United States Patent [19]

Hall

[11] **3,759,492**

[45] **Sept. 18, 1973**

[54] **CONCRETE MIXING SYSTEM**

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[73] Assignee: **U-Cart Concrete Systems Inc.,** Vancouver, Wash.

[22] Filed: **Oct. 28, 1971**

[21] Appl. No.: **193,478**

[52] **U.S. Cl.** **259/169,** 259/46, 259/178

[51] **Int. Cl.** **B28c 7/16**

[58] **Field of Search** ..... 259/169, 172, 178 R, 259/161, 45, 46, 109, 110, 165, 154

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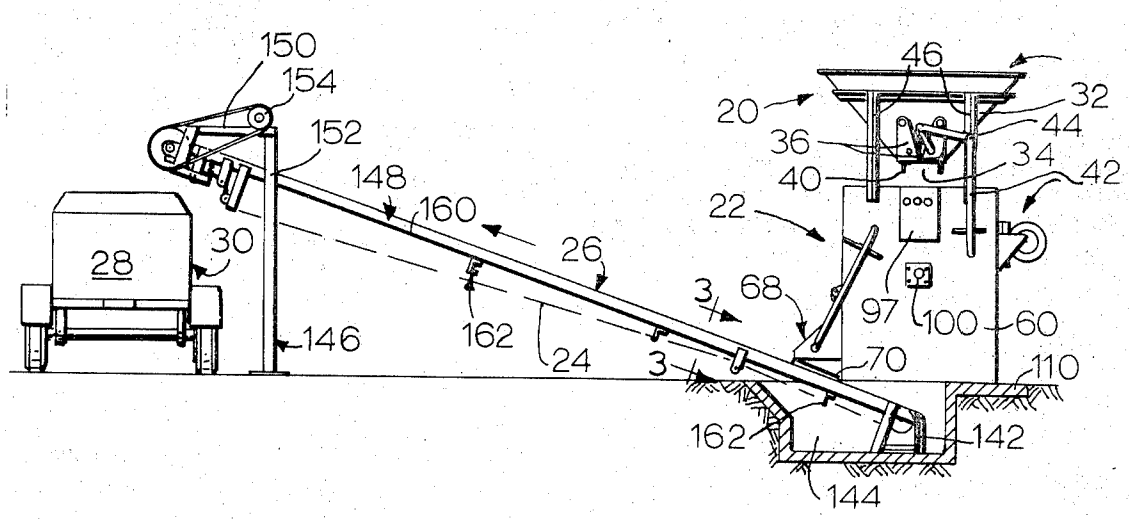
Primary Examiner—Robert W. Jenkins

Attorney—Stephen W. Blore et al.

[57] **ABSTRACT**

A mixer receives dry mix from a detachable hopper, and has adjustable, wiping paddles which push the mix through an opening to a spout having a U-shaped sealing strip engaging a conveyor belt driven by a takeup pulley biased by gravity and compression springs.

9 Claims, 10 Drawing Figures



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FIG 1

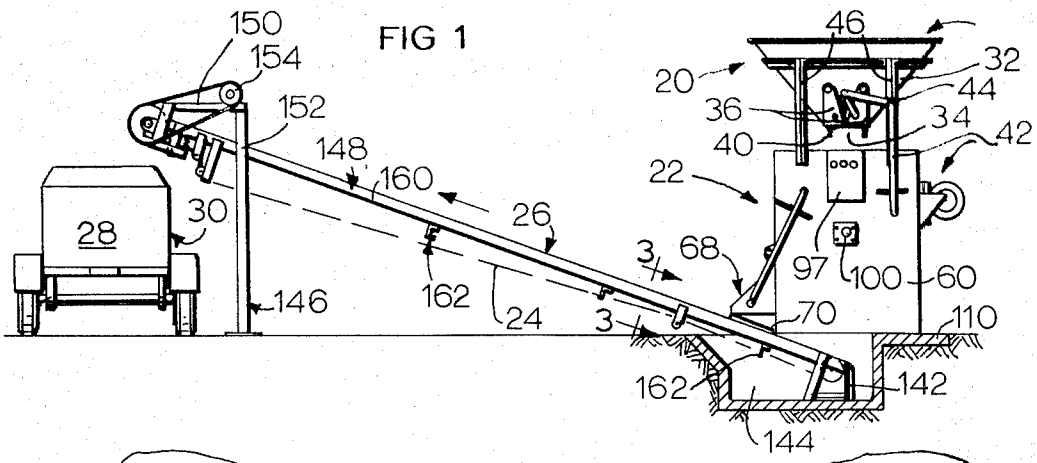


FIG 2

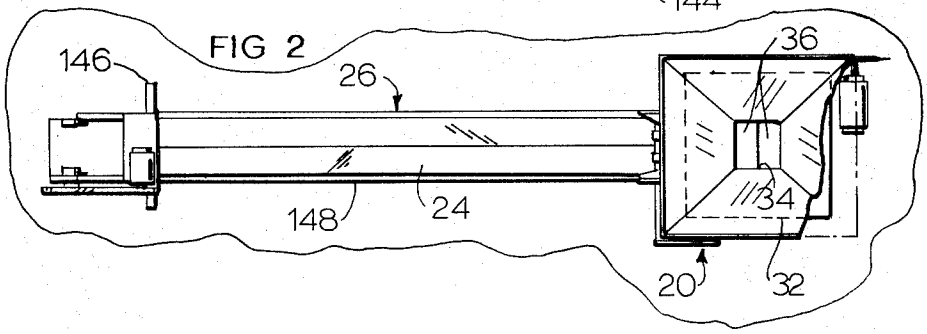


FIG 3

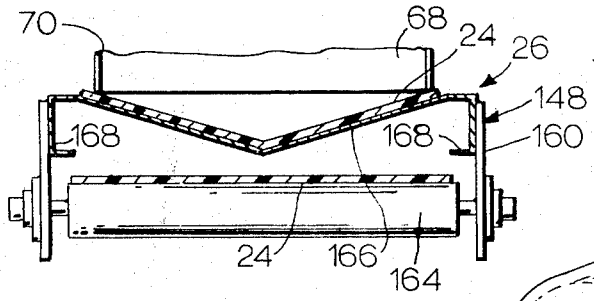
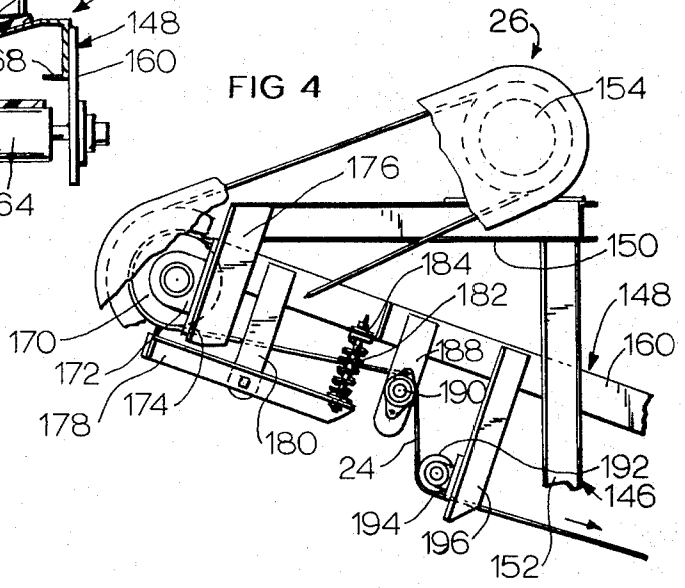


FIG 4

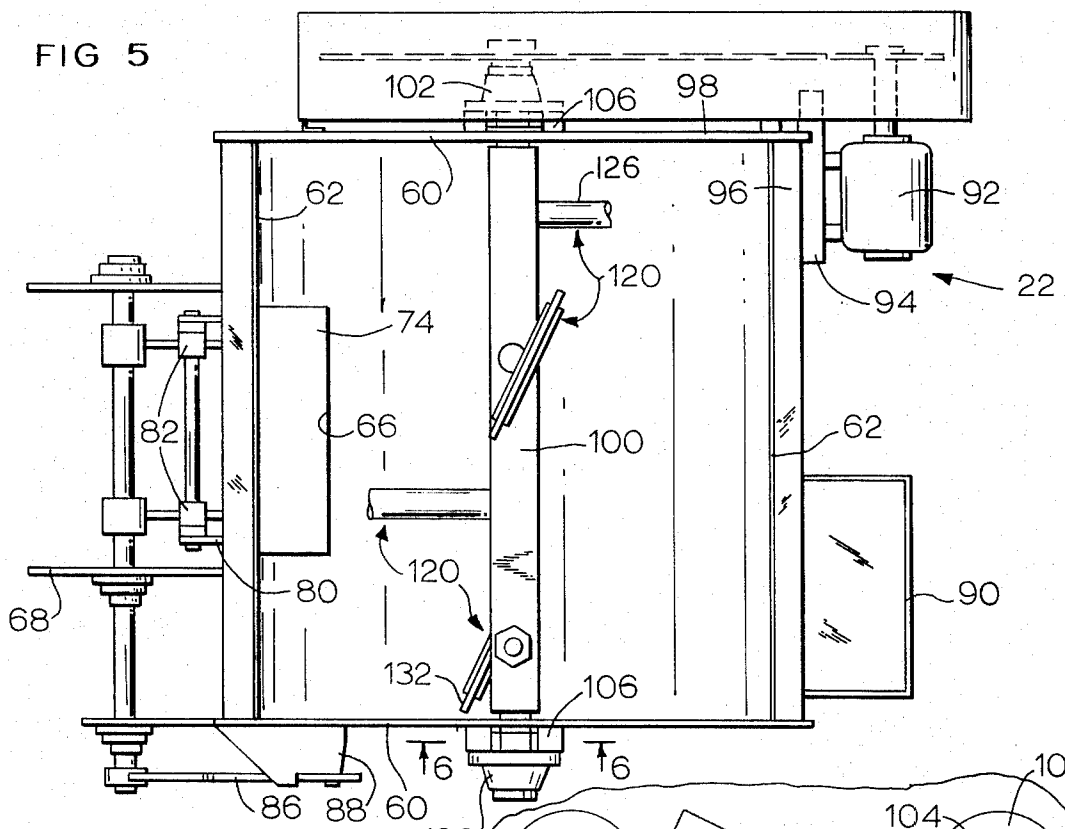


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FIG 5



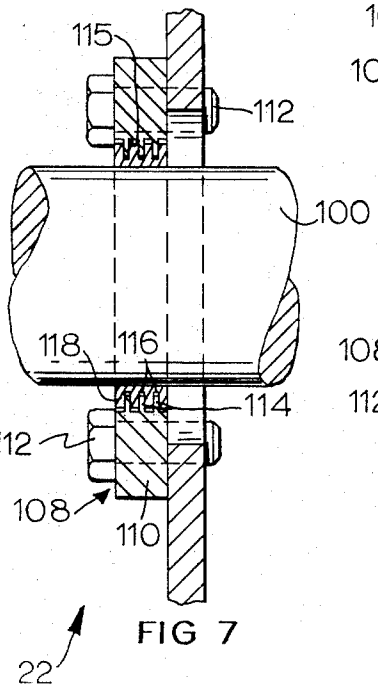


FIG 7

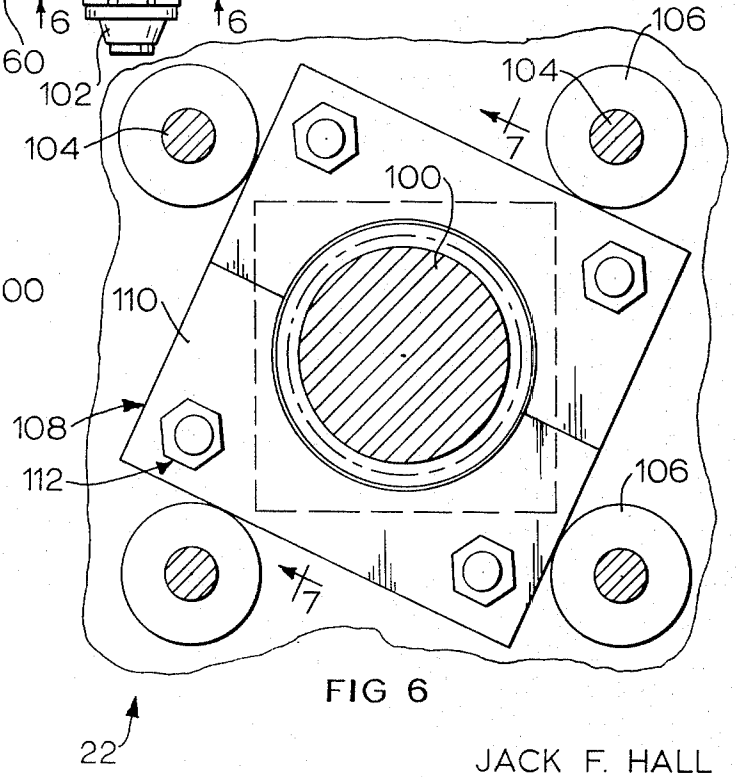
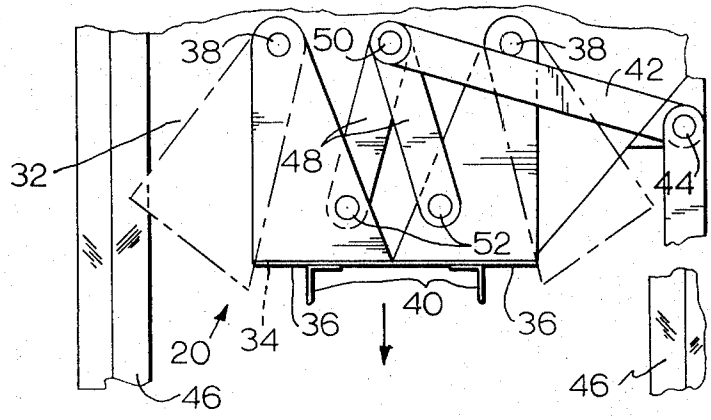


FIG 6

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FIG 9



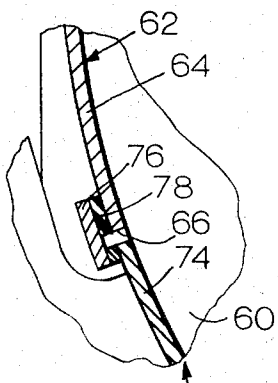


FIG 10

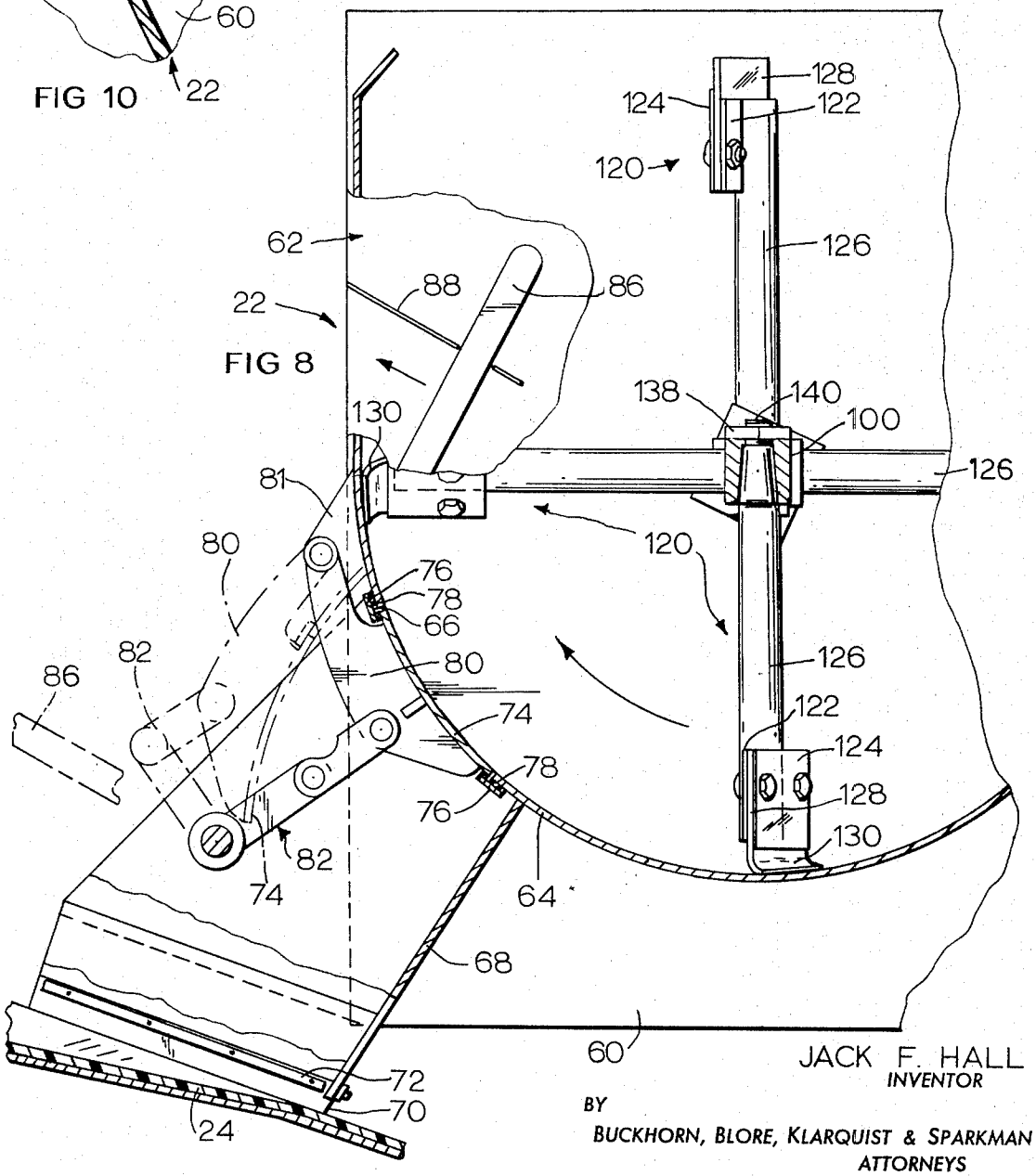


FIG 8

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CONCRETE MIXING SYSTEM

DESCRIPTION

This invention relates to a concrete mixing system, and more particularly to improved portable mixing and loading apparatus.

An object of the invention is to provide a new and improved concrete mixing system.

Another object of the invention is to provide a new and improved mixing and loading apparatus.

A further object of the invention is to provide a mixer having wiping and mixing paddles.

Another object of the invention is to provide a mixer having an improved shaft seal.

Another object of the invention is to provide a mixer and a conveyor having an adjustable connection therebetween.

Another object of the invention is to provide an improved conveyor belt tensioning device.

In the drawings:

FIG. 1 is a side elevation view of a concrete mixing system forming one embodiment of the invention;

FIG. 2 is a top plan view of the concrete mixing system of FIG. 1;

FIG. 3 is a vertical sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is an enlarged, fragmentary side elevatIon view of a portion of the concrete mixing system of FIG. 1;

FIG. 5 is an enlarged, fragmentary top plan view of a portion of the concrete mixing system of FIG. 1;

FIG. 6 is an enlarged, fragmentary, vertical sectional view taken along line 6—6 of FIG. 5;

FIG. 7 is an enlarged, fragmentary, vertical sectional view taken along line 7—7 of FIG. 6;

FIG. 8 is an enlarged, fragmentary partially sectional view of the concrete mixing system of FIG. 1;

FIG. 9 is an enlarged, fragmentary, side elevation view of the concrete mixing system of FIG. 1; and,

FIG. 10 is an enlarged, fragmentary, vertical sectional view of a portion of the concrete mixing system of FIG. 1.

Referring now in detail to the drawings, there is shown therein, a concrete mixing system forming one embodiment of the invention and including a hopper 20 (FIG. 1) for dropping a batch of dry, concrete mix materials into a mixer 22, which mixes the materials dry, adds water and mixes the water ino the mix. The mixer discharges the resulting wet mix onto a belt 24 of a conveyor 26, which elevates the wet mix and drops it into a container 28 of a trailer 30.

The hopper 20 includes a funnelled bin 32 (FIGS. 1, 2 and 9) having a bottom discharge opening 34 normally closed by a pair of U-shaped doors 36 hinged on pins 38 mounted on the bin and reinforced at their bottoms by angles 40. A manually operable bellcrank 42, which is pivotal on a pin 44 on one of posts 46 supporting the bin 32 detachedly on the mixer 22, serves, when swung in a counter-clockwise direction, as viewed in FIG. 9 to swing the doors to open positions through links 48 secured to the bellcrank by a pin 50 and secured to the doors by pins 52. The doors are urged by gravity toward their closed positions shown in full lines in FIG. 9.

The mixer 22 includes plates 60 (FIGS. 1, 5 and 8) forming sidewalls and a U-shaped plate 62 welded to the sidewalls and forming sides and bottom of a mixing

container, bottom portion 64 of the plate 62 being semi-cylindrical. The bottom portion 64 has a discharge opening 66 inclined at about a 45° angle to the vertical and leading to a discharge spout 68 welded to the plate 62 and having a U-shaped flexible sealing strip 70 of rubber or the like secured to the lower end thereof by a clamping band 72. A door 74 having an offset peripheral flange 76, when closed, forms a continuation of the cylindrical inner surface of the bottom portion 64 with the flange 76 bearing against sealing gasket 78. An arm 80 rigidly secured to the door 74 is pivoted on a bracket 81 welded to the bottom portion 64. A manually operable toggle joint linkage 82 is selectively movable between its full-line position shown in FIG. 9 holding the door closed and the broken-line position threof in which the door is swung completely out of the path of concrete discharged from the container into the spout. A handle 86 actuates the linkage and is latchable in its door closing position by a latch 88 on one of the side plates 60.

The U-shaped sealing strip 70 (FIG. 8) engages the conveyor belt 24 closely at the rear and sides of the spout 68 and is open forwardly to permit the belt to advance the wet mix to the left and upwardly from the spout. The strip prevents the mix from sliding rearwardly or to the side relative to the belt.

The mixer 22 includes a water inlet 90 (FIG. 5) and a motor 92 mounted on a base 94 mounted on framing 96. A control panel 97 is conveniently mounted on one of the plates 60. The motor drives a chain and sprocket drive 98 to rotate a paddle shaft 100. The paddle shaft is journaled in outboard bearings 102 mounted on tie rod posts 104 secured to the plates 60 with spacer sleeves 106 therebetween. Labyrinth seals 108 (FIGS 5, 6 and 7) effectively seal the shaft openings in the mixer. Each seal comprises a plate 110 secured by capscrews 112 to the adjacent plate 60 and with rings 114 fitting into a hole 115 in the plate 10. The rings 114 fit loosely in annular grooves 116 in collar 118 keyed to the shaft 100. Initially, slight amounts of the wet concrete mix flow into the seals 108 to fill up excess clearance portions in the labyrinths. Then the mix in the excess clearance portions hardens to provide very good, low friction sealing with just the right amount of clearance for the rings 114 to rotate freely in the grooves 116.

Paddles 120 (FIGS. 2, 5 and 8) adjustably mounted on the shaft 100 serve to mix the concrete mix and to feed the mix to the opening 66 for discharge when the door 74 is open. Clamping plates 122 and 124 mounted on outer end portions of arms 126 clamp planar flexible rubber paddles or wipers 128 therebetween in positions in which free outer end portions 130 curl back and conform to the inner periphery of the semi-cylindrical bottom portion of the U-shaped plate 62. Also, side edge portions 132 engage and wipe the lower portions of the side plates 60. The wipers 128 are slotted so that they can be extended or retracted when the plates 122 and 124 are loosened, and the arms 126 have tapered inner end portions 134 fitting in tapered sockets 136 and clamped therein when nuts 138 on the threaded end portions 140 thereof are tightened. These connections between the arms and the shaft permit adjustments of the arms about their longitudinal axes to any desired angular positions of the paddles. In the adjusted positions shown in FIG. 5, the outer paddles feed the mix inwardly while wiping the adjacent portions of the side

walls 60 and the portion 62, and the paddles inward from the end paddles feed the material somewhat outwardly and also toward the opening 66. The paddles thoroughly mix the materials, with the swaths of the paddles overlapping slightly and the outer paddles tending to feed to the inner paddles and vice versa. When the mixing is completed and the door 74 opened, the outer paddles feed the mix inwardly and toward the opening 66 and the inner paddles push the mix to and through the opening 66.

As best shown in FIG. 1, the mixer 22 can be slid to the left on supporting pad 140 until the sealing strip 70 seals against the conveyor belt 24. The conveyor 26 includes a rear supporting stand 142 mounted in pit 144, a front supporting stand 146 and a framework 148 supported on the stands 142 and 146. The stand 146 has cantilever portions 150 on post portions and supporting motor 151 and the discharge end of the framework 148, which also is rigidly secured to the post portions 152. This provides clearance for the trailer 28 to get well under the conveyor. The framework 148 includes side plates 160 and cross braces 162 and journals return guide rolls 164 (FIG. 3). Belt supporting bed 166 is in the form of a shallow "V" or trough and includes channel-like edge portions 168 secured to the side beams 160.

The belt leaves the bed 166 and travels around a drive roller 170 (FIG. 4) journaled in pillow block bearings 172 supported by a slide 174 slidable along rigid arms 176 carried by the cantilever portions 150. The slide is fixed to levers 178 loosely pivoted on bracket arms 180 and urged clockwise, as viewed in FIG. 4, by compression springs 182 bearing against the levers and fixed spring seats 184. An adjustment bolt 186 may be tightened or loosened to adjust the tension of the belt 24 as desired. Bracket arms 188 support guide roll 190 and guide roll 192 carried on a fixed axis by bearings 194 forms a tortuous belt path with the roll 190. The bearings 194 are supported by bracket arms 196 rigidly fixed to the side plates or beams 160.

While the mixer 22 is shown in use with the conveyor 26, the mixer can be used without the conveyor when in a raised position to permit the trailer 30 to be driven under the spout 68.

What is claimed is:

1. In a concrete mixing system,
a mixer open at the top and having a tubular discharge spout,
a hopper detachably mounted on the mixer,
a conveyor having a belt having a receiving portion adjacent and spaced from the spout,
and a seal mounted on the spout and engaging the belt at the sides and rear of the spout and open at the front of the spout to permit mix to be conveyed away from the spout.

2. The concrete mixing system of claim 1 wherein the seal is a flexible strip.

3. The concrete mixing system of claim 2 wherein the strip is generally U-shaped.

4. The concrete mixing system of claim 1 wherein the mixer includes a container in which the lower portion is cylindrical, and paddle means for moving mix out of an exit in the lower portion of the container.

5. In a concrete mixing system,
a container having a lower portion which forms a portion of a generally horizontal cylinder,
a shaft rotatable in a predetermined direction on the axis of the cylinder,
the shaft having tapered bores extending transversely therethrough,
a plurality of arms having tapered portions fitting in the tapered bores and threaded portions,
a plurality of nuts screwed onto the threaded portions of the arms to fix the arms to the shaft in rotationally adjusted positions relative thereto,
and a plurality of flexible wiper paddles mounted on the arms.

6. The concrete mixing system of claim 5 wherein the paddles include planar flexible wiper blades and clamp means on the arms holding the central portions of the paddles.

7. The concrete mixing system of claim 6 wherein end ones of the paddles are so sloped relative to the shaft and direction of rotation of the shaft as to feed mix along the container away from the ends of the container and others of the paddles are so sloped relative to the shaft and direction of rotation of the shaft as to feed the mix toward the ends of the container.

8. The concrete mixing system of claim 7 wherein the container has a discharge opening in the lower portion thereo and said direction of rotation of the shaft is revolved in a direction in which the paddles are sloped to push mix toward the opening.

9. In a concrete mixing system,
a container having a lower portion which forms a portion of a generally horizontal cylinder,
a shaft rotatable on the axis of the cylinder,
a plurality of rams mounted on the shaft,
a plurality of wiper paddles mounted on the arms,
a pair of outboard bearing means mounted on the outsides of the ends of the container and journaling the shaft,
labyrinth seal means on the container sealing the shaft to the container and having recesses filled with concrete,
a pair of sealing plates having inner annular grooves secured to the ends of the container inwardly from the bearing means,
a pair of collars keyed to the shaft and having annular plates extending loosely into the grooves in the sealing plates,
and fillers of concrete filling the spaces between the sealing plates and the collars.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,759,492 Dated September 18, 1973

Inventor(s) JACK F. HALL

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 38, change "lO" to --llO--

Column 4, line 34, change "thereo" to --thereof--

Column 4, line 41, change "rams" to --arms--

Signed and sealed this 25th day of December 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents

USCOMM-DC 60376-P69