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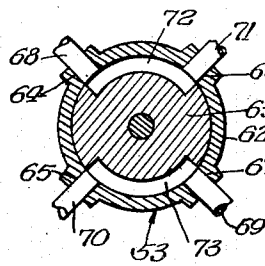
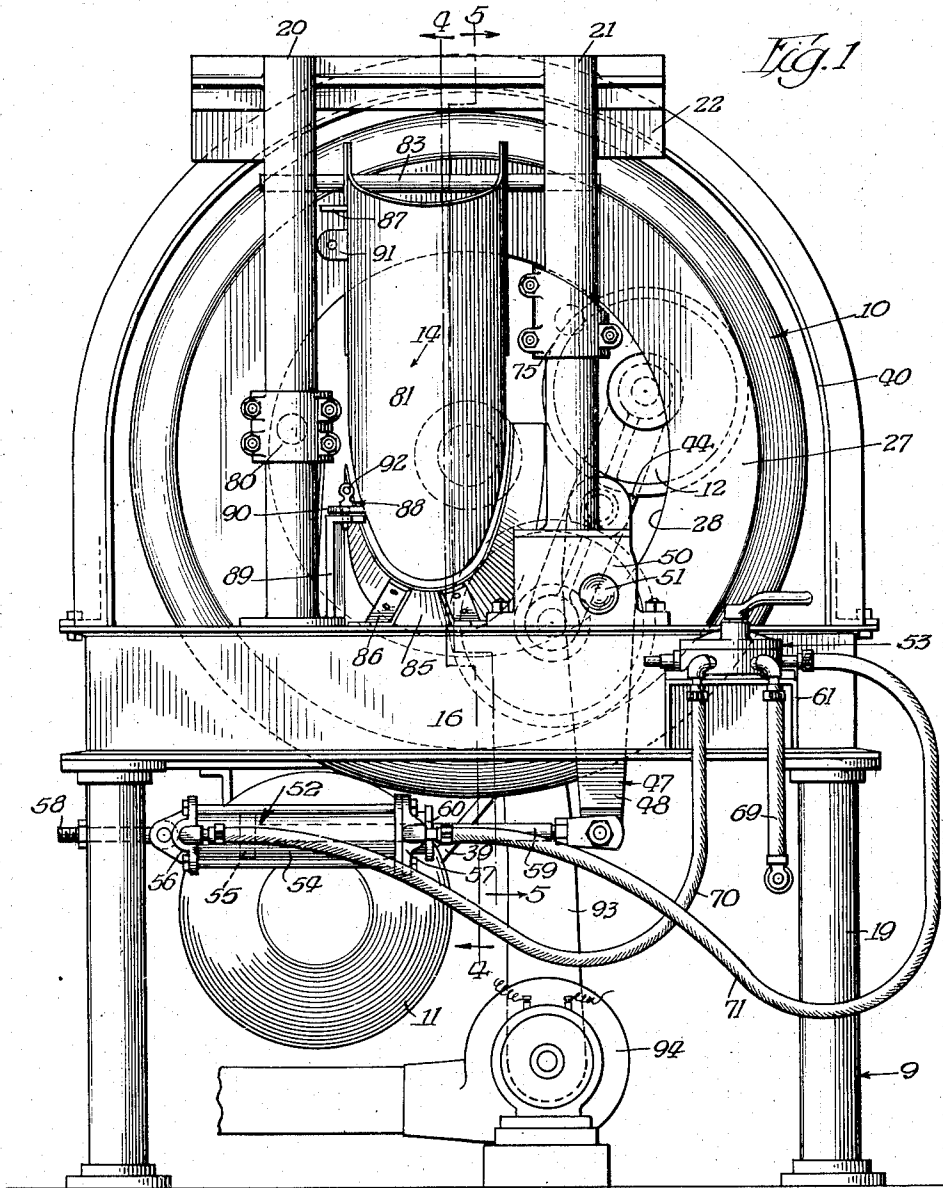
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2,258,392

MULLING APPARATUS

Filed Feb. 16, 1939

5 Sheets-Sheet 1



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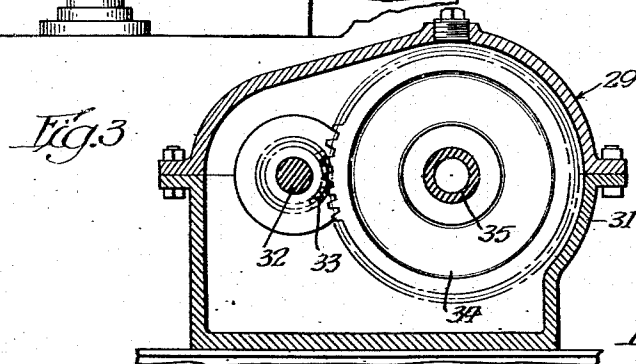
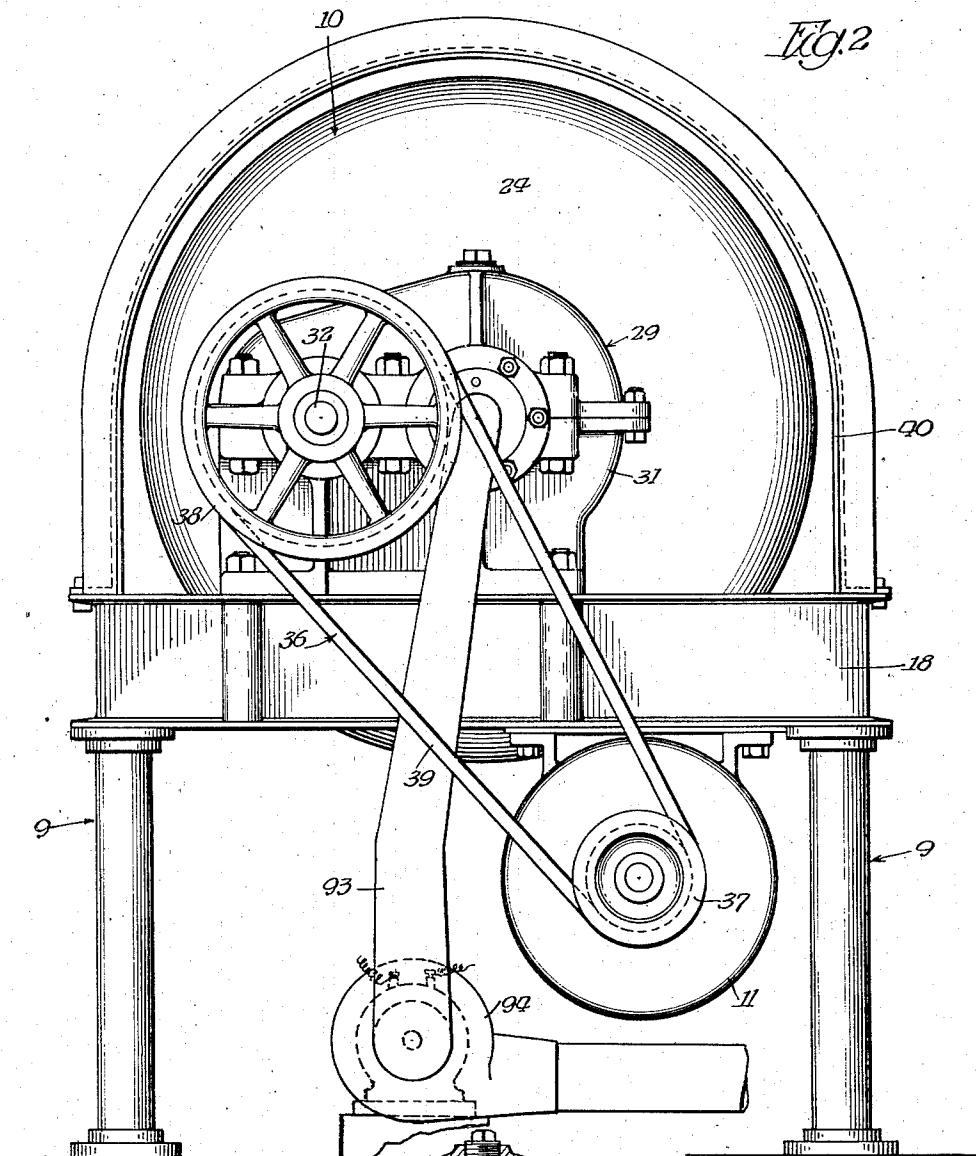
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MULLING APPARATUS

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5 Sheets-Sheet 2



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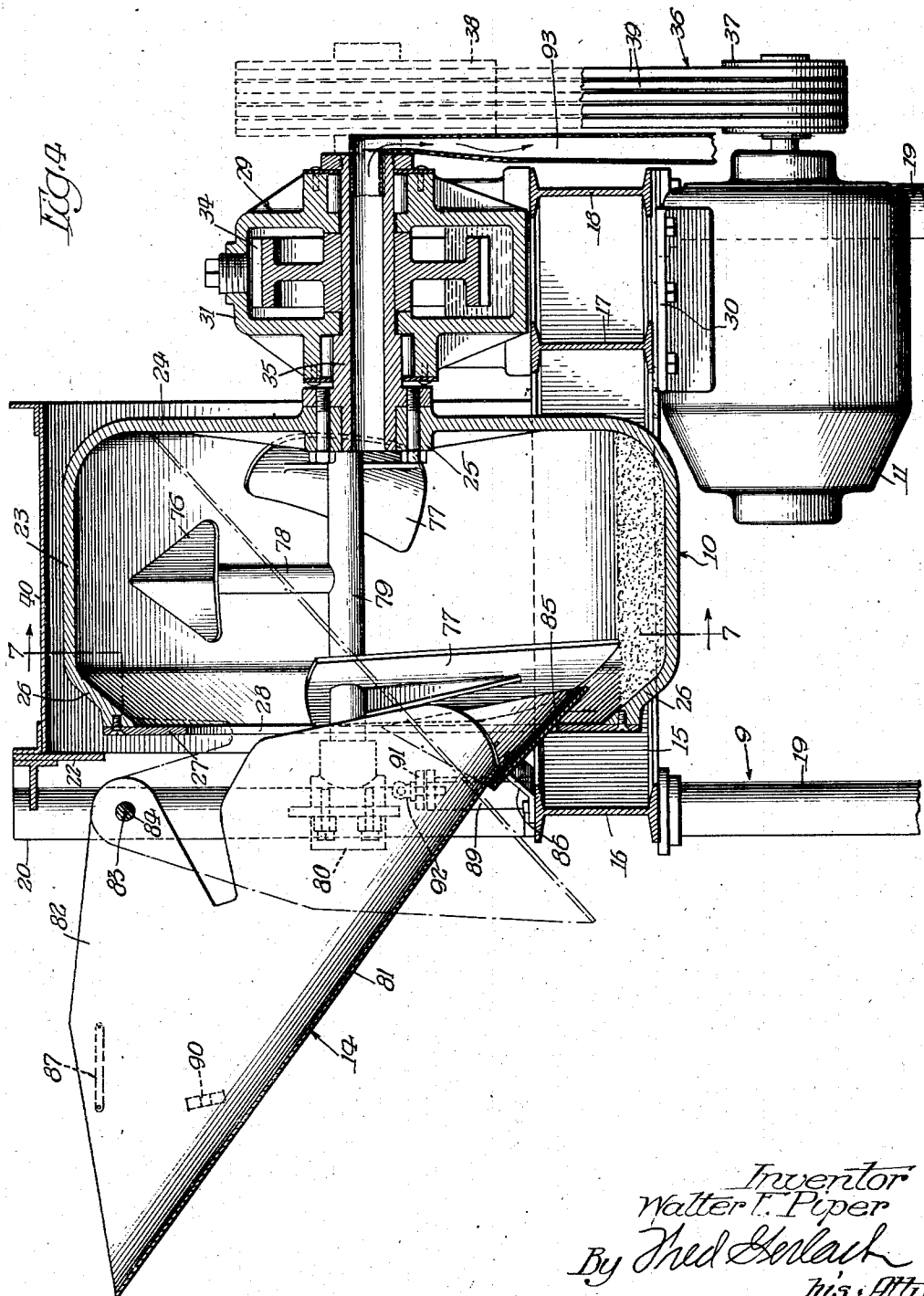
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MULLING APPARATUS

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5 Sheets-Sheet 3



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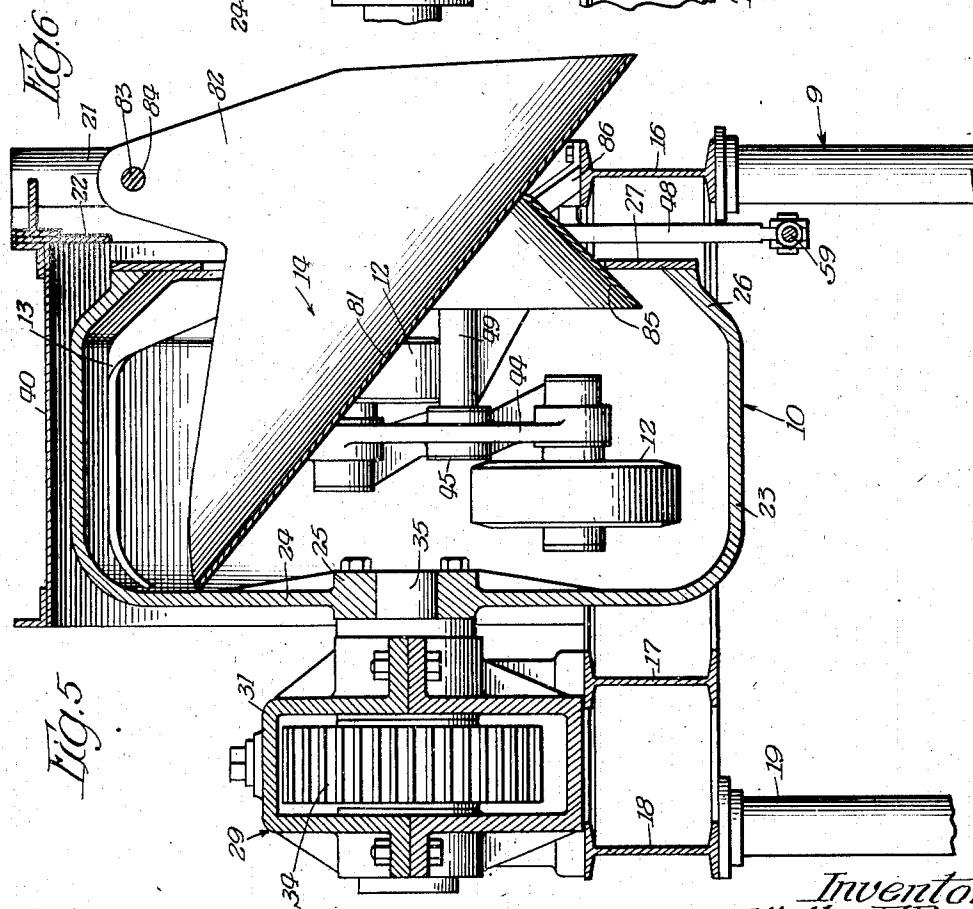
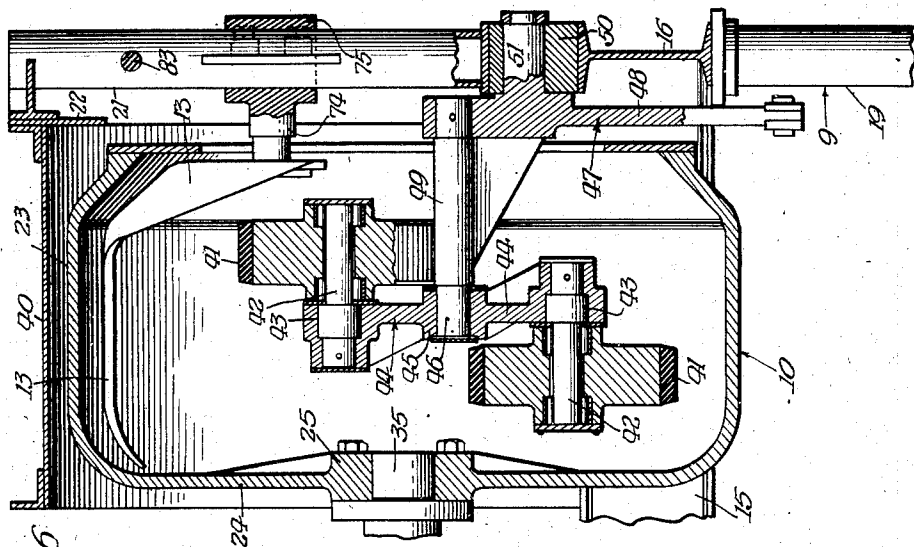
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MULLING APPARATUS

Filed Feb. 16, 1939

5 Sheets-Sheet 4



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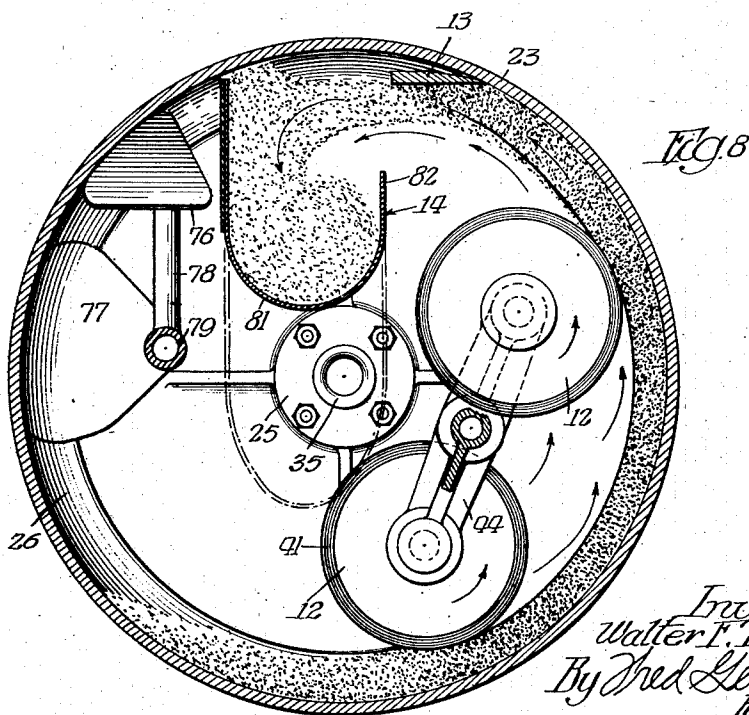
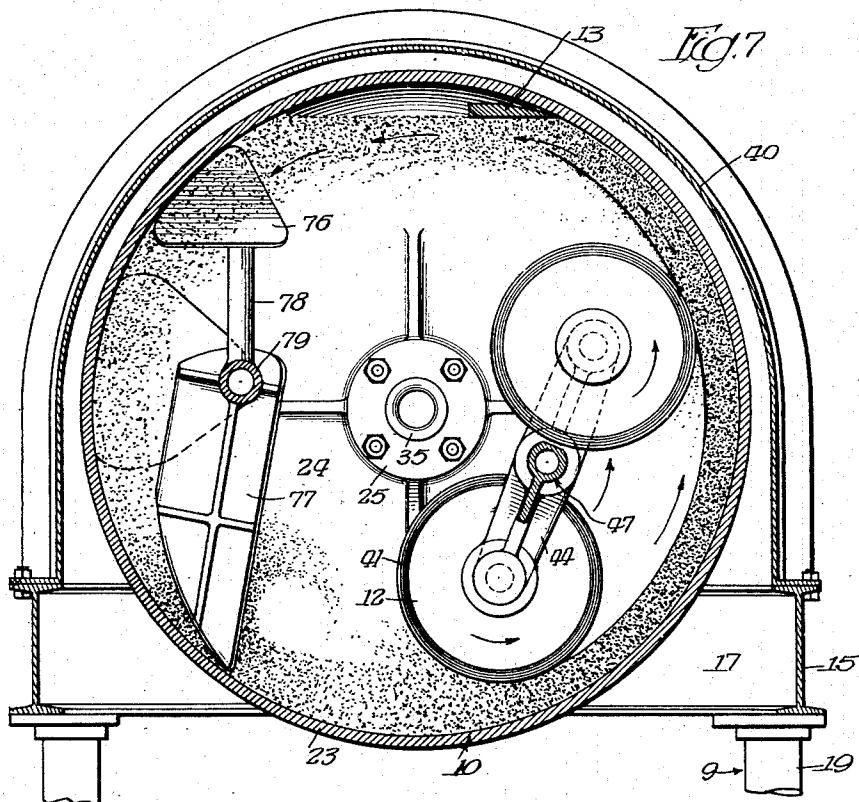
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2,258,392

MULLING APPARATUS

Filed Feb. 16, 1939

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,258,392

MULLING APPARATUS

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Application February 16, 1939, Serial No. 256,741

10 Claims. (Cl. 83—45)

The present invention relates generally to apparatus for mulling granular material. More particularly the invention relates to that type of mulling apparatus which is primarily adapted for mulling or conditioning molding sand in a foundry and comprises (1) a frame structure; (2) a sand retaining receptacle which is mounted for rotation about a horizontal axis and embodies an annular side wall with one end thereof open for the entry and discharge of batches of sand and its other end closed by a circular end wall; (3) an electric motor which is mounted on the structure and operates through the medium of a speed reducing unit to rotate the receptacle; (4) a plurality of mulling elements which are disposed adjacent to the inner face of the side wall and are adapted during rotation or drive of the receptacle to mull the sand by squeezing it against the side wall; and (5) a scraper which is also disposed adjacent to the inner face of the side wall and serves to scrape the sand from the side wall after squeezing thereof by the mulling elements and to direct the scraped sand inwards so as to mix and aerate it and also break up the lumps prior to the next engagement of the sand by the elements.

One object of the invention is to provide a mulling apparatus of this type which is an improvement upon and is more efficient than previously designed sand mulling apparatus including that which is disclosed in, and forms the subject matter of, an application for United States Letters Patent filed by me February 13, 1939, Serial No. 256,096.

Another object of the invention is to provide a mulling apparatus of the type under consideration in which the mulling elements are preferably two in number and are in the form of narrow freely rotatable wheels, and positioned in laterally offset relation and one ahead of the other so that they operate in connection with squeezing of the sand to shift the sand laterally with a rubbing action whereby any bonding material in the sand is effectively distributed over the grains of sand.

Another object of the invention is to provide a sand mulling apparatus of the last mentioned type and character in which the wheel type mulling elements have supporting and control means therefore whereby at the conclusion of a mulling operation they may be shifted bodily away from the side wall of the receptacle in order to render them ineffective and permit the scraper in connection with successive revolutions of the receptacle to break up any mulling caused lumps

in the sand immediately prior to discharge of the sand from the receptacle.

Still another object of the invention is to provide a mulling apparatus of the aforementioned type which includes plow and deflector means which are of novel design and operate to assist the scraper in breaking up and aerating the sand and also to control the sand so that it is properly positioned against the receptacle side wall for mulling by the wheel type mulling elements.

A further object of the invention is the provision in connection with a sand mulling apparatus of the type and character under consideration of a chute which is mounted or carried by the supporting structure so that it is shiftable back and forth between a charging position wherein it is adapted to direct the sand to be mulled into the receptacle and a substantially inverted discharge position wherein it operates to catch or receive the mulled sand from the scraper and direct it out of the receptacle.

Other objects of the invention and the various advantages and characteristics of the present mulling apparatus will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a front view of a sand mulling apparatus embodying the invention;

Figure 1* is a detail sectional view of the valve for controlling shift of the mulling elements to and from the receptacle side wall;

Figure 2 is a rear view illustrating in detail the design and location of the electric motor and speed reducing unit for driving the receptacle;

Figure 3 is a vertical transverse sectional view of the speed reducing unit;

Figure 4 is a vertical longitudinal sectional view of the apparatus taken on the line 4—4 of Figure 1 and showing the chute in its charging position;

Figure 5 is a vertical longitudinal view taken on the line 5—5 of Figure 1 and illustrating the chute in its discharge position;

Figure 6 is a sectional view of the elements showing in detail the design, arrangement and manner of mounting of the mulling elements and also the design and manner of mounting of the scraper for scraping the sand from the inner face

of the receptacle side wall after treatment or squeezing by the mulling elements;

Figure 7 is a vertical transverse sectional view taken on the line 7—7 of Figure 4 and illustrating the manner in which the mulling elements, the scraper, and the plow and deflector means operate in connection with mulling or treatment of the sand within the receptacle; and

Figure 8 is a vertical transverse sectional view showing the chute in its discharge position and the manner in which it coacts with the scraper to effect discharge of the mulled sand.

The apparatus which is shown in the drawings constitutes the preferred embodiment of the invention. It is designed primarily for use in a foundry or like establishment in connection with the mulling or conditioning of molding sand and as its main parts comprises a frame structure 9, a sand holding or retaining receptacle 10, a receptacle driving motor 11, a pair of mulling elements 12, a scraper 13, and a chute 14.

The frame structure 9 is adapted to rest on the floor of the foundry or other establishment in which the apparatus is used and serves as the main supporting medium for the operating parts of the apparatus. It is generally rectangular in contour and comprises a pair of horizontally extending laterally spaced parallel side beams 15, three cross beams 16, 17 and 18 and four legs 19. The side beams are cross-connected and held in laterally spaced relation by the three cross beams. The cross beam 16 extends between and is welded or otherwise fixedly secured at its ends to the front ends of the side beams and the cross beam 18 extends between and is welded to the rear ends of the side beams. The cross beam 17 is positioned slightly inwardly of the cross beam 18 and extends between and is welded or otherwise fixedly secured at its ends to the central portion of the side beams 15. The legs 19 serve to hold the beam formed part of the frame structure 9 in an elevated position with respect to the foundry floor and are secured to and depend from the ends of the side beams 15. In addition to the side and end beams and the legs, the frame structure 9 comprises a pair of vertically extending laterally spaced parallel standards 20 and 21. These standards project upwardly from the central portion of the cross beam 16, as shown in Figure 1, and are cross-connected at their upper end by a plate 22.

The receptacle 10 is located over the front portion of the frame structure 9 and is adapted to be charged with a batch of sand to be mulled by way of the chute 14. It is generally cylindrical in contour or design and embodies an annular side wall 23 and a circular end wall 24. The side wall is of substantially uniform diameter from one end thereof to the other and is adapted to have the sand to be mulled squeezed against the inner face thereof by the mulling elements 12. The end wall 24 is joined to and formed integrally with the rear end of the side wall and has in the central portion thereof a hub 25. The front end of the side wall of the receptacle is provided with an inwardly extending annular flange 26 and this flange, as shown in Figures 4 to 6 inclusive, carries a flat ring 27, the inner edge of which defines a circular opening 28 for the entry and discharge of the sand. When the receptacle is rotated or driven by the motor 11, the sand adheres to the side wall 23, as the result of centrifugal force, and is brought into contact with and squeezed or mulled by the elements 12.

The electric motor 11 operates through the

medium of a speed reducing unit 29 to rotate or drive the receptacle 10 and is suspended from the central portions of the cross beams 17 and 18 by a bed plate 30. It is positioned horizontally and also lengthwise of the frame structure and is laterally offset with respect to the speed reducing unit 19. The latter comprises a casing 31, a drive shaft 32, a pinion 33, a gear 34 and a driven shaft 35, and is connected for drive by the motor 11 by way of a belt and pulley connection 36. The casing 29 is bolted or otherwise fixedly secured to the cross beams 17 and 18 of the frame structure 9 and embodies suitable bearings for the drive and driven shafts 32 and 35. The drive shaft 32 extends horizontally and in parallel relation with the armature shaft of the electric motor 11 and carries the pinion 33. The driven shaft 35 is positioned in parallel relation with the drive shaft 32 and is tubular, as shown in Figure 4. The front end of the driven shaft projects an appreciable distance beyond the casing 32 of the unit 29 and extends into and is fixedly secured to the hub 25 of the end wall 24 of the receptacle. The gear 34 meshes with and is driven by the pinion 33, as shown in Figure 3, and is mounted on the central portion of the driven shaft 35. The belt and pulley connection 36 comprises a pair of pulleys 37 and 38, and a series or plurality of endless belts 39. The pulley 37 is fixed to the rear end of the armature shaft of the electric motor 11 and has belt grooves in the periphery thereof. The pulley 38 is mounted on and fixed to the rear end of the drive shaft 32 of the speed reducing unit and has belt grooves in alignment with the grooves in the periphery of the pulley 37. The endless belts 39 extend around and fit within the grooves in the two pulleys and operate to connect the unit 29 for drive by the motor 11. When the motor is in operation the receptacle 10 is driven or rotated and the sand therein is caused to adhere to the side wall 23, as hereinbefore described. In order to prevent inadvertent contact with the side wall 23 of the receptacle and resultant injury or damage during drive of the receptacle a substantially semicircular hood 40 is provided. This hood extends around the central and upper portions of the receptacle, as shown in Figures 1, 2, 4 and 7, and is secured to the side beams 15 and the plate 22.

The two mulling elements 12 are in the form of narrow wheels and are positioned in laterally offset relation and one ahead of the other, as shown in Figures 5 and 6. They are provided with solid rubber tires 41 and are rotatably mounted on a pair of parallel axles 42. These axles are mounted in sockets 43 in the ends of an arm 44 and project in opposite directions from the arm so that the wheels are laterally offset. The arm 44 has a central hub 45 and this hub is rotatably mounted on a pin 46 on a lever 47. The lever 47 comprises a substantially vertical arm 48 in front of the receptacle and a horizontally extending arm 49 in the receptacle. The arm 49 is fixed to the upper end of the arm 48 and carries the pin 46 at its inner end. It projects through the opening 28 in the ring 27 and is of such length that the arm 45 is disposed in the central portion of the receptacle. The lever 47 is pivotally supported by way of a bearing bracket 50 and a pintle 51. The bracket is mounted on the central portion of the cross beam 16 of the frame structure 9 and underlies the standard 21. The pintle is journaled in the bracket and is formed integrally with and projects outwardly from the upper central portion of the arm 48. When the arm 48 is

swung in a clockwise direction, as viewed in Figure 1, the lever is caused so to swing the arm 44 that the wheel type mulling elements 12 are urged or moved toward the side wall 23 of the receptacle 10. When the arm 44 is swung in the reverse direction, that is, counterclockwise as viewed in Figure 1, the lever 47 together with the arm 44 is swung in such manner that the mulling elements 12 are moved bodily away from said side wall 23. Swinging of the lever 47 is effected by means of a fluid pressure device 52 and a control valve 53. The device 52 underlies one end of the cross beam 16 of the frame structure 9 and consists of a cylinder 54 and a piston 55. The cylinder is of uniform diameter from one end thereof to the other and is closed at the ends thereof by means of a pair of head 56 and 57. The head 56 is pivotally connected by a bolt 58 to one of the legs 19 of the frame structure 9 so that the device 52 is permitted to swing in a vertical plane. The piston 55 is mounted in the cylinder to slide between the two heads 56 and 57 and is provided with a stem 59. The latter extends through a packing gland 60 on the head 57 and is pivotally connected at its outer end to the lower end of the arm 48 of the lever 47. When the piston is shifted in the cylinder towards the head 57 the bracket 48 is swung counterclockwise, as viewed in Figure 1, and the mulling elements 12 are caused to move away from the receptacle side wall into an inoperative position, as hereinbefore pointed out. When the piston 55 is shifted in the opposite direction, that is, toward the head 56 of the cylinder 54, the lever 47 is swung or rotated in a clockwise direction and the mulling elements are thus swung toward the receptacle side wall. Shift or reciprocation of the piston in the cylinder is effected by means of compressed air under control of the valve 53. This valve is mounted on a bracket 61 on the cross beam 16 and consists of a cylindrical casing 62 and a handle equipped plug 63. The casing supports the plug for rotation about a vertical axis and has a vertically extending annular side wall with four ports 64, 65, 66 and 67. These ports are positioned or located 90° apart, as shown in Figure 1^a, and are so arranged that the port 67 is diametrically opposite the port 64 and the port 66 is diametrically opposite the port 65. The port 64 is connected by a pipe 68 to receive air under pressure from a storage tank or other source of supply, and the port 67 is connected to atmosphere by way of a vent pipe 69. The port 65 is connected by a flexible pipe or hose 70 to the head 56 at one end of the cylinder 54 and the port 66 is connected by a flexible pipe or hose 71 to the head 57 at the other end of the cylinder. The plug 63 is adapted to control the four ports in the side wall of the valve casing and is limited in any suitable manner to 90° rotation. As shown in Figure 1^a two diametrically opposite 90° arcuate notches 72 and 73 are formed in the marginal portion of the plug. When the plug is in one position the notch 72 establishes communication between the pipe 68 and the pipe 70 and the notch 73 establishes communication between the pipe 71 and the vent pipe 69. When the plug is rotated into its other position the notch 72 establishes communication between the pipes 68 and 71 and the notch 73 establishes communication between the pipe 70 and the vent pipe 69. From the foregoing it is manifest that when the plug 63 is in its one position, that is, with the notch 72 establishing communication between the pipe 68 and the pipe 70 and the notch 73 estab-

lishing communication between the pipe 71 and the vent pipe 69, air under pressure flows through the head 56 into the cylinder and causes the piston to move towards the head 57 and thus swing the lever 47 in such direction that the mulling elements 12 are swung away from the receptacle side wall into their inoperative position. When the plug 63 is rotated into its other position, that is, the position wherein the notch 72 establishes communication between the pipes 68 and 71 and the notch 73 establishes communication between the pipe 70 and the vent pipe 69, the end of the cylinder with the head 56 is vented and air under pressure flows into the cylinder via the head 57 and forces the piston 55 in such direction that the lever 47 swings the mulling elements 12 toward the side wall 23 of the receptacle. By rotating the plug 63 of the control valve 53 the mulling elements may be swung either toward the receptacle side wall and held under pressure in their operative position or swung away from the receptacle side wall into their inoperative position. When the mulling elements are in their operative position they are under fluid pressure only and hence they are free to move outwards in the event that they encounter scrap in the sand around the side wall of the receptacle. If desired a pressure regulator (not shown) may be connected to the pipe 68 so that the pressure to which the mulling elements are subjected while in their operative position may be controlled or varied. By reason of the fact that the wheel type mulling elements 12 are narrow an effective mulling action is obtained. This is attributable to the fact that the sand during squeezing thereof by the elements is shifted or displaced laterally with a rubbing action which tends to coat the grains of sand with any bonding material which may be mixed with the sand. By having the wheels positioned in laterally offset relation, a portion of the sand which is squeezed or offset laterally by the leading element is directed into the path of the mulling element and is hence again subjected to a mulling action.

The scraper 13 is shaped conformably to the receptacle side wall 23 and is positioned in the upper portion of the receptacle and substantially directly behind the following or trailing wheel type mulling element 12. It is carried by an arm 74 which extends through the opening 28 in the ring 27 and is fixed to the central portion of the standard 21 by way of a bracket 75. As shown in Figure 7, the scraper during operation of the apparatus, that is rotation of the receptacle, operates to scrape the sand from the side wall after it has been packed against the latter by the mulling elements 12. The inner face of the scraper is so angled or shaped that it directs the scraped sand inwardly at a slight angle and in an aerated manner. In order to assist the scraper in breaking up the sand and aerating it, the apparatus includes a plow 76 and a pair of deflectors 77. The plow is located behind the scraper and consists of a pair of substantially triangular walls which are arranged in wedge-type relation and operate to deflect the scraped sand laterally. A vertically extending pipe-like arm 78 serves to support the plow 76 in its operative position and this arm is connected to and extends upwardly from the central portion of a horizontally extending pipe 79. Said pipe 79 is positioned in parallel relation with the axis of rotation of the receptacle and in addition to supporting the arm 78 carries the deflectors 77. The outer end of the pipe 79 extends through the opening 28 in the ring 27

and is fixed to a bracket 80 on the central portion of the standard 20. The deflectors 77 are positioned at the sides of and beneath the plow 76 as shown in Figure 4, and are designed and adapted to receive the sand from the plow and direct it inwards toward the central portion of the side wall and into the path of the mulling elements 12. The scraper, plow and deflectors co-act to aerate and mix the sand after the latter has been subjected to the action of the mulling elements. When the mulling elements are shifted into their inoperative position by manipulation of the plug 63 of the control valve 53 the scraper, plow and deflectors break up any lumps in the sand and thus condition the sand after mulling thereof for immediate use.

The chute 14 constitutes single means for introducing the sand to be mulled into the receptacle and for discharging the mulled sand from the receptacle via the opening 28. It comprises an elongated curved bottom 81 and a pair of sides 82, and is pivoted on a rod 83 to swing about a horizontal axis. The sides 82 of the chute are positioned in laterally spaced relation and have aligned pivot holes 84 for the rod 83. The rod, as shown in Figure 1, extends between and is secured at its ends to the upper ends of the standards 20 and 21. The chute is so designed and pivoted that it may be swung back and forth between a charging position wherein it is outside of the receptacle and the bottom 81 is downwardly and inwardly inclined, as shown in Figure 4, and a discharge position wherein it is disposed for the most part within the receptacle 10 and the bottom is downwardly and outwardly inclined, as shown in Figure 5. When the chute 14 is in its charging position and sand to be mulled is introduced into it, the sand to be mulled is directed into the bottom of the receptacle. When the chute 14 is swung into its discharge position, as shown in Figures 5 and 8, the inner portions of the sides 82 are positioned behind and beneath the scraper 13 and operate to catch the scraped sand and direct it onto the bottom 81 which because of its incline directs or discharges the sand from the receptacle. The shaping of the inner ends or portions of the side walls 82 is such that when the chute is in its discharge position they catch all of the sand from the scraper and hence discharge of the mulled sand is effected during one revolution of the receptacle. By having a single chute serve as the charging and discharge means the apparatus as a whole is simplified. A fixed U-shaped apron 85 is connected by brackets 86 to the central portion of the cross beam 16 and serves as a continuation of the chute when the latter is in its charging position and prevents any spilling of sand as the latter is discharged into the receptacle. The chute is provided with a handle 87 at one side thereof for manipulating purposes and in addition is provided with a releasable locking device 88 for securing it in its charging and discharge positions. This locking means comprises an apertured bracket 89 over the central portion of the cross beam 16, a pair of apertured lugs 90 and 91 on one side of the chute, and a head equipped pin 92. The lug 91 is so arranged that when the chute is in its charging position it overlies or registers with the bracket 89 and permits the pin 92 to pass therethrough into the aperture of the bracket and lock the chute in place. The lug 91 is located at the outer end of the chute and is adapted when the chute is in its charging position to overlie or

register with the bracket 89 and have the pin 92 pass therethrough into the bracket 89 for locking purposes.

In order to eliminate dust during use or operation of the apparatus a duct 93 is provided. This duct is connected to the outer end of the hollow driven shaft 35 and is provided with a fan 94 for creating a suction therein. The fan is so arranged that the suction within the duct operates to draw any dust or sand in suspension from the interior of the receptacle through the driven shaft 35. The discharge end of the duct is adapted to be connected to a dust collector or like device (not shown).

When it is desired to operate the apparatus the motor 10 is first started so as to effect rotation or drive of the cylindrical cylinder 11. Thereafter the plug 63 of the control valve 53 is manipulated so as to cause by the control of compressed air movement of the piston 55 toward the head 56 of the fluid pressure device 52. As heretofore pointed out, such movement of the piston operates through the medium of the lever 47 to swing the wheel type mulling elements 12 toward the side walls of the receptacle. After the aforesaid manipulation of the plug of the control valve the sand to be mulled is introduced into the receptacle by delivering it to the chute 14 while the latter is held or locked into its charging position. After the sand is delivered into the receptacle it comes in contact with and revolves with the side wall 23. As the sand passes the wheel type mulling elements 12, it is squeezed against the side wall by the elements and the desired mulling is effected. If bonding material is mixed with the sand it is uniformly distributed over the grains of sand as the result of the squeezing and mulling action of the mulling elements 12. After the sand travels past the trailing mulling element 12 it encounters the scraper 13 and is scraped from the side wall and directed inwardly towards the plow 76, as heretofore described. After engaging or encountering the plow the sand strikes against the deflectors 77 and is deflected by the latter toward the central portion of the receptacle side wall wherein it is properly positioned for further mulling by the elements 12. As a result of the squeezing of the sand by the elements and the mixing and aeration of the sand by the scraper, plow, and deflectors, the desired or proper conditioning of the sand is obtained. At the conclusion of the mulling operation the plug 63 of the control valve 53 is turned 90° so as to cause the fluid pressure device 52 to swing the mulling elements 12 into their inoperative position. While the elements are in their inoperative position, the receptacle is permitted to rotate several times so that the scraper, plow and deflectors operate to break up any lumps. After breaking up of all the lumps the chute is released by removing the pin 92 and is swung inwardly into its discharge position. As soon as the chute reaches such position it is locked in place by the pin and serves during but a single revolution of the receptacle to discharge all of the mulled sand. During operation of the apparatus the fan equipped duct 93 operates to evacuate any dust or sand in suspension from the receptacle. The motor and speed reducing unit are such that the receptacle is driven at a sufficient speed to cause centrifugal action or force to hold the sand in contact and for rotation with the receptacle side wall 23. If, for example, the receptacle has a diameter of four

feet it is driven at forty revolutions per minute or more in order to effect the desired adherence of the sand with the receptacle side wall.

The hereindescribed mulling apparatus consists of but a small number of parts and hence may be manufactured at a low and reasonable cost. It is extremely efficient and effective as far as the mulling of sand is concerned because of the arrangement and design of the narrow sand type mulling elements 12. By reason of the fact that the elements are mounted or supported so that they may be swung inwardly away from the side wall of the receptacle into an inoperative position it is possible at the conclusion of a mulling operation to utilize the scraper and associated plow and deflector means for breaking up any lumps in the sand prior to discharge of the sand from the receptacle. By having the receptacle rotate on a horizontal axis and employing the chute 14 for introducing the sand into the receptacle and discharging the mulled sand therefrom, the apparatus affords accessibility to its parts and is extremely simple in design.

Whereas the apparatus has been described as being primarily for use in a foundry in connection with mulling of molding sand, it is to be understood that it may be used for conditioning other materials. It is also to be understood that the invention is not to be restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. A mulling apparatus comprising in combination a frame structure, a receptacle for the material to be mulled mounted to rotate about the center thereof and embodying an annular side wall, means carried by the frame structure for rotating said receptacle, a mulling element disposed in the receptacle and adjacent the side wall and having frame-structure-carried supporting means therefor whereby it is movable toward said side wall into an operative position wherein it serves during rotation of the receptacle to mull the material by squeezing it against the side wall, and away from said side wall into an inoperative position wherein it effects no mulling of the material, and fluid pressure actuated means for shifting the element into either its operative or inoperative position embodying a valve type control device with a single movable part, and adapted upon movement of the part into one position to shift the element into its operative position and upon movement of the part into another position to shift the element into its said inoperative position.

2. A mulling apparatus comprising in combination a frame structure, a receptacle for the material to be mulled mounted on the frame structure to rotate on a substantially horizontal axis and embodying an annular side wall concentrically arranged with respect to the axis and having means associated therewith for entry and discharge of the material, means on the frame structure for rotating the receptacle, a mulling element positioned in the receptacle and adjacent the side wall and adapted during rotation of the receptacle to mull the material by squeezing it against said side wall, a scraper disposed in the receptacle behind the element and adapted to scrape and move inwardly the material from the side wall after squeezing thereof by the element,

a pair of deflectors positioned behind and outwardly of the scraper and arranged and designed to divert the scraped material back on to the side wall and into the path of the mulling element.

3. A mulling apparatus comprising in combination a frame structure, a receptacle for the material to be mulled mounted to rotate on a substantially horizontal axis and embodying an annular side wall concentrically arranged with respect to the axis and having one end thereof open, means for rotating the receptacle, a mulling element positioned in the receptacle and adjacent the side wall and adapted during rotation of the receptacle to mull the material by squeezing it against said side wall, a scraper in the receptacle positioned behind the element and adapted to scrape the mulled material and direct it inwards from the side wall, and a chute movably supported on the frame structure so that it is shiftable back and forth between a charging position where it is exteriorly positioned with respect to the receptacle and serves to direct the material to be mulled into the receptacle via the open end and a discharge position wherein it is disposed substantially entirely within the receptacle and operates to receive the scraped material from the scraper and direct it outwards through said open end.

4. A mulling apparatus comprising in combination a frame structure, a receptacle for the material to be mulled mounted to rotate on a substantially horizontal axis and embodying an annular side wall concentrically arranged with respect to the axis and having one end thereof open, means on the structure for rotating the receptacle, a mulling element positioned in the receptacle and adjacent the side wall and adapted during rotation of the receptacle to mull the material by squeezing it against said side wall, a scraper in the upper portion of the receptacle carried by the frame structure and arranged to scrape the mulled material from the side wall and deflect it downwards, and a chute pivotally supported on the frame structure so that it is shiftable back and forth between an inclined charging position wherein it is exteriorly disposed with respect to the receptacle and serves to direct the material to be mulled into the receptacle via the open end, and a reversely inclined discharge position wherein it is disposed substantially within the receptacle and operates to receive the scraped material from the scraper and direct it outwards through said open end.

5. A mulling apparatus comprising in combination a frame structure, a receptacle for the material to be mulled, mounted on the structure to rotate about the center thereof and embodying an annular side wall with one end thereof open for the entry of the material and its other end closed, means on the structure for rotating the receptacle, an elongated arm in the receptacle and adjacent the side wall and carried by the frame structure so as to be movable bodily to and from said side wall and pivoted at the central portion thereof so that its ends are free to swing to and from said side wall, a pair of axles mounted on the ends of the arms and extending in substantially parallel relation with said side wall, comparatively narrow wheel type mulling elements rotatably mounted on the axles and adapted during rotation of the receptacle to mull the material by squeezing it against the side wall, and means for quickly and readily shifting the

arm together with the mulling elements toward or away from said side wall.

6. A mulling apparatus comprising a receptacle for the material to be mulled mounted to rotate about the axis thereof and embodying an annular side wall together with means forming an opening for entry of the material, means for rotating the receptacle, an arm in said receptacle and adjacent the side wall having supporting means therefor whereby it is movable bodily to and from said side wall and embodying axles at its ends extending one in one direction and the other in the opposite direction and arranged so that they are parallel to the axis of said receptacle, a pair of narrow wheel type mulling elements mounted on the axles in laterally offset relation and adapted during rotation of the receptacle to squeeze the material against the receptacle side wall in order to effect mulling thereof, and means associated with the supporting means for urging the arm towards the receptacle side wall and thus rendering the elements operative.

7. A mulling apparatus comprising a frame structure, a receptacle for the material to be mulled mounted to rotate on a substantially horizontal axis and embodying an annular side wall concentrically arranged with respect to said axis and having one end thereof open, means on the frame structure for rotating the receptacle, an arm in the receptacle and adjacent said side wall, having frame-structure-supported mounting means therefor whereby it is movable bodily to and from said side wall and embodying at its ends a pair of laterally offset axles extending one in one direction and one in the opposite direction and substantially parallel with said receptacle side wall, a pair of wheel type mulling elements mounted rotatably on and held in laterally offset relation by the axles and adapted during rotation of the receptacle by said means to mull the material by squeezing it against the side wall, and means supported on said frame structure and associated with the mounting means for urging said arm towards the receptacle side wall and thus rendering the elements operative.

8. A mulling apparatus comprising a receptacle for the material to be mulled embodying an annular side wall and having means forming an opening for entry of the material, an arm in the receptacle and adjacent the side wall, means for supporting the arm so that it is movable bodily to and from the side wall, embodying as part there-

of a central pivot for the arm whereby said arm is free to tilt relatively to the side wall, a pair of rotary wheel type mulling elements mounted on axles at the ends of the arm and parallel to the axis of the receptacle, and adapted to effect mulling of the material by squeezing it against the side wall, and means associated with the supporting means for urging the arm toward the receptacle side wall and thus rendering operative the mulling elements.

9. A mulling apparatus comprising a frame structure, a receptacle for the material to be mulled mounted to rotate about the center thereof and embodying an annular side wall with one end thereof open for entry of the material and its other end closed, means on the frame structure for rotating the receptacle, an elongated arm in the receptacle and adjacent the side wall carried by the frame structure so that it is movable bodily to and from said side wall and having a pivot at the central portion thereof so that the ends thereof are free to swing to and from said side wall, axles on the ends of the arm projecting in opposite directions and in substantially parallel relation with the side wall, comparatively narrow wheel type mulling elements rotatably mounted on the axles in laterally offset relation and adapted during rotation of the receptacle to mull the material by squeezing it against the side wall, and power means for urging the arm toward the receptacle side wall and thus rendering operative the mulling elements.

10. A mulling apparatus comprising in combination a receptacle for the material to be mulled embodying a continuous side wall and an end wall and having means forming an opening for the entry of the material, a freely rotatable mulling element in the receptacle and adjacent one wall thereof mounted to move towards said one wall into an operative position wherein it serves to mull the material by squeezing it against said one wall and away from said one wall into an inoperative position wherein it effects no mulling of the material, and fluid pressure actuated means for shifting the element into and out of its inoperative position, embodying a valve type control device therefor with a single movable part and adapted upon shift of said part into one position to shift said element into its operative position and upon shift or movement of the part into another position to retract the element or shift it into its inoperative position.

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