No. 823,018. PATENTED JUNE 12, 1906.

W. A. WOOD.

AUTOMATIC GUIDING AND FEEDING MACHINE.

APPLICATION FILED NOV. 8, 1905.

3 SHEETS—SHEET 1.

FIG. 1.

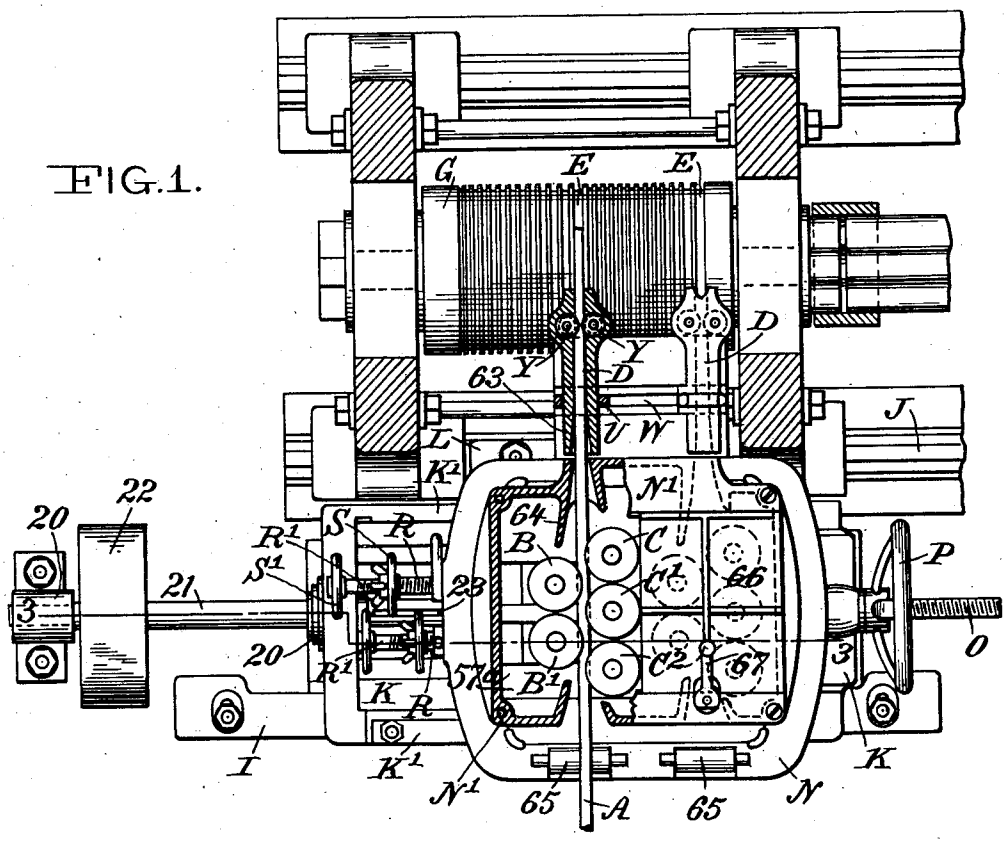
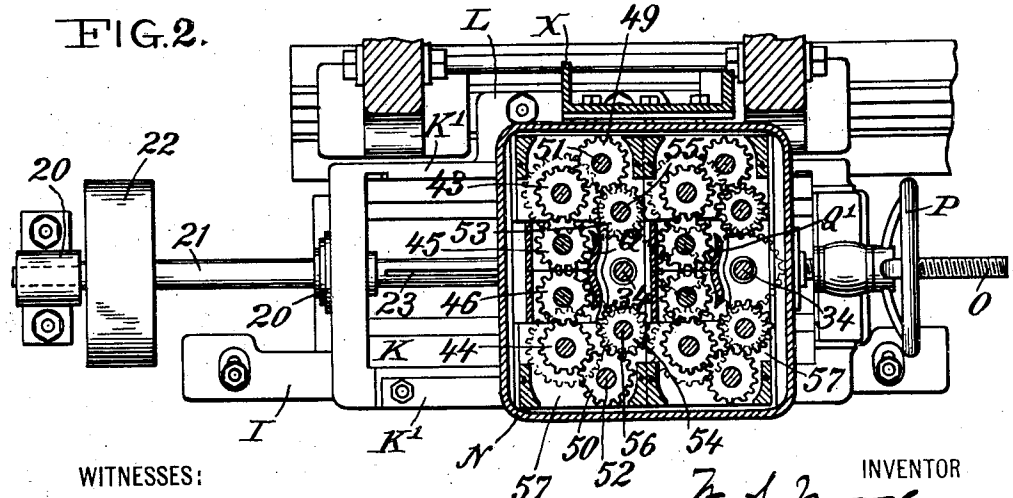


FIG. 2.



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3 SHEETS—SHEET 2.

FIG. 3.

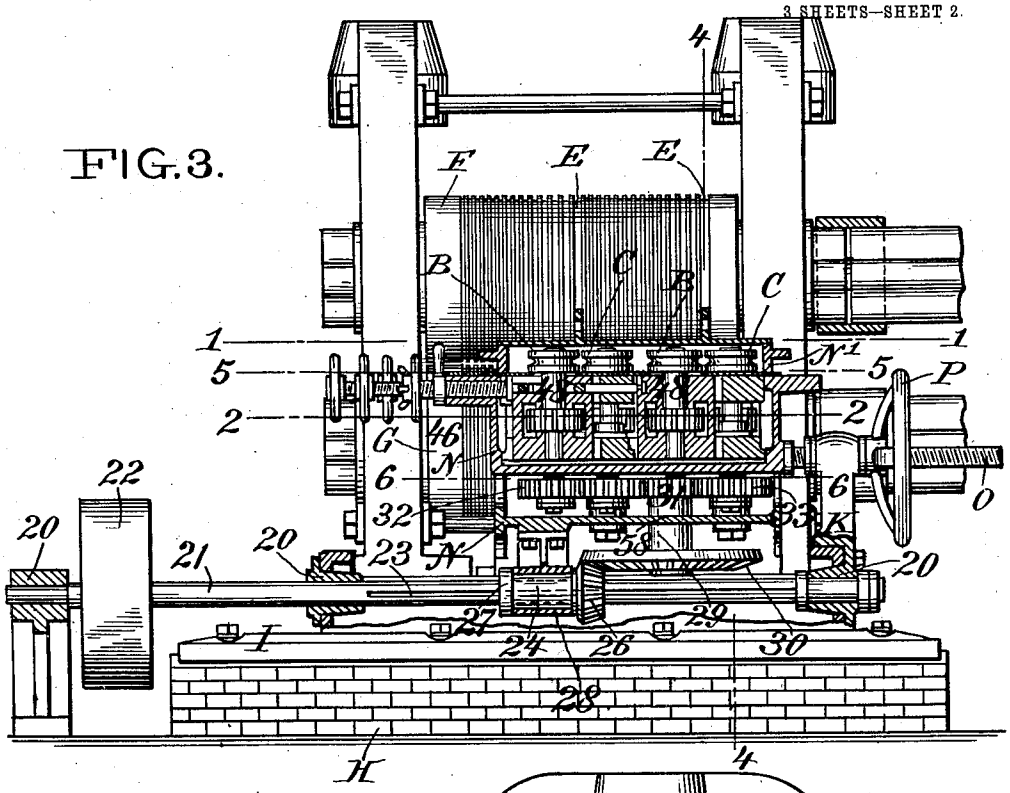
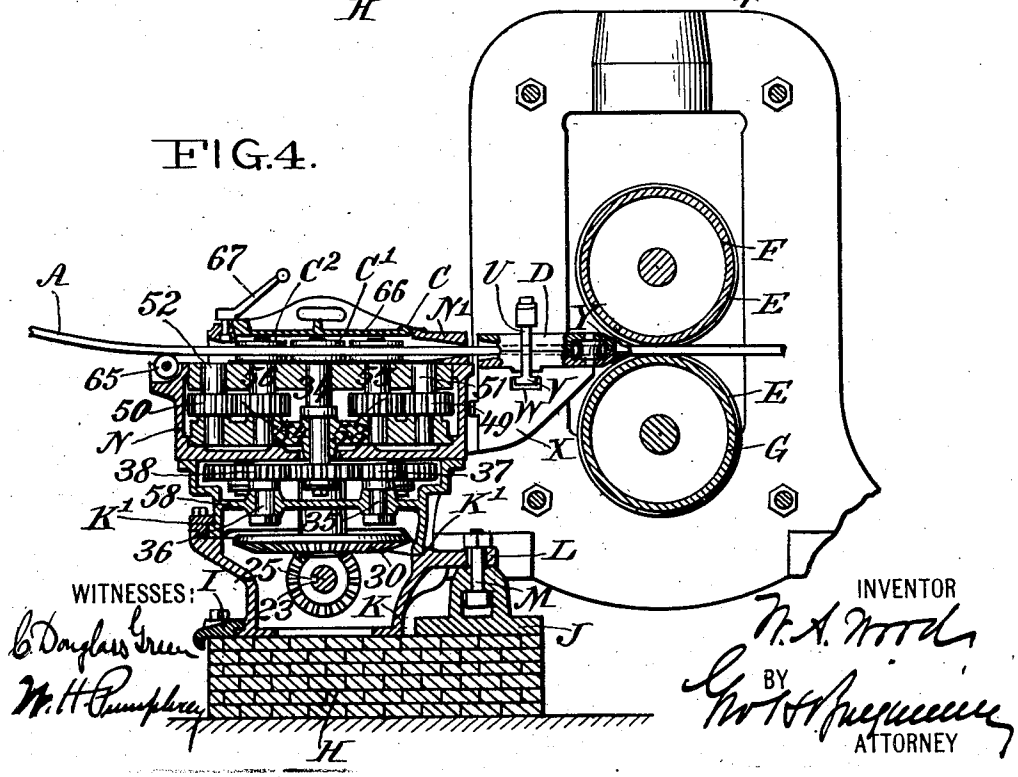


FIG. 4.



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3 SHEETS—SHEET 3.

FIG. 5.

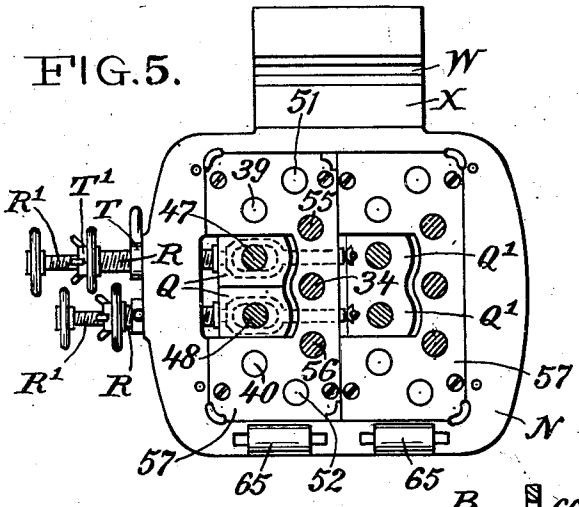


FIG. 6.

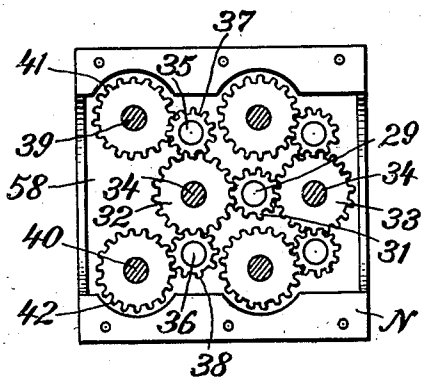


FIG. 7.

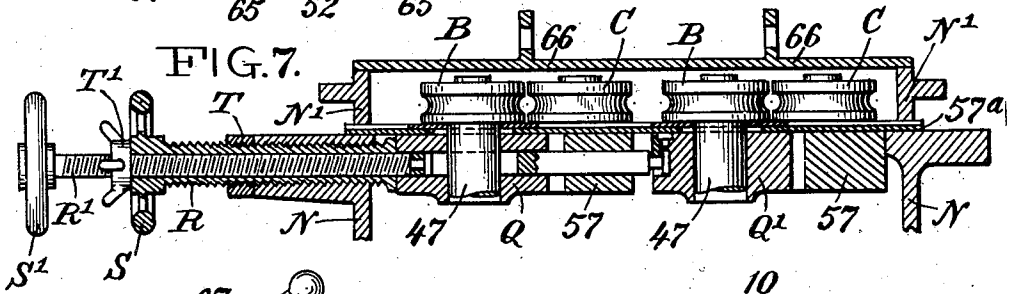


FIG. 8.

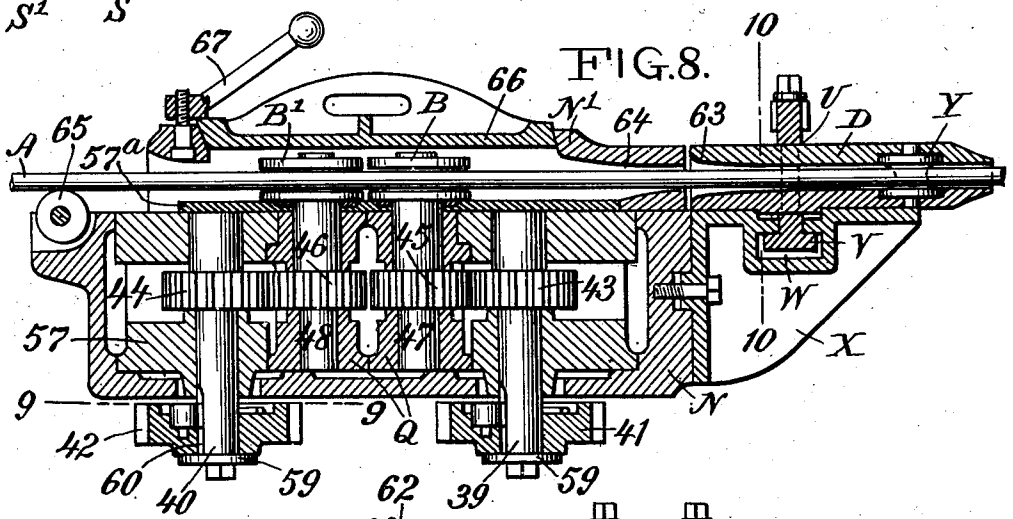


FIG. 9.

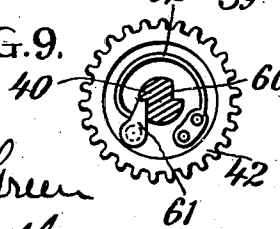
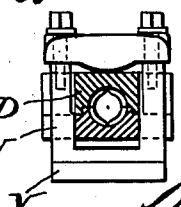


FIG. 10.



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UNITED STATES PATENT OFFICE.

WILLIAM ALEXANDER WOOD, OF ANSONIA, CONNECTICUT, ASSIGNOR TO THE COE BRASS MANUFACTURING COMPANY, A CORPORATION OF CONNECTICUT.

AUTOMATIC GUIDING AND FEEDING MACHINE.

No. 823,018. Specification of Letters Patent. Patented June 12, 1906.

Application filed November 8, 1905. Serial No. 286,384.

To all whom it may concern:

Be it known that I, WILLIAM ALEXANDER WOOD, a citizen of the United States, residing at Ansonia, county of New Haven, State of Connecticut, have invented certain new and useful Improvements in Automatic Guiding and Feeding Machines, of which the following is a specification.

My invention relates to a device adapted to be used in connection with the rolls of a rod-mill, and which has for its purpose to automatically grasp, straighten, guide, and feed the rod or rods to be acted upon to the desired pass or passes between the rod-rolls.

Heretofore it has been the practice for the workman to push the end of the rod, which comes to him either straight, bent, or coiled, into the proper pass between the rolls. As the rolls do not readily grasp or bite the rod the workman is required to expend considerable strength in forcing the end of the rod between the rolls; further, especially when the rod is not straight, to guide it by hand to keep it within the proper pass.

The object of my invention is to provide means for automatically seizing the end of a rod, straightening it, guiding and feeding it into the proper pass between the rod-rolls, thus relieving the workman of all physical exertion and thereby permitting him to readily feed a double or triple rod-mill, thus materially reducing the cost of rolling the rods.

The accompanying drawings will serve to illustrate my invention. The drawings show my invention as applied to a mill with two sets of passes, or, otherwise, a double mill.

Figure 1 is a plan view and partial horizontal section taken on the line 1 1 of Fig. 3. Fig. 2 is a partial plan and horizontal section taken on the line 2 2 of Fig. 3. Fig. 3 is an elevation and section taken on the line 3 3 of Fig. 1. Fig. 4 is a vertical section on the line 4 4 of Fig. 3. Fig. 5 is a section on the line 5 5 of Fig. 3. Fig. 6 is a section on the line 6 6 of Fig. 3. Fig. 7 is an enlarged vertical section approximately on the same line as Fig. 3, showing the mechanism for adjusting the guide-rolls relative to each other. Fig. 8 is a section approximately on the same line as Fig. 4, showing the arrangement of the driving mechanism for two of the feed-rolls. Fig. 9 is a sectional plan taken on the line 9 9 of Fig. 8. Fig. 10 is a view taken on the line 10 10 of Fig. 8 looking from the left.

In order to simplify the description of the invention, I will first describe its operation and then the details of the mechanism employed.

The rod designated as A to be subjected to the action of the rolls of the rod-mill is fed by the workman between the two series of positively-driven rolls B C, there being two rolls in the series B B′ and three rolls in the series C C′ C^2. These rolls grasp the rod, feed it forward, and at the same time straighten it. The rod is then directed by a guide D into one of the passes—for instance, E—formed in the peripheries of the horizontally-disposed pair of rolls F G, which reduces the rod to the required size.

In order that the rod A may be directed through any one of the passes on the rolls F G, the rolls B C are mounted in a casing or frame, which is longitudinally adjustable in the axis of the rolls, and, further, to provide for feeding rods of different size the rolls of the series B are arranged to be adjustable relative to the rolls of the series C.

Referring now to the details of the mechanism employed, the rod-mill, considered as a whole, presents no point of novelty. The rolls F G, however, have each formed in their periphery two sets of coacting grooves, forming passes, the grooves of one roll coacting, as is usual, with those of the opposite roll. The passes are shown as differing in diameter, with the widest passes situated at the right of the roll. In the drawings each roll is shown as provided with two sets of thirteen passes.

Located in front of the rod-mill and upon an extension H of the supporting-foundation of the mill is a guide-plate I, and situated between this guide-plate and a slotted frame J, which serves as a support for one side of the rod-mill, is a movable frame K. This frame is provided with a horizontally and rearwardly extending arm L, which rests and is adapted to move over the surface of the slotted frame J and to be secured in position thereon by means of the bolts M. The object of this arrangement is to permit the frame K to be moved transversely to the axis of the rolls of the rod-mill. Mounted

upon the top of the movable frame K is a casting or frame N, which serves to support and inclose the guide and feed rolls B C and the mechanism for driving them. The casing N is arranged to be moved longitudinally on the frame K in guides K′ by means of the screw O and wheel P. The object of this arrangement is to provide means whereby the opening between the two series of guide-rolls B C may be brought into relation with any desired pair of passes upon the rolls F G.

The rolls B C are arranged in two series. Those indicated at B are mounted in movable bearings Q Q′. The bearings Q are adjusted laterally by means of the screw R and hand-wheel S, and the bearings Q′ by means of the screw R′ and hand-wheel S′, Fig. 7. Suitable jam-nuts T T′, Fig. 5, are employed to fix the position of the series of rolls B when adjusted.

The guide D, situated between the rolls B C and the rolls F G, is also longitudinally adjustable in the axis of the rolls. This is accomplished by means of the locking-yoke U. (Shown in Fig. 10.) The lower end of this yoke U is provided with lateral extensions V and situated in the slot W in a bracket X, extending rearwardly from the casing N. In the forward end of this guide are the oppositely-disposed rollers Y.

I will now describe the mechanism for positively driving the rolls B C.

Arranged in bearings 20, located at the opposite ends of the movable frame K, is a shaft 21, on the left-hand end of which is the driving-pulley 22. The shaft 21 has formed in it a slot 23. Located upon the shaft 21 is a sleeve 24, from the interior of which projects a spline 25, Fig. 4, which coacts with the slot 23. On the right-hand end of the sleeve is a beveled gear 26 and at the left-hand end a collar 27. The sleeve 24 is situated in a bearing 28, depending from the casing N. It will thus be seen that when the casing N is moved in the axis of the rolls under the action of the screw O and wheel P that the sleeve 24 is correspondingly moved along the shaft 21.

Depending from and supported by the casing N is a vertical shaft 29, and on the lower end of this shaft is a beveled gear 30, which coacts with the gear 26 on the sleeve 24. Upon the upper end of the shaft 29 is a pinion 31, Fig. 6, which pinion is in mesh with the gears 32 33. (Shown in full lines in Fig. 6 and in dotted lines, Fig. 2.)

As the rolls B C are in duplicate sets, I will only describe the mechanism for driving one set of rolls—*i. e.*, the set at the left. The gear 32 is situated on the lower end of a shaft 34, and at the upper end of this shaft is mounted the guide-roll C′. Mounted on the upper end of the shafts 35 36 are the pinions 37 38. Mounted on the lower end of the shafts 39 40 are the gears 41 42, respectively, in mesh with the pinions 37 38. Situated farther up on the shafts 39 40 are the gears 43 44, Fig. 8, which are in mesh with the gears 45 46, respectively, on shafts 47 48. These shafts have their bearings in the adjustable bearings Q Q′, and upon the ends of the shafts 47 48 are the guide-rolls B B′. In mesh with gear-wheels 43 and 44 are two gear-wheels 49 and 50 on corresponding shafts 51 and 52. The gears 49 and 50 each mesh with other gear-wheels 53 and 54 on shafts 55 and 56, and upon the upper end of the shafts 55 and 56 are the guide-rollers C and C^2. It will thus be seen that the guiding and feeding rolls B B′ C C′ C^2 are driven positively from the pinion 31 and that the power-transmission means provided will permit the adjustment of the rolls B B′ relative to C C′ C^2. In a double machine the pinion 31 also drives the mechanism for operating the second set of rolls. Bearings Q and Q′ of rollers B B′, the shaft of rollers C C′ C^2, and the shafts of intermediate gears 43 44 and intermediate gears 49 50 are mounted in removable frames 57, which are inclosed by frame N. The bearings of the shafts in frame 57 are covered by a plate 57^a, and above this plate and surrounding the guide-rolls B C is a frame N^2, secured to frame N. The shafts of pinions 31, 37, and 38 are mounted in a frame 58, forming a part of casing N.

The gears 41 42 on the ends of the shafts 39 40 are mounted loosely upon such shafts and are supported thereon by means of the collars 59. The lower ends of these shafts 39 40 have teeth 60, formed in their periphery, as shown in Fig. 9, and upon the upper surface of each gear is pivotally mounted a pawl 61, pressed toward the shaft by means of a spring 62. The object of this arrangement is to permit relative movement between the shafts 39 40, and the gears 41 42 thereon, which movement is necessary in case the speed of rotation of the rod-mill differs from that of the shaft 21, which drives the guiding and feeding rolls.

The driving mechanism for the feeding and guiding rolls which I have described, is the best of which I am now aware. I wish it understood, however, that I do not limit myself to such mechanism, as other mechanism may be employed, through the instrumentality of which all the rolls may be driven positively and at the same time permit their adjustment relative to each other.

Situated between the sets of guiding and feeding rolls and the passes upon the rolls F G of the rod-mill are the adjustable guides D. These guides are provided with flared openings 63, which are arranged coincident with similar flared openings 64 in the rear of the casing N′. At the rear of the guides D are arranged the oppositely-disposed rollers Y. These rollers may be dispensed with; but they are convenient in use, as they prevent frictional engagement of the rod with the guide. Situated in

front of the casing N are the horizontal rollers 65. These are convenient for use, but are not essential.

The top of the casing N' is closed by a plate 66 and locking-handle 67. This arrangement I find convenient in practice, although it may be dispensed with.

In this specification I have not entered into a description of the minor features of construction, as I wish it understood that various changes may be made in the mechanism employed and shown in the drawings without in any wise departing from the intent of my invention.

Having thus described my invention, I claim—

1. The combination with the rolls of a rod-mill, a device for seizing the rod to be acted upon, straightening it, guiding it and positively feeding it in a straight line between the rolls of the rod-mill.

2. The combination with the rolls of a rod-mill having two series of circumferential grooves therein forming two sets of parallel passes, a device for seizing the rods to be acted upon, straightening them, guiding them and respectively positively feeding them in straight lines to the selected passes between the rolls of the rod-mill.

3. The combination with the rolls of a rod-mill having a series of parallel passes formed therein, a device for seizing the rod to be acted upon, straightening it, guiding it and feeding it into some one of the passes between the rolls, said device embodying in its construction two sets of positively-driven rolls, and a guiding device arranged in the axis of the opening through which the rod acted upon moves between said last-named rolls.

4. The combination with the rolls of a rod-mill having a series of parallel passes formed therein, a device for seizing the rod to be acted upon, straightening it, guiding it and feeding it into some one of the passes between the rolls of the rod-mill, said device embodying in its construction two sets of positively-driven rolls, a guiding device, together with means for adjusting said sets of rolls and the guiding device longitudinally along the axis of said rod-rolls.

5. The combination with the rolls of a rod-mill, a device for seizing the rod to be acted upon, straightening it, guiding it and feeding it between the rolls of the rod-mill, said device embodying in its construction two sets of acting rolls, means for positively driving said rolls, means for adjusting one set of said rolls relatively to the other set, and an adjustable guiding device located in the axis of the opening through which the rod acted upon moves between said last-named rolls.

6. The combination with the rolls of a rod-mill, a device for seizing the rod to be acted upon, straightening it, guiding it and feeding it between the rolls of the rod-mill, said device embodying in its construction two sets of rolls, means for positively driving said rolls, means for independently adjusting the position of each roll of one set relatively to the other set, and an adjustable guiding device arranged in the axis of the opening through which the rod acted upon moves between the last-named rolls.

7. The combination with the rolls of a rod-mill, a device for seizing the rod to be acted upon, straightening it, guiding it and feeding it between the rolls of the rod-mill, said device embodying in its construction two sets of horizontally-rotating rolls, one set composed of two rolls and the other set of three rolls, means for positively driving all of said rolls, means for effecting independent adjustment of two of said rolls, and a guiding device located in the line of movement of the rod through such coacting rolls.

8. The combination with the rolls of a rod-mill, a device for seizing the rod to be acted upon, straightening it, guiding it and feeding it between the rolls of the rod-mill, said device embodying in its construction a frame located in front of the rolls, a casing mounted upon said frame, two sets of rolls mounted in and carried by said casing, means for effecting longitudinal movement of said casing and carried rolls in the axis of the rolls of the rod-mill, means for positively driving the rolls situated in the casing and irrespective of their position relative to the rolls of the rod-mill, and an adjustable guide for the rod fed between the rolls carried by the casing situated between said rolls and the rolls of the rod-mill.

9. The combination with the rolls of a rod-mill, mechanism for seizing, straightening, guiding and feeding the rod to be acted upon, said mechanism comprising two sets of rolls, one set formed of two rolls and the other set of three rolls, said rolls of the first set having their axes in a plane parallel with those of the second series but intermediate thereof, together with means for positively driving said rolls.

10. The combination with the rolls of a rod-mill, mechanism for seizing, straightening, guiding and feeding the rod to be acted upon, said mechanism comprising two sets of rolls, one set formed of two rolls and the other set of three rolls, means for independently adjusting the position of each of the rolls forming the set having two rolls relatively to the set having three rolls, together with means for positively driving all of said rolls.

11. In a feeding attachment for rod-mills, the combination of two series of rolls, one series having each roll independently adjustable relative to the rolls of the other series, means for effecting such adjustment, together with means for driving both series positively from the same source of power.

12. In a feeding attachment for rod-mills,

the combination of a frame, a casing mounted on said frame, a power-shaft mounted in said frame, seizing, straightening, guiding and feeding rolls mounted in said casing, power-transmission means interposed between said power-shaft and rolls, together with means for shifting the casing and power-transmission means along the frame and power-shaft.

13. In a feeding and straightening attachment for rod-mills, the combintion of a frame, a casing mounted on said frame, a power-shaft mounted in the frame, seizing, straightening, guiding and feeding rolls mounted in said casing, and power-transmission means interposed between said power-shaft and rolls.

14. In a feeding attachment for rod-mills, the combination of a frame, a casing on said frame, a power-shaft mounted on said frame, seizing, straightening, guiding and feeding rolls mounted in said casing, and comprising two sets of rolls, means for adjusting said rolls relative to each other, and power-transmission means interposed between said power-shaft and said rolls.

15. In a feeding attachment for rod-mills, the combination of a frame, a casing on said frame, two sets of coacting rolls in duplicate mounted in said casing, mechanism for driving all of said rolls positively, and mechanism situated on one side of said casing for effecting independent adjustment of certain of said rolls.

16. In a feeding attachment for rod-mills, the combination of a casing, two sets of rolls mounted in said casing, one set occupying a fixed position and the other set adjustable relative to the fixed rolls, a driving-shaft, a shaft driven from the driving-shaft and having on its end a gear, and gears interposed between said first-named gear and said rolls for driving said fixed and adjustable rolls, and irrespective of their position relative to each other.

17. In a feeding attachment for rod-mills, the combination of a casing, an inlet-guide and an outlet-guide formed in the bottom of the casing, two sets of rolls interposed between said guides, one set fixed and the other set adjustable, means for adjusting said last-named rolls, together with means for driving said rolls.

18. In combination with the rolls of a rod-mill having a series of circumferential grooves therein differing in diameter, a device for seizing the rod to be acted upon, straightening it, guiding it, and positively feeding it toward the rolls, and means for adjusting said device longitudinally relative to the rolls.

19. In combination with the rolls of a rod-mill, a device for seizing the rod to be acted upon, straightening it, guiding it, and positively feeding it in a straight line between said rolls, means for adjusting said device longitudinally relative to said rolls, and means for positively driving the respective parts of said device, and irrespective of the position of the device considered as a whole relative to the rolls.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM ALEXANDER WOOD.

Witnesses:

W. H. PUMPHREY,

C. DOUGLASS GREEN.