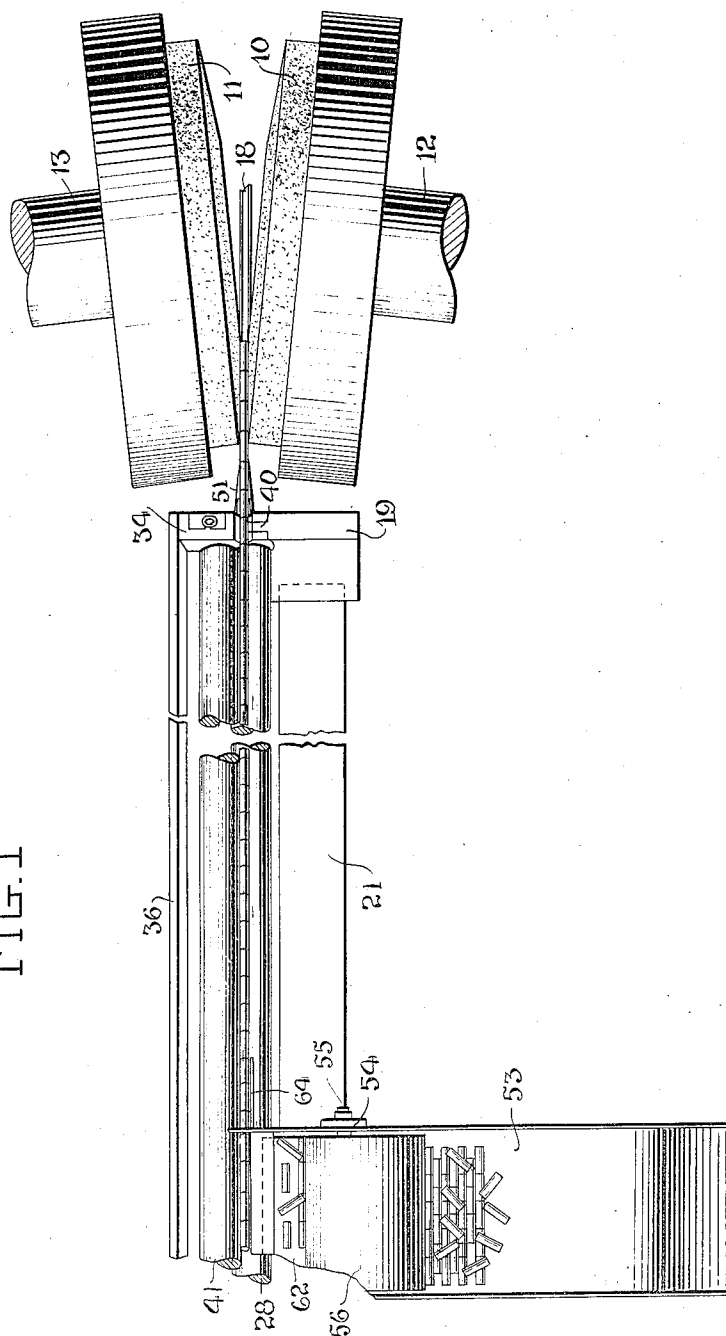


1,278,463.

L. R. HEIM.
FEEDING MECHANISM.
APPLICATION FILED OCT. 18, 1917.

Patented Sept. 10, 1918.
3 SHEETS—SHEET 1.

FIG. 1

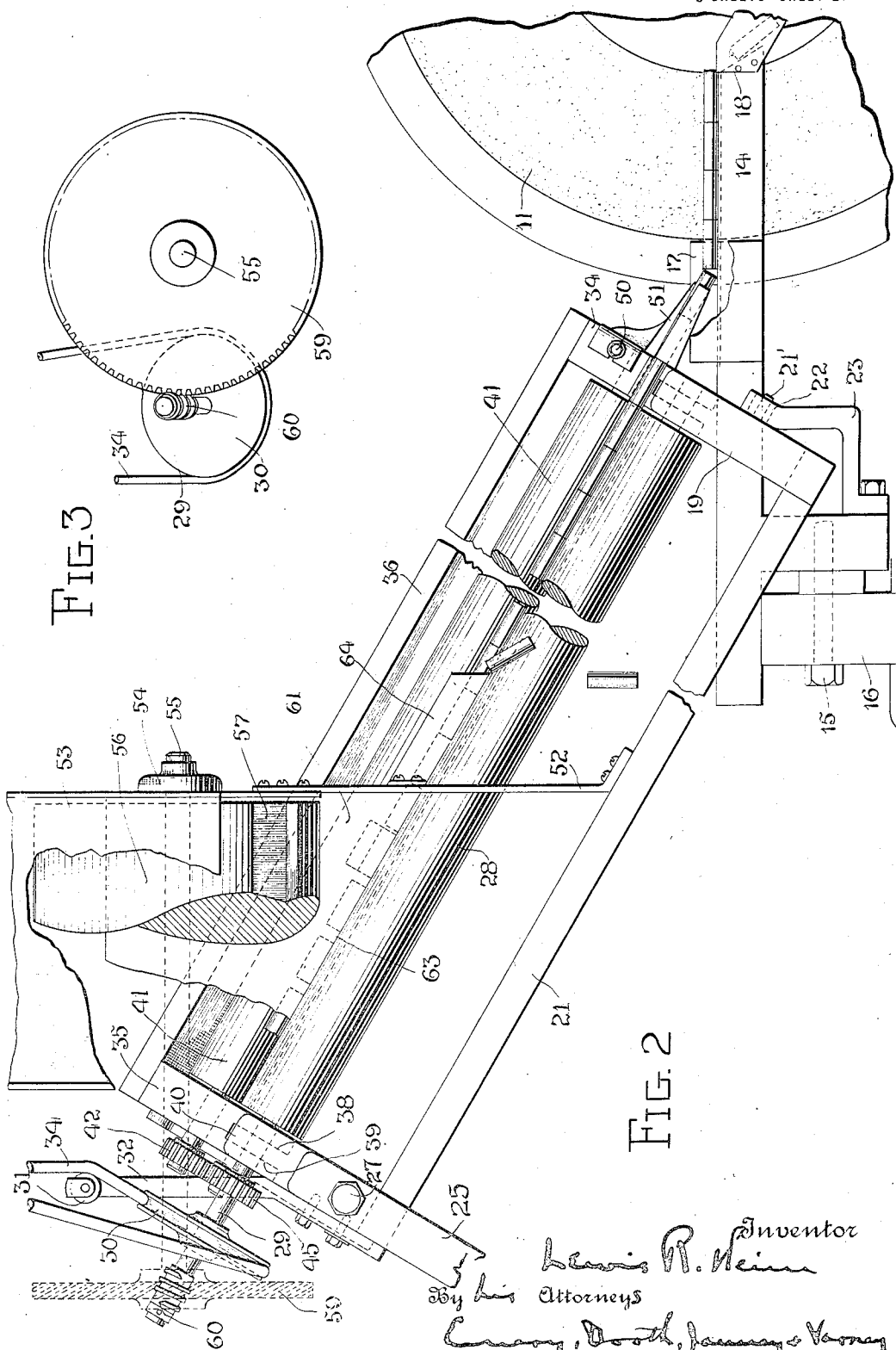


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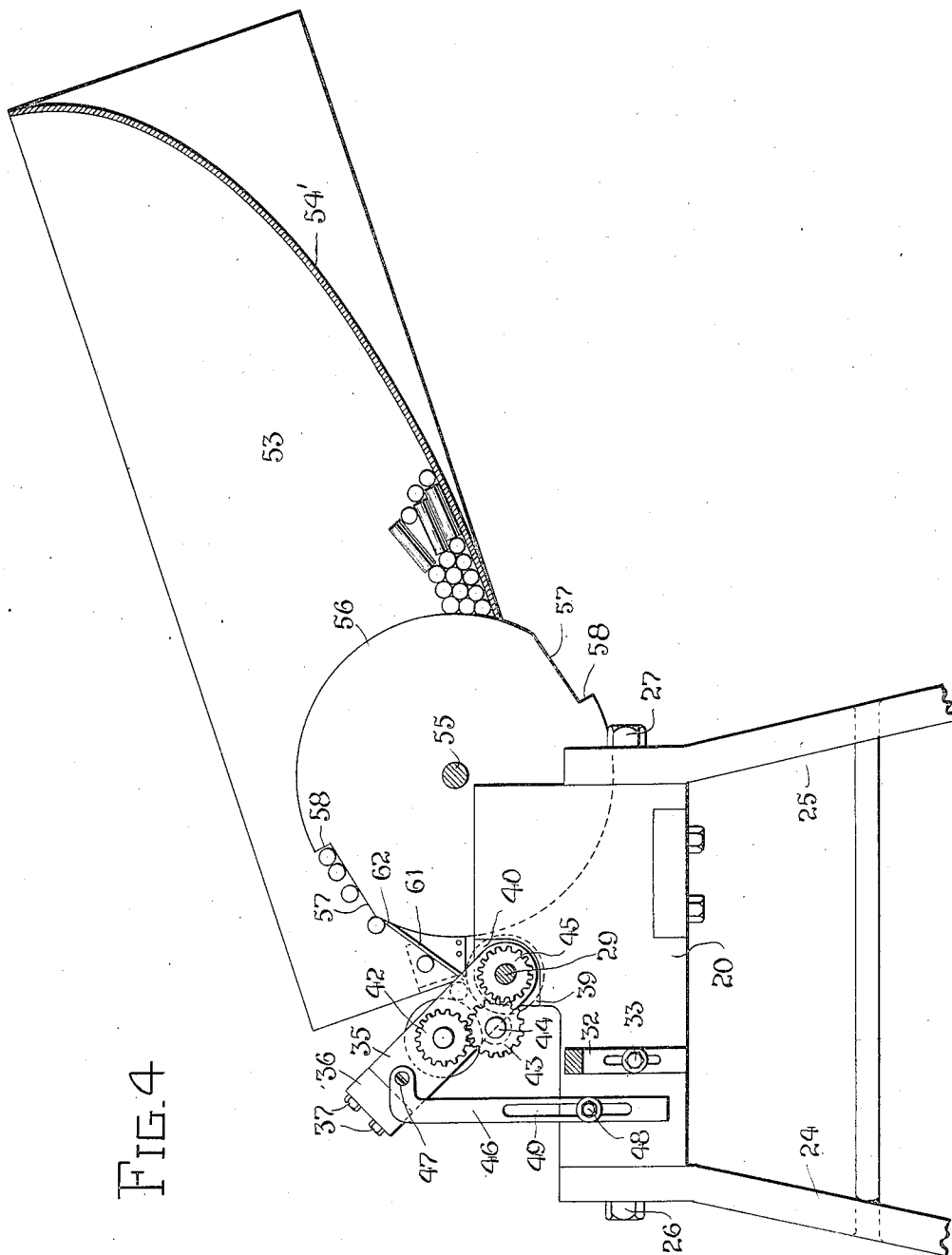
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3 SHEETS—SHEET 3.

FIG. 4



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UNITED STATES PATENT OFFICE.

LEWIS R. HEIM, OF DANBURY, CONNECTICUT.

FEEDING MECHANISM.

1,278,463.

Specification of Letters Patent. Patented Sept. 10, 1918.

Application filed October 18, 1917. Serial No. 197,238.

To all whom it may concern:

Be it known that I, LEWIS R. HEIM, a citizen of the United States, and a resident of Danbury, county of Fairfield, State of Connecticut, have invented an Improvement in Feeding Mechanism, of which the following is a specification.

This invention relates to feeding and conveying mechanisms, and more especially to a new and improved mechanism particularly adapted to feed parts to a machine to be operated upon thereby.

An object of this invention is to provide a simple and practical feeding mechanism that shall be at the same time of highly efficient action and of maximum ruggedness and durability.

Another object is to provide a feeding mechanism of such automatic action as will greatly minimize the manual attention and operation otherwise required and insure greater reliability of action.

Another object is to provide a feeding mechanism that may be conveniently applied to a machine and readily and easily adjusted in itself for greatest effectiveness of operation in connection therewith and to adapt it to handle parts of different magnitudes without impairment of efficient action.

This invention has for another of its objects the provision of a feeding mechanism which will deliver parts in proper feeding alinement, and which will automatically remove such parts as tend to be delivered out of such feeding alinement.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the structure hereinafter described and the scope of the application of which will be indicated in the following claims.

This invention is particularly adapted for use in connection with machines for grinding rolls and the like, an example of which is shown in my Patent No. 1,210,937 of January 2, 1917. As conducive to a clearer understanding, this invention will be described in connection with such a roll grinding machine, but it is to be understood, however, that many features of this invention may be equally adaptable to machines of other types

and to other uses. In the accompanying drawings, in which is shown one embodiment of this invention as applied to a roll grinding machine,

Figure 1 is a plan view showing the feeding mechanism in operative relation to the grinding wheels of a roll grinding machine,

Fig. 2 is a side elevation of the same on a larger scale, with certain parts broken away,

Fig. 3 is a detail view of the driving mechanism, and

Fig. 4 is an end view partly in section, of the apparatus with the parts shown brought into the same plane for the purpose of simplifying the drawing.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawings, there are shown the operating wheels of a grinding machine, such as is described in my above-mentioned Patent No. 1,210,937 of January 2, 1917, of which wheel 10 is the grinding wheel and wheel 11 the regulating wheel. These wheels may be of the cylindrical type and may have coacting faces formed with a slight bevel, as is clearly shown in Fig. 1. In the latter case the shafts 12 and 13, upon which the operating wheels 10 and 11 respectively are suitably mounted, are slightly offset and form a slight angle with one another, so that the operating faces of the wheels lie closer to one another at the front of the machine than at the rear.

Extending between the operating wheels is a carrier 14 suitably mounted as by bolt 15 to the standard 16 of the grinding machine. This carrier may be of substantially the same construction as described in my Patent No. 1,210,936 of January 2, 1917, and comprises, in general, a bar 14 of substantially rectangular cross section, provided with sheet metal guiding flanges 17 suitably secured thereto, exterior of the operating wheels, and U-shaped trough 18 secured to the inner end of the carrier and extending in a downward direction in the clearance space provided by the offsets of the operating wheels. The carrier 14 serves to support the rolls between the faces of the wheels during the grinding operation, during which the grinding wheel 10 rotates at a relatively high speed and acts to hold the rolls down

upon the carrier and grind them, while the regulating wheel 11 rotates in the reverse direction at a relatively low speed, and acts to cause a constant and uniform rotation of the rolls while being operated upon by the grinding wheel.

Referring now to the drawings, there is provided an inclined main frame, comprising the end members 19 and 20 rigidly connected by a bar 21 securely bolted thereto. This frame is adapted to be attached to a machine in an inclined position and is supported at its lower extremity by the standard 16 of the machine. The frame is held in place by means of a pin 21' engaging an elongated slot 22 in the bracket 23, suitably secured to the standard 16 of the machine. The upper end of the frame is supported by means of a standard composed of the bars 24—25, pivotally secured to the end member 20 as by screws 26—27 respectively, and of such length as to extend to the floor. The bars 24—25 may be connected by suitable tie rods and brackets to insure the rigidity of the supporting standard.

Rotatably mounted within the upper portion of the end members of the main frame, is a roll 28 provided with a driving shaft 29, upon which is mounted the driving pulley 30. Coacting with the driving pulley is an idler 31, suitably mounted on the upper end of the bracket 32, secured to the end member 20 as by the screw 33. The idler serves to properly guide the belt 34 on to the driving pulley, and is adjustable with respect thereto by means of the bracket 32.

Pivotally mounted with respect to the main frame and swinging about the shaft 29, as an axis, is an auxiliary frame comprising the end members 34 and 35 rigidly interconnected at their outer extremities by a bar 36 suitably secured thereto as by the screws 37. The end members 19 and 20 are each milled out on either side thereof as at 38 and 39 to leave a centrally extending portion 40 adapted to fit into the lower slotted ends of the end members 34 and 35. In this manner a rigid and solid hinge construction is provided, whereby the auxiliary frame may be readily swung about the axis of the roll 28.

Journaled in the end members 34 and 35 of the hinged frame, is a roll 41 provided at its upper end with a shaft extension, upon which is mounted a spur gear 42. This roll is driven by means of the spur gear 42 through an idler 43 mounted upon a stud 44 in the end member 35. This idler gear is, in turn, driven from the spur gear 45 mounted upon the driving shaft 29 of the roll 28. Roll 41 is substantially similar in construction to the roll 28 and is so mounted in the end members 34—35 as to leave a slight clearance space between the two coacting rolls. This clearance space,

for the purposes of this invention, may or may not be present, the two coacting rolls forming a supporting surface or trough, irrespective of such clearance space.

Referring to Fig. 4 of the drawings, it will be seen that the auxiliary frame, in which the secondary roll 41 is mounted, is provided with a bracket 46 secured to the end member 35 thereof as by screw 47, and adapted to be adjustably secured to the end member 20 of the main frame by the screw 48 extending through the slot 49 in the lower end of the bracket. In this manner the roll 41 may be adjustably positioned at any desired angle with respect to the roll 28, so that the transverse inclination or slope of the supporting surface or trough formed by the two rolls may be varied, the one roll being swung about the axis of the other, as provided for in the hinged construction of the auxiliary frame.

The hinged end members 19, and 34 are cut away, as is more clearly shown in Fig. 1, in direct line with the trough formed by the two rolls, so as to form an extension thereof to facilitate the continued passage of the rolls to be ground from the supporting rolls.

Secured to the swinging end member 34, as by the screw 50, is a sheet metal guiding trough 51, so positioned as to be in alignment with the supporting trough formed by the rolls 28 and 41, and to receive the rolls or other bodies therefrom to conduct them to the carrier 14. The lower end of this trough extends between the guiding flanges 17 of the carrier 14. This trough, being mounted on the end member of the swinging auxiliary frame, will always be in substantial alinement with the trough formed by the two rolls for all positions of the secondary roll 41.

Mounted at the upper end of the bar 21 of the main frame, as by the bracket 52, and at an angle with respect to the frame, is a container 53 adapted to receive a supply of rolls or bodies to be operated upon by the grinding machine. Journaled in suitable bushings as 54 in the sides of the container, is a shaft 55, upon which is mounted a rotary member 56 adapted to co-operate with the rolls 28 and 41 to feed thereto the bodies from the container. The container is provided with a bottom 54' sloping toward the rotary member 56, which is of such size as to substantially form the lower end of the container. The member 56 is, in general, of a cylindrical form, provided with a recess extending in the direction of its axis, and providing a substantially plane surface 57 and a surface 58 substantially at right angles thereto. The rotary member is driven by means of the shaft 55, at the outer extremity of which is mounted a worm wheel 59 driven from the

worm 60, mounted upon the main driving shaft 29, as is more clearly shown in Fig. 3.

Mounted immediately in front of the rotary member 56, and secured to the sides of the container, is a sheet metal guide 61. This guide is so formed that its upper edge 62 is substantially parallel to the axis of the rotary member, and extends across the face thereof, slightly above its axis, and that its lower edge 63 is substantially parallel to the axis of the roll 28 and extending along the upper surface of the roll 28. Secured to the bracket 52 is an auxiliary sheet metal guide 64, so formed as to provide an extension for the lower edge 63 of the guide 61, and extending along the upper surface of the roll 28.

In the operation of this mechanism, the main drive shaft 29 is driven at a relatively low speed, by means of the pulley 30 and the belt 34, from a suitable source of power, preferably overhead. The main drive shaft causes the rotation of the rolls 28 and 41, and drives the rotary member 56 at a slower rate of speed by means of the worm 60 and worm wheel 59. The rotary member 56, upon the container 53 being supplied with the rolls or other parts to be operated upon by the grinding machine, is slowly rotated in an anti-clockwise direction, and forming the lower inclosing end of the container and by reason of the sloping bottom 54' therein, picks up in the recess in its surface, a certain number of rolls. Continued rotation of the rotary member 56 carries these parts upwardly until the plane surface 57 of the recess assumes a substantially horizontal position. The rolls which have thus been picked up by the rotary member 56 will be found placed upon the plane surface 57 in various positions with respect to the direction of the axis of the rotary member, as shown in Fig. 1. Further continued rotation of the rotary member causes the gradual tilting of the surface 57, whereby the rolls or bodies supported thereon gradually roll off, their order in so doing being determined by their position with respect to the axis of the rotary member. The rolls extending in the same direction substantially as that of the axis, roll off upon slight tilting of the surface, and those happening to be positioned at an angle with respect to the axis roll off only after a further tilting of the plane surface has taken place.

Upon leaving the rotary member 56 in the manner described, the parts are guided by means of the guide plate 61 onto the rolls 28 and 41. The latter rotate in a clockwise direction when viewed as in Fig. 4, and together form a supporting surface or trough for transferring the parts or rolls to the machine. The rolls to be transferred to the machine thereupon take the positions on

the coacting rolls as shown in Figs. 1 and 2, and are constantly rotated by the movement of the surface upon which they rest, whereby they are constantly fed or assisted in their downward movement along the supporting trough formed by the rolls.

The rate of their movement down the trough may be adjusted by varying the speed of either or both of the rolls forming the supporting surface, or by proper adjustment of the slope thereof, by means of the standard composed of the bars 24 and 25 resting on the floor, thereby varying the longitudinal inclination of the transferred trough. In so varying the inclination or slope of the supporting surface with respect to its longitudinal projection in the horizontal, the reaction of the transferring surface upon the rolls is varied, thereby causing a corresponding change in the rate at which they slide down the incline, assisted by the movement of the supporting surface itself.

It will be noted that the supporting surface formed by the coacting rolls 28 and 41 has, in addition to the longitudinal inclination above described, also a transverse inclination, that is, it is inclined with respect to its projection in the horizontal in a plane substantially transverse to the axis of either roll as 28. This transverse inclination is clearly shown in Fig. 4, and it will be further noted that this inclination may be varied by changing the elevation of the roll 41 with respect to the roll 28 by means of the bracket 46. The rolls upon being received in the transferring trough from the rotary feeding member 56, are automatically lined up in the trough formed by the coacting rolls as shown in Figs. 1 and 2. The transverse inclination of the trough or supporting surface is now so adjusted that only a single line of rolls is supported thereby and maintained in feeding alinement with respect to the carrier 14. The moving surface of the roll 28 coöperates with the adjacent surface of the roll 41, to support this line of rolls and that part of the surface of the roll 28 exterior of the vertical plane passed through the axis thereof acts to engage those rolls which tend to descend the trough in a second line adjacent the above-mentioned line of rolls. This second line, which may also consist of only a single roll, is carried down the incline, and is held thereon by the guide plates 61 and 64. As soon, however, as the individual rolls, which thus tend to descend adjacent the initial line of rolls pass the guide plate 64, the above-mentioned exterior portion of the surface of roll 28 engages the parts forming the secondary line and effectively removes them from the transferring trough by the transverse movement of the surface. The parts which thus tend to be delivered to the carrier 14 and

thus to the machine in a duplicate line exterior of the proper feeding path or alinement of the parts are automatically removed and discarded into a suitable receptacle from which they may be transferred to the receptacle 53. This removing operation is clearly shown in Fig. 2. In this manner the rolls are fed in proper alinement to the grinding machine and interference therewith by duplicate parts exterior of the path of alinement and resultant defective operation are effectively avoided.

It is to be noted that the adjustment of the transverse inclination of the transferring trough provides also for accommodating the latter to various sizes of rolls or the like without impairing the effectiveness of the removing operation thereof. The transverse slope is preferably so adjusted for each different magnitude of parts handled, that the center of gravity of the parts in the secondary or duplicate line falls exterior of the vertical plane passed through the axis of the roll 28. In this manner the surface of the roll 28 exterior of this plane will engage such parts and remove them from the transferring trough by effectively rolling them off due to the movement of this surface. The rolls maintained in proper feeding alinement, as clearly shown in Figs. 1 and 2, pass from the transferring trough through the trough 51 on to the carrier 14, and between the grinding and regulating wheels. Upon passing between the faces of these wheels and being operated upon thereby, the rolls pass through the trough 18 extending in a downward direction in the clearance space between the operating wheels and into a suitable receptacle.

It will thus be seen that there is provided a feeding mechanism of practical and rugged construction and of highly efficient action and great reliability. It is to be noted also that there is provided an apparatus in which the several objects of this invention are achieved, and that in this invention there is provided a construction in which the several advantages noted, together with many others are effectually gained.

As various possible embodiments might be made of the above invention and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompany drawings is to be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In apparatus of the class described, in combination, means forming a supporting surface adapted to guide bodies in a predetermined path and to rotate said bodies while in said path, and automatic means for removing bodies exterior of and adjacent said path.

2. In apparatus of the class described, in combination, means comprising a pair of movable body-supporting surfaces for guiding a body in a predetermined path, and means for moving said surfaces in a direction transverse to said path, thereby to remove bodies exterior of said path, said surfaces being separated from each other by a distance less than the minimum diameter of said body.

3. In apparatus of the class described, in combination, means forming a supporting surface comprising longitudinal rotating rolls adapted to guide bodies in a predetermined path, automatic means for removing bodies exterior of said path, and means for varying the longitudinal inclination of said supporting surface.

4. In apparatus of the class described, in combination, means forming a supporting surface adapted to guide bodies in a predetermined path, automatic means for removing bodies exterior of said path, and means for varying the transverse inclination of said supporting surface.

5. In apparatus of the class described, in combination, means for guiding a body in a predetermined path, means for moving the surface upon which said body rests in a direction transverse to said path, and means for varying the longitudinal inclination of said path.

6. In apparatus of the class described, in combination, an inclined cylindrical surface, a secondary surface adjacent said cylindrical surface and forming therewith a supporting trough, means for adjusting said surfaces whereby the longitudinal inclination of said supporting trough is varied, and means for moving said cylindrical surface.

7. In apparatus of the class described, in combination, a pair of inclined rolls coacting to form a supporting surface, means for varying the longitudinal inclination of said supporting surface, and means for driving said rolls.

8. In apparatus of the class described, in combination, a pair of inclined rolls coacting to form a supporting surface, means for varying the transverse inclination of said supporting surface, and means for driving said rolls.

9. In apparatus of the class described, in combination, transferring means forming a supporting surface adapted to guide bodies in a predetermined path and to impart rotary movement to said bodies while in said path, a container, means for automatically feeding said transferring means from said container, and automatic means for removing bodies exterior of said path.

10. In apparatus of the class described, in combination, means for transferring bodies in a predetermined path, a container, means

for automatically feeding said transferring means from said container, and a pair of rotary members driven in the same direction and forming part of said transferring means adapted to engage and discard bodies exterior of said path.

11. In apparatus of the class described, in combination, a container, transferring means including rolls movable in the same direction for guiding bodies in a predetermined path, means for moving said rolls in a direction transverse to said path, thereby to remove bodies exterior of said path, and means for feeding said transferring means from said container.

12. In apparatus of the class described, in combination, a container, a pair of members spaced apart and together forming a supporting surface adapted to guide bodies in a predetermined path, and to eject excess bodies from said path, a conveyer for feeding said members from said container, and an adjusting device for varying the transverse inclination of said supporting surface to control the ejection of said excess bodies from said path.

13. In apparatus of the class described, in combination, an inclined cylindrical surface, a secondary surface adjacent said cylindrical surface and forming therewith a supporting trough, means for relatively adjusting said surfaces whereby the transverse inclination of said supporting trough is varied, a container and means for feeding said supporting trough from said container.

14. In apparatus of the class described, in combination, a container, a pair of inclined rolls coacting to form a supporting surface, means for feeding said inclined rolls with rollers arranged end-to-end from said container, means for driving said rolls, and

means for varying the transverse inclination of said supporting surface to control the ejection of excess rollers.

15. In apparatus of the class described, in combination, a pair of members normally projecting at unequal heights and together forming a transversely inclined supporting surface adapted to guide bodies in a predetermined path, said members having also a longitudinal inclination, automatic means for removing bodies exterior of said path, and means for varying both the transverse and longitudinal inclination of said supporting surface.

16. In apparatus of the class described, in combination, a pair of inclined rolls coacting to form a supporting surface for a series of bodies, and means for driving the rolls, the transverse spacing of the rolls being less than the minimum diameter of the bodies.

17. In apparatus of the class described, in combination, a pair of inclined rolls coacting to form a supporting trough, means for varying the transverse inclination of said supporting trough, means for driving said rolls, a container, and means for feeding said supporting trough from said container.

18. In apparatus of the class described, in combination, an inclined surface circular in cross-section, a second surface circular in cross-section and adjacent said first surface and forming therewith a supporting trough, means for adjusting said surfaces whereby the transverse and longitudinal inclination of said supporting trough is varied, a container, and means for feeding said supporting trough from said container.

In testimony whereof, I have signed my name to this specification this 10th day of October, 1917.

LEWIS R. HEIM.