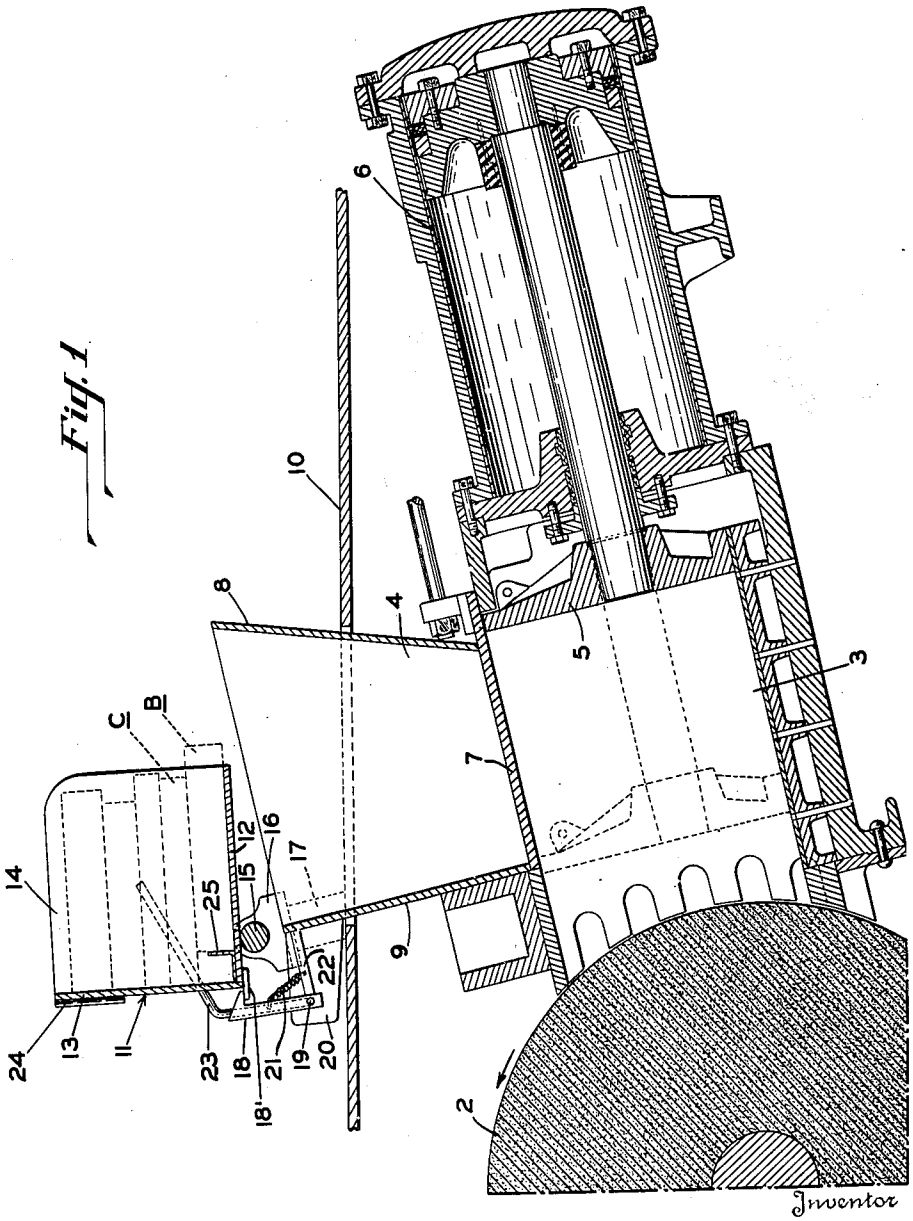
March 11, 1952 E. A. WORM, JR., ET AL 2,588,448

FEEDING DEVICE FOR WOOD GRINDERS

Filed May 2, 1949 2 SHEETS—SHEET 1

Fig. 1




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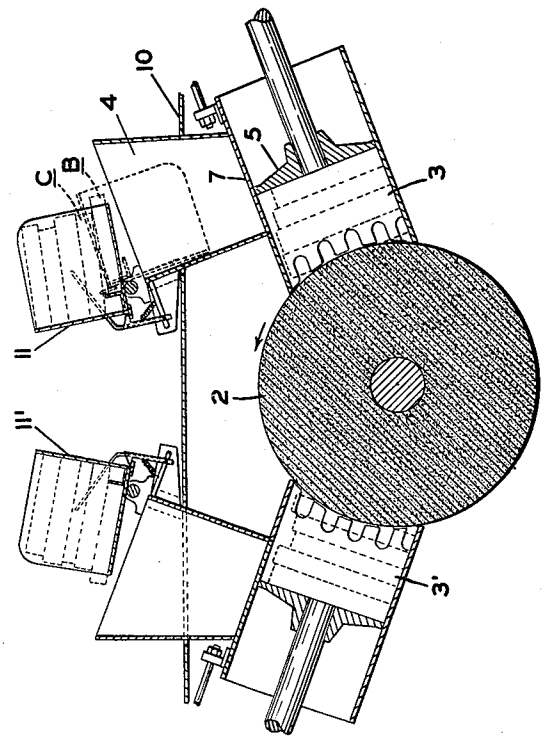



Fig. 2

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## FEEDING DEVICE FOR WOOD GRINDERS

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7 Claims. (Cl. 241—282)

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This invention relates to a feeding device for wood grinders and is concerned particularly with a device adapted to receive a plurality of bolts of wood for simultaneous discharge into the pocket of a wood grinder.

In the grinding of wood in pocket type grinders, common practice is to manually stack the bolts of wood in a hopper disposed above the grinder pocket, the hopper being provided with a retractable bottom or gate. The hopper is normally filled during the grinding operation; and, when the charge of wood in the pocket has been ground, the pressure foot which moves through the pocket to press the wood against the grinding wheel is retracted. The hopper gate is then moved rearwardly, and the bolts of wood fall by gravity into the pocket. The pressure foot is then moved to press the wood in the pocket into engagement with the grinding wheel, and the operation is repeated. Most common practice is to cross grind the wood; and this permits the wood to be disposed in the hopper in a horizontal position so that, when the movable bottom of the hopper is retracted, the wood falls with a rolling action into the pocket and is stacked therein in a substantially horizontal position. Any misalignment of a minor nature which may occur in this operation is overcome when the feeding plunger applies pressure to the stack.

In the manufacture of fiberboard in accordance with the invention of W. L. Scott, which is disclosed in his application for patent, Serial No. 769,295, filed August 18, 1947, and entitled "Process of Making Fiberboard," and assigned to the assignee of the present invention, the bolts of wood are disposed in a substantially vertical plane during grinding. In other words, the general longitudinal axis of the bolts is normal to the axis of the pressure-applying piston. With the customary wood grinding equipment, this has necessitated that the bolts be placed on end in the hopper; and, with wood varying in diameter from 4" to 18", it is difficult to properly stack the wood on end. In addition, as the retractable gate of the hopper is opened, the bolts tend to fall into the pocket irregularly, the smaller pieces frequently falling over and tending to assume a horizontal or inclined position rather than a vertical position. Since the gate is retracted subsequent to the charging of the hopper, the bolts of wood fall progressively as the gate opens. Because the bolts are of different diameters, some are discharged before others. The pieces of smaller diameter, particularly, frequently fall over and tend to assume a more or less horizontal

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position; other bolts fall upon them; and it is impossible to obtain a stack in the pocket in which the bolts are disposed in a substantially vertical plane. The invention is directed particularly to the feeding of wood for this type of grinding, although it is not limited thereto since the device is also useful in the feeding of wood for conventional grinding.

An object of the invention is to provide a feeder which will be effective for discharging a full charge of wood into a grinder pocket substantially as a unit with the bolts of wood disposed in generally the desired position by pressure application and grinding.

Another object of the invention is to provide a feeder in which the wood may be stacked in a generally horizontal position and delivered as a charge into a grinder pocket in a generally vertical stack with the bolts in proper position for longitudinal grinding.

A further object of the invention is to provide a feeder for wood grinder which will increase the output of the grinder by more fully utilizing its grinding capacity.

Additional objects of the invention will become apparent from the following description of a preferred embodiment of the invention.

According to the present invention, the feed hopper is eliminated or converted into a feed chute. A receptacle which includes a bottom wall, a back wall, and two side walls is mounted over the grinder pocket and above the feed chute, if it be provided. This receptacle receives a charge of bolts of wood adequate to supply the grinder pocket. This receptacle is pivoted upon a bar which is journaled in bearings, the bar preferably extending generally parallel to the rear wall of the feed chute, although it may be positioned adjacent either of the sides or adjacent to the front wall of the chute if desired. The receptacle is open at the front, opposite the pivot to permit discharge of the bolts of wood from the receptacle through the feed chute and into the grinder pocket when the receptacle moves about its pivot from a horizontal to a vertical position. A suitable latching arrangement is provided for holding the receptacle in a substantially horizontal position during the stacking of the bolts therein. Upon release of the latch the receptacle will pivot about its horizontal axis and will discharge the wood from the receptacle into the feed chute and therethrough into the grinder pocket. The action is rapid, and the charge of bolts moves as a unit from the receptacle into the pocket with the bolts supporting one another and preventing

them from assuming anything other than a generally vertical position with the bolts properly positioned for longitudinal grinding. Subsequent to charging the pocket, the gate may be closed in order to prevent the escape of water and steam from the grinding area; but, if desired, the gate may be removed or it may be left open.

In order that the invention may be clearly understood, a typical embodiment will be discussed in conjunction with the attached drawings in which:

Figure 1 is a sectional view of a generally diagrammatic nature illustrating the device of the present invention incorporated in a multiple pocket grinder; and

Figure 2 is a diagrammatic sectional view illustrating the invention incorporated into a multiple pocket grinder showing two pockets in operation.

Referring to Figure 1 in which a grinder of the so-called "Great Northern" type is shown, the grinding wheel is indicated at 2, the pocket at 3, the feed chute at 4, the pressure foot at 5, and the hydraulic pressure foot actuating cylinder and piston arrangement at 6. The feed chute 4 is provided with a retractable gate 7. As mentioned above, normal feeding practice is to manually position a charge of bolts of wood in a hopper in the position now occupied by the feed chute 4 with the gate 7 closed. Upon retraction of the pressure foot to the position shown in solid lines, the gate 7 is opened; and the charge is transferred from the hopper into the pocket 3. The pressure is again applied to the foot 5 to move the charge into engagement with the grinding wheel 2 which is rotated in the direction of the arrow. When the charge has been ground, and the pressure foot has moved to the dotted line position of Figure 1, the foot is retracted to permit the reception in the pocket of a new charge of wood to be ground.

Normally the front and back walls of the feed hopper are parallel. With the arrangement of the present invention, however, the feed chute is constructed with a front wall 8 which is preferably inclined with respect to the rear wall 9 for the purpose of directing the charge as a unit into the pocket, as will be more fully hereinafter explained. The grinder is customarily disposed below floor level with the hopper projecting thereabove. In the embodiment illustrated, floor plates 10 have been shown and the feed chute 4 projects therethrough.

Mounted above the feed chute 4 is a receptacle 11 which includes a base member 12, a back member 13, and side members 14, one of which is shown in Figure 1. The opposite side is of the same structure as the one shown. The receptacle 11 is mounted upon a horizontal shaft 15 by welding the base plate 12 to the shaft 15. The shaft 15 is journaled in bearings 16, one of which is shown in Figure 1. These bearings are mounted upon channel supports 17 which may be welded to the hopper 4 or otherwise fixed with respect thereto. It will be observed that the receptacle 11 is mounted on the shaft 15 adjacent the line where the back wall member 13 adjoins the base member 12, with a substantial portion of the weight of the hopper and its load disposed forwardly of the pivot. Thus the receptacle 11 will normally move by gravity to a position with the base member 12 disposed substantially vertically since the center of gravity of the receptacle 11 is substantially forward of the axis of shaft 15. This is true whether the receptacle is loaded or not. The delivery position of the receptacle has been illustrated by dotted lines on the right-hand portion of Figure 2. The solid line portion of the hopper in the drawings is referred to as the wood-receiving position, and the dotted line position of Figure 2 is referred to as the wood-delivering position.

A latch mechanism is provided for holding the receptacle in the wood-receiving position shown in Figure 1 with the base member 12 substantially horizontal. In the embodiment illustrated, this arrangement includes a latch 18 which is affixed to a cross shaft 19 mounted in bearing brackets 20, one of which is shown in Figure 1. The brackets 20 may be welded or otherwise fastened to the rear wall 9 of the feed chute 4. The latch 18 is normally urged into latching position, over a keeper 18' attached to the base of the receptacle, by a spring 21 affixed to a stationary part of the mechanism such as the reinforcing bracket 22 shown in Figure 1. An operating handle 23 may be provided on the cross shaft 19 to effect unlatching. The receptacle 11 is made of metal and is relatively heavy; and in order to facilitate the movement of the receptacle from the wood-delivering position to the wood-receiving position shown in Figure 1, a section of pipe 24 may be welded to the back wall 13 of the receptacle to receive a bar by which the operator may obtain additional leverage to rotate the hopper from wood-delivering to receiving position.

In order to facilitate charging of the pocket and to overcome any tendency for the portions of bolts which remain in the pocket at the completion of each cycle of operation from becoming misaligned, it has been found desirable to have the lowermost layer of bolts in the receptacle project outwardly beyond the remaining bolts. This has been shown in dotted lines in the drawings wherein the bolts B in the bottom row extend beyond the remaining bolts C in the rows superimposed thereon. In the embodiment illustrated, an angle stop 25 is welded onto the base 12 at the rear wall 13 of the receptacle 11 to prevent the lowermost row of bolts from engaging the rear wall 13, causing that row to project generally beyond the remaining bolts. In the embodiment illustrated, where bolts of a minimum diameter of three inches are being operated on, the member 25 may be a 3'' x 3'' angle iron extending across the width of the receptacle. This will cause the lowermost row of bolts B to project an average of three inches beyond the remaining bolts C in the charge.

In the operation of the device, the pressure foot 5 is retracted by actuating the hydraulic cylinder and piston arrangement 6. Simultaneously therewith the gate 7 is retracted, if it is used. The charge of wood which has been stacked in the receptacle 11 is then discharged by the operator's lifting handle 23 which disengages latch 18 from keeper 18'. The receptacle 11 which is secured to the cross shaft 15 rotates about the axis of the shaft; and because this is a gravity operation, rotation is free, and the weight relatively great, the charge of bolts falls generally as a unit through the feed chute 4 into the pocket 3. If the uppermost bolts tend to slide forwardly, they come into engagement with the inclined wall 8 of the feed chute 4 and are caused to fall in alignment with the remaining bolts leaving the receptacle. By having the lowermost row B of bolts disposed outwardly with respect to the remaining bolts, any tendency for partially ground bolts which lie in the fore part of the

pocket to be improperly positioned is overcome by the row of bolts B which will strike any misaligned partially ground bolts as the charge drops into the pocket; and proper positioning of the entire charge will be thus obtained. In addition, any tendency for the uppermost rows of bolts to fall before the lowermost row due to difference in weighing of the different rows will be overcome by the advance position which the lowermost row assumes, for that is the row which carries the greatest weight and would normally be the last row to fall freely from the receptacle into the charging pocket.

Upon charging of the pocket 3 from the receptacle 11, the pressure foot 5 will be moved toward the grinding wheel 2; and pressure will be applied to the charge to bring it into engagement with the wheel 2. The gate 7 may be moved into position as shown in Figure 1 upon completion of the charging; although, as mentioned previously, the gate 7 may be left open or may be eliminated. There is some considerable heat generated during the grinding operation and this creates a large volume of steam. A steam exhaust system is normally provided on wood grinders; but there is, nevertheless, a substantial volume of steam which collects in the pockets and would flow upwardly through the feed chute. For the convenience and comfort of the machine operator, it is preferred to close the gate 7 to prevent the escape of steam up through feed chute 4. If it is desired to inspect the charge during grinding the gate 7 may be opened and such inspection permitted. As the grinding operation proceeds, the machine operator refills the receptacle 11; and, upon completion of the grinding cycle, the receptacle 11 is filled and ready to feed a new charge of wood into the pocket 3 for grinding.

In Figure 2 a two-pocket grinder has been shown with the feeding arrangement of the present invention incorporated therein. In the drawing both the pocket 3 on the right and the corresponding pocket 3' on the left have been shown as fully charged, and both the receptacle 11 on the right and the receptacle 11' on the left are loaded ready for discharge. In order to secure a maximum operating efficiency, preferred practice will be to charge one pocket while the other pocket is grinding, thus avoiding any period during which both pockets will be open to receive charges and the grinding wheel thus inoperative.

While a preferred embodiment of the invention has been illustrated and described, it will be understood that the invention is not limited thereto but may be otherwise embodied and practiced within the scope of the following claims.

We claim:

1. In a wood grinder having a grinding wheel, a pocket for the reception of wood to be ground by the grinding wheel, and pressure means movable within said pocket for urging the wood to be ground into contact with the grinding wheel, the combination with said pocket of: a receptacle mounted above said pocket to receive bolts of wood disposed in a substantially horizontal plane, means for pivoting said receptacle for movement about a substantially horizontal axis to deliver said bolts of wood from said receptacle to said pocket on edge and in a substantially vertical plane with the axes of said bolts of wood disposed substantially at right angles to the axis of the grinding wheel, and means for holding said receptacle in wood-receiving position, said holding means being releasable to permit pivotal movement of said receptacle to wood-delivering position.



2. In a wood grinder having a grinding wheel, a pocket for the reception of wood to be ground by the grinding wheel, and pressure means movable within said pocket for urging the wood to be ground into contact with the grinding wheel, the combination with said pocket of: a movable receptacle mounted above said pocket to receive wood to be fed to said pocket with said receptacle disposed to support said wood in a substantially horizontal plane and movable by gravity from such wood-receiving position to a wood-delivering position to discharge said bolts of wood from said receptacle to said pocket on edge and in a substantially vertical plane with the axes of said bolts of wood disposed substantially at right angles to the axis of the grinding wheel, and means for holding said receptacle in wood-receiving position, said holding means being releasable to permit movement of said receptacle from wood-receiving to wood-delivering position.

3. In a wood grinder having a grinding wheel, a pocket for the reception of wood to be ground by the grinding wheel, and pressure means movable within said pocket for urging the wood to be ground into contact with the grinding wheel, the combination with said pocket of: a receptacle to receive bolts of woods to be fed to said pocket including a base member disposed in a substantially horizontal plane for the reception of bolts of wood thereon when in wood-receiving position, means for pivoting said receptacle for movement through an angle of about 90° to deliver said bolts of wood from said receptacle to said pocket in a substantially vertical plane with the axes of said bolts of wood disposed substantially at right angles to the axis of the grinding wheel, and means for holding said receptacle in wood-receiving position, said holding means being releasable to permit pivotal movement of said receptacle to wood-delivering position.

4. In a wood grinder having a grinding wheel, a pocket for the reception of wood to be ground by the grinding wheel, and pressure means movable within said pocket for urging the wood to be ground into contact with the grinding wheel, the combination with said pocket of: a receptacle to receive bolts of wood to be fed to said pocket, including a base member disposed in a substantially horizontal plane for the reception of wood thereon when in wood-receiving position, side members, and a back member substantially perpendicular to the base member for confining wood disposed in said receptacle; means for pivoting said receptacle for movement from said wood-receiving position to a delivery position in which the base member is substantially vertical, to deliver said bolts of wood from said receptacle to said pocket in a substantially vertical plane with the axes of said bolts of wood disposed substantially at right angles to the axis of the grinding wheel; means for releasably latching said receptacle in wood-receiving position; and an inclined wall disposed above said pocket for directing wood leaving said base member in a plane inclined to the horizontal to deliver the wood into the pocket in a substantially vertical plane.

5. In a wood grinder having a grinding wheel, a pocket for the reception of wood to be ground by the grinding wheel, and pressure means movable within said pocket for urging the wood to be ground into contact with the grinding wheel, the combination with said pocket of: a receptacle to receive tiers of bolts of wood to be fed to said

pocket, said receptacle including a base member, side members, and a rear wall member; means attached to said receptacle for spacing the lowermost tier of wood disposed in said receptacle forwardly of the remaining tiers of wood in said receptacle; means for pivoting said receptacle for movement from a wood-receiving position, with said base member lying in a plane to support the tiers of bolts of wood disposed thereon, to a wood-delivering position with said base member lying in a plane inclined to the horizontal to permit the wood to discharge from the receptacle into said pocket in a substantially vertical plane with the axes of said bolts of wood disposed substantially at right angles to the axis of the grinding wheel; and means for holding said receptacle in wood-receiving position, said holding means being releasable to permit pivotal movement of said receptacle to wood-delivering position.

6. In a wood grinder having a grinding wheel, a pocket for the reception of wood to be ground by the grinding wheel, and a pressure device movable through said pocket for urging the wood to be ground into contact with the grinding wheel, the combination with said pocket of: a receptacle to receive tiers of bolts of wood to be fed to said pocket, said receptacle including a base member, side members, and a rear wall member; means projecting from said base member a distance less than the diameter of the minimum size bolt to be fed for spacing the lowermost tier of bolts of wood disposed in said receptacle forwardly of the remaining tiers of wood in said receptacle; means for pivoting said receptacle for movement from a wood-receiving position, with said base member lying in a plane to support the tiers of bolts of wood disposed thereon, to a wood-delivering position with said base member lying in a plane inclined to the horizontal to permit the wood to discharge from the receptacle to said pocket in a substantially vertical plane with the axes of said bolts of wood disposed substantially at right angles to the axis of the grinding wheel; and means for holding said receptacle in wood-receiving position, said holding means being releasable to permit pivotal movement of said receptacle to wood-delivering position.



7. In a wood grinder having a grinding wheel, a pocket for the reception of wood to be ground by the grinding wheel, and pressure means movable within said pocket for urging the wood to be ground into contact with the grinding wheel, the combination with said pocket of: a receptacle to receive bolts of wood to be fed to said pocket, said receptacle including a base member, two side walls, and a back wall, said receptacle being open at the front and mounted over said pocket for the reception of bolts of wood to be fed to the pocket and which are disposed in tiers, with the axes of the bolts parallel to the side walls; a feed chute disposed above the pocket and below the receptacle, said feed chute having a wall inclined downwardly and inwardly from the open front of the receptacle toward the pocket; and means for pivoting said receptacle adjacent to the rear wall thereof for movement about a substantially horizontal axis parallel to said rear wall to deliver said bolts of wood from said receptacle to said pocket in a substantially vertical plane with the axes of said bolts of wood disposed substantially at right angles to the axis of the grinding wheel, with the inclined surface of the feed chute engaging the ends of the bolts to direct them into the pocket in an aligned position.

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