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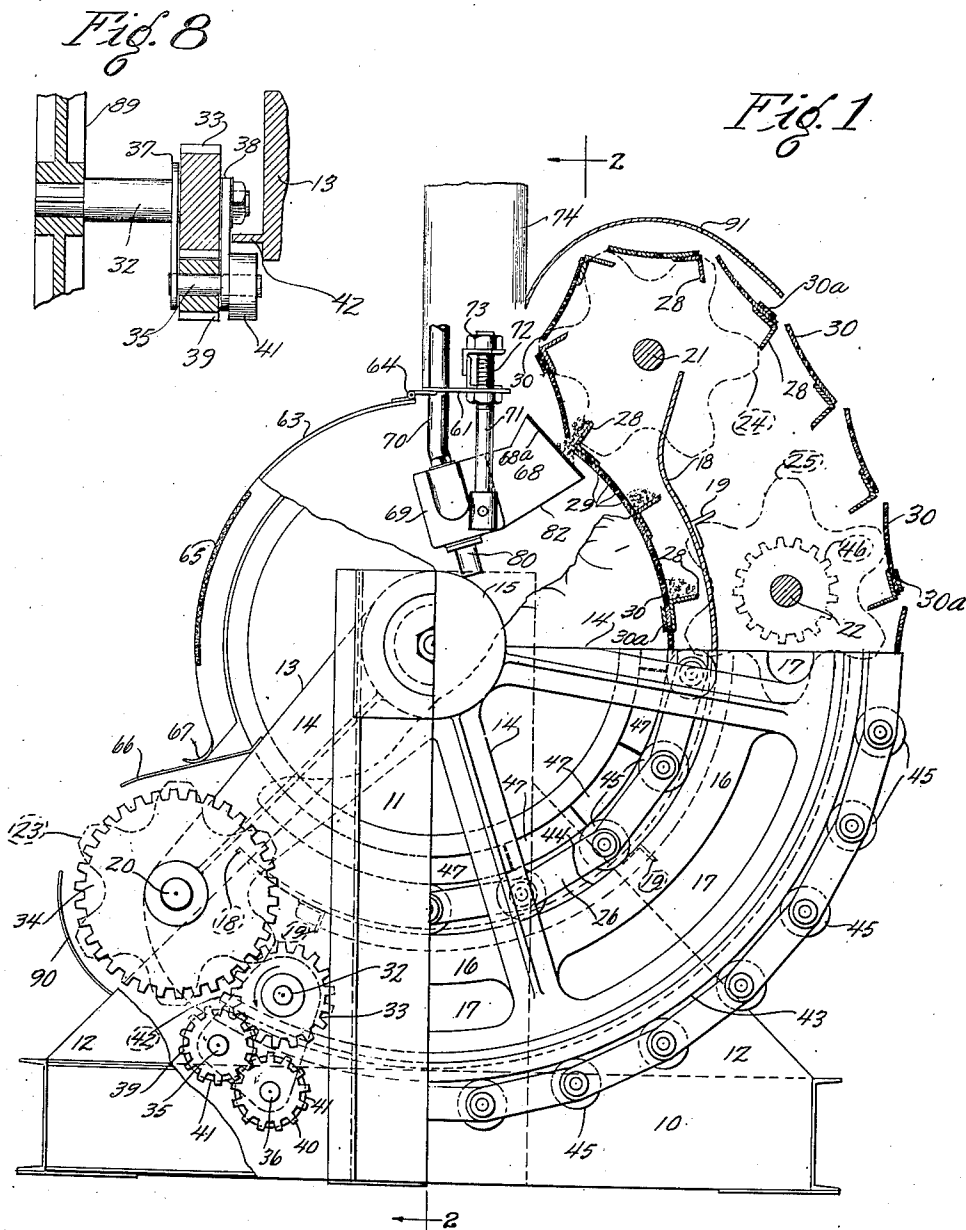
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L. D. PEIK

TUMBLING MILL

Filed March 1, 1922

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3 Sheets-Sheet 2

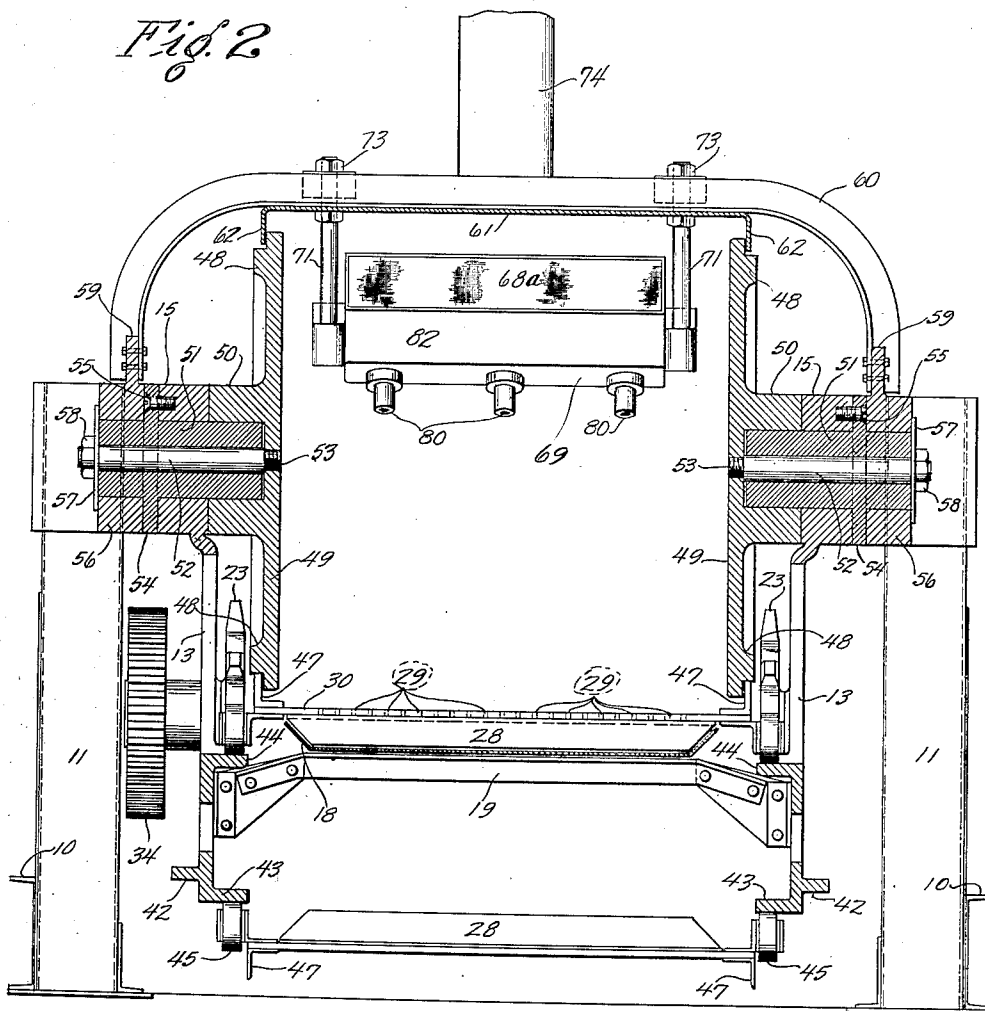
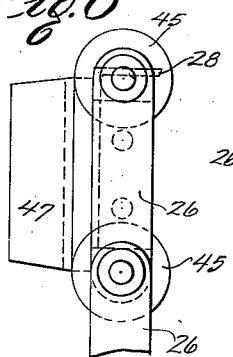
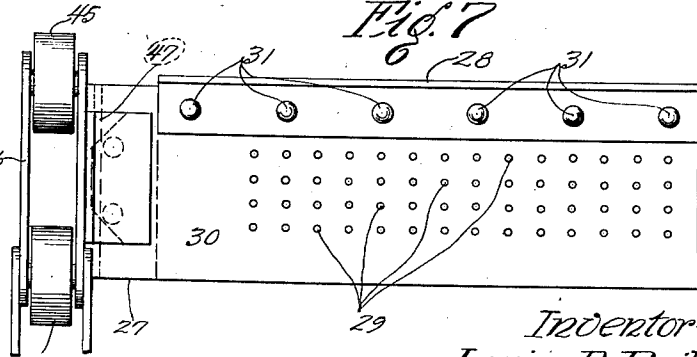


Fig. 6



Witness
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Fig. 7



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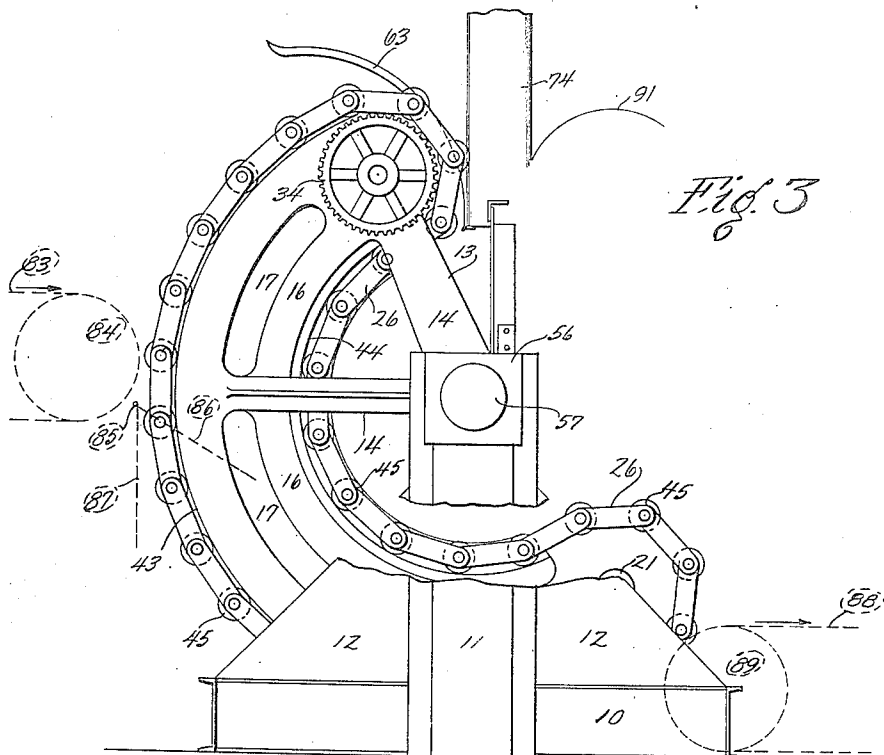
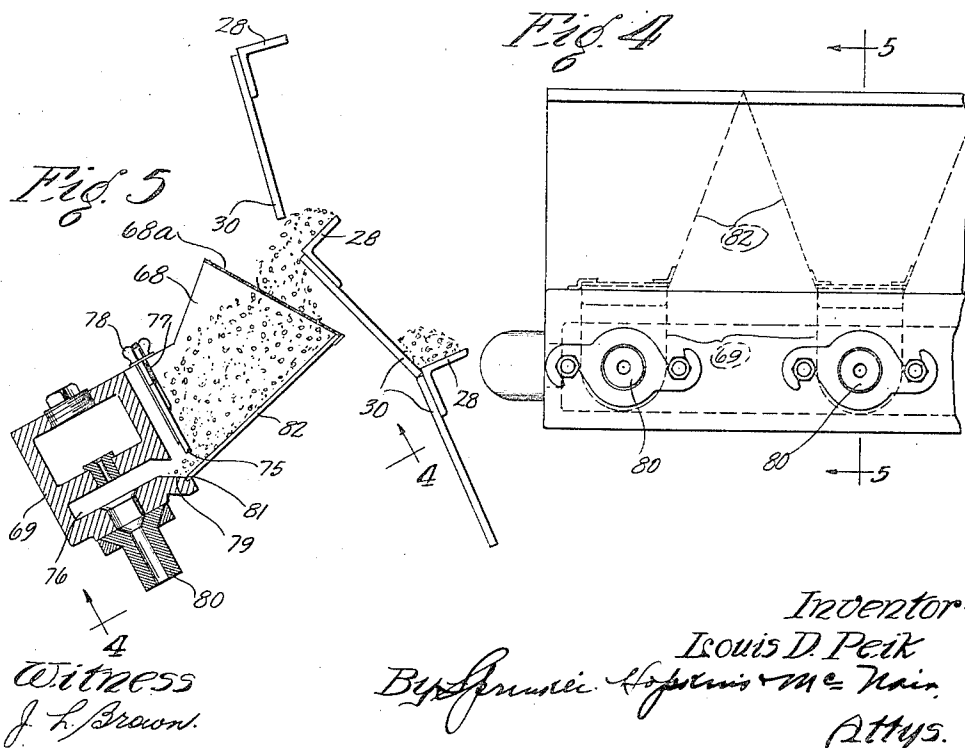
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

LOUIS D. PEIK, OF CLEVELAND, OHIO.

TUMBLING MILL.

Application filed March 1, 1922. Serial No. 540,127.

To all whom it may concern:

Be it known that I, LOUIS D. PEIK, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Tumbling Mills, of which the following is a specification.

In tumbling mills for sand blasting, polishing, grinding, mixing and the like, it is the common practice to employ a rotatable cylinder for tumbling or cataracting the material to be acted upon.

The primary object of my invention is to improve mills of the character stated generally.

One of the objects of the invention is to provide improved tumbling means comprising an endless belt conveyor in lieu of the rotatable cylinder.

A further object of the invention is to provide means in a tumbling mill for supporting and shifting the position of the working surface of a movable endless belt cataracting or tumbling device.

A further object of the invention is to provide a tumbling mill in which the work to be acted upon by the mill may be loaded into the mill and removed therefrom, after having been acted upon by the mill by mechanical means.

A still further object of the invention is to so construct a tumbling mill that the interior working mechanism thereof may be readily and easily exposed to view for inspection, adjusting or repairing.

Other objects of the invention will appear from the following description taken together with the accompanying drawings which form a part of the specification.

Fig. 1 is an end elevation view partly in section of my improved tumbling mill with a portion of the supporting frame head omitted to more clearly show the invention.

Fig. 2 is an elevation view partly in section taken approximately on line 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a similar view to Fig. 1 showing the mill in position for discharging the work therefrom.

Fig. 4 is a bottom plan view showing two of the sand blast nozzles with the sand hop-

per in dotted lines and a portion of the compressed air pipe taken on line 4—4 of Fig. 5.

Fig. 5 is a vertical sectional view taken on line 5—5 of Fig. 4 looking in the direction of the arrows showing the gate for regulating the flow of sand from the sand hopper, the interior construction of one of the air guns, and a fragment of the conveyor discharging sand into the hopper.

Fig. 6 is an end elevation detail view of one of the conveyor sections together with a portion of one of the sprocket chains carrying same.

Fig. 7 is an enlarged detail plan view showing one of the conveyor sections as attached to one of the links of the sprocket chain with a portion of the sand box broken away.

Fig. 8 is a detail sectional view of the mechanism for rotating the conveyor frame, a fragment of the conveyor frame and the belt pulley with portions broken away being shown.

In view of the fact that the vibration of tumbling mills when in operation is very violent and the mills are usually placed in foundries having dirt floors which afford no means of tying the mill thereto, I prefer to construct the support for the mill of channel iron of such weight and make the base of such dimensions as will insure suitable rigidity and immobility. My improved mill is substantially cylindrical in contour and has a portion of its cylindrical wall formed of an endless belt conveyor comprising a looplike structure describing the arc of a circle and being adapted to travel around the extremities thereof.

Referring now to the drawings for a more particular description of the invention, reference character 10 indicates the base of my improved mill having standards 11 for the support of the mill heads and the oscillatable endless belt conveyor frame. Standards 11 are provided with suitable braces 12. The oscillatable conveyor frame is provided with heads designated by reference character 13 generally, these heads being duplicates, and one at each end of the frame. I prefer to form the heads 13 with spokelike members 14 radiating from hub 15 which are connected by webs 16. The upper spokelike member 14 of the heads 13 with its ad-

joining web 16 is broken away in Fig. 1 of the drawings in order to more clearly show portions of the mechanism covered by the head 13. Webs 16 have cutout portions 17 for the purpose of lightening the conveyor frame. Heads 13 are rigidly secured together by sand pan 18, which is secured at its respective ends to the heads 13 and by angle iron brackets 19. Shafts 20, 21 and 22 are journaled at their respective ends in the opposite conveyor frame heads 13 and have secured thereto sprockets 23, 24 and 25, which operably engage sprocket chain 26, it being understood that each of the respective shafts is provided with duplicate sprocket wheels, one at each end of the shaft for engaging a sprocket chain, there being a sprocket chain 26 provided for the sprocket wheels on each side of the conveyor frame. I form my conveyor apron by securing the ends of the conveyor sections 27 to the links of the sprocket chains 26 by suitable brackets, as clearly shown in Figs. 6 and 7. Scraper blades 28, for scraping onto the conveyor sections from the sand pan 18 sand which has filtered through the work and the perforations 29 in the bottoms 30 of the sections 27, are provided at the rear edges of the bottoms 30 of the sections. Sand thus collected by the sections will find lodgement in the angle formed by the scraper blades and the lower sides of the section bottoms and will be carried upwardly to a point immediately above the inclined wall 82 of sand hopper 68, where by reason of the links of the sprocket chain 26 being pivoted at a point intermediate the top and bottom thereof, the end of the bottom 30 adjacent the scraper blade 28 of the next succeeding section will be caused to move outwardly and away from the scraper blade in accommodating itself to its line of travel around the sprocket wheel 24, thus discharging sand from the section into the sand hopper, where it will again be drawn into the air guns for reuse by the air current (see Fig. 1).

Scraper blades 28 may be formed of angle iron secured to the bottoms 30 of sections 27 by rivets as at 31, or in any other suitable manner. Bottoms 30 have cleats 30^a secured to their undersides for effectually imparting a plunging or cataracting movement to material placed within the mill. Shaft 32 journaled in a suitable support, not shown, carried by base 10, has secured thereto main driving gear 33 meshing with gear 34 affixed to shaft 20 for imparting rotation to sprockets 23 for driving sprocket chains 26. Shafts 35 and 36 suitably journaled in triangular links 37, 38 in a well known manner have gears 39, 40 secured thereto at their outer ends, gear 39, meshing with main driving gear 33, being an intermediate gear for imparting rotation to gear 40. Each of the shafts 35, 36 have secured to their inner end

a roller 41 adapted to be moved into frictional engagement with tracks 42 on the conveyor frame heads 13 for imparting movement to the conveyor frame. The conveyor frame heads each have tracks 43, 44 on the inner faces thereof over which rollers 45 of the sprocket chain 26 are adapted to travel when the conveyor is set in motion by driving sprockets 23. By this construction the conveyor is maintained in a looplike formation substantially describing in outline the arc of a circle, the conveyor travelling around the sprocket wheels at the extremities thereof. Triangular links 37, 38 are provided with suitable operating means, not shown, for throwing either the roller 41 carried by shaft 35 or the roller 41 carried by shaft 36 into frictional engagement with track 42 to impart movement to the conveyor frame 13 about its axis. Rollers 41 being rotated in opposite directions of rotation, the direction of movement imparted to the conveyor frame will depend upon which of the rollers 41 is thrown into frictional engagement with track 42 of conveyor frame heads 13.

Assuming that the conveyor frame 13 is in the position shown in Fig. 1 and main driving gear 33 is rotated in the direction indicated by the arrow, the conveyor frame will be moved to the left in a pendulum-like movement until it assumes the position shown in Fig. 3 by moving roller 41 carried by shaft 36 into engagement with the track 42 and will be operated in the opposite direction or into the position shown in Fig. 1, if roller 41 carried by shaft 35 be then moved into engagement with track 42. As shown in Fig. 1 the rollers 41 are in inoperative or neutral position. Shaft 22 has secured thereto gear 46 lying in the same vertical plane with the main driving gear 33 with which it is adapted to mesh and impart movement to the conveyor through sprockets 25 when the conveyor frame is rotated into the position shown in Fig. 3. Conveyor sections 27 have upstanding projections 47 frictionally engaging annular flanges 48 carried by the mill heads or side walls 49 for imparting rotating movement to the mill heads when the conveyor is operated. Mill heads 49 have centrally bored hubs 50. Stub shafts 51 have flanges 54 preferably made integrally therewith and may be secured to the mill heads 49 at their inner ends by bolts 52 as at 53. Hubs 15 of conveyor frame heads 13 and hubs 50 of mill head 49 are journaled on stub shafts 51. Flanges 54 of stub shafts 51 are interposed between hubs 15 and the stub shaft bearings 56 and are secured to hubs 15 of conveyor frame heads 13 by screws 55. Clamping washers 57, having a bearing surface on the outer faces of bearings 56, are placed intermediate nuts 58, having screw threaded engagement with the

outer extremities of bolts 52, and the bearings 56 in order to retain bearings 56 and hubs 15 and 50 in proper alignment and relation. Bearings 56 have upstanding ears or lugs 59 to which are secured by bolts or other suitable means the ends of supporting yoke 60. Yoke 60 has secured to the underside thereof plate 61 having flanges 62 extending downwardly over the edges of heads 49 to trap the dust in the top of the mill and beneath dust flue 74. Dust hood 63 pivotally related to plate 61 as at 64 has copper gauze screen 65 therein through which the interior of the mill may be viewed, while the mill is in operation. Obviously a rubber curtain may be placed in the hood for using a hand hose for sand blast cleaning, if desired. Conveyor frame heads 13 have outwardly extending brackets 66 adapted to engage the upwardly curved bottom portion 67 of hood 63 and move the hood upwardly into the position shown in Fig. 3 when the conveyor frame is moved into the position shown therein, and to support the hood in its downward movement when the conveyor frame is returned to the position shown in Fig. 1. It will be readily seen by reference to Fig. 3 that the entire interior of the mill can be clearly viewed from the right hand side thereof when the conveyor frame is moved into the position shown in Fig. 3.

Sand hoppers 68 and air guns 69 together with the compressed air pipe 70 are adjustably supported by rods 71 provided with screw threaded portions 72 at their outer extremities and adapted to be engaged by adjusting nuts 73. Dust flue 74 may be provided with a rotary fan or other suitable means for removing dust from the mill. Sand hoppers 68 are provided with screens 68^a and have adjustable gates 75 to control the flow of sand from the hoppers into the throats 76 of air guns 69. Gates 75 may be moved upwardly or downwardly, to vary the flow of sand from the sand hoppers into throats 76 of the air guns 69, by the screw threaded rod 77 provided with butterfly nuts 78. Throats 76 of air guns 69 have downwardly extending portions 79 adjacent gates 75 to prevent the sand from feeding into the air guns 69 by gravity. Air guns 69 are supplied with compressed air by pipe 70 leading from any suitable source of compressed air. The current of compressed air passing through nozzle 80 forms a vacuum in throats 76 of air guns 69, thereby creating a suction on the sand fed by gravity into the angle 81 formed by the inclined wall 82 of sand hoppers 68 and the downwardly extending portions 79 of throats 76 entraining the sand with the air current. At one side of the mill and adjacent hood 63, as diagrammatically shown in Fig. 3, I place an endless conveyor 83, which travels over drum 84 for loading material to be acted

upon by the mill thereinto, a portion of the conveyor only being indicated. The conveyor 83 is provided with a pivoted skid as at 85 which may be moved into the position shown in dotted lines 86, for loading the mill or may be dropped into the vertical position shown by dotted line 87, when not in use for loading purposes. At the opposite side of the mill is diagrammatically shown a portion of an endless conveyor 88 which travels over drum 89 for receiving the material fed from the mill by the conveyor after being acted upon and the conveyor frame rotated into the position shown in Fig. 3. When the conveyor frame is rotated into the position shown in Fig. 3, gear 46 will be in mesh with the main driving gear 33, thereby rotating the sprocket wheel 25, which will impart movement to the conveyor and discharge the material acted upon by the mill therefrom and on to conveyor 88, when it may be conveyed to any desired point. Power may be transmitted to main driving shaft 32 in any suitable manner. In the drawings, Fig. 8, I have indicated a pulley 89 for receiving a power belt from any suitable source of power. Sprocket wheels 23 and 24 are provided with suitable safety guards 90, 91.

The scope of utility of the improved tumbling mill herein described and disclosed is not limited to the operation of sand blasting, polishing and grinding, but the device is particularly adapted to the mixing of various kinds of material such as sand, gravel and cement with water for making concrete, for example, or it may be used for crushing ores and the like.

I claim:

1. A tumbling mill comprising a base, supporting side walls, said base having an endless belt conveyor mounted thereon to form a partial peripheral wall and with said side walls form a chamber, said conveyor being bodily movable with respect to said base for discharging the contents thereof.

2. A tumbling mill comprising a base, supporting side walls, said base having an endless conveyor belt pivotally mounted thereon and adapted to describe an arc of a circle in its line of travel to form a partial peripheral wall and with said side walls form a chamber, and means for bodily moving said conveyor belt with respect to said base and in the arc of a circle and means for imparting travelling movement to said conveyor.

3. A tumbling mill comprising a base, supporting side walls, said base having a movable supporting frame thereon, a conveyor supported by the frame to form a partial peripheral wall and with said side walls form a chamber, and means for moving said frame with respect to said base for discharging the contents of said mill.

4. A tumbling mill comprising a base, supporting side walls, said base having a movable supporting frame mounted thereon, an endless conveyor supported by the frame to form a partial peripheral wall and with said side walls to form a chamber, and adapted to have a movement with relation to the frame, means for moving said frame with respect to said base and means for imparting movement to said conveyor.

5. A tumbling mill comprising a base, supporting side walls, said base having a supporting frame oscillatably mounted thereon, an endless conveyor carried by the frame to form a partial peripheral wall and with said side walls form a chamber, means for imparting movement to the conveyor, and means for imparting movement to the frame for moving the same with respect to said base.

6. A tumbling mill comprising side walls and having an arcuate supporting frame therein, a looped conveyor adapted to travel around the ends of said arcuate frame to form a partial peripheral wall and with said side walls form a chamber, means for imparting movement to the conveyor, and means for bodily moving said arcuate frame and said conveyor.

7. A tumbling mill comprising a base, supporting side walls, said base having a supporting frame oscillatably mounted thereon, an endless conveyor supported by the frame to form a partial peripheral wall and with said side walls form a chamber, and frictional means for oscillating the frame on said base.

8. A tumbling mill comprising a base and having rotatable heads mounted thereon, a frame pivoted to said base and operably related to said heads, an endless conveyor belt carried by said frame forming a partial peripheral wall to a chamber formed by said heads and conveyor, means for imparting movement to the conveyor and means carried by the conveyor for imparting rotary movement to the heads.

9. A tumbling mill having rotatable heads, a frame pivoted to said mill and oscillatable by said heads, an endless conveyor carried by the frame forming a partial peripheral wall to a chamber formed by said heads and conveyor, means for imparting movement to the conveyor and frictional means carried by the conveyor for imparting rotary movement to the heads.

10. A tumbling mill having a supporting base, a supporting frame within the mill, a flexible endless conveyor carried by the supporting frame, said frame being oscillatable in the plane of travel of the conveyor, means carried by the base for imparting movement to the supporting frame in opposite directions.

11. A tumbling mill having a tumbling endless conveyor therein, sand blast guns supported within the mill, means formed as a part of said conveyor for feeding sand to the guns, and means for adjustably spacing the guns with relation to the conveyor.

12. A tumbling mill having a tumbling device therein, sand blast guns supported within the mill, means for supplying sand to the guns by said tumbling device, means for controlling the flow of sand from the sand supply means to the guns and means for adjustably spacing the guns with respect to said tumbling devices.

13. A sand blast mill having a frame, tumbling devices arranged to define a receiving and discharging gap, mounted on said frame, said frame being oscillatable to change the position of said gap, a hood pivotally related to said mill for completely enclosing said mill, and means whereby said hood may be oscillated about its pivot by the movement of said frame.

14. A sand blast mill having an oscillatable frame, having a vertical receiving and discharging gap whose position is altered by the oscillation, a hood pivotally related to the mill to completely encase said mill and said hood being adapted to be moved upwardly on its pivot by engagement with one end of said frame by the movement of the frame in one direction, and said hood being supported and gradually lowered by the frame during its return movement in the opposite direction.

15. A tumbling mill comprising substantially a cylindrical compartment having a portion only of the peripheral wall thereof consisting of a tumbling device.

16. A tumbling mill comprising substantially a cylindrical compartment having a portion only of the peripheral wall thereof consisting of an endless conveyor.

17. A tumbling mill comprising a base, a frame supported by the base, tumbling devices carried by said frame and arranged to define a receiving and discharging gap, said frame being oscillatable to change the position of said gap, rollers journaled in a triangular link supported by the base and adapted to be rotated in opposite directions, means for engaging the frame with either of said rollers at will for oscillating said frame, and means for imparting rotation to the rollers.

18. A tumbling mill having rotatable end heads, a movable conveyor pivoted to said mill and oscillatable concentrically with said heads, flanges carried by the heads and adapted to frictionally engage the conveyor, means for imparting a travelling movement to the conveyor and means for oscillating said conveyor about said heads.

19. The combination in a tumbling mill

of an endless conveyor belt, a frame pivotally mounted on said mill for supporting said conveyor, said endless belt conveyor arranged in substantially an arc of a circle to
5 form a receiving and discharging gap in various positions of adjustment, and means for imparting a travelling movement to said endless conveyor belt and for actuating the same to receiving or discharging positions.
10 20. A tumbling mill comprising a base, a tumbling mechanism mounted on said base comprising a frame pivoted to said base having a portion in the form of an arc of a circle, and an endless conveyor belt mounted
15 on the arcuated portion of said frame, and means whereby said frame may be tilted on said base for positioning the same for re-

ceiving material therein or discharging the contents therefrom.

21. A tumbling mill comprising a base, a 20 tumbling mechanism mounted on said base comprising a frame pivoted to said base having a portion in the form of an arc of a circle, and an endless conveyor having a gap therein mounted on the arcuated portion of 25 said frame, whereby said frame may be tilted on said base for positioning the conveyor for receiving material therein or discharging the contents therefrom.

In testimony whereof I have signed my 30 name to this specification on this 21st day of February, A. D. 1922.

LOUIS D. PEIK.