D. N. CARLIN.

UNLOADING DEVICE FOR GRINDING AND MIXING MACHINES.

APPLICATION FILED APR. 11, 1913.

1,127,587.

Patented Feb. 9, 1915.

3 SHEETS—SHEET 1.

FIG. 1

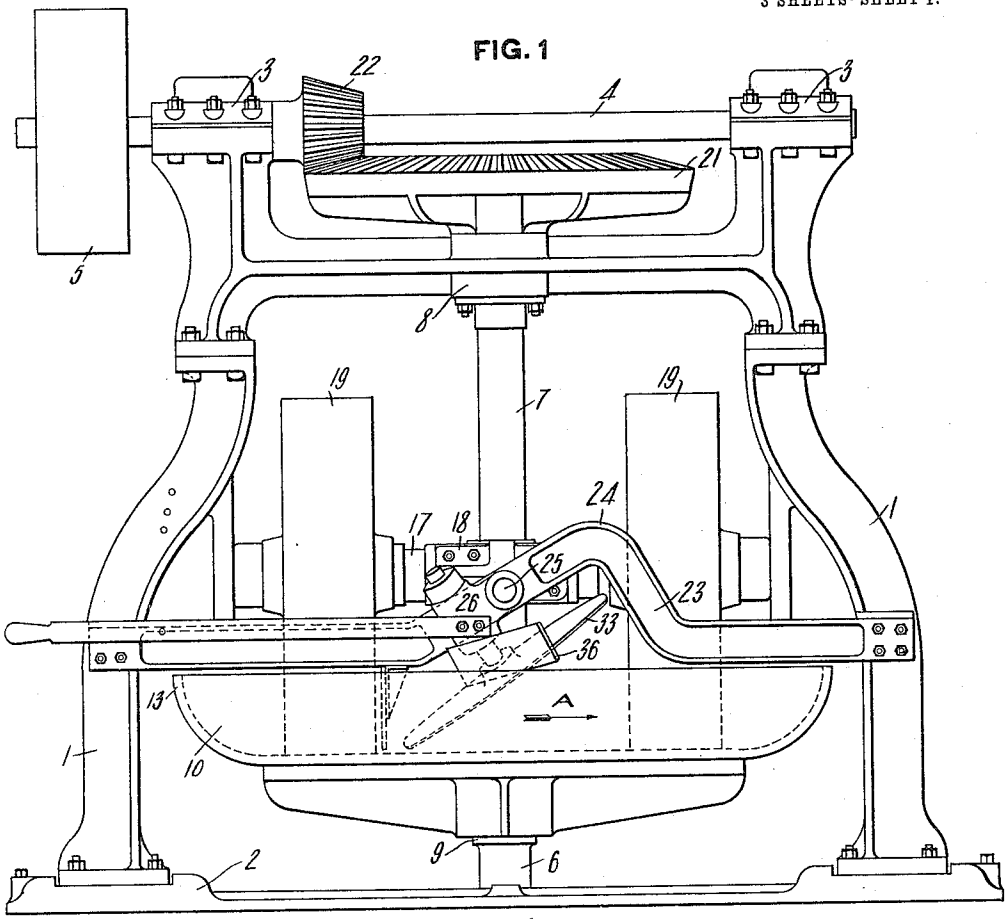
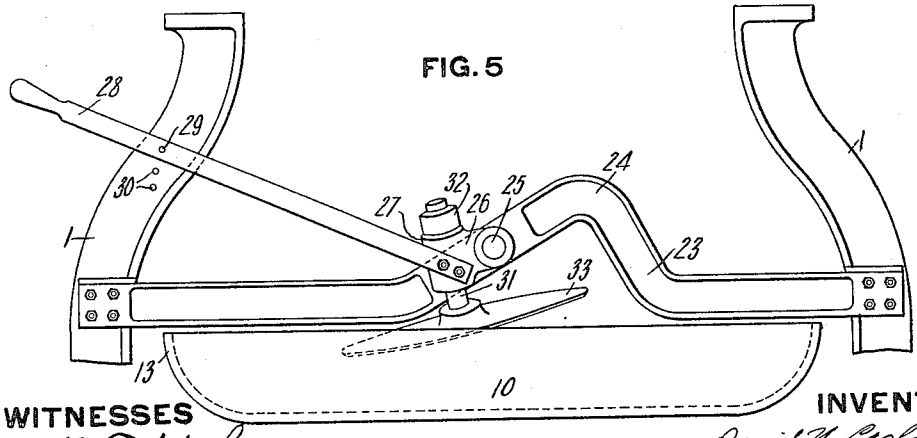


FIG. 5



WITNESSES

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3 SHEETS—SHEET 2.

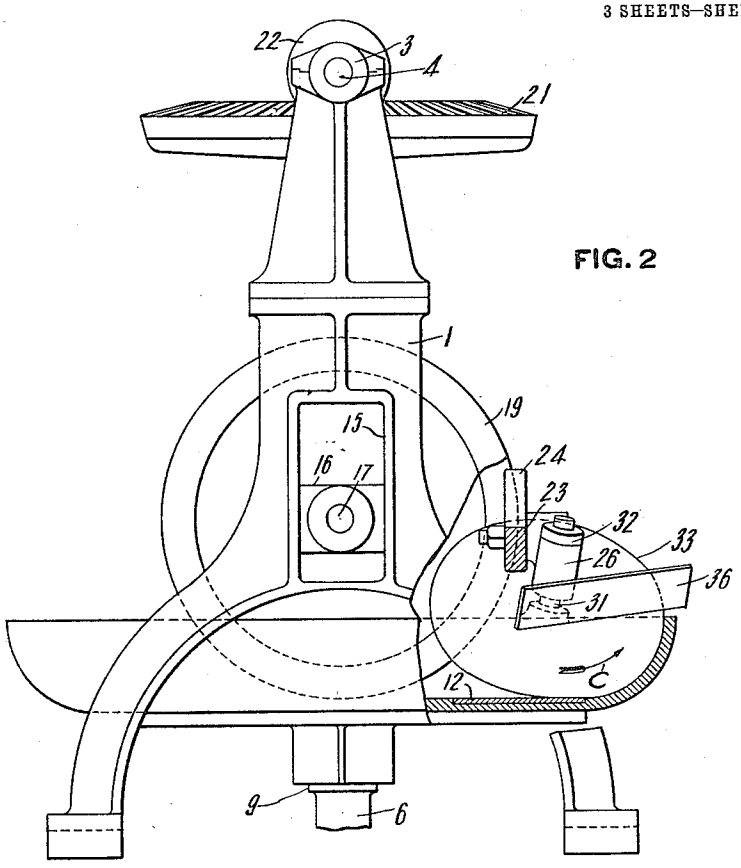
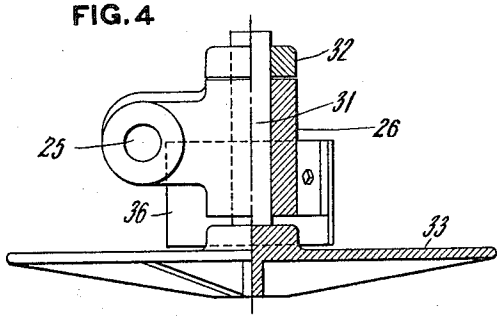


FIG. 2

FIG. 4



WITNESSES

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3 SHEETS—SHEET 3.

FIG. 3

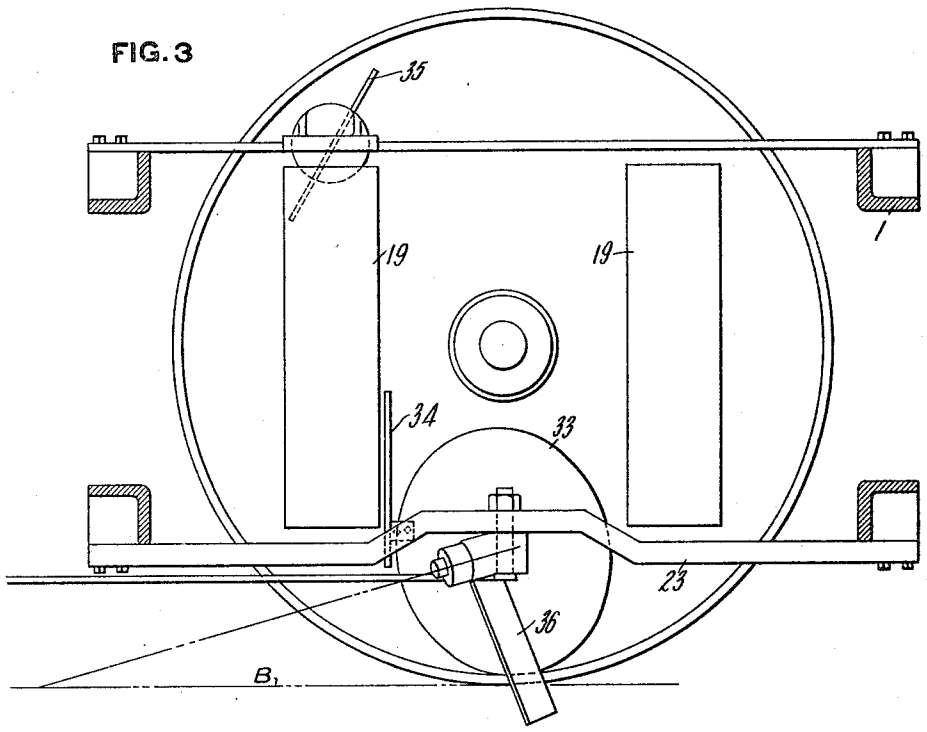
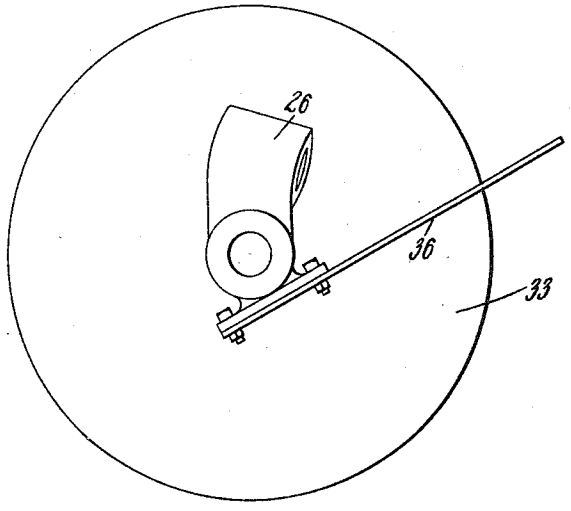


FIG. 6



WITNESSES

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UNITED STATES PATENT OFFICE.

DAVID N. CARLIN, OF PITTSBURGH, PENNSYLVANIA.

UNLOADING DEVICE FOR GRINDING AND MIXING MACHINES.

1,127,587. Specification of Letters Patent. Patented Feb. 9, 1915.

Application filed April 11, 1913. Serial No. 760,542.

To all whom it may concern:

Be it known that I, DAVID N. CARLIN, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Unloading Devices for Grinding and Mixing Machines, of which the following is a specification.

This invention relates to grinding or mixing mills or pans, such as are used for grinding ores or working up clay, or for mixing and crushing molders' sand and like materials.

The invention has reference particularly to the means for unloading or discharging the ground or mixed material from the pan.

In grinding and mixing ores or clay, or in mixing molders' sand and like materials with a liquid or plastic binder, it has been the practice to employ a mill embodying a shallow pan mounted to rotate upon a vertical axis and which holds the material. Supported over said pan, on a horizontal axis, are one or more rollers, which are held down by gravity or a spring and roll over and mix or grind the materials. After the materials are sufficiently worked it is necessary either to shovel them out or to provide special mechanism, or a special arrangement of pan, which will assist in the unloading operation. In some cases manually movable scoops have been mounted above the pan so that they can be thrust down into contact with its bottom surface to scoop up the material and elevate it over the edge or rim of the pan. Such scoops, however, are objectionable because the material does not readily slide on the scoop and must be helped along by hand. It has also been proposed to arrange the pan with a rotatable bottom and a fixed or non-rotatable rim, one portion of the rim being hinged so that it can be swung into the pan to form a deflector or plow to scrape up and deflect the material through the opening in the rim. This construction is objectionable because there is a running joint between the rotatable bottom and fixed rim of the pan and other joints around the movable gate which permit the material to leak out, especially if any liquid is present.

My invention has for its object to provide an improved mill wherein the pan embodies a single member with both the bottom and rim rotating together, so that there are no running joints through which the sand or other material can work its way to the outside, and where conveyer mechanism is provided for collecting or scooping up the worked material in the pan and lifting or elevating the same and then deflecting it over the rim or outer wall of the pan.

A further object of the invention is to provide, in a mill or pan of the character described, conveyer mechanism, preferably of the disk type, which is driven or operated by the rotating movement of the pan itself, and which positively lifts and carries the material up over the rim of the pan, whereby manual assistance is avoided.

In the drawings, which represent one embodiment of the invention, Figure 1 represents a front elevation; Fig. 2 is an end elevation, partly in section; Fig. 3 is a plan view; Fig. 4 is an enlarged detail view, partly in section, of the disk conveyer and its bearing support; Fig. 5 is a detail view showing the conveyer raised out of contact with the pan bottom; and Fig. 6 is a plan view of the conveyer disk and its bearing, the operating handle being omitted.

The machine in the drawings comprises a suitable frame 1 having supporting legs resting upon or secured to a floor or base 2, of concrete or the like. Frame 1 consists of two end members, which are provided at their upper ends with alined journal bearings 3 for a horizontal shaft 4, provided with suitable driving means, such as the pulley 5. Beneath the frame is a thrust bearing 6 for a central vertical shaft 7, which is rotatable in a bearing 8 at the upper end of the frame and is provided at its lower end with a collar 9 to support the pan 10. Pan 10 is rigidly secured to the shaft 7 and is preferably formed of cast or wrought metal. It may also be provided with a seat to hold an annular wear plate 12 of hardened metal. Said pan or vessel is provided with an outer wall or rim 13, which is arched or curved outwardly and upwardly, so that the pan is in the form of a dish with its outer wall having a curved inner surface. The end frame members are provided with vertical guideways 15 for the movable blocks 16 which support the ends of shafts 17, which are connected at their inner ends by a member 18, which embraces shaft 7. Mounted to rotate loosely upon the shafts 17 are one or more rollers 19, which are held down against the bottom of the pan and the material therein, either

by gravity, or by springs. Shaft 7, at its upper end, is provided with a large bevel gear or pinion 21, which meshes with and is driven by a smaller bevel pinion 22 on the driving shaft 4.

Extending across the front of the machine and rigidly secured to the end frame members is a rail 23 bent upwardly intermediate its ends, as at 24, to provide clearance, as hereinafter described. Pivotally mounted upon said rail, as at 25, is a bracket 26 having a journal or bearing 27. Said bracket may be tilted about its pivot by means of a hand lever 28 rigidly secured thereto and adapted to be fixed in different vertical positions, as by a pin 29 which may be passed through said lever into any one of a number of apertures 30 on the frame. Mounted to rotate in bearing 27 is a shaft 31, having a collar 32 on its upper end and at its lower end carrying a disk 33 whose plane is normal to the axis of the shaft. Shaft 31 may be raised and lowered bodily by the lever 28, to shift the disk relative to the pan. The axis of shaft 31 is askew or inclined in three directions. First, as shown in Fig. 1, it is inclined downwardly in the direction of rotation of the pan 10, which is indicated by the arrow A in Fig. 1. Second, it is inclined downwardly toward the center of the machine or toward the axis of shaft 7, that is, downwardly and to the left in Fig. 2. Third, it is inclined inwardly, in the direction of rotation of the pan 10, toward the axis of rotation of said pan, or, in other words, with respect to a tangent to the edge of said pan drawn substantially opposite the lower end of said shaft, such as the tangent line B, Fig. 3.

The inner surface of pan 10 is shaped to correspond with the projected curvature of the disk 33, when the latter is in its lower position, indicated in Fig. 2. This curvature depends upon the size of the disk and the exact angles of inclination of shaft 31. The position of said shaft and the curvature of the pan are determined by experiment, and depend upon various factors, such as the weight and consistency of the material being worked, etc.

Just in front of the disk conveyer 31, that is, preceding it along the direction of rotation of the pan, is a guide or deflector 34, consisting of a plate supported rigidly on rail 23 with its straight bottom edge in fairly close contact with the pan bottom. Said plate is inclined so as to direct the material traveling with the bottom of the pan upon the outer half of the disk conveyer 33 or, in other words, into the space between the axis of shaft 31 and the rim or wall of the pan. Other deflectors, such as the deflector 35, may be suitably supported over the pan to direct the material being worked beneath the rollers 19. Bracket 26 also has rigidly secured thereto so as to be bodily movable with disk 33, a deflector 36 which is arranged with its lower edge in contact with the upper surface of the disk and extends upwardly and outwardly beyond the edge of the pan.

In operation, the sand or other material to be mixed or crushed is placed in the pan, and any water, molasses, or other liquid to be incorporated therein is thrown in with or upon the material. The driving mechanism is then started and the pan 10 rotates in the direction of the arrow A, Fig. 1. The disk conveyer 33 is raised out of the pan and out of contact with the material therein, as shown in Fig. 5. As the pan rotates the material is deflected beneath rollers 19 by members 35 and is thoroughly mixed or crushed, and the liquid, if any, incorporated therewith. When the material has been sufficiently worked, handle 28 is released and the bracket 26, shaft 31, disk 33 and deflector 36 are lowered until the conveyer disk contacts with the bottom and side walls of the pan. Since the shaft 31 is inclined in the three directions referred to, the disk conveyer 33 is frictionally rotated by the contact between its edge and the inner surface of the pan 10, the disk rotating in the direction of the arrow C, Fig. 2, that is to say, the lower portion of the disk moves upwardly and outwardly. The material in the pan is deflected outwardly by member 34 and travels up with the disk conveyer, and is therefore elevated above the edge of the rim of the pan. It then strikes deflector 36 and is guided outwardly and discharged over the edge of the pan upon a table or conveyer or into a tub, car, or the like.

The apparatus described is simple, strong, rigid and very durable. It will unload or discharge the material from a pan in a very short time and requires no special driving mechanism. The pan is in a single piece and the material therefore does not leak to the outside, so that there is a considerable saving in material.

What I claim is:—

1. In a machine of the character described, the combination of a frame, a rotatable pan, a supporting rail lying above said pan and carried by the frame and having an offset portion, and a rotatable disk conveyer pivotally mounted on said rail on an axis transverse to its axis of rotation and having one edge portion thereof lying in the offset portion of said rail.

2. In a machine of the character described, the combination of a frame, a pan rotatable on a vertical axis, a rigid rail supported by said frame and lying above said pan, said rail being offset upwardly intermediate its ends, a bearing member pivot-

ally mounted upon said rail on a horizontal axis, and a disk conveyer loosely rotatable in said bearing member and having its outer edge fitting the inner surface of said pan and extending up beneath the offset portion of said rail.

In testimony whereof, I have hereunto set my hand.

DAVID N. CARLIN.

Witnesses:
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WILLIAM P. LARKIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."