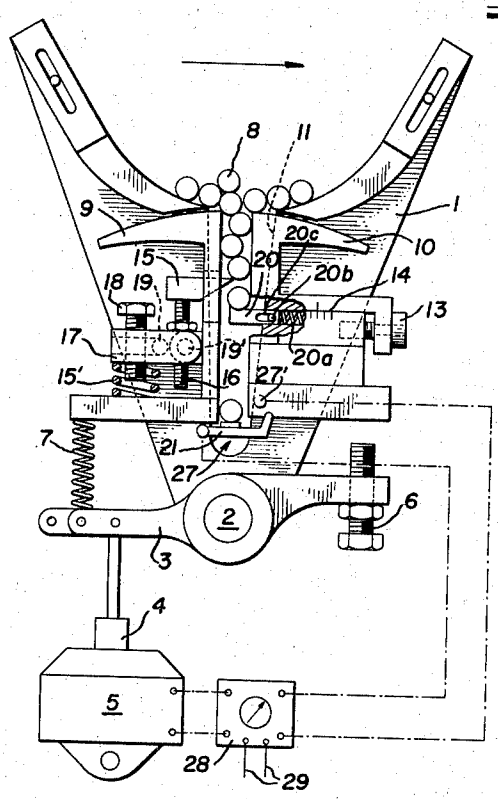
July 28, 1959 H. HERRMANN 2,896,379

FEEDING ATTACHMENTS

Filed May 29, 1957

Fig. 1.



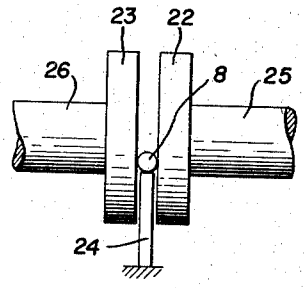


Fig. 4.

Fig. 2.

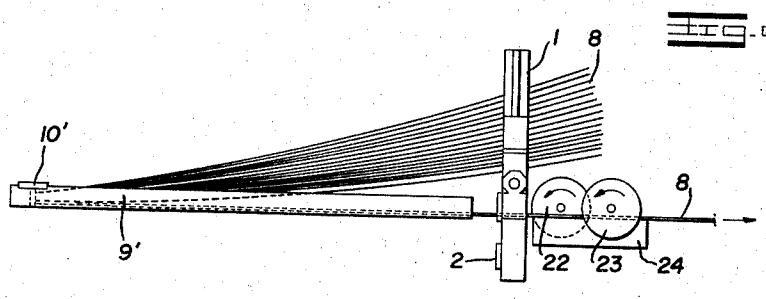
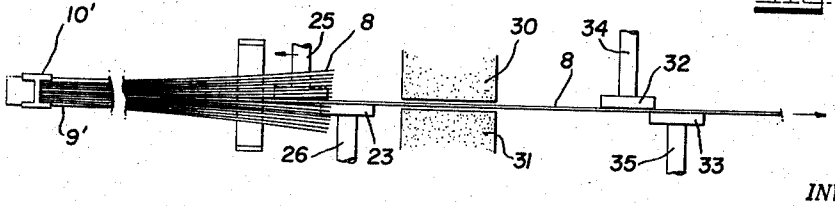


Fig. 3.



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FEEDING ATTACHMENTS

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7 Claims. (Cl. 51—215)

This invention relates to feeding attachments for feeding round bars, tubes and other lengthy materials into machine-tools, e.g. grinding machines, polishing machines and machines performing both these operations, in which machine-tools the lengthy materials are advanced into their axial direction while being machined, and the object of the invention is to provide a feeding attachment, which will take bundles of materials, in which the bars or the like are unstraightened and not in parallel order.

Another object of the invention is to provide a feeding attachment, which is narrow in dimension and does not protrude over the plan view of the machine-tool.

A further object of the invention is to provide a feeding attachment, which not only advances the materials into their axial direction, but also rotates them round their axis.

A still further object of the invention is to provide a feeding attachment feeding the material with variable speeds of advance in axial direction and of rotation.

The invention consists essentially in providing means for receiving bundles of lengthy pieces of materials, means for releasing said pieces one by one, and means for receiving said pieces and feeding them into a machine-tool.

Means for receiving said pieces of material and feeding them into a machine-tool may consist of a pair of discs with their axes in a parallel position, the circular surfaces of said discs at least partly facing each other and in a distance from each other to allow both surfaces to come into contact with said pieces of material, a straight edge placed in the space between said circular surfaces of the discs and able to support said pieces of material, and means able to rotate said discs round their axes.

Means may be provided to lift the straight edge into positions close to the centers of the discs and to lower them into positions away from said centers.

Means for receiving bundles of pieces of lengthy material and for releasing them one by one may consist of a slotted fork able to receive the ends of said pieces of material, means to swing the slotted fork to and fro, a slotted part, the slot of said part coming into coincidence with the slot of the fork during the swinging movement, two means intruding into the slot of said slotted part and being able to be withdrawn from the slot only one at a time and to release the lengthy parts of material one by one into said means for receiving the pieces and feeding them into the machine-tool, means to withdraw one of said intruding means from the slot when the fork swings to and to withdraw the other one when the fork swings fro, and means to rest the ends of the pieces of lengthy materials opposite to the ends resting in said slotted fork.

Means may be provided to adapt the width of the slot in the slotted part, to the diameter of the lengthy pieces of material and means to adapt the distance of the means intruding into said slot to said diameter.

The means able to swing the slotted fork to and fro

may comprise a magnet to swing said fork into one and a spring to swing it back and into the other direction, means limiting the swinging movement of the slotted fork to a desired amount, a switch and a time switch connecting the coils of said magnet to a current line when a piece of lengthy material released from the means intruding into the slot of the slotted part has left the means for receiving and feeding the piece of lengthy material into the machine-tool.

The feeding attachment may comprise in combination two grinding wheels with their axes in a position parallel to said part of lengthy materials, means to rotate said grinding wheels round their axes, and/or two polishing discs with their axes parallel and in positions rectangular to said piece of lengthy material and the circular surfaces of said discs at least partly facing each other and means for rotating said discs round their axes.

In the drawings which incorporate one embodiment of the invention,

Fig. 1 is a simplified end view of the attachment,

Fig. 2 is a schematical side view of the attachment,

Fig. 3 is a schematical top view of the attachment in combination with a grinding and polishing machine, of which the working elements only are incorporated, and

Fig. 4 is a schematical end view of the driving elements of the feeding attachment.

Referring more particularly to the drawings, 1 is a slotted fork able to swing to and fro round an axis 2, which is supported by the frame of the attachment, 3 is a lever connected to the slotted fork 1 and 4 the armature of a magnet 5, the armature being connected to the lever 3 and the magnet able to swing the lever 3 and the slotted fork 1 into one direction, and 6 is a screw, which may be turned in a thread in the other arm of the lever 3 and may be set to limit the swinging movement of said lever and the slotted fork 1 for a desired amount. A spring 7, which is connected to the lever 3 with its one end and to the frame of the attachment with the other, swings the lever 3 and the slotted fork 1 back into the other direction as soon as the armature 4 is released by the magnet 5.

The slotted fork 1 is able to receive one end of a bundle of material, e.g. round bars 8, which, with their other ends, rest in a groove 9' against a stop 10', the groove and stop being connected to the frame of the attachment.

Two L-shaped parts 9 and 10 are connected to the frame of the attachment having a slot 11 between them, which slot, during the swinging movement of the fork 1 comes into coincidence with the slot of the fork and during coincidence is able to receive one or more of the round bars 8 resting in the fork 1. The L-shaped part 10 is mounted slidably on the frame of the attachment, and an arm 12 is fastened on it. A screw 13 may be turned in a threaded part of the frame of the attachment and when turned, moves the arm 12 and the L-shaped part 10. Thus by turning the screw 13 the width of the slot 11 may be adapted to the diameter of the round bars 8, the width of the slot being indicated on a dial 14.

A nose 15 is fixed to a shaft 16, the shaft being supported in a part 17 pivotally attached to the frame of the machine at 19^1, and which part 17 can be moved up and down respective to said frame by means of a screw 18. A part of the nose 15 intrudes into the slot 11 and can be moved completely out of the slot by the shaft 16 being moved together with part 17 round the axis 19. The shaft 16 is held in the position, in which a part of the nose 15 intrudes into the slot 11 by means of a spring 15^1, and is brought out of this and into a position, in which the nose 15 is completely out of the slot 11 by a cam 19, which is fixed to the fork 1, during the swinging movement of said fork into the direction opposite to the arrow. Another nose 20 is slidably

attached to the frame of the machine, partly intruding into the slot 11 and held in this position by means of a spring 20*a*, and is brought out of this and into a position, in which the nose 20 is completely out of the slot 11 by another cam 20*b*, which is fixed to the fork 1 and rides in slot 20*c* in nose 20, during the swinging movement of said fork.

Thus, when the fork 1 swings to, and the nose 15 is withdrawn from the slot 11, one round bar 8 resting in said slot on the nose 15 falls downwards and comes to rest on the nose 20. When the fork 1 swings fro, the nose 15 intrudes into the slot again and blocks the passage of the following round bars, while the nose 20 is withdrawn from the slot and allows the round bar, which had been resting on said nose, to fall down in the slot onto the lever arm 21 and, with its front end, between the discs 22 and 23, where the front end of the round bar comes into contact with both of the discs. The straight edge 24, which is attached to the frame of the machine, supports the round bar in this position. Means, which are not incorporated in the drawing keep the discs 22, 23 in rotation round their axes 25, 26 in the same direction, which is indicated by arrows in Fig. 2 of the drawing. The straight edge 24 is attached to the frame of the machine by means, which allow said edge to be lifted into positions closer to the centers of the discs and to be lowered into positions away from said centers. The round bar, which is positioned between the rotating discs 22, 23 is rotated by said discs round its own axis and, at the same time, pushed into the direction of its axis out of the feeding attachment. The speed of both these movements depends on the position of the straight edge 24 respective to the centers of the discs 22 and 23, on the diameter of the bars, and on the speed of the discs 22, 23. When the edge is close to the centers, the rotative movement of the round bar is fast and its axial movement slow, and, when the edge is lowered into a position away from said centers, the axial movement of the round bar is fast and the rotative movement slow. When bars of different diameters are used in the attachment, and the straight edge 24 is kept in position, bars of smaller diameter will be given a faster axial and slower rotative movement than bars of higher diameter.

The lever arm 21 is connected with an electric contact 27^1, which together form a switch 27 with this switch being closed, when the lever arm is in its horizontal position, in which it is held by a spring, and being opened, when the lever arm is pressed down by a round bar resting on said arm. The switch 27 is connected to a time-switch 28, which time-switch is set to connect the coils of the magnet 5 to the current line 29 at a certain time after the switch 27 has been closed.

The feeding attachment as it has been described above and is incorporated in Figs. 1, 2 and 4 of the drawing operates as follows:

Some of the round bars 8, which rest with their ends in the slotted fork 1 have fallen down into the slot 11, and one of the round bars is resting on the nose 15, another bar is resting on the nose 20.

The lever arm 21 is, as no bar is resting on it and pressing it down, in its horizontal position and thus the switch 27 is closed, and the magnet 5 connected to the current line 29. By action of the magnet the fork 1 is swung into one direction, and the nose 20 is withdrawn from the slot 11. The round bar, which had been resting on said nose, falls down in the slot 11 onto the lever arm 21, which is pressed down by the bar and opens the switch 27 and disconnects the magnet 5 from the current line.

Then the fork 1 is swung, by action of the spring 7, back into the other direction, the cam 19 turns the shaft 16 so that the nose 15 is withdrawn from the slot 11 and a round bar, which had been resting on said nose, falls

down onto the nose 20, which again intrudes into the slot 11.

The round bar, which is resting on the lever 21, is with its front end positioned between the rotating discs 22, 23, which discs rotate the bar and at the same time move it in its axial direction out of the feeding attachment. When, during said movement, the bar leaves the lever 21 said lever is brought back into its horizontal position by action of a spring and closes the switch 27, and after a time, which allows the round bar to leave the space between the discs 22, 23, the time switch 28 connects the coils of the magnet 5 to the current line 29, the fork 1 is swung, by action of said magnet, into one direction, the nose 20 is withdrawn from the slot 11, and the round bar, which had been resting on said nose, falls down in the slot 11 onto the lever arm 21 and with its front end between the rotating discs 22, 23.

Referring now to Figure 3 of the drawing, this figure incorporates the feeding attachment in combination with a grinding and polishing machine.

Two grinding wheels 30 and 31, only parts of which are incorporated in the drawing, are attached with their axes to the frame of the machine, the axes being in a position parallel to that round bar, which is fed by the feeding attachment into the grinding and polishing machine. Means, able to rotate the grinding wheels, are provided and not incorporated in the drawing. The grinding wheels 30, 31 are kept in a certain distance from each other, and both of them are in contact with the round bar and grinding said bar.

Two polishing discs 32 and 33 are attached with their axes 34 and 35 attached to the frame of the machine, said axes being in a position rectangular to said round bar, and the discs having the round bar between their circular surfaces and being in contact with the bar. Means, able to rotate the polishing discs round their axes 34, 35 are provided and not incorporated in the drawing.

While I have thus described the preferred forms of my feeding attachment it is to be understood that the invention is not limited to said forms, but that various modification may be made therein without departing from the spirit of the invention or of the scope of the subjoined claims.

What I claim is:

1. An attachment for axially feeding elongated cylindrical work pieces into a tool machine having a working plane, comprising means for supporting a bundle of the work pieces in the general direction of feed and at an inclination with the ends of the work pieces nearest the machine supported in an elevated position above the working plane of the machine and their other ends substantially in the working plane, means for successively releasing the elevated ends of the work pieces one by one from the bundle to permit them to drop toward the working plane, and means below the elevated ends of the work pieces to intercept and advance the individually dropped work pieces toward the machine, said advancing means including a pair of discs having their end faces spaced a distance substantially corresponding to the diameter of the work pieces to receive an individual work piece therebetween, said discs being axially offset relative to each other but in partially overlapping relation and rotatable in the same direction to rotate a work piece therebetween, and a work rest blade between said discs to support the work piece dropped between said discs substantially in the working plane of the machine.

2. A feeding attachment as claimed in claim 1, wherein said supporting means includes an upright pivotally mounted slotted fork for supporting the elevated ends of the work pieces and a rest stop for holding the other ends thereof, and means for oscillating said fork, and said releasing means includes a stationary chute adjacent said fork and with which the fork slot registers during oscillation, and two stop elements projecting into

said chute and operatively connected with the fork so as to be alternately projected into and withdrawn from the chute and between the work pieces contained therein, whereby to release the work pieces one by one from the chute.

3. A feeding attachment as claimed in claim 2, wherein said chute comprises spaced members which are relatively movable to selectively vary the width thereof, and said stop elements are relatively movable to vary the distance therebetween according to the diameter of the work pieces.

4. A feeding attachment as claimed in claim 3, wherein said fork oscillating means comprises an electromagnet to oscillate said fork in one direction and a spring to oscillate it in the other direction, means selectively limiting the oscillation of said fork, a movable switch operable by a work piece released by said stop elements, a time switch, and power circuit means connecting said time switch with said movable switch and said electromagnet.

5. A feeding attachment comprising means for supporting bundles of elongated cylindrical work pieces, means for successively releasing said pieces one by one from said supporting means, and means for receiving the released pieces and feeding them to a tool machine, said bundle supporting means including means for supporting one of the ends of said work pieces, a pivotally mounted upstanding slotted fork for supporting the other of the ends of said work pieces, and means for oscillating said fork, and said releasing means including a slotted part adjacent said fork to receive a work piece therefrom when the slots thereof come into coincidence during the oscillation of said fork, a pair of movable

stop means normally protruding into the slot of said slotted part and removable from the slot only one at a time to release the work pieces one by one, and means to withdraw one of said stop means from the slot when the fork swings in one direction and to withdraw the other said stop means when the fork swings in the other direction.

6. A feeding attachment as claimed in claim 5, wherein said slotted part comprises spaced members defining the slot therebetween, said members being relatively movable to selectively vary the width of the slot according to the diameter of the work pieces, and means to vary the distance between said stop means according to said diameter.

7. A feeding attachment as claimed in claim 6, wherein said fork oscillating means comprises an electromagnet to oscillate said fork in one direction and a spring to oscillate it in the other direction, means selectively limiting the oscillation of said fork, a movable switch operable by a work piece released by said stop means, a time switch, and power circuit means connecting said time switch with said movable switch and said electromagnet.

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