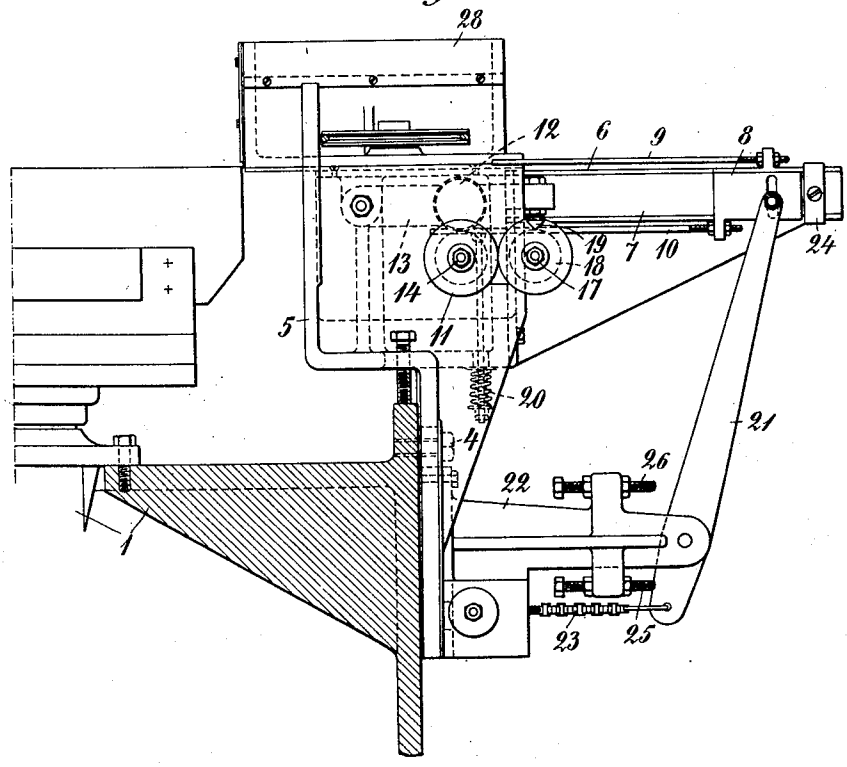
Oct. 20, 1953 E. WETTERBORG 2,655,773

APPARATUS FOR FEEDING CYLINDRICAL WORKPIECES INTO CENTERLESS-GRINDING MACHINES

Filed Nov. 15, 1951 2 Sheets-Sheet 1

Fig. 1.



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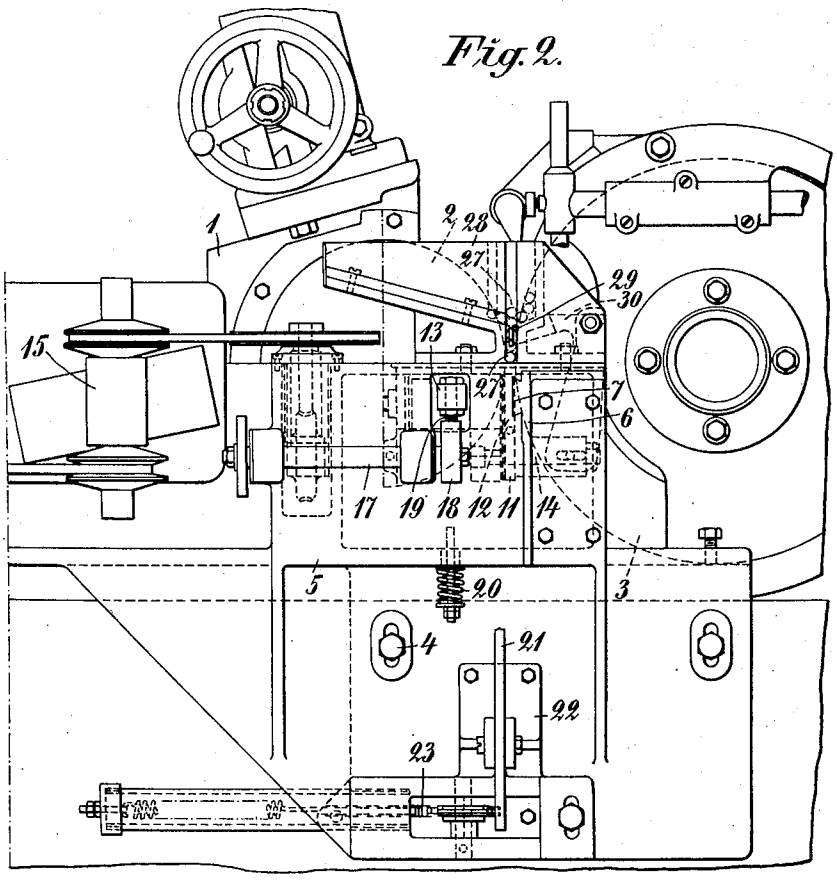
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Fig. 2.



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APPARATUS FOR FEEDING CYLINDRICAL WORKPIECES INTO CENTERLESS-GRINDING MACHINES

Erland Wetterborg, Halmstad, Sweden

Application November 15, 1951, Serial No. 256,549
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2 Claims. (Cl. 51—215)

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The present invention relates to an apparatus for feeding cylindrical work pieces, for instance twist drills or other relatively short work pieces, into centerless-grinding machines. The invention is generally characterized in that the apparatus comprises a push-rod adapted to feed the work piece and caused to reciprocate parallelly and in alignment with a supporting bar, said push rod being adapted for each forward stroke to move a work piece inserted in front of the feeding-rod, when said rod is in its rear position in order to feed the work piece into a position between the grinding wheel and the counter-pressure roller, the feeding speed of the rod being equal to or suitably a little greater than the feeding speed of the work piece through the grinding machine, said last-mentioned speed being determined by the oblique setting and the number of revolutions of the counter-pressure roller.

By means of an apparatus according to the present invention it is possible to attain a complete automatic grinding of work pieces of the kind described.

The invention will be further described in the following in connection with the accompanying drawings, in which

Fig. 1 is a side elevation of the apparatus according to the invention in connection with a centerless grinding machine, and

Fig. 2 the same in front elevation, but with some parts cut away.

On the drawing 1 designates a centerless-grinding machine of known construction in which a supporting bar for the work-piece is arranged between the grinding wheel 3 and the counter-pressure roller 2.

At the front of the grinding machine 1 a frame-construction 5 is fixed by means of bolts 4, said frame being adapted for supporting the different parts of the feeding apparatus. Furthermore, the apparatus consists of an arm 6 attached to the frame 5, said arm lying parallel and in alignment with the supporting bar. At its one side the arm 6 is provided with a guide member 7 for a sliding member 8 reciprocable along said arm, said sliding member 8 being provided with a push rod 9 at the upper side thereof and with a driving rod 10 at the under side thereof. Said driving rod 10 is inserted between two rollers 11 and 12, which engage opposite sides of the rod under friction, one of said rollers being rotatably mounted in the frame 5, while the other roller 12 is rotatably mounted in a lever 13, which in turn is pivotably mounted on the frame. The roller 11 mounted on a shaft 14 is continuously

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rotated by an electric motor via a variable gearing 15. The motor also drives, via the gearing 15, a shaft 17 rotatably mounted in the frame 5, said shaft being provided with a cam disc 18 adapted to cooperate with a pin 19 fixed at the free end of the lever 13 so as to rock the lever 13 and thus the roller 12 upwardly at a moment determined by the cam disc, so that the roller 12 is moved out of friction engagement with the driving rod 10. This moving of the roller 12 takes place against the action of a spring 20, which is adapted to return the roller to the working position and to maintain the necessary friction engagement between the rollers 11, 12 and the driving rod 10. Furthermore, at the sliding member 8 is fixed one end of a lever 21, pivotably mounted on a bracket 22 attached to the machine frame. The other end of said lever is connected to one end of a spring or weight actuated chain 23, wire or the like, which tends to maintain the lever 21 and thus the sliding member 8 and the rods 9 and 10 in the position shown in Fig. 1 or to move them into said position, which is determined by a settable abutment 24 on the free end of the arm 6 and by one of two settable abutments 25 and 26 on the bracket 22, said last-mentioned abutment 26 serving to limit the reciprocating members in the opposite end position.

Above the forward end of said arm 6 is placed a magazine for the work pieces 27, which are to be fed by means of the new feeding apparatus. The magazine comprises a container 28 with inclined side walls, said container being provided at the bottom with a slot 29 situated exactly above the arm 6, through which slot the work pieces can fall down one at a time in front of the push rod 9, when this is in its rear end position. In order to prevent the work pieces 27 to jam in the container 28 an agitator 30 is suitably arranged at the one side of the container (Fig. 2).

The operation of the feeding apparatus is the following assuming the parts being in the position according to Fig. 1 and a work piece being introduced in front of the forward end of the push rod.

In this position that part of the cam disc 18 operating the lever 13 has just passed the pin 19 and the roller 12 presses against the driving rod 10 by the action of the spring 20. In consequence of the continuous rotation of the roller 11 the driving rod 10 is drawn towards its forward end position taking with it the sliding member 8 and the push rod 9 against the action of the spring acting on the lever 21. Thus, the work piece lying on the arm 6 is moved forwards by means

of the push rod 9. When the push rod reaches its forward end position, the cam disc rocks the lever 13 and thus the roller 12 upwards, thereby releasing the driving rod 10, so that the members 8, 9 and 10 by means of the spring-operated lever 21 are returned to the starting position (Fig. 1). When the push rod reaches this rear end position, a new work piece falls down in front of the push rod.

The rotation of the roller 11 must be so accommodated, that the feeding speed of the rods 9 and 10 is equal to or suitably so much greater than the feeding speed of the work piece determined by the counter-pressure roller 2 that it compensates the loss of time by the return movement of the members 8, 9 and 10. In this way the distance between two work pieces to be fed and ground one after another is reduced to a minimum and the grinding takes place without losses along the whole width of the grinding wheel.

By causing the feeding by means of friction rollers according to the present invention the result is attained, provided that the pressure of the rollers against the driving rod is correctly adjusted, that if for any reason the work piece should be bent and jammed in the slot 23 or if the feeding speed should be too great, so that the work piece is positively forced between the grinding wheel and the counter-pressure roller, the feeding movement in view of the increased resistance will be interrupted or decreased, because the rollers slip against the driving rod.

The invention is, however, not limited to the above described embodiment, but may be varied in many ways within the scope of the invention. So for example, the rollers may act directly on the push rod, which thus at the same time serves as driving rod. Also the interruption of the friction engagement of the rollers may be carried out in another way.

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

1. In apparatus for feeding cylindrical work pieces into centerless-grinding machines, which

apparatus includes a supporting bar for the work piece and a feeding rod, a push rod for moving work pieces into a position in front of said feeding rod, mounting means for mounting said push rod for parallel reciprocating motion with respect to said supporting bar, a driving rod, rigid connecting means engaging said driving rod and said push rod and mounting said driving rod in parallel relationship with respect to said push rod, a pair of continually rotating feeding rollers, said driving rod having a portion extending between said feeding rollers to be frictionally engaged and driven thereby, means for mounting one of said rollers in movable frictional relationship toward the other of said rollers, means to relieve the frictional engagement of said rollers with said driving rod by moving said movably mounted roller away from said driving rod when said driving rod has reached its forward end position and a counteracting member acting on said driving rod to return it to its rear end position on release of said frictional engagement, whereby said push rod through said rigid connecting means is moved conjointly with said driving rod for the moving of work pieces.

2. Apparatus as claimed in claim 1 and including a lever pivotally mounted on the machine frame, means for mounting one of said feeding rollers on said lever for providing the movable mounting thereof, spring means for moving said lever to urge said roller into frictional engagement with said driving rod, and cam mechanism acting on said lever against the action of said spring means for rocking said lever and moving said roller out of engagement with said driving rod.

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