Sept. 9, 1924. 1,508,031

H. S. SIMPSON

FOUNDRY SAND MIXER

Filed Sept. 10, 1921 4 Sheets-Sheet I

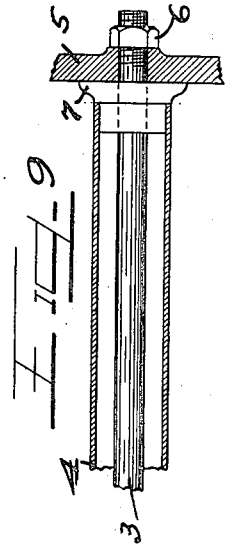


FIG. 9

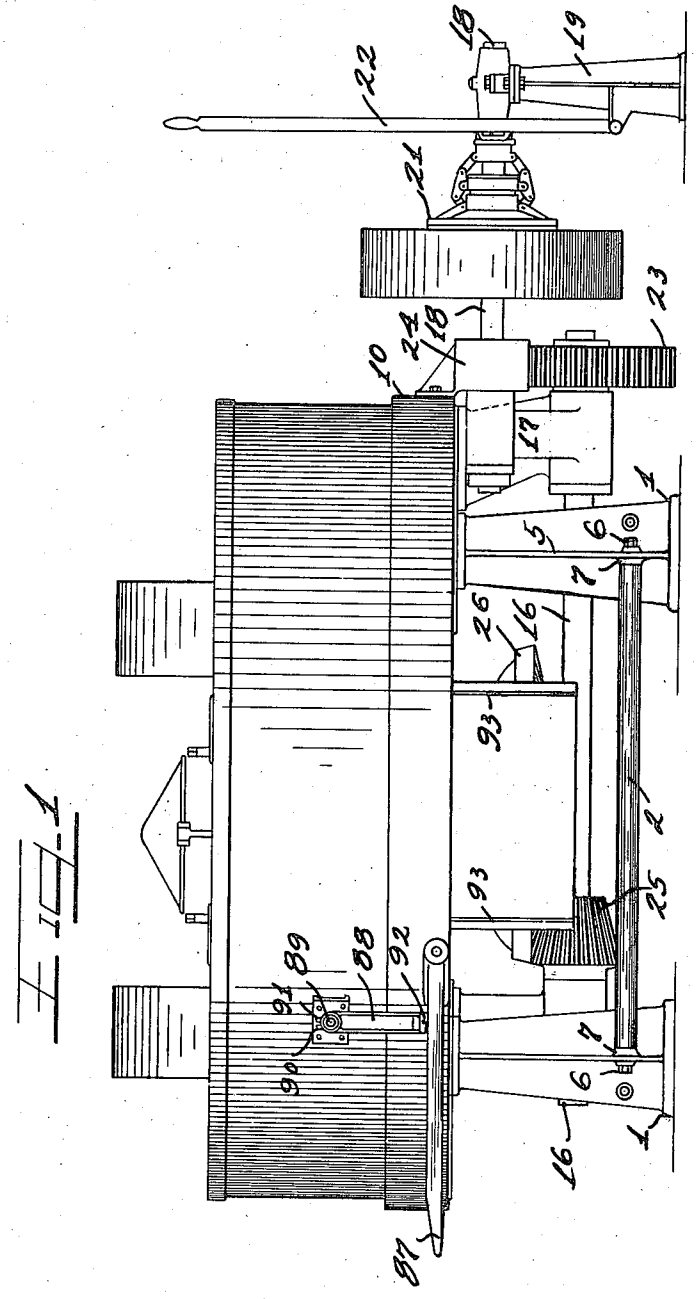


FIG. 1

Witnesses

A. G. Parks

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Sept. 9, 1924. 1,508,031

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FOUNDRY SAND MIXER

Filed Sept. 10, 1921 4 Sheets-Sheet 2

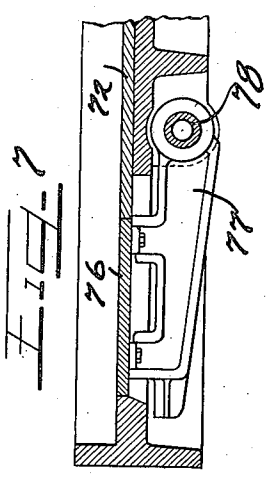
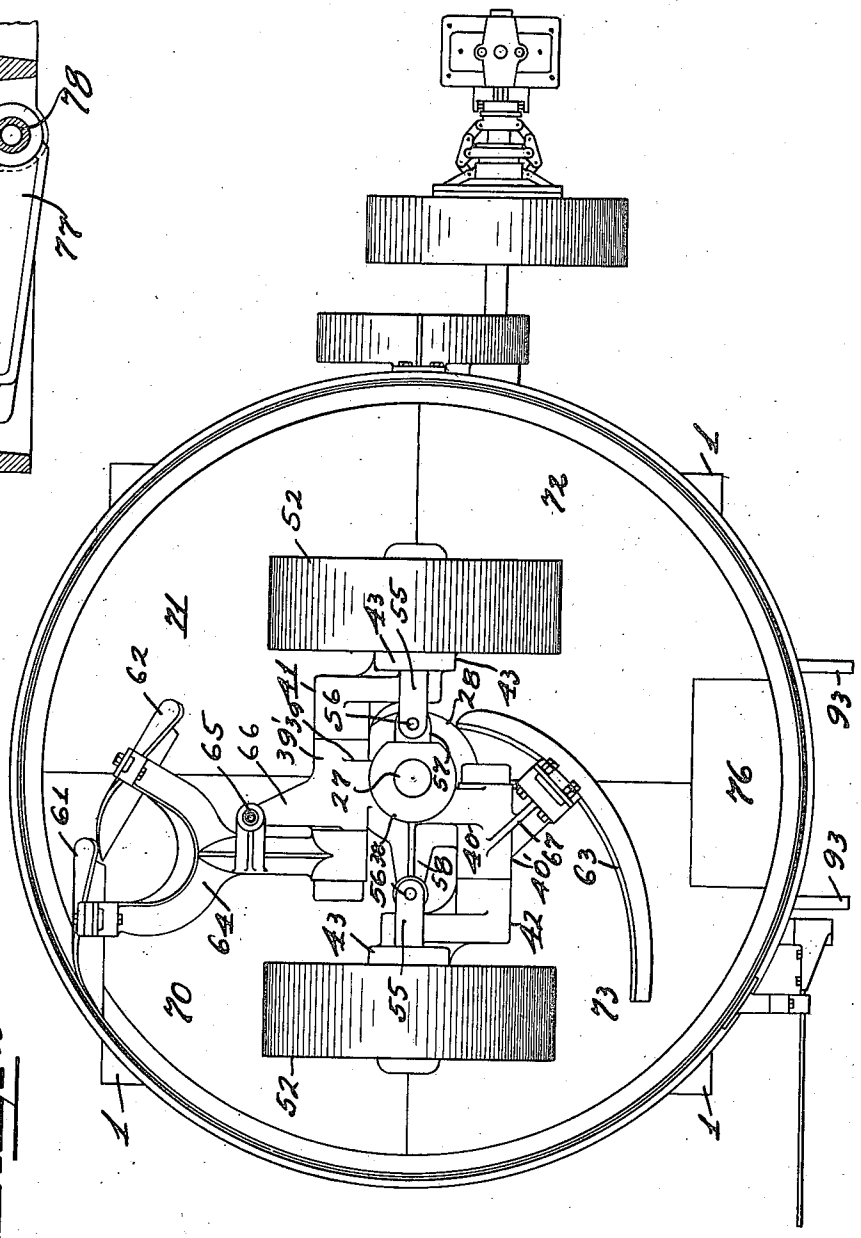


FIG. 2



Witnesses

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Sept. 9, 1924. 1,508,031

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FOUNDRY SAND MIXER

Filed Sept. 10, 1921 4 Sheets-Sheet 3

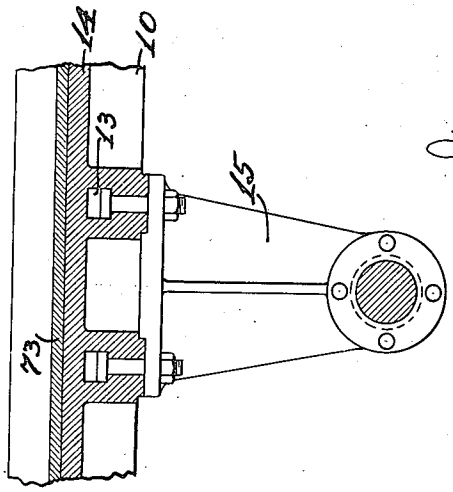


FIG. 3

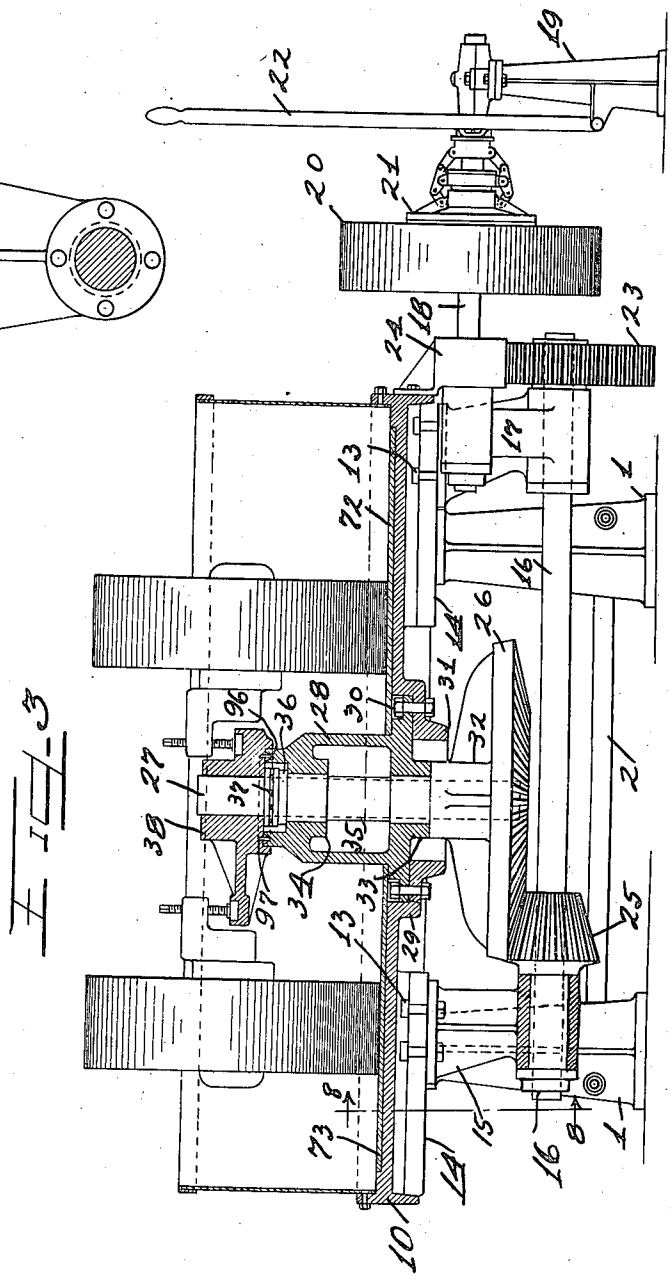


FIG. 2

Witnesses

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FOUNDRY SAND MIXER

Filed Sept. 10, 1921 4 Sheets-Sheet 4

Fig. 4

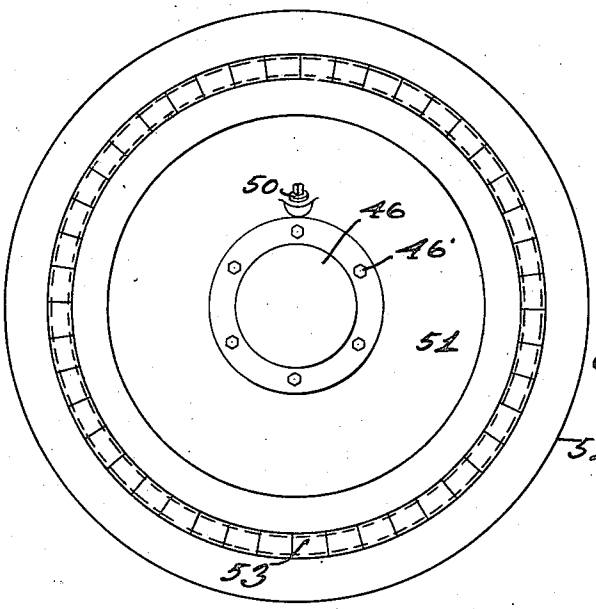


Fig. 5

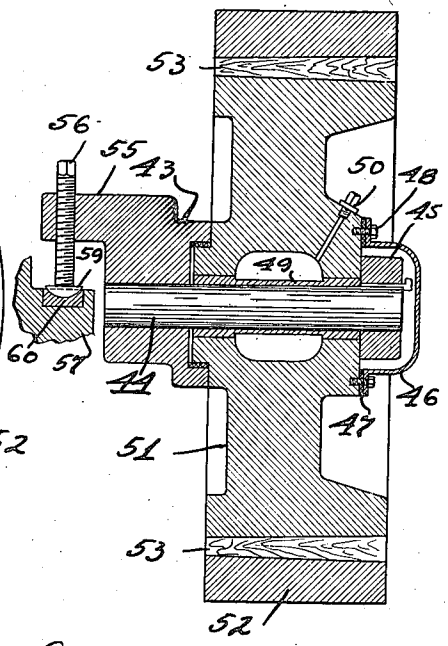
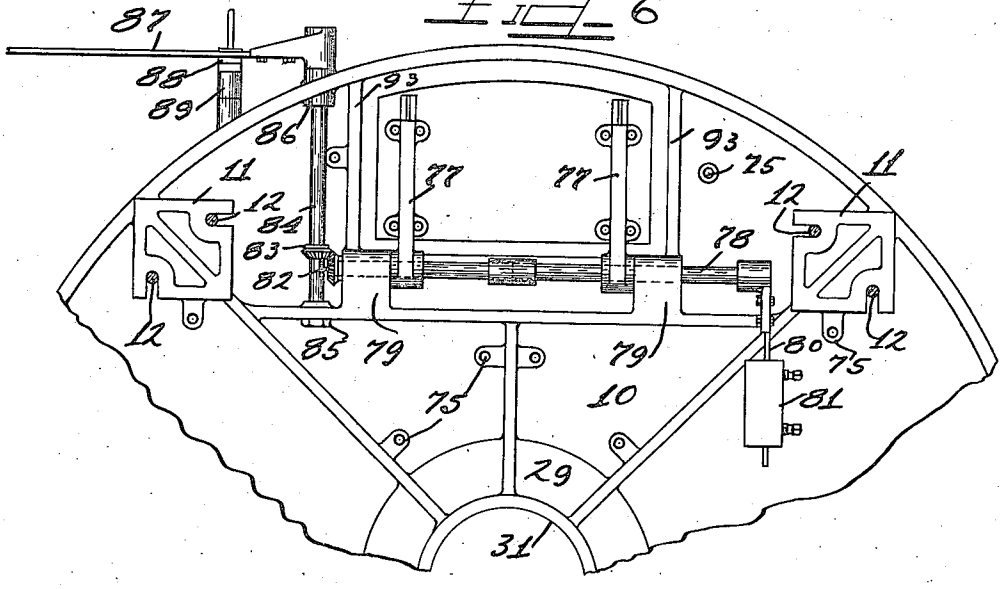


Fig. 6



Witnesses

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Patented Sept. 9, 1924. 1,508,031

UNITED STATES PATENT OFFICE.

HERBERT S. SIMPSON, OF CHICAGO, ILLINOIS.

FOUNDRY-SAND MIXER.

Application filed September 10, 1921. Serial No. 499,620.

To all whom it may concern:

Be it known that I, HERBERT S. SIMPSON, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Foundry-Sand Mixers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to a foundry sand mixer of the type illustrated in my Patent No. 1,337,333, granted April 20th, 1920.

It is an object of this invention to generally improve the mixing machine illustrated in the above patent, in making certain parts separable from others so that the same may be readily renewed, spacing the mullers at different distances from the center, with provision for shifting the driving mechanism from one side of the machine to the other, and protecting the vital operating parts from dirt and dust.

Other and further important objects of this invention will be apparent from the disclosures in the specification and drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a front elevation of the machine as a whole.

Figure 2 is a plan view.

Figure 3 is a vertical central section.

Figure 4 is a side view, and Figure 5 is a section of one of the mullers.

Figure 6 is a bottom plan view of the part of the machine having the dumping door.

Figure 7 is a section through the dumping door.

Figure 8 is a detail section showing the way of fastening the shaft hangers in place.

Figure 9 is a detail section showing the way of bracing the supporting pedestals or legs.

As shown on the drawings:

The machine is supported on four pedestals or legs 1 which are braced against vibration by means of cross-pieces 2, the structure of which has been illustrated in Figure 9. Each cross-piece consists of a rod 3 surrounded by a pipe 4. The rods 3 pass through the webs 5 of the pedestals, and are tightened by nuts 6. Between the ends of the pipes 4 and the faces of the webs 5 are blocks 7 at each end of each pipe. By tightening the nuts 6, the rods 3 may be placed under tension, and the pipes 4 under compression. The pipes 4 thus prevent any motion of the legs toward one another, and the rods 3 any motion away from one another. The cross-braces 2, therefore, materially reduce the vibration.

The bottom of the machine consists of a casting 10 upon which anchor pads 11 are secured. These anchor pads are in the form of square or rectangular metal castings and each is shown as provided with a pair of bolt slots 12. These bolt slots are provided with suitable shoulders similar to those shown in Figure 8 for the reception of the heads of the bolts which extend upwardly from pedestals 1 whereby the machine may be removably anchored to the supporting pedestals.

The driving mechanism for operating the machine is interchangeably mounted upon the bottom 10 of the machine in a manner as now will be described: similar anchor pads 14 are secured upon the bottom of the machine. These anchor pads consist of suitable metal castings or the like having grooves or slots 13 extending inwardly from the outer edges thereof. The form of this pad is shown in Figure 8 and in referring to said figure it will be observed that each pad has a pair of depending ribs in which the grooves are made; the upper portions of the grooves being enlarged for the reception of the heads of suitable bolts. In referring to Figure 3 it will be noted that these pads 14 are located upon opposite sides of the machine and that a shaft hanger 15 is removably anchored to one pad by means of suitable headed bolts slid into the grooves of the adjacent pad and that a second shaft hanger 17 is removably anchored to the other pad in a similar way. The shaft hanger 17 is provided with a pair of bearings, one for supporting the inner end of the shaft 18 and the other for supporting the end of the shaft 16. The opposite end of the shaft 18 is supported in a pedestal 19, while the opposite end of the shaft 16 is supported in the hanger 15. It will therefore be evident that the driving mecha-

nism is removably mounted upon the bottom of the machine and the same may be readily reversed from a right side to a left side position by simply sliding the anchoring bolts from their position in the pads and turning the driving mechanism end for end and again attaching the same to the anchor pads 14.

Upon the shaft 18 is loosely mounted a pulley 20 which can be secured to the shaft 18 by means of the clutch 21 manipulated by the lever 22 which is pivoted upon the pedestal 19. The shaft 18 also carries a small gear which meshes with a large gear 23 upon the shaft 16. The small gear is covered by the usual gear casing 24 which may be supported from the bracket 17 or may be separately bolted to the casting 10. At the other end of the shaft 16 is a bevel gear 25 which meshes with a bevel gear 26 supported from the central shaft 27 of the machine.

The shaft 27 is supported by a turret 28 which is removably supported on the casting 10. The central portion of the casting is offset downward to provide a seat for this turret as indicated at 29, and the turret is bolted to the casting by the bolts 30. The inner portion of the offset 29 has a depending skirt 31 which extends below the hub 32 of the gearing 26. On the lower end of the turret 28 is a sleeve 33, the end of which coacts with the end of the hub 32 to positively position the gearing 26. The turret 28 also has a skirt 34 at its upper end. The projection of the skirt 31 below the abutting edges of sleeve 33 and hub 32 tends to prevent the dirt getting into the bearing. Aligned bearings in the two skirts 33 and 34 serve to position the bushing 35 in which the shaft 27 runs. At the upper end of the bushing is a collar 36 which supports a seat for the balls of the thrust bearing 37.

The upper member of this thrust bearing supports a cross head or spider 38 by which the plows and mullers are carried. As the weight of the plows and the mullers is taken by the thrust bearing, the power required to drive them is materially lessened because of this arrangement. The top of the turret 28 surrounds the thrust bearing 36 and its upper edge has a V-shaped groove 96 and the cross-head or spider has a ring 97 inserted therein which cooperates with oil placed in the groove 96 to make a seal preventing the contents of the pan from getting into the bearing.

The cross-head or spider 38 is best shown in Figure 2, and includes a pair of bracket arms 39 and 40 extending in opposite directions from the center of the cross-head. Each of these arms ends in a shaft bearing 39′ and 40′ respectively, by which the crank shafts 41 and 42 are respectively rotatably supported. The bearing 39′ is considerably shorter than the bearing 40′, so that the elbow of the crank shaft 41 is considerably nearer from the center than that of the crank shaft 42.

Each of these crank shafts ends in a hub 43 which affords a bearing for the axle 44 of a muller, as best illustrated in Figure 5. The other end of the axle 44 is supplied with a collar 45 keyed thereto, and this is covered by cap 46, between which and the muller there is a gasket 47. The cap 46 and the gasket 47 are secured to the muller by screws 48 and rotate therewith. A removable bushing 49 is indicated in Figure 5.

The muller consists of a wheel 51 and a tire 52. The tire is fastened to the wheel by means of an annular series of wooden wedges 53. Thus the tire may be made of hard steel without the necessity of making the whole muller of this material. Thus it may be readily renewed when worn because it is easily separated from the wheel. Moreover, the fastening of wood between the two serves to lessen the vibration upon the muller bearings.

The hub 43 is supplied with a lug 55 which supports a bearing for a screw 56 which passes through the lug 55 and bears against a support 57 or 58, the first of which extends from the cross-head or spider 38 toward the crank shaft 41, and the other of which extends in the other direction toward the crank shaft 42. By adjusting the screws 56, the height of the mullers above the bottom of the pan may be regulated. The lower end of each screw 56 is supplied with a cap in the form of a spherical segment of hard steel 59 which rests in an inlay 60, also of hard steel, provided in the lug 57 or 58. Wear of the end of the screw is thus prevented or minimized.

The cross-head 38 also supports the plows 61, 62 and 63. The first two of these are carried in a beam 64 supported from the bearing 39′ by being mounted in alignment therewith on the rock shaft 41. A screw 65 is provided for co-operating with a lug 66 on the bearing 39′ to regulate the height of these two plows from the bottom plate. The plow 63 is supported from an arm 67 integral with the bearing 40′ upon the end of the arm 40. No provision for vertical adjustment of this plow is made except that at its point of attachment to the arm, because this plow is intended to be positioned directly adjacent the bottom of the pan at all times.

The plow 61 extends to the edge of the pan. It is set at an angle to the radius of the pan so that it can not only turn over the contents of the pan, and also move it towards the center thereof. The plow 62 is immediately in the rear of the plow 61 and at a larger angle to the radius of the pan so that it also tends to turn over the contents and to move the contents still more rapidly

toward the center of the pan. The plow 63 is in contact with the turret 28. It slopes in the opposite direction from the plows 61 and 62 so that as the spider rotates, the plows 61 and 62 tend to bring the mixture toward the middle of the pan, and the plow 63 moves the mixture away from the center. The plow 63 is made curved in order that the more rapidly moving portion thereof shall not bear too squarely against the mixture, but shall continue to move it outward at about the same rate as do other portions. The outer end of the plow 63 is at the same distance from the center of the pan as the outer edge of the more distant of the two mullers.

The bottom of the pan is lined with steel plates 70, 71, 72 and 73. These are secured to the casting 10 by means of screws. Lugs are provided upon the casting to afford bosses which may be threaded for these screws as indicated in Fig. 6 at 75. Because there are four of these plates, it is possible to remove them without first removing the spider, as they are small enough to be lifted out through the space between the moving parts and the side of the pan by raising one of the mullers or plows 61 and 62 and rotating the spider if desirable to bring the raised part successively over each plate. Each of these plates is approximately the shape of a quarter of a circle, but the two plates 73 and 72 have an angle cut from their adjacent corners in order to provide for a door 76.

This door is bolted to hinges 77 which are rigidly connected to a shaft 78 and there are lugs 79 upon the casting 10 which afford bearings for this shaft. One end of the shaft 78 has an arm 80 to which is attached a counterweight 81. At the other end, the shaft 78 is supplied with a bevel gear 82 which meshes with a bevel gear 83 upon a shaft 84. The latter is mounted in a rib of the casting 10 as shown at 85, and in the rib at the edge of the casting 10, as shown at 86. The shaft 84 extends beyond the edge of the casting 10, and is supplied with an arm 87 which serves as a lever by which to manipulate the door.

In order to prevent the door moving under the influence of the weight of the charge in the pan, a locking dog 88 is provided which is pivoted upon a stud 89 secured to the side of the pan. A lug 90 upon the edge of the dog 88 and a lug 91 upon the bearing affords a stop so that the dog cannot be moved clockwise as shown in Figure 1, beyond the locking position. A handle 92 is provided at the lower end of the dog for convenient manipulation of the same. Side walls 93 are provided at each side of the opening of the door 76 to guide the material when it is discharged.

The operation of the device will be apparent from the foregoing description and the description in the aforementioned patent, and is therefore described only briefly.

When the clutch is thrown in, the action of the plows 61 and 62 is to move the material toward the center of the pan. The material thus comes under the mullers. When the material gets toward the center of the pan so that it escapes the action of the mullers, the plow 63 will move it out again. The combined action of the plows and the mullers will thoroughly mix and knead the material.

When this operation is completed, the operator opens the dog 88. The weight of the material in the pan then causes the trap door 76 to open, and the action of the plows in rotating the material in the pan brings it to the opening so that the pan is completely emptied after a few revolutions. In returning the door to the closed position, the weight 81 assists the operator in the manipulation of the lever 87. The lug 88 will return by gravity almost to locking position, and when the lever 87 is in the position corresponding to a closed door, the operator forces the lug 88 home by the handle 92.

As the mullers pass over the material being treated in the machine, if they meet a place where the material is particularly thick or particularly resistant, they will be lifted by their passage over such material and will descend by gravity when the lump in question is passed. This action will not cause any rapid battering of the end of the screws 56 because of the facing of hard steel, shown at 59 and 60, (see Fig. 5).

As the material used is fairly free from such lumps, the passage over lumps is not the particular purpose of the provision for a vertical motion of the mullers provided made by mounting them upon rock shafts. This mounting is primarily intended to provide for an adjustment, and for this reason it is important that the screws 56 shall not wear rapidly.

In the assembly of the machine, it is necessary to determine whether it is more convenient to mount the shaft 18 and the drive pulley 20 at the right or the left. When this has been determined, the bearing bracket 15 is mounted upon the side of the machine chosen to correspond, and the bearing bracket 17 upon the side where the shaft 18 is to be located. This mounting is effected by sliding the bolts into the slots 13 and securing the brackets to their bolts. The machine is therefore available for either right hand or left hand driving. If the left hand position be chosen, it is obvious that the levers 22, 87 and the handle 92 all are near to each other so that one operator can control the whole of the operation of the machine without being obliged to pass

from one side of the machine to the other.

I am aware that many changes may be made, and details of construction may be varied without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon, otherwise than necessitated by the prior art.

I claim as my invention:

1. In a mixing machine, a pan having a central opening surrounded by an annular flange, a turret having an annular base flange seated upon said first mentioned flange, a shaft journalled in said turret, a spider secured upon the upper end of said shaft, a pair of vertically adjustable mullers supported upon opposite sides of said spider, and segmental-shaped wear plates on the bottom of said pan adapted to be removed through a vertical adjustment of said mullers.

2. In a mixing machine, a pan, segmental-shaped wear plates covering the bottom of said pan, a turret removably secured centrally of said pan, a shaft journalled in said turret, a spider secured upon the upper end of said shaft and provided with trunnions, vertically swingable crank arms on said trunnions, mullers supported by said crank arms, and vertically adjustable therewith whereby said wear plates may be removed without interfering with said spider.

3. In a mixing machine, a pan, a turret removably secured centrally of the pan, a shaft journalled in said turret, a spider secured upon the upper end of said shaft and comprising bearing arms of unequal length, cranks rotatably supported on said bearing arms, mullers mounted on said cranks, in combination with means for diverting the material to be mixed toward and from the center of the pan.

4. In a mixing machine comprising a pan, a vertical muller operating shaft supported centrally of the pan and having a bevelled gear secured upon its lower end, a bevelled pinion meshing with said gear, a shaft for supporting said pinion, a driving gear on said shaft, a pair of spaced brackets for supporting said shaft, headed studs projecting from the upper end of said brackets, and slotted pads secured to the bottom of the pan and adapted for interchangeably receiving the studs of the different brackets for the purpose set forth.

5. In a mixing machine, a pan, a door in the bottom of said pan, an axle to which said door is secured, lugs integral with the bottom of the pan and having bearing apertures therein for receiving said axle, a shaft rotatably mounted on the bottom of the pan and extending to the front of the machine and geared to said axle, a lever connected to the front end of said shaft, means for anchoring said lever for retaining the door in closed position, and a counter-weight secured to said door for the purpose set forth.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

HERBERT S. SIMPSON.

Witnesses:
EARL M. HARDINE,
JAMES M. O'BRIEN.