M. F. SANBORN.

CONCRETE MIXER.

APPLICATION FILED AUG. 14, 1908.

1,048,738. Patented Dec. 31, 1912.

Fig. 1.

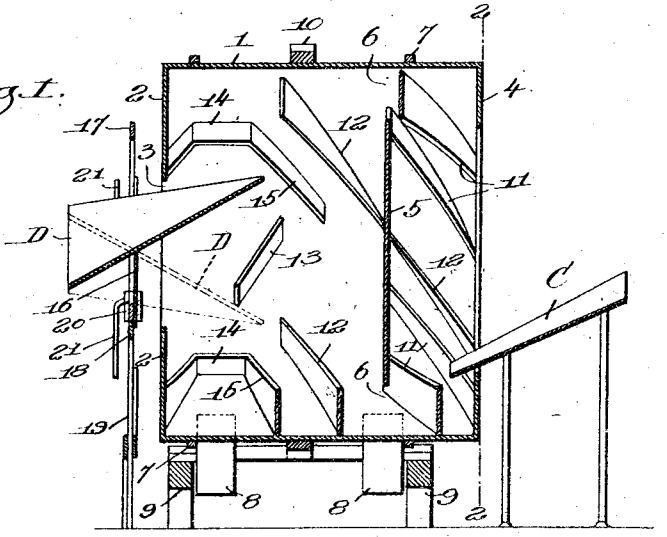


Fig. 5.

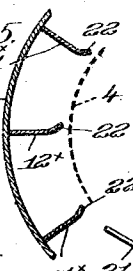


Fig. 2.

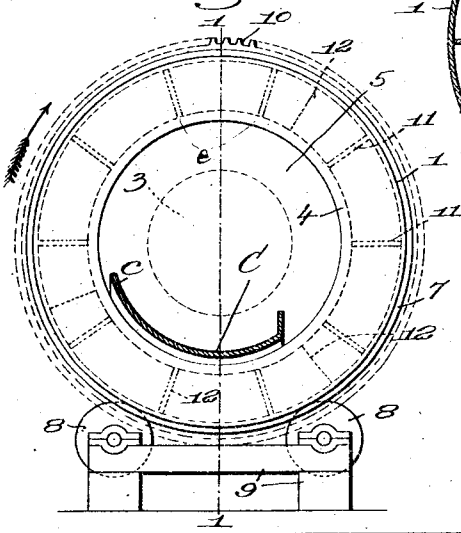


Fig. 3.

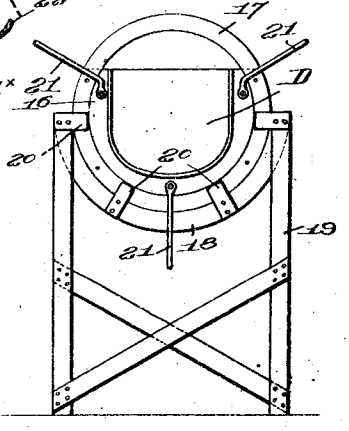
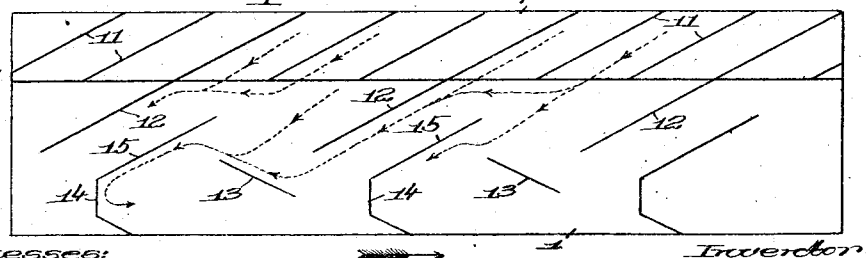


Fig. 4.



Witnesses:
Fred. L. Grunsky.
Joseph M. Ward.

Inventor.
Morton F. Sanborn,
by Bosby Gregory Calkins

UNITED STATES PATENT OFFICE.

MORTON F. SANBORN, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO MATTHEW HOWARD REED, OF PITTSBURGH, PENNSYLVANIA.

CONCRETE-MIXER.

1,048,738. Specification of Letters Patent. Patented Dec. 31, 1912.

Application filed August 14, 1908. Serial No. 448,508.

To all whom it may concern:

Be it known that I, MORTON F. SANBORN, a citizen of the United States, residing at Somerville, county of Middlesex, and State of Massachusetts, have invented an Improvement in Concrete-Mixers, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to apparatus for mixing concrete and other granular material, of the type wherein a rotary drum is arranged to receive the materials to be mixed, the drum having internal flanges for effectively mixing together the different materials and for lifting them when mixed and depositing the same in a discharge chute.

One of the objects of my invention is the production of a novel form of drum whereby the charging can be done in a very easy manner, the materials to be mixed being introduced at one end of the drum near its periphery, enabling a low charging chute to be employed.

Another object of my invention is the production of improved means within the drum for more efficiently and thoroughly mixing the materials introduced thereinto, and for directing the mixed charge to the outlet or discharge chute.

The construction and arrangement of the discharge chute also involves novel features of construction and arrangement, the various novel features of my invention being fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a vertical sectional view of a mixing apparatus embodying one form of my invention, taken on the line 1—1, Fig. 2; Fig. 2 is a right hand end elevation of the drum, the charging chute being shown in section on the line 2—2, Fig. 1; Fig. 3 is a left-hand end view of the discharge chute and the support in which it is movably mounted; Fig. 4 is a diagram showing the interior of the drum spread out in a plane, to illustrate the relative arrangement of the mixing, directing and lifting members or flanges; Fig. 5 is a modification of the lifting flanges to be referred to.

In the drawings a revoluble cylinder or drum 1 has at its discharge end an annular head 2, through the central opening 3 of which the discharging chute is extended into the interior of the drum, and at its opposite end the drum is provided with an inturned annular flange or lip 4, while a circular head 5 is secured within the drum, set in from the plane of the flange 4, as shown in Fig. 1, and leaving an annular space 6 between the drum and the periphery of the head.

The drum is shown as provided with external annular ribs 7 and is mounted for rotation on a horizontal axis upon rolls 8 carried in a suitable manner on a base frame 9, the ribs 7 coöperating with said rolls to prevent movement of the drum in an axial direction. A ring-gear 10 on the drum is adapted to mesh with any suitably driven actuating gear, not shown, and of usual construction in apparatus of this class, whereby rotation of the drum is effected. Upon the inner surface of the drum I fixedly secure series of flanges 11, 12, the arrangement whereof is best shown in Fig. 4, said flanges being arranged in parallelism, and diagonally to the ends of the drum, but at an angle of less than 40°. The inner diagonally arranged edges *e* of said flanges or carriers 11, 12, are preferably spaced outwardly radially away from the inner edge of flange 4 to provide clearance space for the inner end of chute C. The outer ends of all the carriers extend to and are fixedly connected with the flange 4, though of somewhat less depth, as shown in Fig. 1, but the carriers 11 at their inner ends stop in the plane of the head 5, while the carriers 12 extend inward past such head and beyond the center of the drum, the head 5 being secured to the carriers and rigidly sustained thereby.

From the foregoing description it will be seen that the carriers form a series of inlet pockets which are open between the head 5 and flange 4, the open tops of the pockets as they pass under the charging chute C, Fig. 1, being adapted to receive therefrom the materials to be mixed. The central portion of the charging end of the drum is closed by the head 5, the openings of the pockets being located inside of the flange 4 and arranged in a circle concentric with the drum. One side of the charging chute C is carried upward in a curve concentric with the pocket openings, as at *c*, Fig. 2, to better direct the charge into the pockets, and referring to Fig. 1 it will be

seen that the chute is brought low down, owing to the construction of the drum, making it much easier to feed the material into the chute. Owing to the relatively flat curve of the chute I am enabled to give it much less slope than is usual, as the material slides down easily and steadily to the pockets. When the material enters the pockets the carriers conduct it into the interior of the drum as the latter revolves, and by making said carriers at an angle of less than 40° they act to slide or carry the material inward beyond the plane of the head 5, rather than lifting it.

I have shown two of the shorter carriers 11 interposed between each pair of the longer carriers 12, and across the inner ends of the latter, but beyond them, I fix flanges 13 which constitute deflectors, the material sliding out of the pockets and against the deflectors, as shown by broken lines, Fig. 4, so that its direction is changed and the parts thereof are mixed together thoroughly. The width of the front ends of carriers 11 and 12 is somewhat less than the width of flange 4 so that the inner edges of the carriers are thus located inwardly beyond the flange edge, giving clearance for the chute terminal and incoming raw material and insuring its retention during rotation of the drum. Alternating with the deflectors a series of bent flanges 14 are fixed on the inner surface of the drum, constituting lifters, the short outer walls extending to the annular head 2 of the drum, Fig. 1, while their inner walls 15 are made long enough to extend across the deflectors. These walls 15 receive the mixed material, agitate and change its direction again, and conduct it to the bottoms of the lifters, which carry the mixed material up and then drop it onto the bottom of the drum. Thus a most thorough and intimate mixing of the parts of the charge is effected, the incoming portions being quickly directed by the carriers to the interior of the drum as one pocket after another receives its load from the chute C. The mixing proceeds first by the coöperation of the carriers and the deflectors with the charge, and then is continued by the alternate lifting and dropping of the material by the lifters 14, as will be obvious. When the charge has been thoroughly mixed the discharge chute is positioned to receive the charge from the lifters and to convey it out of the drum at the discharge end thereof. As the carriers 12 are longer than the deflectors, and extend beyond the ends of the sides 15 of the lifters, toward the discharge end of the drum, the material will finally reach the lifters, after various changes in direction which insure proper and thorough mixing, and if the drum is very large more than one deflector may be provided for each of the long carriers. The discharge chute D is curved in cross section, and its sides increase in depth gradually from its inner to its outer end, as shown in Fig. 1, and when in operative, full line position, its bottom has the proper slope to enable the mixed material to slide down the chute to be discharged into carts, wheelbarrows, or other suitable receptacles. The chute is suitably bolted to a plate 16 and extends through an opening therein, the plate in turn being secured to a metal ring 17 which is rotatable in a vertical plane in a curved seat 18, Fig. 3, secured to a suitable stand or frame 19. Inturned ears 20 on the seat 18, at the back and front of the seat retain the carrier ring in upright position.

When the mixed material is to be discharged from the drum the chute D is positioned as shown in full lines, Fig. 1, and as the lifters 14 carry the material up the side of the drum the same will be dropped onto the wide and shallow upper end of the chute, sliding down the latter to its outer, delivery end. When it is desired to stop the discharge the chute is turned upside down, into dotted line position, Fig. 1, by rotative movement of the annular carrier 17, so that the convex bottom of the chute will shed the material during the mixing of a fresh charge. Such rotative movement of the chute may be effected by means of handles 21 secured to the plate 16 and offset to clear the ears 20. When the chute is turned to inoperative position the bottom inclines downward and inward toward the charging end of the drum, so that the material falling upon the chute bottom is directed inward, away from the opening 3, while the delivery end of the chute is elevated out of the way. The turning of the chute is very easily effected as it does not have to turn or lift against the weight of the concrete which may be in it at the time it is desired to stop the discharge.

I have shown the blades or flanges which constitute the carriers 11 and 12 as flat pieces of metal, but if desired they may be bent or curved transversely, one such variation being shown in Fig. 5, wherein the carriers 11^x, 12^x are shown with their upper edges bent over, as at 22. This change will be desirable in handling some kinds of material should there be a tendency of the material to spill over the edge of one carrier into the pocket below as the drum revolves.

Changes or modifications may be made in various details of construction and arrangement without departing from the spirit and scope of my invention as set forth in the annexed claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a mixer, in combination, a revoluble

drum having a centrally open head at its discharge end and a circular head set in from the opposite end of the drum and permanently closing the center thereof, means wholly within the cylindrical wall of the drum and between the latter and the periphery of the closed head to receive the material outside said head and introduce it to the interior of the drum beyond the head, and means on the interior of the drum to mix and lift such material and carry it toward the open discharge end.

2. In a mixer, in combination, a revoluble drum having a central opening at its discharge end, a circular head set in from the opposite end of the drum and permanently closing the center thereof, a series of annularly arranged inlet pockets between the periphery of the circular head and wall of the drum and extended to the end of the latter outside the head, said pockets being open toward the axis of the drum exterior to the head, means to direct the material to the pockets near the bottom of the series of pockets, and means to discharge the mixed charge at the centrally open end of the drum.

3. In a mixer of the class described, a revoluble drum having a centrally open head at one end, a circular head set in from the other end of the drum and permanently closing the central portion of the drum, diagonally arranged blades providing material inlet pockets peripherally arranged around the circular head and exterior thereto but within the cylindrical wall of the drum outside of the head, means to charge the material into said pockets, and means to discharge the mixed materials through the centrally open head of the drum.

4. A revoluble drum having a centrally open receiving end, a circular head set in therefrom and permanently closing the interior of the drum, a series of parallel and diagonally arranged flanges constituting carriers on its interior at its charging end to advance the material toward the discharge end, deflectors crossing the planes of some of the carriers beyond their inner ends, and lifters separated from the inner ends of the carriers and adjacent the discharge end of the drum, the deflectors directing the material thereto, the inner side of each lifter being long and extending beyond the nearer end of the next deflector, and the outer ends of the carriers projecting beyond the circular head to the adjacent end of the drum forming pockets to receive the material charged into the drum.

5. In a mixer, in combination, a revoluble drum having a centrally open inwardly flanged front, a centrally arranged transverse circular head member set in from the open front and permanently closing the center of the drum, means wholly within the cylindrical wall of the drum and between it and said circular member to receive the material outside said circular head member and introduce it to the interior of the drum beyond the circular member, means on the interior of the drum to mix and lift the material and carry it toward the other end of the drum, and a discharge chute extending outwardly through said other end.

6. The combination with the rotatable mixing drum having an annular flange at its front end providing a central unobstructed charging opening, of a series of diagonally arranged blades having their front ends of less width than the flange and their inner diagonally arranged edges spaced outwardly radially away from the inner annular edge of said flange, said blades being in contact with and secured to said flange for a portion of its width and extending diagonally backward therefrom within the drum for a portion only of its periphery, each blade overlapping the next adjacent blade with an intervening space, and operable to feed material into the interior of the drum upon its rotation.

7. The combination with the mixing drum having an annular flange at its front end providing a central unobstructed charging opening, and an inwardly located circular head separated from the drum by an annular space, of a series of overlapping diagonally arranged flat blades having their inner edges bent over or deflected, said blades being secured to said flange and extending inwardly and backwardly therefrom with intervening spaces and operable to feed material into the interior of the drum upon its rotation.

8. In a mixer of the class described, the combination of a cylindrical rotatable drum having annular inwardly turned terminal walls or flanges forming a centrally open head at each end and providing an open charging end and an open delivery end, a series of diagonal carriers secured to the inner face of the drum extending diagonally backward from the annular wall at the charging end forming a peripheral series of pockets, some of said carriers being extended inwardly beyond intervening ones thereof toward the delivery end of the drum, and a series of bent flanges forming lifting pockets secured to the inner face of the drum adjacent to its delivery end and adapted to receive material from said extended carriers, substantially as set forth.

9. In a mixer of the class described, the combination of a cylindrical rotatable drum having annular inwardly turned terminal walls or flanges forming a centrally open head at each end and providing an open charging end and an open delivery end, a series of diagonal carriers secured to the inner face of the drum extending diagonally

backward from the annular wall at the charging end forming a peripheral series of pockets, some of said carriers being extended inwardly beyond intervening ones thereof toward the delivery end of the drum, a series of bent flanges forming lifting pockets secured to the inner face of the drum adjacent to its delivery end and adapted to receive material from said extended carriers, and a series of deflecting flanges arranged diagonally across the line of direction of the extended carriers and annularly between them and said pockets, substantially as set forth.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

MORTON F. SANBORN.

Witnesses:
JOHN C. EDWARDS,
FREDERICK S. GREENLEAF.