May 12, 1931. J. M. KOCH 1,804,422

AUTOMATIC FEEDER FOR CENTERLESS GRINDERS

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Fig. 1

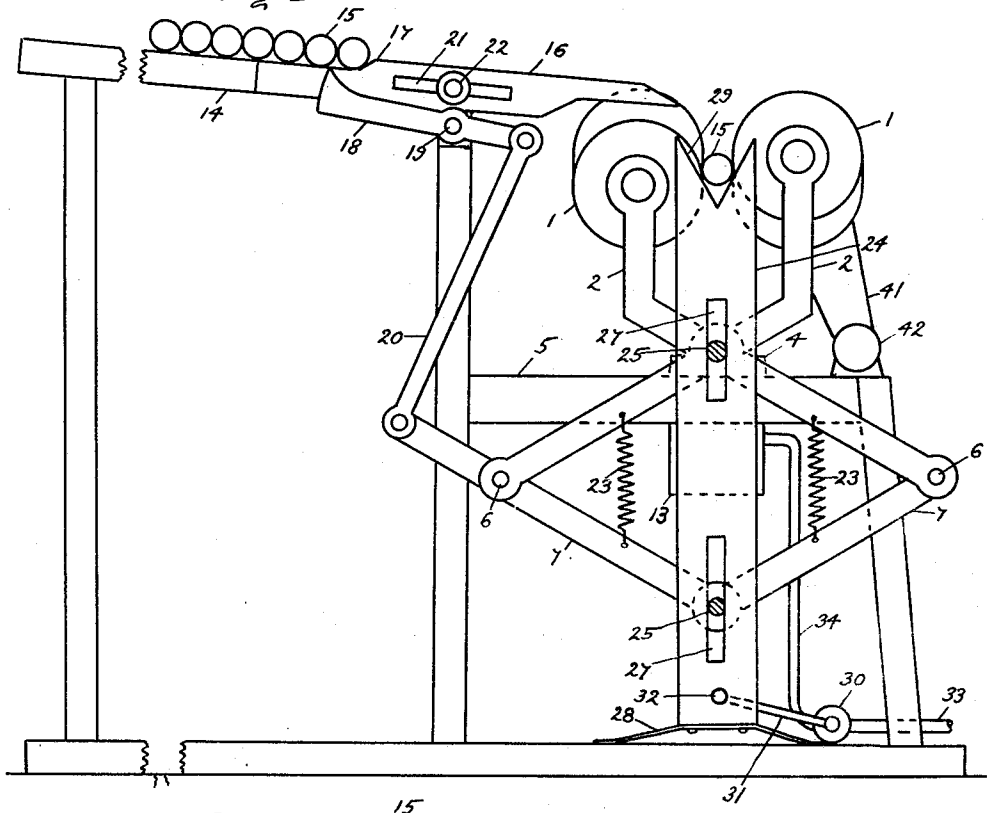


Fig. 3

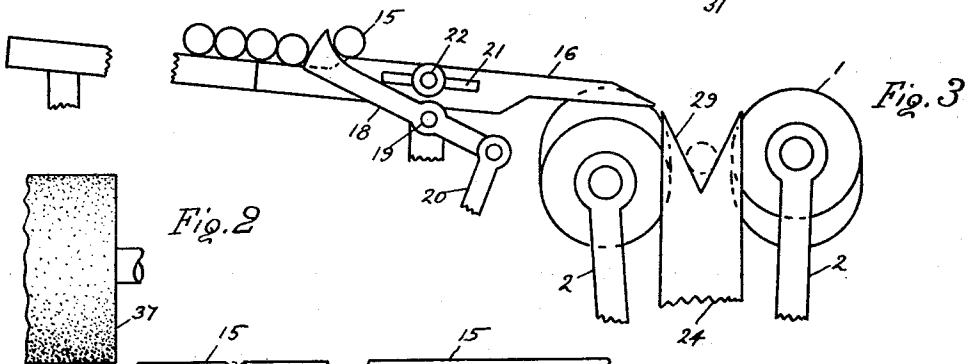
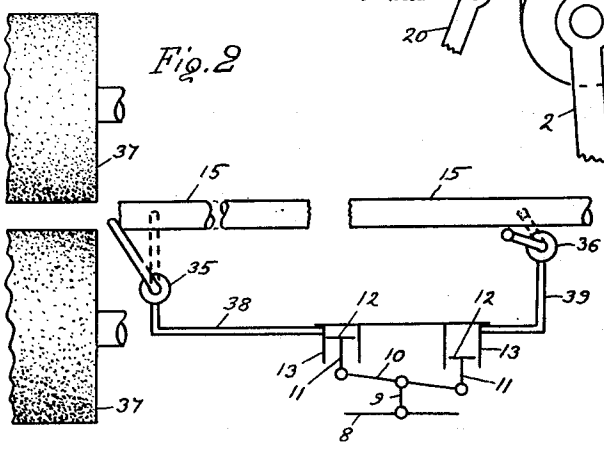


Fig. 2



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Fig. 4

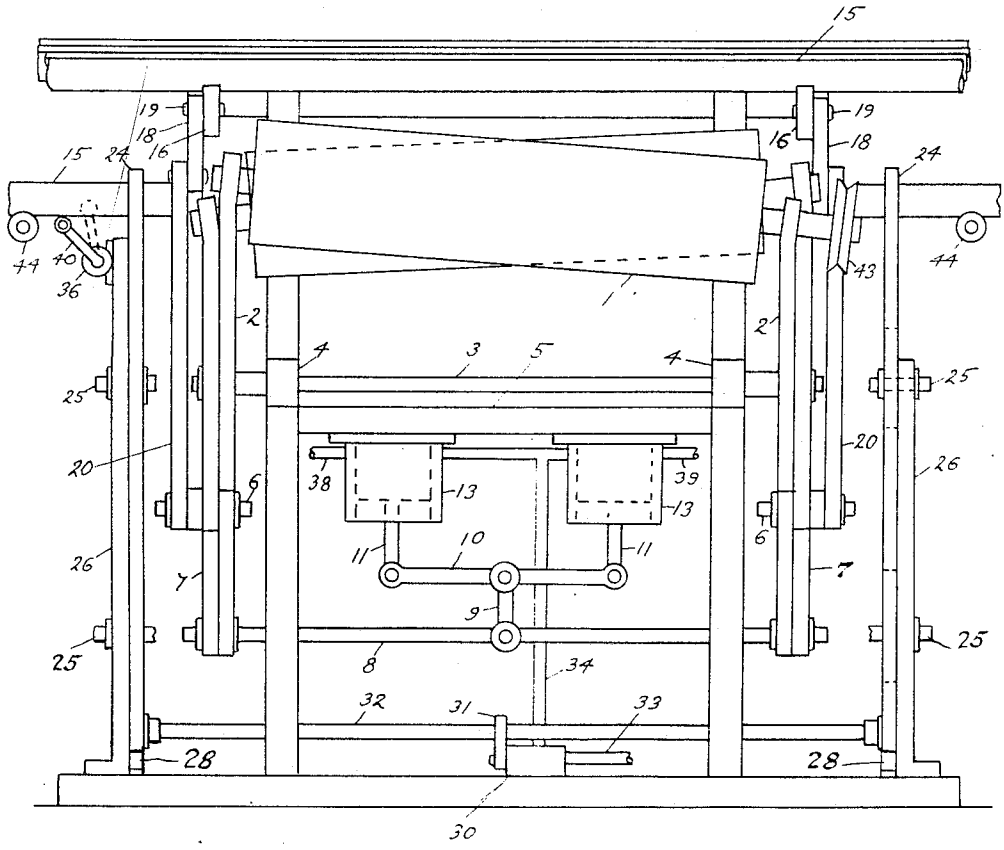


Fig. 5

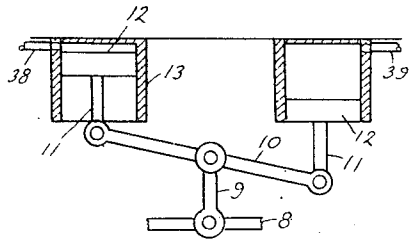
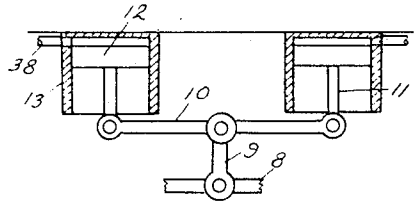


Fig. 6



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UNITED STATES PATENT OFFICE

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AUTOMATIC FEEDER FOR CENTERLESS GRINDERS

Application filed March 14, 1930. Serial No. 435,820.

My invention relates to automatic feeding devices for centerless grinding machines, and has a particular reference to devices or machines for feeding round bar successively and automatically into engagement with grinding rolls.

In centerless grinding machines the rods are usually fed by hand, the operator inserting the new rod as soon as the grinding of a previously inserted rod is completed. The grinding rolls are usually arranged so that they also move the rod along while it is being ground thereby automatically leaving room for the next rod.

With my improved feeding device the rods are automatically delivered to the grinding rolls when the finished rod leaves the machine, the operation being controlled by the movement of the rods through the machine.

For this purpose I provide a pair of power operated feeding rolls arranged in line with the grinding rolls and adapted to feed the rods into these grinding rolls. I also provide an automatic tripping device which delivers one rod at a time to the feed rolls at a moment when the grinding of a previously delivered rod is almost completed. I further provide for a control of the feed rolls by the movement of the rods themselves, so as to render the operation of the feeding device dependent on the speed of the grinding machine.

My invention is more fully described in the accompanying specification and drawings in which—

Fig. 1 is an elevation of my machine partly in section, Fig. 2 is a partial view showing arrangement of the control valves, Fig. 3 is a partial elevation showing a different position of the operating parts, Fig. 4 is a front view, Fig. 5 is a partial view of the air cylinders, and Fig. 6 is a view of these cylinders in another operating position.

My device consists of skewed rolls 1 rotatively supported with their extensions in the ends of arms 2.

These arms are pivotally supported on a shaft 3 journaled in bearings 4 supported on a table 5. The lower extensions of these arms are pivotally connected by pins 6 with bars 7. The lower ends of these bars are mounted on a shaft 8. The latter is connected in the middle with a link 9 pivoted to a crossbar 10 the ends of which are connected with rods 11 of pistons 12. These pistons are fitted in cylinders 13 supported on the table 5.

An inclined rack 14 is placed so that rods 15 can roll from it over the guide plates 16 into the space between the feed rolls 1. A shoulder 17 is provided on the plates 16 preventing the rods to roll down until they are pushed over this shoulder. For this purpose a trip lever 18 is provided pivotally supported on a pin 19 and pivotally connected by its other end with a link 20 the other end of which is connected with the extension of a bar 7.

The plate 16 has a slot 21 for a bolt 22 with which it is clamped to the side of the rack 14. Its position is so adjusted that the trip lever 18 can move one rod at a time over the shoulder 17 starting it to roll down over the extension of the plate 16 into the space between the rolls. Springs 23 tend to draw the shaft 8 up, moving the rolls 1 together and moving the trip lever 18 down as shown in Fig. 1. The pistons 12 are then pushed inside of the cylinders 13.

Control bars 24 are slidably supported on bolts 25 fitted in brackets 26. Slots 27 permit the bars to be moved up or down on the bolts 25. Light springs 28 tend to raise these bars. The upper ends of these bars are provided with recesses 29 for the rods 15. An air valve 30 is connected with its handle 31 with a rod 32 connecting the lower ends of the bars 24. This valve is connected with an air supply pipe 33 and with pipes 34 connected with the cylinders 13.

Additional control valves 35 and 36 are placed along the route of the rods 15 between the feed rolls and the grinding rolls 37. The valve 35 is opened when the end of the rod 15 reaches the grinding rolls. It is connected by a pipe 38 with the left cylinder 13. The valve 36 is opened when the rod 15 slides off releasing its lever 40. It is connected by a pipe 39 with the right cylinder 13.

The operation of my device is as follows.

When the machine is not in operation, the

control bars 24 are raised by the action of springs 28 (position Fig. 3) with the air valve 30 closed, so that the pistons 12 are pushed all the way into the cylinders 13 (Fig. 6). The arms 2 and 7 are drawn together by the action of the springs 23. The air from the cylinders is exhausted through the valve 30 and the supply of compressed air is cut off from the pipe 33 by the same valve.

In this position the tripping lever 18 is raised (Fig. 3) delivering one of the bars 15 over the shoulder 17. It then rolls over the guide plate 16 into the slot 29 of the control bars 24 depressing them against the springs 28, thereby opening the valve 30. The compressed air is then admitted into both cylinders 13 pushing the pistons 12 down. This action closes the feed rolls 1 against the stock 15 and moves down the tripping lever 18 thereby admitting another rod 15 to a position against the shoulder 17.

One of the rolls 1 is provided with a pulley 43 connected by a belt 41 with an electric motor 42 (or other suitable source of power) and continuously rotates when the device is in operation.

When the machine is not in operation, the air supply may be cut off, or the bar 15 removed from the control bars 24.

The action of the feed rolls causes the rod 15 to move toward the grinding rolls 37. If the front roll, Fig. 4, turns clockwise, then the rod will be moved to the left over the supporting rollers 44. The rod 15 also depresses the arm 40 of the valve 36 thereby closing it so that the air cannot escape from the right cylinder 13 through the pipe 39.

With the further movement of the rod 15 its end reaches a position just in front of the grinding rolls 37 of a centerless grinding machine of an ordinary type. In this position the end of the rod 15 trips the air valve 35 thereby releasing the air from the cylinder 13 (left) and cutting off the supply of compressed air into this cylinder. The corresponding piston 12 moves up under action of the springs 23, the shaft 8 being slightly raised (Fig. 5). In this position the rolls 1 become separated and do not grip the rod 15 any more which then becomes engaged by the grinding rolls 37 and moves under their pulling action. This arrangement is made in order to prevent a simultaneous pull on the rod 15 from the feed rolls and from the grinding machine.

The lever 18 becomes slightly raised but not enough to raise the next rod 15 over the shoulder 17.

When the rear end of the rod 15 leaves the valve 36 the latter becomes opened under action of its spring (not shown), as shown with dotted lines in Fig. 4. This permits the air from the right cylinder 13 to escape, and the whole system takes a position shown in Fig. 6, with the feed rolls 1 fully opened and the arm 18 fully raised (Fig. 3) thereby pushing the next rod 15 over the shoulder 17.

With my device the rods 15 are automatically delivered to the grinding machine at the exact moment when the previously delivered rod is finished. This operation is controlled by the movement of the rod through the grinding machine, so that the feed is automatically adjusted to the speed of the grinding machine. The machine does not require any attendance whatever except for occasional lubrication. It can be used with a wide range of sizes of rods 15, the only adjustment necessary being to shift the guide bar 16 so that the end of the lever 18 will raise one rod at a time.

I claim as my invention:

1. In an automatic feeding device for centerless grinding machines, the combination with feed rolls, of means to deliver rods to be ground to said rolls, means to control said delivering means by the movement of said rods through said grinding machine, said feed rolls being adapted to move said rods into engagement with said grinding machine, and means to render said feed rolls inoperative when said rods become engaged by said grinding machine.

2. In an automatic feeding device for a centerless grinding machine, the combination with feed rolls in a cooperative relation with said grinding machine, means to deliver rods to be ground into engagement with said feed rolls, means to bring said feed rolls together so as to support and feed the rods to the grinding rolls, said bringing together means being controlled by the weight of said rod, and means to control said delivering means by the operation of said grinding machine.

3. In an automatic feeding device for a centerless grinding machine, the combination with feed rolls in a cooperative relation with said machine, means to rotate one of said rolls, means to bring said feed rolls together so as to support the work, said rolls being adapted to deliver said work into said grinding machine, said bringing together means being adapted to be controlled by the weight of said work, and means to release said rolls from said work when said work is engaged by said grinding machine.

4. In an automatic feeding device for a centerless grinding machine, the combination with feed rolls in a cooperative relation with said machine, means to deliver one rod at a time into said rolls, means to bring said rolls together so as to support and feed said rod to said grinding machine, said feeding means being operatively connected with said bringing together means, said bringing together means being controlled by the weight of said rod, said rolls being adapted to become partly separated thereby releasing said rod when said rod becomes engaged by said

grinding machine, said rolls being adapted to become fully separated thereby causing said delivering means to operate when said rod fully passes into said grinding machine thereby leaving the space in said feed rolls clear for receiving the next rod.

5. In an automatic feeding device for a centerless grinding machine, the combination with feed rolls, a rack in a coordination with said feed rolls, a tripping device adapted to deliver one rod at a time from said rack into said rolls, said rolls being adapted to rotate said rod and to move it lengthwise into engagement with said grinding machine, a plurality of levers supporting said rolls and operatively connected with said tripping device, means to move said rolls with said levers together against said rod, said means being controlled by the weight of said rod, means to move said rolls one step apart without causing operation of said tripping device when the front end of said rod becomes engaged by said grinding machine, and means to move said rolls fully apart thereby causing said tripping device to operate when the rear end of said rod leaves said feed rolls and leaves the space open for the next rod.

6. In an automatic feeding device for a centerless grinding machine, the combination with feed rolls, a rack in a coordination with said feed rolls, and adapted to support rod to be delivered into said machine, a plurality of levers supporting said rolls, a tripping device adapted to deliver one rod at a time from said rack into said rolls, said tripping device being operatively connected with said levers, air operated plungers adapted to clamp said rolls against said rod, a valve controlling said clamping action and adapted to be operated by the weight of said rod when it is delivered into said rolls, a second valve adapted to be operated by the front end of said rod when it enters said grinding machine thereby releasing a portion of said plungers and releasing the grip of said rolls on said rod, and a third valve adapted to be operated by the rear end of said rod releasing the rest of said plungers thereby fully moving said rolls apart and causing operation of said tripping device.

In testimony whereof I affix my signature.

JOHN M. KOCH.