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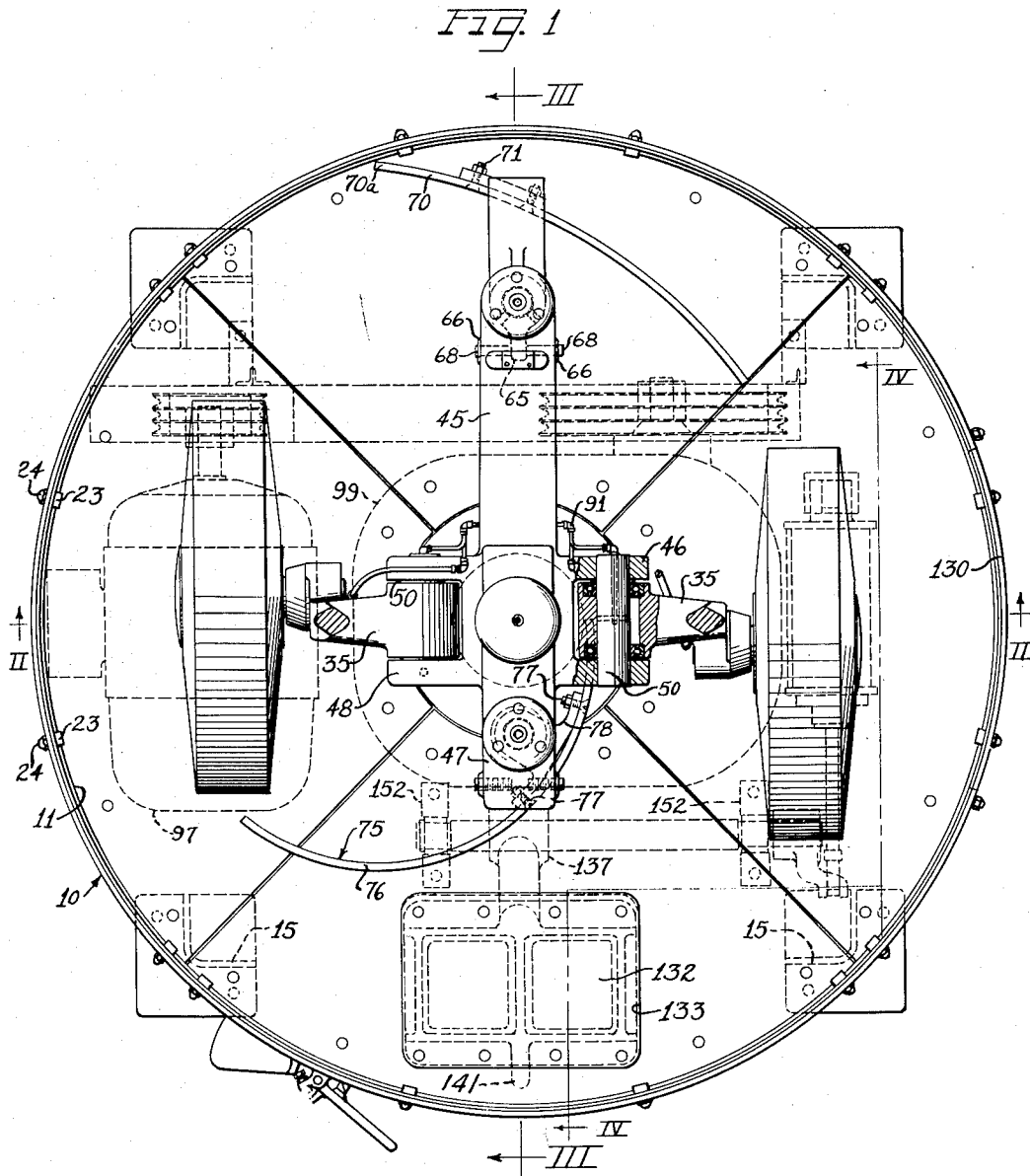
W. HORTH

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MIXER

Filed March 2, 1950

3 Sheets-Sheet 1



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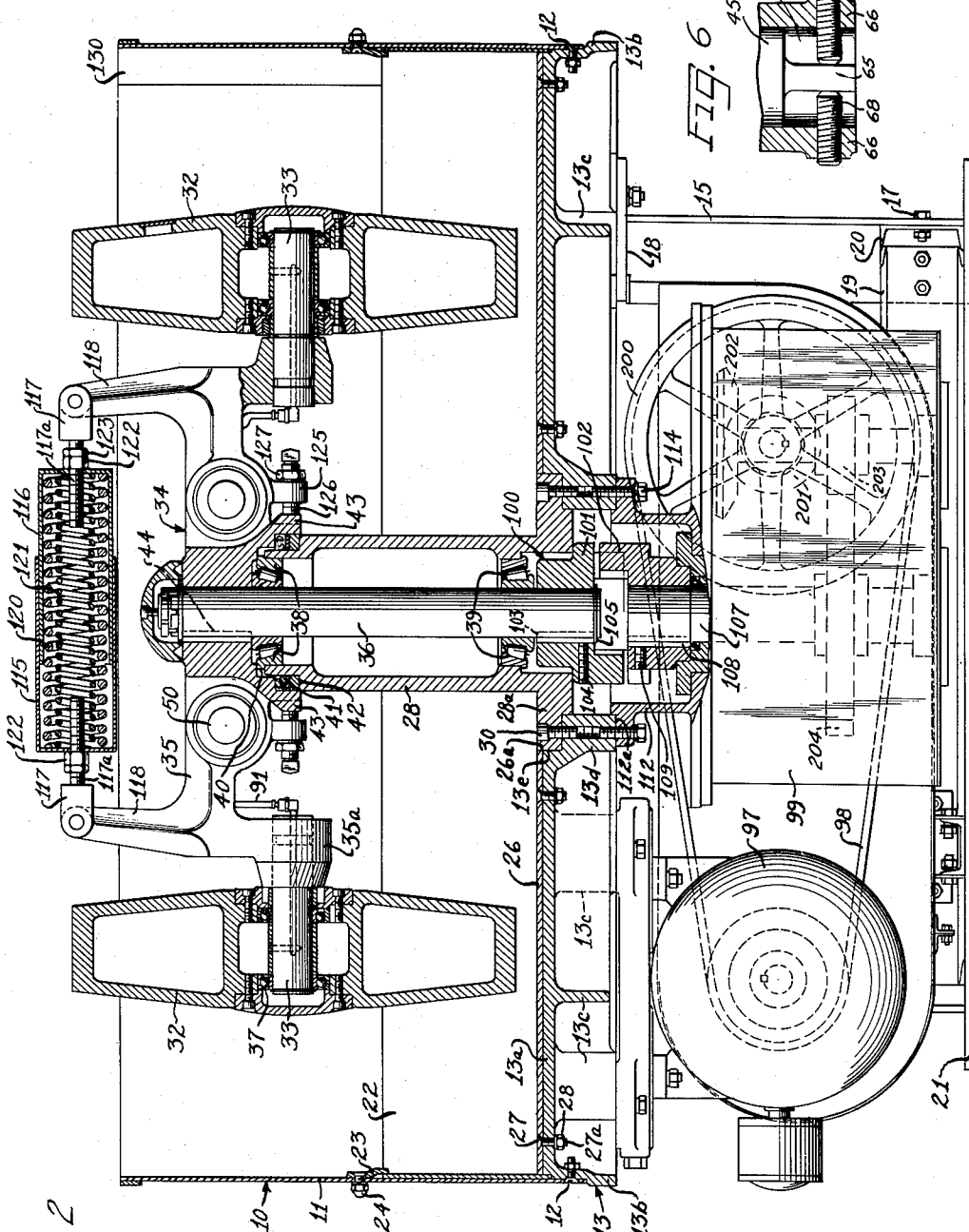
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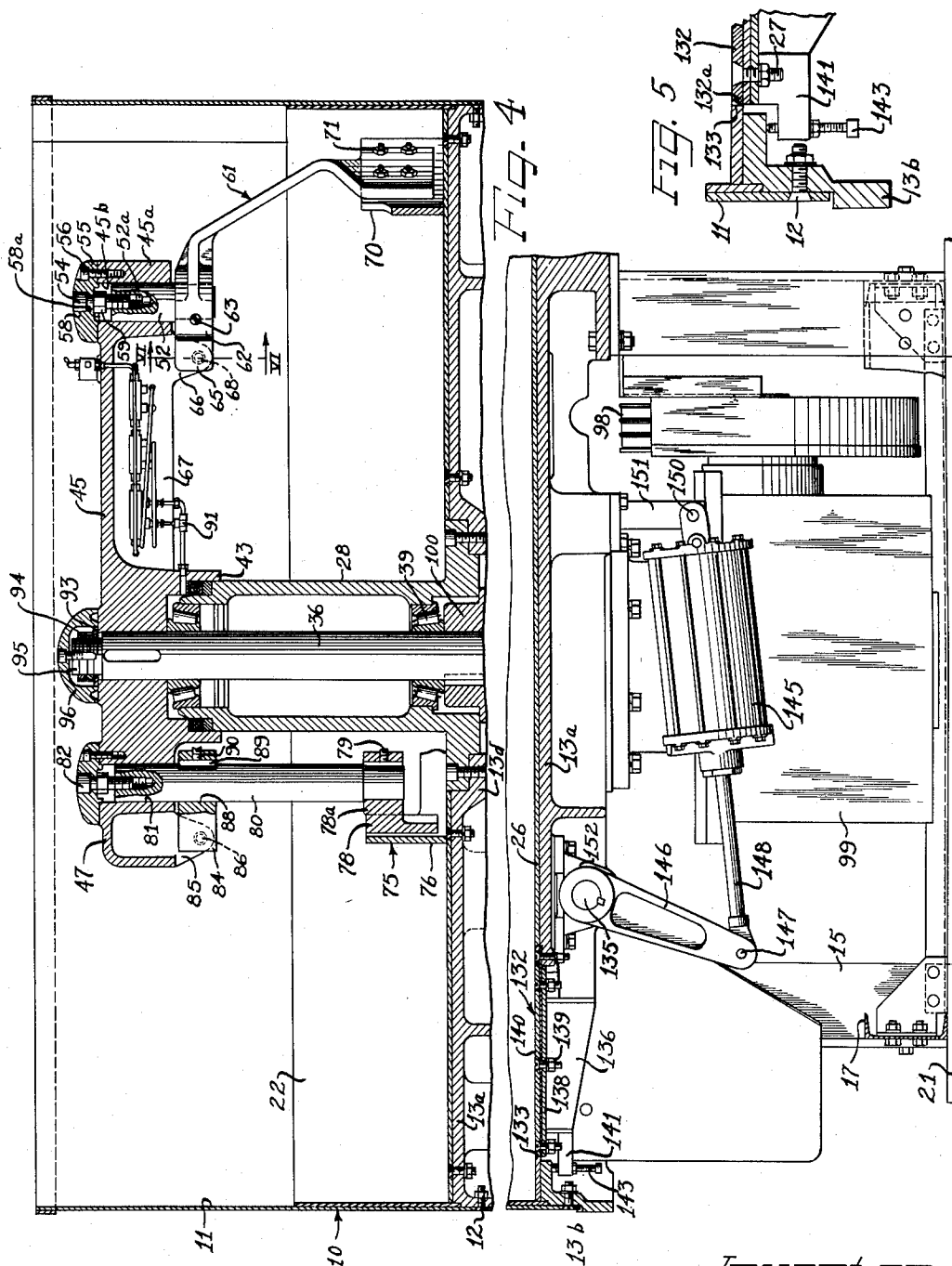


Fig. 3

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1

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MIXER

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Application March 2, 1950, Serial No. 147,171

14 Claims. (Cl. 241—124)

This invention relates to improvements in foundry equipment. More particularly it has to do with an improved mulling machine for mixing and processing granular material such as foundry sand or the like.

It is an important object of the present invention to provide a mulling machine having a novel means for connecting the drive mechanism to the bedplate of the machine featuring means for automatically aligning the drive shaft of the driving mechanism with the drive shaft of the muller crosshead and means for quickly installing or dismounting the drive means.

Another object of this invention is to provide a mulling machine having a turret which can be removed from the machine without disturbing any other part of the machine.

A further object of this invention is the provision of a novel adjusting device for regulating the position of the plows located close to the upper edge of the crib wall.

It is a feature of the present invention to provide a mixer including a support structure, a bedplate mounted on the structure having a pilot receiving portion and a central opening, a drive shaft extending through the opening and having a coupling means thereon, and a speed reduction mechanism suspended as a unit from the bedplate and having a coupling member drivingly engaging the shaft coupling means, the mechanism including a casing with a pilot positively engaging said bedplate pilot receiving portion to align the coupling member with the drive shaft coupling means, the pilot and pilot receiving portion comprising telescoping wall portions carried by the bedplate and by the casing respectively.

It is a further feature of the present invention to provide a mixer including a support arm having a vertical passage at one end, a rod having an upper end disposed in the passage, a plow carried by the lower end of the rod for vertical movement therewith and for rotation about the axis of the rod, and rotary advancing means acting on the upper end of the rod for raising and lowering the rod upon rotation thereof to adjust the vertical position of the plow.

According to the teachings of the present invention, there is provided a mulling machine in which the crosshead which carries the muller wheels is driven through a shaft which carries one member of a jaw-type clutch. The output shaft of a speed reducer carries the other member of the jaw-type clutch which is arranged to be automatically engaged with the first clutch member when the speed reduction assembly is secured to the bedplate of the machine. The speed reduction assembly carries an automatic centering pilot ring which engages a circular flange extending downwardly from the bedplate to automatically center the output shaft of the reduction unit with the drive shaft of the cross head.

The turret of the present machine is secured to the bedplate and extends through a central opening in the wearplate so that the turret can be removed by removing the bolts which hold it to the bedplate without disturbing the position of the wearplate.

The adjusting devices used to regulate the position of

2

the plows are disposed at the upper end of the plow arms so that they can be readily adjusted by a person reaching over the top edge of the crib without actually getting into the mixing machine crib.

Other and further features, objects and advantages of the present invention will become apparent to one skilled in the art from the following detailed description taken in connection with the accompanying drawings.

On the drawings:

Figure 1 is a top plan view, partly in section, of the novel mulling machine of the present invention;

Figure 2 is a vertical, sectional view, with parts in elevation, taken on line II—II of Figure 1;

Figure 3 is a fragmentary, vertical sectional view, with parts in elevation, taken on line III—III of Figure 1;

Figure 4 is a fragmentary vertical sectional view taken on line IV—IV of Figure 1;

Figure 5 is a fragmentary, exploded view of a portion of Figure 4; and

Figure 6 is a fragmentary vertical sectional view taken substantially along the line VI—VI of Figure 3.

As shown on the drawings:

In Figures 1, 2 and 3 the reference numeral 10 indicates a mulling machine having a generally cylindrical crib 11 secured near its lower end by bolts 12 to a bedplate 13. The bedplate 13 has a flat upper supporting surface 13a and an annular depending outer peripheral flange 13b. The bedplate 13 is reinforced by a plurality of depending ribs 13c which may be coextensive with the flange 13b. At its center the bedplate 13 has a depending ring-like boss 13d having a recessed circular upper annular portion 13e.

The machine is supported by welded steel pedestals 15 which have a substantially V-shape in plan, as seen in Figure 1. At the lower end the pedestals are secured by bolts 17 to spaced channel members 19 and 20, which are in turn welded to a baseplate 21. At the upper ends the pedestals 15 are secured, as by welding, to plates 18 which are secured to the lower ends of the flange 13b and the ribs 13c.

A liner 22 is disposed around the inner wall of the lower portion of the crib 11 and is held therein by a plurality of clamps 23 which are fastened in the crib wall by means of bolts 24 and have an inner end portion overlying the upper end of the liner 22.

The bedplate 13 is provided with a hardened steel wearplate 26 which is made in quadrants and is secured on the bedplate, by means of a plurality of bolts 27. The nuts 28 are arranged to be threaded on the bolts 27.

It is a particular feature of this invention that the bolts 27 have lower ends 27a equipped with Allen head sockets. With this arrangement the wearplate can be secured in place, by a single workman operating from underneath the bedplate. By holding the bolt 27 with the socket wrench he can tighten the nut 28 with a wrench. Thus, the services of a man, inside the muller for holding the bolt 27 in place while the nut 28 is threaded thereon, is eliminated.

The wearplate 26 has a central opening 26a conforming to the opening 13e in the bedplate 13.

A generally cylindrical hollow turret 28 has a laterally extending base portion 28a fitting snugly in the openings 13e and 26a and having openings through which bolts 30 secure the turret to the annular flange 13d of the bedplate 13. It will be seen that it is necessary in removing the turret 28 from this machine only to loosen the bolts 30 without disturbing any other part of the machine.

A pair of muller wheels 32 are mounted in substantially diametrically opposed position on shafts 33 which extend outwardly from rocker arms 35 pivotally mounted on a crosshead 34. Each muller wheel 32 is rotatably mounted on the shaft 33 on ball bearing assemblies

37. The opposite end of the shaft 33 is secured, as by a press fit, in a lower end portion 35a of the rocker arm 35. The end portion 35a is inclined rearwardly as seen in Figure 1, so that the center of the muller wheel is displaced from the center line of the crosshead. This disposition of the muller wheel permits a trailing effect which increases the smearing action of the wheels and decreases the possibility of picking up material on the muller surfaces.

It is a feature of this invention that the muller wheels rotate on a circle so that approximately two-thirds of the sand in the crib is placed between the center line of the mullers and the wall of the crib and one-third of the sand between the center line of the mullers and the turret. This disposition of the sand adequately distributes the plow function between the inside plows and the outside plows, which will be described hereinafter in detail, and more nearly balances the power requirements of the plows.

Specifically, I have found that with a crib of 80 inches in diameter and a turret of 11 inches in diameter, muller wheels rotating on a 48-inch circle give very efficient operation.

The crosshead 34 is rotated and supported by means of a drive shaft 36 which is journaled for rotation in the turret 28 by bearing assemblies 38 and 39. The inner face of the bearing assembly 38 is pressed on the shaft 36 while the outer face has a shoulder portion 40 overlying the upper end of the turret 28. A seal ring assembly 41 is disposed between a recessed shoulder portion 42 of the turret 28 and a depending skirt 43 of the crosshead 34. This seal, assembly 41, prevents the entry of foreign materials into the bearing assembly of the machine.

The crosshead 34 is secured for rotation with the shaft 36 by means of a key 44 and, as best seen in Figure 1, has four arm portions 45, 46, 47 and 48 which are integrally formed and disposed substantially at right angles to each other. The arms 46 and 48 are bifurcated and have openings therethrough journaling the rocker arm shafts 50 which carry the rocker arms 35.

The arm 45 extends radially outwardly and carries at its free end portion a sleeve 45a (Figure 3) having a vertical opening 45b therethrough arranged to receive a rod 52 in sliding engagement. The rod 52 has a threaded longitudinal opening 52a in the upper end into which is threaded an adjusting bolt 54. A cap 55 is secured by means of set screws 56 to the top surface of the sleeve portion 45a and has a central opening 58 with a shoulder 58a on which the head of the bolt 54 rests. A lock nut 59 is threaded on the shank of the bolt 54 and against the lower surface of the cap 55. Thus, the bolt 54 may be rotated by means of a socket head to cause the shank of the bolt 54 to be threaded in and out of the rod 52 to cause said rod to be raised or lowered.

A plow arm 61, having an upper substantially cylindrical end portion 62 locked to the lower end of the rod 52 by means of a set screw 63, carries a positioning arm 65 which extends between a pair of ears 66 depending from a rib 67 of the arm 45. An adjusting set screw 68 (Figure 1) is threaded through each ear 66 and engages at its inner end against the arm 65 for locking this arm in an adjusted position. It will be seen that, when the set screws 68 are backed away from the arm 65, the plow arm 61 may be rotated with the rod 52. When the desired setting of the arm 61 is reached, the set screws 68 can be screwed against the arm to lock it in position.

Thus, the vertical position of the plow arm 61 may be adjusted by the rotation of the bolts 54 while the radial position may be adjusted by means of the set screws 68. It is to be particularly noted that both of these adjustments are at the upper end of the plow arm and at the radially outward point on the support arm 45 of the crosshead. Thus, the adjustment can be made by lean-

ing over the edge of the crib 11 without getting into the crib. This construction greatly facilitates the adjusting of the plow arm.

At the lower end of the plow arm 61 a plow blade 70 is secured thereon by means of bolts 71. As best seen in Figure 1, the plow blade 70 has its forward end 70a disposed close against the side of the liner 22 of the crib. Thus, it is effective to scrape the material from the side of the crib while at the same time scraping it from the wear plate 26. The plow blade 70 is so disposed that it will move material inwardly toward the path of the muller wheel.

A second plow or scraper 75 is mounted on the crosshead arm 47. The plow 75 has a blade 76 secured by bolts 77 to a support arm 78. The arm 78 has a sleeve portion 78a (Figure 3) keyed by means of a set screw 79 to a shaft 80. At its upper end the shaft 80 is journaled for sliding and rotating movement in a vertical opening 81 in the arm 47. An adjusting bolt 82 has a lower threaded shank portion which is engaged in a threaded opening at the upper end of the rod 80 and is effective to adjust the vertical positioning of the rod and consequently the plow 75 exactly in the manner described in connection with the adjusting bolt 54 of the plow 61.

The angular position of the plow 75 is regulated by the movement of an arm 84 which extends between a pair of ears 85 of the crosshead arm 47. Set screws 86 threaded through the ears 85 are arranged to hold the arm 84 in a selected position. The shaft 80 extends through an opening 88 in the arm 84 and is slidably held therein by a key 89 and a set screw 90 which is threaded in the arm 84 against the key 89. This connection, of course, permits the vertical adjustment of the rod 80 while the arm 84 remains in a substantially horizontal position.

The bearings of the muller shaft, those on the rocker arm shaft, and the bearings on the carriage by the turret are lubricated through a forced lubrication system indicated generally by the reference numeral 91.

The crosshead 34 is locked on the shaft 36 by the key 44 and by a washer 93 and a pair of lock nuts 94 which are threaded on the threaded upper end 95 of the shaft 36. This threaded connection is effective to press the crosshead 34 down on the bearing assemblies 38 and 39. A cap 96 is disposed over the upper end of the shaft 36.

The shaft 36 is driven by an electric motor 97 through a V-belt drive 98 and a gear reduction unit 99 through a positive acting jaw clutch 100.

The gear reduction unit 99 comprises a wheel 200 driven by V-belt 98 and on a common shaft with a bevel gear 201 which meshes with a bevel gear 202. The bevel gear 202 drives a small gear 203 which in turn drives a large gear 204 on output shaft 107.

One portion 101 of the jaw clutch 100 is keyed for rotation with the shaft 36 by means of a key 103 and a set screw 104 which bears against the key 103. A snap retainer ring 105 is disposed around the lower end of the shaft 36 and against the lower end of the clutch element 101 to prevent axial displacement of the member 101 relative to the shaft 36.

The other member 102 of the clutch 100 is secured for rotation on the output shaft 107 of the gear reduction unit by means of a key 108 and a set screw 109 which engages the key 108. The casing of the reduction unit 99 has an upwardly extending annular sleeve portion 112 with a recessed shoulder 112a which receives the depending annular boss 13d of the bedplate 13. As best seen in Figure 2, the reduction unit is positioned relative to the bedplate 13 merely by lifting it upwardly so that the annular ring 13d fits into this recessed shoulder of the speed reduction unit housing. The housing is then secured by bolts 114 to the ring 13d. It is to be particularly noted that this sleeve 112 provides an

5

automatic pilot for centering the speed reduction unit in the machine and assures the alignment of the output shaft 107 with the drive shaft 36.

The muller wheels 32, which roll over the material disposed on the wearplate 26 in the crib, may be pre-loaded by means of telescoping cylinders 115 and 116 which are pivotally mounted by connectors 117 to upwardly extending arms 118 of the rocker arms 35. The connectors 117 are provided with threaded shanks 117a which extend through openings in the ends of the cylinders 115 and 116.

Coil springs 120 and 121 are disposed inside the cylinders 115 and 116 and have their ends abutting the inner end walls of the cylinders. The pressure exerted by the springs on the arms 118 is regulated by lock nuts 122 and 123 which are threaded on the shank 117a of each connector. The closer the cylinders 115 and 116 are telescoped inside each other to compress the spring, the greater will be the loading on the arms and consequently on the muller wheel 32.

The rocker arms 35 also carry downwardly extending ear members 125 which have a threaded opening receiving an adjusting screw 126 which bears against the skirt 43 of the crosshead. A lock nut 127 is effective to hold the adjusting screw 126 in a selected position. It will be seen that this adjusting screw, by its contact against the skirt 43, will control the downward pivoting movement of the rocker arm. Thus, the clearance between the wearplate 26 and each muller wheel 32 can be regulated.

It is a feature of this invention that a section of the crib wall 11 is made removable so that the muller wheels, the rocker arms and the turrets can be moved laterally through the opening when it is desired to disassemble these moving units for maintenance purposes. Heretofore, the entire unit had to be lifted clear of the top of the crib wall 11, or the crib wall had to be completely removed from the bedplate. In Figures 1 and 2 the removable section of this crib wall is shown and is indicated generally by the reference numeral 130. It will of course be noted that this segment of the crib wall is held in place by the through bolts 12 just as the other larger segment is held in place. Also the clamp members 23 which engage over the crib liner 22, which is continuous at this portion, helps to hold this part of the crib wall in place.

Sand is discharged from this mulling machine through a discharge door 132 (Figures 1 and 3) which is of a generally rectangular configuration and fits snugly into a rectangular opening 133 in one quadrant of the wearplate 26. As best seen in Figure 5, the edge of the door is beveled as at 132a and this bevel may be a segment of an arc of a circle with the center at the axis of a pivot shaft 135 about which the door swings on a lever arm 136. The lever arm 136 has a cylindrical bearing portion 137 (Figure 1) which is keyed to the shaft 135 and has a flat plate portion 138 which is secured by bolts 139 to a top plate 140 which may be made of the same material as the wear plate 26 and which is arranged to be moved into flush engagement with the upper surface of the wear plate 26.

The beveled edge 132a of this wear plate segmental portion of the door 132 cooperates with the lower edge of the opening 133 in the wear plate proper to remove any sand that might be on the edge of the door as it is moved into closed position. Thus, the door closes with a slicing action which substantially eliminates the possibility of sand caking on the door.

A tab 141 extends from the free end of the door outwardly or beyond the opening 33 in the wearplate and underlies a portion of the bedplate 13. An adjustable screw 143 is arranged to contact the lower surface of said plate and limits the upward movement of the door. Thus, the door can be adjusted so that when it closes the

6

upper surface of the top plate 140 is flush with the surface of the wear plate proper.

The shaft 135 is oscillated from a power cylinder 145 through a link 146 which is keyed to the shaft 135 and is pivotally connected by a pin 147 to a piston rod 148 of the power cylinder 145. The power cylinder, at an opposite end, is pivotally mounted on a pin 150 from a depending bracket 151 of the bedplate 13. The shaft 135 is journaled for rotation in spaced bearing blocks 152.

The power cylinder 145 may be actuated by any suitable fluid and connected for energization through control means remote from the cylinder itself by any of the well known remote control mechanisms.

From the foregoing description it will be seen that there is provided in this invention an efficient compact mulling machine featuring a speed reduction unit which carries a pilot connection for accurately and automatically aligning the drive shaft of the muller and the output shaft of the reduction unit. This muller also features a removable crib section for facilitating the removal of the muller wheel, the crosshead and the turret, and the turret itself is removable from the assembly without disturbing any of the other parts of the structure.

A novel plow adjusting means facilitates the adjusting of the plow both vertically and radially in the crib while a novel fastening connection permits assembly of the wear plate on the bedplate of the crib by one man operating from below the bedplate.

The mulling machine produced by the novel features of this invention is relatively economical to manufacture, efficient in operation and has very low operating and maintenance expenses.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In combination a support structure, a bedplate mounted on said structure having an opening therethrough with a recessed shoulder therearound, a wearplate on said bedplate, fastening means securing said wearplate to said bedplate, said wearplate having a central opening conforming in size and shape to the opening in said bedplate, a turret having a peripheral portion extending into said openings and seated on and secured to said shoulder with the wear plate abutting said turret peripheral portion, and with the upper surface of said peripheral portion lying flush with said wear plate, a drive shaft journaled for rotation in said turret, a crosshead keyed to the upper end of said drive shaft having arms extending radially outwardly therefrom, one of said arms having a vertical passage at the outer free end thereof, a rod journaled for rotation and sliding movement in said passage, a plow secured to said rod, means for adjusting the vertical and angular position of said rod, and muller wheels pivotally mounted on said crosshead for rolling movement over material on the wearplate, whereby said turret including said drive shaft, said crosshead, said plow and said muller wheels may be assembled and removed as a unit without removal of said wearplate.

2. In combination in a mixer, a support structure, a bedplate mounted on said structure having a depending annular flange defining an opening therethrough, a drive shaft, a coupling member secured to said shaft and extending through said opening and a power-driven speed reduction unit having a second coupling member, and a pilot on said unit telescoping said flange to align the coupling of said drive shaft with the coupling member of said unit.

3. In combination in a mixer, a support arm having a vertical passage at one end, a rod slidably disposed in said passage having an upper threaded bore, a plate secured over the upper end of said passage, an adjusting member supported in said plate having a shank in threaded engagement with said bore, means for securing said adjusting member against vertical displacement relative to

said plate while accommodating rotation of said adjusting member relative to said plate, rotation of said member being effective to vertically adjust said rod, a plow secured to said rod for movement therewith in a vertical direction, a pair of spaced ears depending from said support arm, a positioning arm on said plow and extending between said ears, and a set screw threaded through each ear and bearing against an opposite side of said positioning arm to adjust the angular position of said rod.

4. In combination in a mixer, a support arm having a vertical passage at one end, a rod slidably and rotatably disposed in said arm and having a threaded bore in one end, a plate secured over the top of said passage, an adjusting member rotatably supported in said plate and having a threaded shank engaging the bore of said rod, means securing said adjusting member against vertical displacement relative to said plate while accommodating rotation of said adjusting member relative to said plate, rotation of said adjusting member being effective to vertically adjust said rod, a plow secured to the lower end of said rod, a pair of spaced ears extending from said support arm, a positioning arm secured to said rod for rotation therewith and having a free end extending between said ears, and a set screw threaded through each ear and bearing against a side of said positioning arm to hold it in angularly adjusted position.

5. In combination in a mixer, a support arm having a vertical passage at one end, a rod slidably disposed in said arm and having a threaded bore at one end, a plate secured over the top of said passage, an adjusting member rotatably supported in said plate and having a threaded shank engaging the bore of said rod, means for securing said adjusting member against vertical displacement relative to said plate while accommodating rotation of the adjustment member relative to the plate, rotation of said adjusting member being effective to vertically adjust said rod, a plow secured to the lower end of said rod, a pair of spaced ears extending from said support arm, a positioning arm having one end extending between said ears, means for securing said positioning arm to said rod, and a set screw threaded through each ear and bearing against a side of said positioning arm to hold it in an angularly adjusted position.

6. In combination in a mixer, a bedplate having a central opening with a recessed seat extending therearound, a wearplate secured to said bedplate and having a central opening conforming to the shape and size of the opening in said bedplate, a turret supported on said bedplate having a peripheral portion extending into said openings and resting on said recessed seat, a drive shaft journaled within said turret and having a lower end depending from said turret through said openings and having coupling means thereon, a power driven speed reduction mechanism supported as a unit from said bedplate and having a coupling member movable into driving contact with said shaft coupling means, and fastening means for securing said turret to said bedplate, whereby said turret and drive shaft may be assembled with and removed from said bedplate without removal of said wearplate and without disturbing said speed reduction mechanism.

7. In combination in a mixer, a support arm having a vertical passage at one end, a rod having an upper end disposed in said passage, a plow carried by the lower end of said rod for vertical movement therewith and for rotation about the axis of said rod, and rotary advancing means acting on the upper end of said rod, means securing said rotary advancing means against vertical displacement relative to said support arm while accommodating rotation of the rotary advancing means relative to said supporting arm, and means for rotating said rotary advancing means to raise and lower said rod for adjusting the vertical position of the plow.

8. In combination in a mixer, a bedplate having a central opening, a turret supported on said bedplate, a

drive shaft journaled within said turret and having coupling means at the lower end thereof within the confines of said bedplate opening, a power-driven speed reduction mechanism supported from said bedplate and having a coupling member movable into driving contact with said shaft coupling means, and fastening means for securing said turret to said bedplate, whereby said turret may be assembled with and removed from said bedplate without disturbing said speed reduction mechanism.

9. In combination in a mixer, a support arm, a plow rotatably carried by said support arm, a pair of spaced ears depending from said support arm, a positioning arm connected with said plow and extending between said ears, and a set screw threaded through each ear and bearing against an opposite side of said positioning arm to adjust the angular position of the plow.

10. In combination in a mixer, a support structure, a bedplate mounted on said structure having an opening therethrough, a turret supported on said bedplate having a peripheral portion seated on the peripheral edge of said opening, fastening means for securing said peripheral portion to said bedplate, a drive shaft journaled in said turret and extending through said opening and having coupling means thereon, a power-driven speed reduction mechanism supported as a unit from said bedplate and having a coupling member arranged to engage said drive shaft coupling means to drive said shaft, pilot means on said mechanism telescoping said bedplate for aligning said coupling member with said drive shaft coupling means, a wall secured in upright position around said bedplate defining a crib, muller wheels rotatably mounted in said crib, and a crosshead secured to said drive shaft and pivotally carrying said muller wheels.

11. In combination in a mixer, a support structure, a bedplate mounted on said structure having an opening therethrough, a drive shaft extending through said opening and having coupling means thereon, a power-driven speed reduction mechanism supported as a unit from said bedplate having a coupling member movable into driving contact with said shaft coupling means, and pilot means on said mechanism telescoping a portion of said bedplate for aligning said coupling member with said drive shaft coupling means.

12. In combination in a mixer, a support structure, a bedplate on said structure having a pilot receiving portion and a central opening, a drive shaft extending through said opening and having coupling means thereon, and a speed reduction mechanism suspended as a unit from said bedplate and having a coupling member drivingly engaging said shaft coupling means, said mechanism including a casing with a pilot positively engaging said bedplate pilot receiving portion to align said coupling member with said drive shaft coupling means, said pilot and pilot receiving portion comprising telescoping wall portions carried by said bedplate and by said casing respectively.

13. In combination in a mixer, a bedplate, a wearplate secured on said bedplate and having a discharge opening, a discharge door supported on said bedplate for swinging movement toward and away from said opening and having an upper surface portion movable into said opening to close the same and lie flush with the upper surface of the wearplate, said discharge opening being defined at the edge thereof most distant from the axis of swinging movement of the door by a straight vertical wall of said wearplate, and said door having a slanted edge located on the edge of the door adjacent said vertical wall and formed substantially on an arc defined by the swinging movement of the door, and said slanted edge being arranged to pass close to the lower edge of the wearplate defining said discharge opening, said door having a relatively narrow projection for underlying a portion of the bedplate outwardly of the opening in closed position of the door, and an adjusting screw extending through said relatively narrow projec-

tion for abutment with the bedplate to position the door with said door upper surface portion flush with the upper surface of the wearplate in closed position of the door.

14. In a mixer, the combination of a bedplate, a wearplate secured on said bedplate and having a discharge opening therein, a discharge door mounted for swinging movement toward and away from said opening and having an upper surface portion movable into said opening to close the same and lie flush with upper surface of the wearplate, said discharge opening being defined by a straight vertical wall of said wearplate at the edge of the opening most distant from the axis of swinging movement of the door, said door having a slanted edge located on the edge of the door adjacent said flat wall and formed substantially on an arc defined by the swinging movement of the door, said slanted edge being arranged to pass close to said flat wall in order to effect a scraping action for removing material adhering to the slanted edge and to the straight wall, said door having

a projecting portion underlying a portion of the bedplate beyond an edge of the opening in closed position of the door, and means including said projection for limiting the movement of said door into said opening beyond the point where its upper surface lies flush with the upper surface of the wearplate.

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