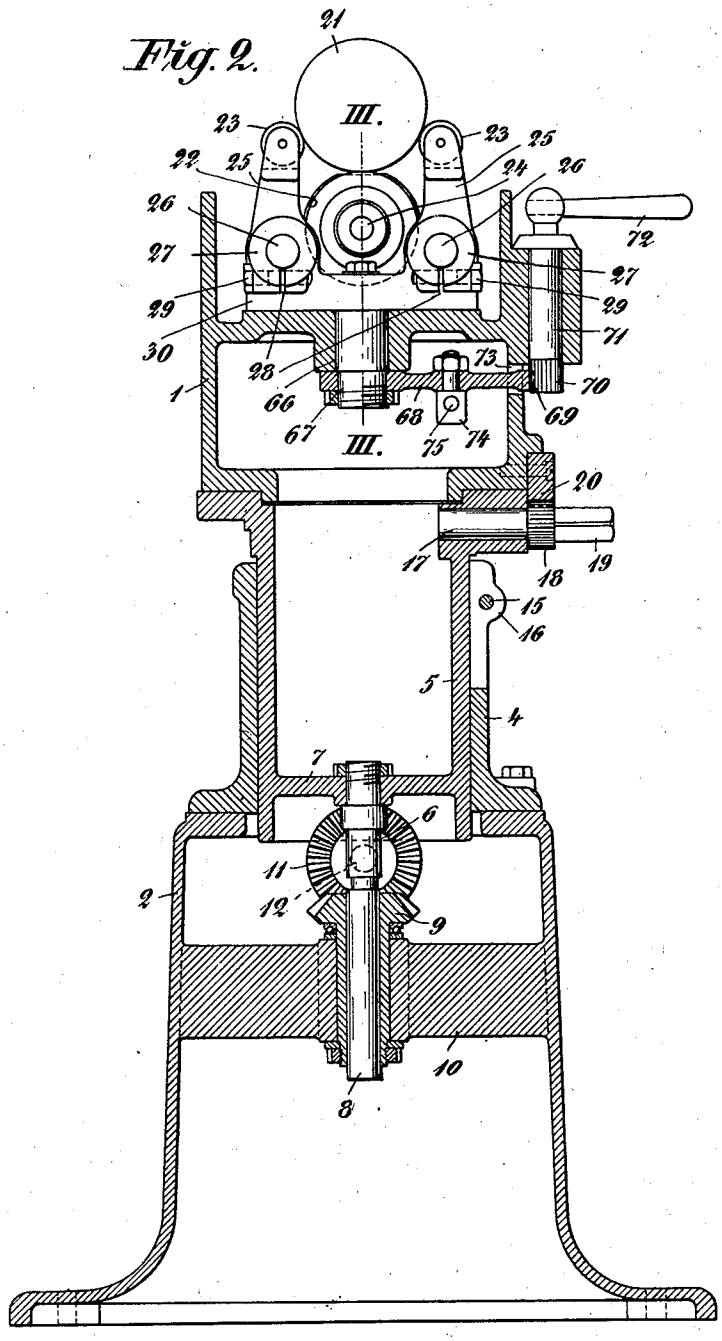
Inventor:
JOHN ERIK BERGSTRÖM
by Haseltine, Lake & Co.
attys.

May 26, 1942. J. E. BERGSTROM 2,284,257

DEVICE FOR FEEDING RODS OR TUBES IN GRINDING MACHINES OR THE LIKE

Filed Dec. 21, 1939 3 Sheets-Sheet 2

Fig. 2.



INVENTOR:
JOHN ERIK BERGSTRÖM
BY: Haseltine, Lake & Co.
ATTORNEYS

May 26, 1942. J. E. BERGSTRÖM 2,284,257

DEVICE FOR FEEDING RODS OR TUBES IN GRINDING MACHINES OR THE LIKE

Filed Dec. 21, 1939 3 Sheets-Sheet 3

Fig. 3.

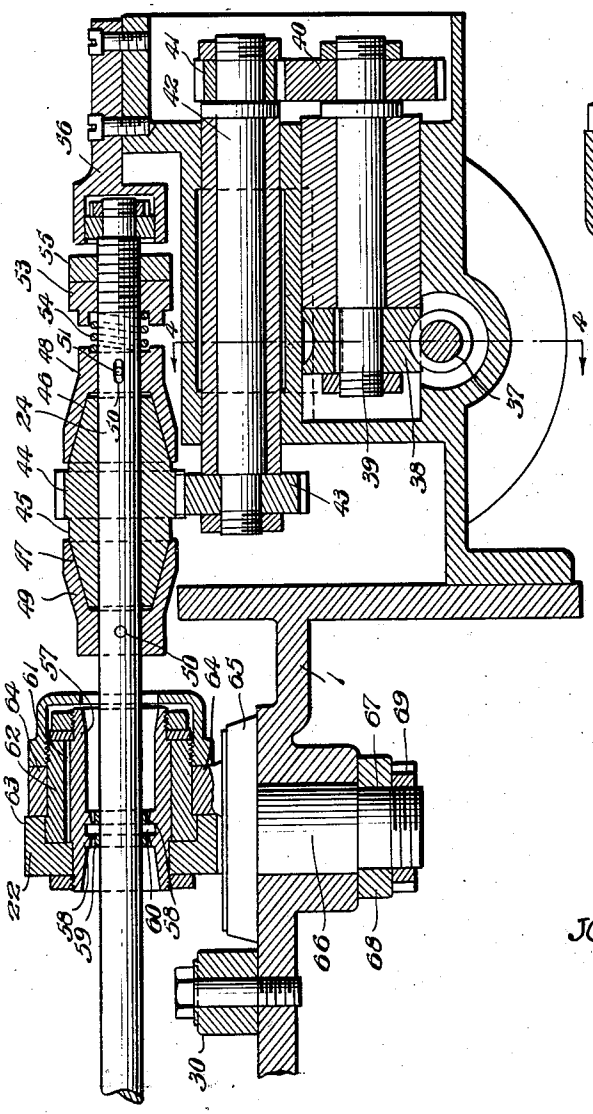
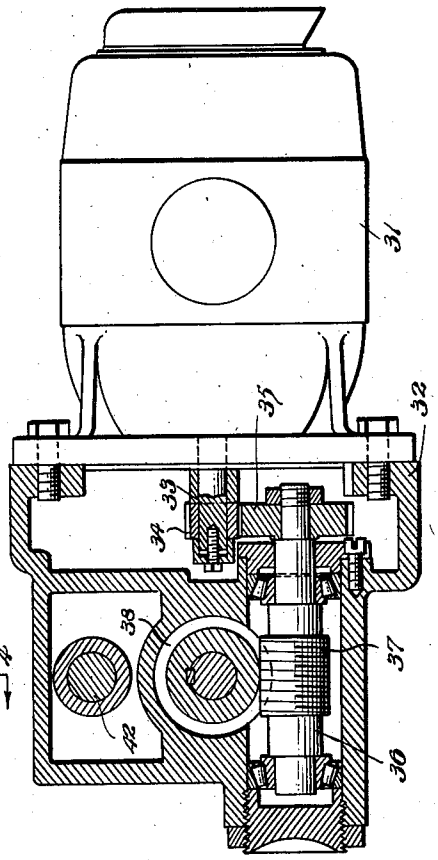


Fig. 4



Inventor:
JOHN ERIK BERGSTRÖM

by Haseltine, Lake & Co.
attys.

Patented May 26, 1942

2,284,257

UNITED STATES PATENT OFFICE

2,284,257

DEVICE FOR FEEDING RODS OR TUBES IN GRINDING MACHINES OR THE LIKE

John Erik Bergström, Halmstad, Sweden

Application December 21, 1939, Serial No. 310,374
In Sweden March 4, 1939

3 Claims. (Cl. 51—236)

When grinding long rods or tubes it is necessary to use a supporting channel or a so-called feeding table. For small dimensions up to about 15 mm. it is sufficient to use a supporting channel that is displaceable in the vertical direction and provided with movable or adjustable guiding strips for the work.

As soon as larger dimensions are to be ground, a simple supporting channel is no longer sufficient, and other and more efficient means must then be used. Obliquely adjustable rollers have been used, between which the rods or tubes have been supported. The rollers run on ball-bearings, and the oblique adjustment of the rollers is effected to facilitate the feeding of the rods.

The above described auxiliary feeding devices are, however, connected with the great disadvantage that only comparatively thin rods may be fed in centreless grinding machines depending on the pulling force of the feed roller or regulating wheel used in such machines. To make possible a good and efficient feed of the rods one has used electrically operated feeding tables, in which obliquely adjustable supporting rollers arranged in pairs have been driven by an electric motor, the work resting in the gap between the supporting rollers being arranged in pairs. Such a support for the rods has the disadvantage that a certain bending action is effected between the rollers, which action may become so strong that a spiral-formed mark in the form of a shadow may be observed on the rod after the grinding.

Furthermore these known feeding tables have the disadvantage that the rate of feed cannot be adjusted or changed as desired without making necessary an intricate and expensive electric regulating device, and they cannot be run both back and forth.

The present invention has for its object to develop a feeding table for grinding machines, particularly centreless grinding machines, in which the rate of feed is adjustable in a very simple manner, and wherein the direction of feed may be reversed, and in which all of the above mentioned disadvantages are eliminated.

In the feeding table according to the invention as in the known tables, rotary rollers supporting the work are used, the axes of which rollers are obliquely adjustable in relation to the work for the purpose of facilitating or effecting a feed of the work, but according to the invention the said supporting rollers are arranged singly on a line one after another and support the work at or in the neighborhood of the highest point of the rollers, and besides freely rotatable side bearing rollers are provided to abut against the work and maintain the position of the work on top of the supporting rollers during the feeding.

Said rotary supporting rollers may also be arranged as mechanically operated drive rollers having also the object of feeding the work.

Due to the position of such supporting drive rollers right below the work, they may be obliquely adjusted at any time during the operation, the rate of feed being thereby adjustable from nought to a maximum, and, furthermore, the direction of feed of the work may be reversed forth and back depending on whether the drive rollers are obliquely adjusted to the one or the other side in relation to the work.

An embodiment of the invention is illustrated on the accompanying drawings.

Fig. 1 shows a side elevation view of a feeding table arranged according to the invention.

Fig. 2 shows a vertical cross-section of the same taken along the line II—II in Fig. 1.

Fig. 3 shows a vertical longitudinal section through the end portion of the table farthest away from the grinding machine and taken in the plane III—III in Fig. 2.

Fig. 4 shows a vertical cross-section along the line IV—IV in Fig. 3.

In Figs. 1 and 2, 1 designates a feeding table which is supported by the two standards 2 and 3 so as to be elevated or lowered. *a* indicates in Fig. 1 the bed of a centreless grinding machine. The standards 2 and 3 each support a cylinder 4 in which a piston 5 supporting the table 1 is fitted. The piston 5 is carried by a vertical rod 6 being secured to a transverse wall 7 in the piston.

The lower portion 8 of the rod 6 is threaded and screwed axially into a bevel gear 9 that is rotatably journalled in a transverse yoke or bar 10 being a part of the standards 2 and 3 respectively. The two bevel gears 9 in the standards 2 and 3 are each in mesh with a bevel gear 11, which gears are attached on a horizontal shaft 12 that extends between the two standards 2 and 3. On the shaft 12 a hand wheel 13 is secured. By turning the hand wheel in the one or the other direction the rods 8, pistons 5 and the table 1 are raised or lowered. The table may be safely secured on the adjusted level thereby that the cylinders 4 on top are provided with a cut out slit 14 so that the cylinders may be resiliently contracted on top by means of a screw 15 being threaded into the boss 16 so that

the cylinder with sufficient friction will enclose the piston 5 to secure the same in position.

The standard 2 differs from the standard 3 therein that in the upper portion of the standard 2 a pinion 18 is rotatably journalled by means of a pin 17. The pinion may be rotated by means of a wrench that is set on to the square head 19. The pinion 18 is in mesh with a longitudinal rack 20 attached to the table 1.

By turning the pinion 18 in the one or the other direction the whole feeding table may be moved in the direction towards or away from the grinding machine. In Fig. 1 the table 1 occupies the limit position closest to the grinding machine.

21 designates a cylindrical rod that is being fed by the feeding table in the direction toward the grinding machine. The rod 21 is supported by a number of drive rollers 22 arranged in alignment and journalled on the top side of the table, which rollers are so adapted that the rod will rest on the highest or in the neighbourhood of the highest point of the drive rollers. The drive rollers 22 are driven by a common shaft 24 running along the table. Further, the work 21 is sustained by side bearing rollers 23 that, although not necessarily, may be arranged in pairs opposite each other. The side bearing rollers are freely rotatably journalled in arms 25, which are pivotally mounted on rods 26 that are running in parallel with the shaft 24 on opposite sides of the same. When the arms 25 have been turned to the desired position depending on the diameter of the work, the arms 25 are secured on the rods 26 which may be effected thereby that the hubs of the arms are slit open at 28 and may be clamped on the rods 26 by tightening a screw 29. The rods 26 are supported by brackets 30 secured on the top side of the table.

The rods 26 may be secured by a clamping device (not shown) similar to the device 27, 28, 29 and secured to or integral with one of the brackets 30. By loosening the clamping device of the rods 26, the latter may be turned.

Thereby the positions of the side supporting rollers 23 on one or both of the rods 26 may be adjusted simultaneously to suit the position of the regulating wheel of a centreless grinding machine in relation to the work. This is of great importance, since it gives a possibility of readily adjusting the position of the work to the one or the other side of the highest points of the drive rollers 22 to bring the work to the correct position on the feeding table in relation to the regulating wheel and the grinding wheel.

Only the drive rollers 22, on the tops of which the work is resting, may be mechanically driven. Their driving means is illustrated in Figs. 3 and 4. Their driving shaft 24 is driven by the motor 31, the housing of which is secured to the flange 32 on the feeding table farthest to the right in Fig. 1. From the motor shaft 33 the drive power is transmitted by means of the gears 34, 35 to the shaft 36 and from there by means of the worm gearing 37, 38 to the shaft 39 which by means of the gears 40, 41 drives the shaft 42 on which a second gear 43 (Fig. 3) is secured and in mesh with teeth 44 provided on the circumference of a friction member 45 which is loosely mounted on the shaft 24 so that it may be rotated about as well as displaced along the shaft 24. The two end portions 46, 47 of the friction member 45 are bevelled and cooperate with corresponding bevelled surfaces of two clutch members 48 and 49 respectively. The clutch member 49 is rigidly secured on the shaft 24 by means of the pin 50, whereas the clutch member 48 is displaceable along the shaft 24 within certain limits, for which purpose a pin 51 secured to the member 48 is passed through an oblong hole 52 in the shaft 24. Between the clutch member 48 and a nut 53 threaded on the shaft a spring 54 is arranged, the tension of which spring presses the clutch member 48 towards the friction member 46 and the latter in its turn against the clutch member 49. By turning the nut 53 which may be locked by the locking nut 55, the said tension may be varied and adjusted so that a desired sliding may be obtained in the friction clutch.

The end of the shaft 24 is, as indicated, journalled in a bracket 56 secured to the feeding table.

From the shaft 24 the drive power is transmitted to the drive rollers 22 by the following means. The drive roller 22 is secured to a sleeve 57 enclosing the shaft 24. On the inside said sleeve is provided with an annular shoulder 58 or a pair of projections arranged diametrically opposite one another, the face of said shoulder or said projections turned towards the shaft 24 being cylindrical or spherical and abutting against a ring 59 secured on the shaft 24. Through the shaft 24 and the ring 59 a pin 60 is passed, the ends of which engage bores in the shoulder or projections 58 so that, when the shaft 24 is rotated, the pin brings the sleeve 57 and thus also the drive roller 22 along in the rotation.

By means of the described mounting of the sleeve 57 on the shaft 24 it is possible to position the axis of the drive roller 22 obliquely in relation to the shaft 24. In doing so the sleeve is pivoted about the ends of the pin 60 in a plane through the centreline of the shaft 24 perpendicular to the drawings. Thereby the axis of the drive roller will be obliquely positioned also in relation to the centre line of the work so that the frictional force acting between the drive roller and the work will obtain a component in the longitudinal direction of the work, which component will exert a feeding action on the work in the same way as in centreless grinding machines when the regulating wheel is obliquely positioned in relation to the work.

The drive roller 22 is mounted on a needle bearing 61, the needles being arranged between the sleeve 57 and an outer bearing ring 62 which engages inside a cylindrical flange 63 on the drive roller. The ring 62 is enclosed and carried by an anular bracket 64 projecting upwards from a disc 65 mounted on the feeding table. The disc 65 is provided with a vertical pivot pin 66 being journalled in the indicated way in the feeding table. In one of the drive rollers 22 the lower end 67 of the pivot pin 66 is passed through a toothed segment 68 being clamped on the pivot end 67 by means of a nut 69 so that the toothed segment cannot turn on the pivot pin (Fig. 2). The teeth 69 of the toothed segment 68 are in mesh with teeth 70 being cut in the end of a vertical rod 71 being rotatably journalled in the feeding table and provided with a handle 72 for turning the same (Figs. 1 and 2). The toothed portion of the toothed segment 68 protrudes through a slot 73 in the side wall of the feeding table. The toothed segment 68 supports a die 74 through which a regulating rod 75 is passed and secured to the same, said regulating rod being extended in the longitudinal direction of the feeding table and connected to levers (not shown) which instead of the toothed segment

68 are secured in a similar way to the pivot pin 67 of the other drive rollers.

When the handle 72 is turned, the toothed segment 68 is turned and thus also the pivot pin 66 on which the toothed segment is non-rotatably attached. The regulating rod 75 transmits this motion to the pivot pins 66 of the other drive rollers so that all the pivot pins are turned simultaneously and equal amounts. Thereby the discs 65 (Fig. 3) and the annular bracket 64 are turned about the centre line of the pivot pin 66. The bracket 64 will thus turn the drive roller 22 and the sleeve 57 about the pin 60 by means of the bearing ring 62, the pin 60 being coaxial with the pivot pin 66. Thereby the drive rollers will occupy the same oblique position in relation to the shaft 24 and the work 21.

By the above described feeding device the advantage is also reached in connection with centreless grinding machines that the work may be given the same rate of feed and peripheral velocity as the feed roller or regulating wheel of the grinding machine has or is giving to the work. The side bearing rollers 23 may, if desired, also be made obliquely adjustable in relation to the work in order to make the least possible resistance to the feeding of the work.

The above described feeding table with accessories is placed, on the feeding side of the grinding machine and also on the delivery side of the same to receive and feed out the ready ground work.

Having now particularly described the nature of my invention and the manner of its operation what I claim is:

1. Feeding table for feeding rods or tubes in grinding machines comprising a table arranged at the side of the grinding machine, a number of single rotary supporting rollers mounted on said table in alignment with each other and adapted to support the work in the proximity of the highest points of said supporting rollers, a number of side bearing rollers being freely rotatably mounted on said table and adapted to abut against the work and to maintain the position of the latter on top of said supporting rollers, a longitudinal straight and undivided common drive shaft for said supporting rollers passing centrally through bores in said supporting rollers, means for rotating said drive shaft, means for transmitting the rotary motion of the drive shaft to said supporting rollers, means for supporting and freely rotatably journalling said supporting rollers independently of said drive shaft about axes, being perpendicular to the drive shaft, and a common regulating rod interconnecting said supporting rollers and adapted to turn them simultaneously, even during the grinding operation, about said axes to oblique positions in relation to the work.

2. Feeding table for feeding rods or tubes in grinding machines comprising a table arranged at the side of the grinding machine, a number of single rotary supporting rollers mounted on said table in alignment with each other and adapted to support the work in the proximity of the highest points of said supporting rollers, a longitudinal common drive shaft for said supporting rollers passing centrally through bores in said rollers, means for rotating said drive shaft, means for transmitting the rotary motion of the drive shaft to said supporting rollers, standards displaceably supporting the feeding table, means for displacing the feeding table in the vertical direction in relation to said standards to adjust the level of the supporting rollers for works of different diameters, a set of side bearing rollers being freely rotatably mounted on the feeding table on each side of the work and adapted to abut against the work and to maintain the position of the latter on top of said supporting rollers, said side bearing rollers being pivotally mounted on arms, which on each side of the work are mounted on a common longitudinal rod to be adjustable simultaneously in the transverse direction of the work to suit different sizes of the work.

3. Feeding table for feeding rods or tubes in grinding machines comprising a table arranged at the side of the grinding machine, a number of single rotary supporting rollers mounted on said table in alignment with each other and adapted to support the work in the proximity of the highest points of said supporting rollers, a number of side bearing rollers being freely rotatably mounted on said table and adapted to abut against the work and to maintain the position of the latter on top of said supporting rollers, a longitudinal straight and undivided common drive shaft for said supporting rollers passing centrally through bores in said supporting rollers, means for rotating said drive shaft, means for supporting and freely rotatably journalling said supporting rollers on the feeding table independently of said drive shaft about pivot axes being perpendicular to said drive shaft, means for turning said supporting rollers about said pivot axes to oblique positions in relation to the work even during the grinding operation, each supporting roller being rotated by said drive shaft by means of a pin device arranged and acting in a plane going substantially through said pivot axis and adapted to allow said turning of said supporting rollers about said pivot axes independently of the drive shaft.

JOHN ERIK BERGSTRÖM.