No. 870,797. PATENTED NOV. 12, 1907.

A. W. RANSOME.

CONCRETE MIXER.

APPLICATION FILED NOV. 17, 1906.

2 SHEETS—SHEET 1.

Fig. 2.

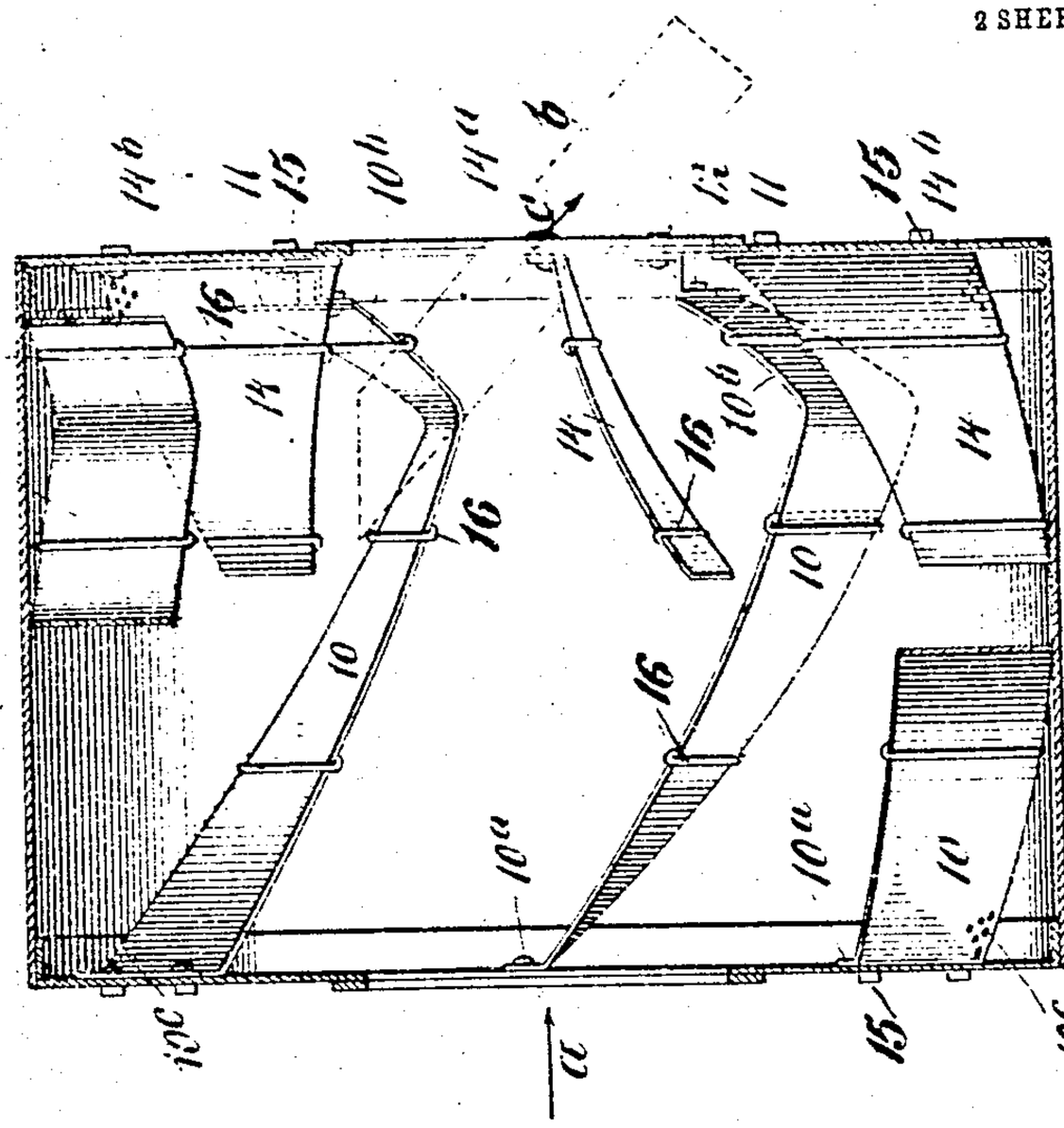
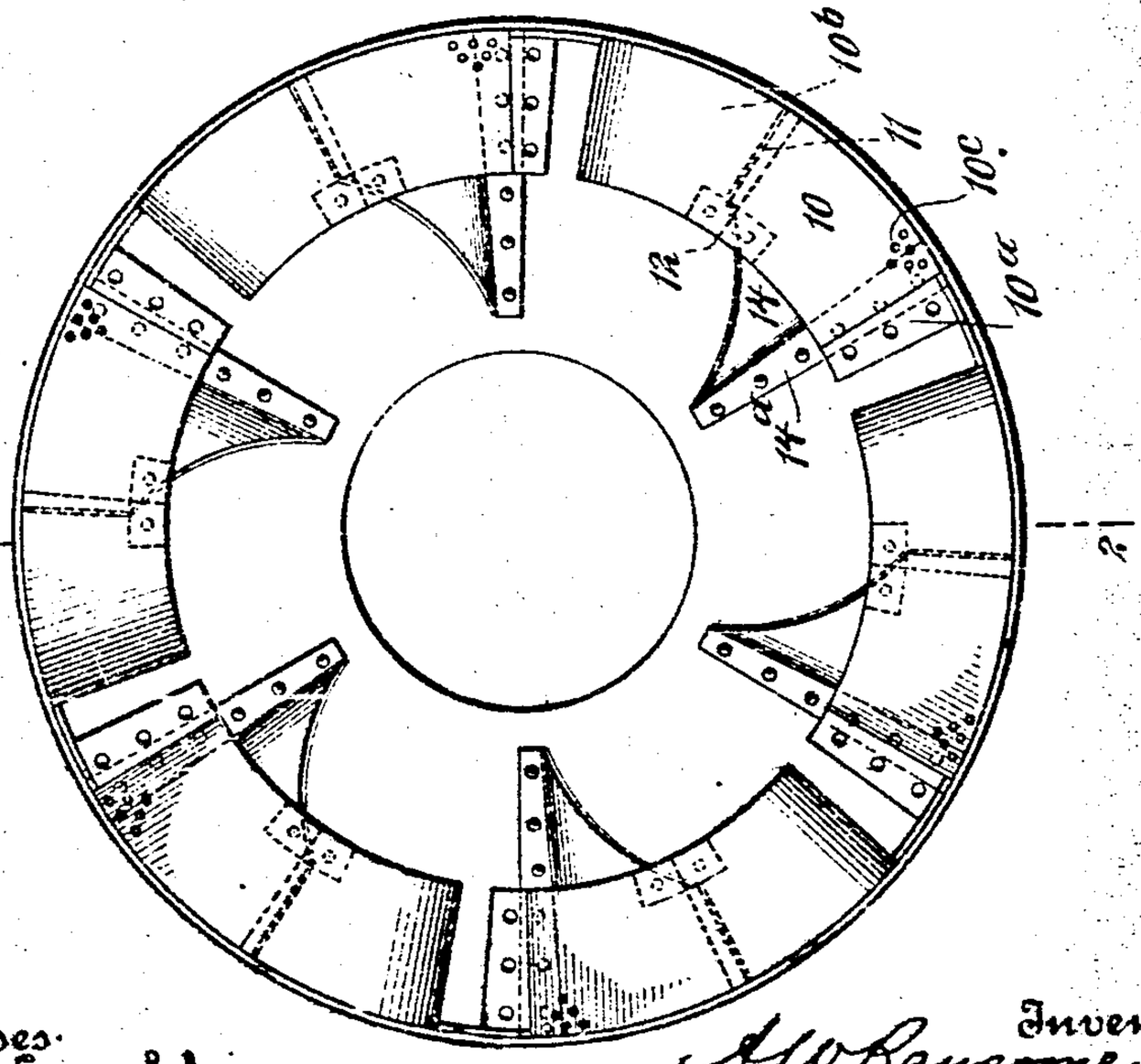


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

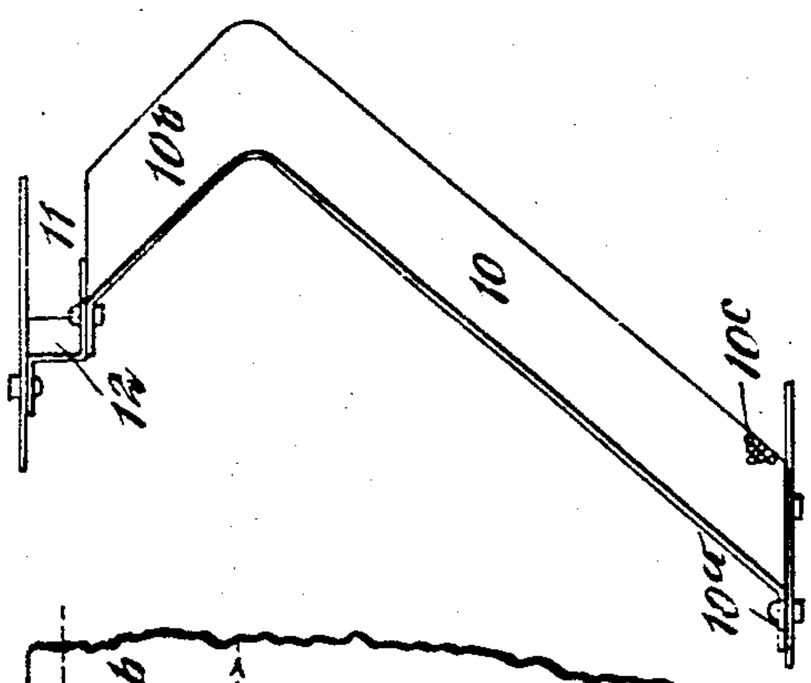


Fig. 5.

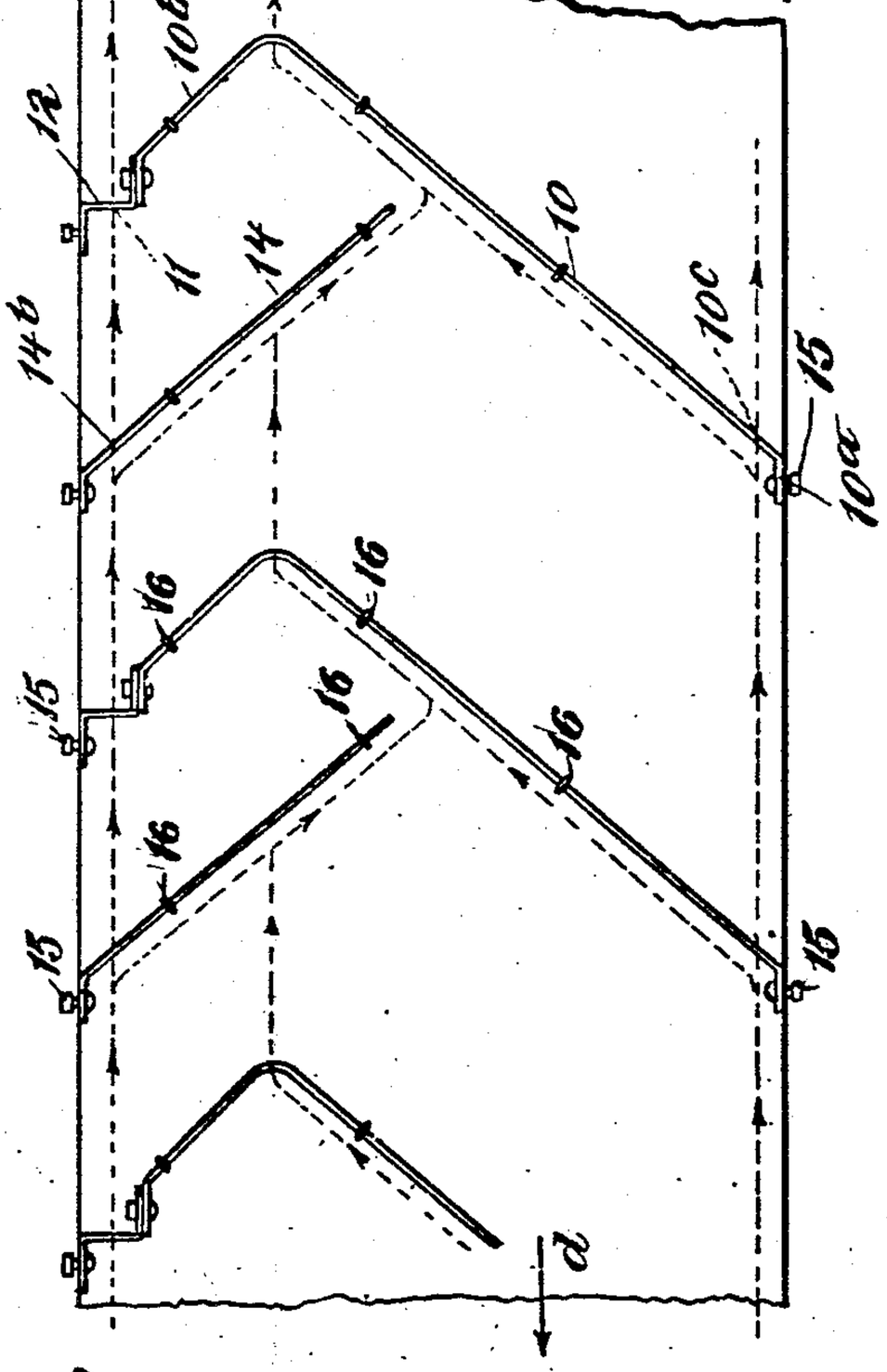
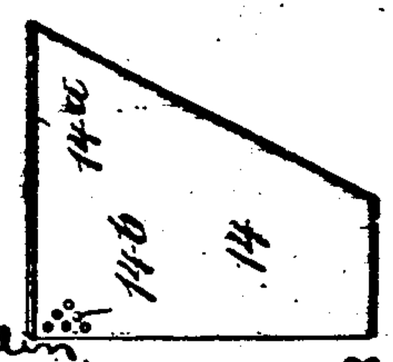


Fig. 4.



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UNITED STATES PATENT OFFICE.

ARTHUR W. RANSOME, OF NEW YORK, N. Y.

CONCRETE-MIXER.

No. 870,797. Specification of Letters Patent. Patented Nov. 12, 1907.

Application filed November 17, 1906. Serial No. 343,821.

To all whom it may concern:

Be it known that I, ARTHUR W. RANSOME, of the borough of Richmond, in the city of New York, State of New York, have invented certain new and useful Improvements in Concrete-Mixers, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain improvements in apparatus for mixing concrete and other granular material. It relates generally, to that class of apparatus in which a rotary drum is adapted to receive the materials to be mixed and which drum is provided interiorly with lifting flanges or other mixing members, the material to be mixed, being charged into the drum and discharged therefrom when the mixing operation is complete.

The invention relates particularly to improvements in the rotary mixer forming the subject matter of the piror patent to Ernest L. Ransome, No. 814,803, dated March 13, 1905.

Heretofore drums were provided with a number of flanges extending obliquely across their interiors and abutting closely against the discharge ends or heads of the drums. Crossing these flanges were a number of opposing or return flanges which engage the inner edges of the advancing or lifting flanges and which are designed to set up a counter movement of the material in the drum, effecting thereby a thorough admixture. In the practical operation of such mixers it was found that the flanges or baffles abutting snugly againsnt the heads of the drum formed corners of cavities in which there was a tendency of the concrete to accumulate and harden and thus, to some extent clog the machine and interfere with its effective operation. It has also been found that the crossing or return flanges, being extended across the inner edges of the main or advancing flanges, retain but a minor portion of the material falling upon them and do not return the material toward the receiving end sufficiently to prevent accumulation of the material at the discharge end. This accumulation has, in some classes of work been found to be disadvantageous. It has further been developed in the practical operation of the mixers heretofore constructed, that the crossing or return flanges, being engaged with the inner edges of the main or advancing flanges, are not fastened in place with absolute security and require much care to be exercised to prevent accidental dislodgment. Further the blade arrangement previously employed induced splashing to a considerable degree with the result that the bearings of the drum were clogged and the exterior of the machine covered with material thrown from the drum.

My present invention, therefore, has for its principal objects to overcome these specific disadvantages, and at the same time to effect material improvements generally in the art of mixers of the class to which the invention relates. In attaining this end, I rearrange the flanges in such a way as to admit of a thorough and unrestrained circulation, through and around the flanges, of the water which forms a part of the material within the drum. This water, being by my improved construction, permitted to wash in and out of the various crevices or corners clearing them of the accumulated concrete and preventing the clogging referred to. Further by thus allowing the water unrestrained flow in the drum I avoid splashing of the plastic or semi-plastic material through the openings in the drum. I also, by the above referred to rearrangement avoid the necessity of placing the return flanges against the inner edges of the advancing or main flanges, but, on the contrary, locate said return flanges, directly against the inner wall of the drum alternately between the main or advancing flanges, securing thereby the double advantage of effectual return of the material and, therefore, effectual mixing and of easily, firmly and removably securing the flanges in place against the walls of the drum. This enables me not only to securely fasten the flanges but to remove them easily for repair or otherwise.

My invention involves various other features of major or minor importance and all will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is now had to the accompanying drawings which illustrate as an example one method of practically embodying the idea of means constituting my invention in which drawings

Figure 1 is a view looking into the receiving end of a mixing drum to which my invention has been applied; Fig. 2 is a sectional view of the same on the line 2–2 of Fig. 1; Fig. 3 is a perspective view of one of the main or advancing flanges; Fig. 4 is a plan view of one of the return flanges and Fig. 5 is a diagram showing a section of the interior of the drum supposed to be spread out in a flat plane and illustrating, by broken lines and arrow heads, the course of the water circulating through the drum to effect the washing and non-splashing action hereinbefore mentioned.

In regard to the drawings I would here explain that I have, in the interest of clearness and illustration shown in Figs. 1 and 2, only the drum and its flanges in which reside the essential features of my present invention.

In practice, as will be understood from the prior art particularly from the prior patent hereinbefore mentioned that the drum is mounted to turn in a suitable base, and is combined with mechanism for imparting to it its rotating movement. As will also be understood from the prior art, the material is charged into the drum through one end and discharged from the drum through the other. In Fig. 2 an arrow *a* indicates the direction in which the material is charged into the left hand e

receiving end of the drum and in said view the broken lines *b* indicate the usual discharge chute by means of which the material is carried from the drum in the direction indicated by the arrow *e*. This discharge chute is usually hung on a pivot and may be tilted reversely to the position indicated in Fig. 2 to delay discharge of the material until the mixing action is complete. All of these things are fully set forth in the prior patent mentioned and constitute no part of my present invention.

10 indicates the main or advancing flanges. Any number of these may be provided according to the nature of the mixer; in the type of machine here illustrated these main or advancing flanges are six in number, and they are arranged with their outer edges snugly against the inner surface of the drum, and extend for the major portion of their length diagonally across the same. At the receiving head of the drum, the flanges 10 are provided at their extremities with lips 10^a and these are fastened by bolts 15 or otherwise to the receiving head of the drum. At a point adjacent to the discharge end, the flanges are shaped with offset or laterally disposed portions 10^b, which form lifting pockets facing the direction of rotation of the drum (see the diagram Fig. 5 in which the arrow *d* indicates the direction of rotation) and serving to lift the material with the rotation of the drum and drop the same into the discharge chute *b*, when said chute is in position indicated in Fig. 2. Said advancing flanges 10, however, instead of extending directly to and contacting with the discharge head of the drum, terminate short of the same, leaving between the discharge end of the flange and the corresponding head of the drum a space or passage 11. To hold the discharge ends of the flanges 10 securely in place, I provide Z-brackets 12 which are fastened by bolts 15 or otherwise to the discharge ends of the flanges and to the discharge head of the drum. Said brackets, however, are relatively narrow and do not materially obstruct the above mentioned passage 11. I further form the flanges 10 with an opening or openings 10^c directly adjacent to the receiving head of the machine and close to the side walls of the drum. As will be observed from Figs. 1 and 3 the main or advancing flanges 10 are shown as of uniform width. This construction I prefer to employ since it insures a uniform advance of the material from the receiving to the discharge end. The advancing flanges are fastened to the side walls of the drum by U-bolts 16 which embrace the flanges and pass through the drum walls. By these fastenings 15 and 16 the flanges are securely held in place and may yet be removed easily and at will for repair or otherwise.

14 indicates the return or secondary flanges. These are provided with lips 14^a which are removably fastened by bolts 15 or otherwise against the inner side of the discharge head of the drum and as shown in the drawings, these flanges 14 extend along and are removably fastened by U-bolts 16 to the inner surface of the drum, the flanges projecting in a direction reverse to the direction in which the advancing flanges 10 extend. Further, the return flanges 14 are arranged alternately between the advancing and out of contact therewith, both the advancing and return flanges being engaged with the side walls and heads of the drum and being held in place by the fastenings at such points of engagement. The return flanges are preferably formed with their inner edges tapering toward the receiving end of the drum. This marginal form is illustrated clearly in Fig. 4. The return flanges extend from the discharge end, inward toward the receiving end and terminated at approximately the middle of the drum. Said return flanges are located at equidistant points between the advancing flanges. The inner ends of the return flanges terminate short of the advancing flanges, to leave a space through which the water, concrete, etc., may pass freely as they slide along the advancing flanges. The return flanges are provided with an opening or openings 14^b in the corners between the discharge head and the sides of the drum, which openings serve to allow a thorough circulation of water, as will be hereinafter fully explained.

In the use of my invention the material to be mixed is charged into the receiving end of the drum, the discharge chute is turned to reverse position, (opposite that indicated in Fig. 2) the drum is rotated to mix the material and when this operation is complete the discharge chute is returned to its operative position indicated in Fig. 2, and the material in the drum is raised by the flanges and discharged from the pockets 10^b into and from the chute *b*, all of which will be fully understood.

Upon the rotation of the drum, the material within the same is picked up by the advancing flanges 10 and, owing to the inclination of these flanges, as the flanges rise the material slides down on the flanges toward the discharge end and is then caught in the pockets 10^b. As the flanges continue to rise with the rotation of the drum, the material slides over the edges of the flanges 10 and is caught in part by the return flanges 14, this operation being assisted by the relatively increased width of said flanges 14. The material received by the return flanges is, owing to the position of the same, conveyed with the rotation of the drum downward toward the receiving end and is finally discharged from the inner ends of the return flanges partly upon the advancing flanges and partly dumped down into the bottom of the drum where it is reëngaged by the advance flanges. It will thus appear that the construction which I have provided sets up, upon the rotation of the drum, an active countermovement of the material bringing about a thorough admixture thereof. By locating the return flanges intermediate the advance flanges, I increase the effectiveness of operation of the return flanges, carrying back toward the receiving end a larger quantity of material than heretofore and preventing an objectionable accumulation of material at the discharge end. Further, I am enabled more securely yet removably to fasten the flanges in place and thus increase the life and durability of the machine, and facilitate repair. This arrangement of the flanges also contributes to the non-splashing effect by causing the return flanges to deliver the material principally on the advancing flanges rather than to throw this material violently into the bottom of the drum.

A further important function of the new construction which I provide, is the thorough circulation of water which effectually prevents the accumulation of concrete in the crevices and corners and consequent clogging of the machine and also prevents splashing

from the drum. As hereinbefore intimated, a common disadvantage of this class of machines is the accumulation and setting of the concrete in the crevices and corners thereof, to such an extent that the operation of the machine is seriously interfered with.

It will be understood that in all concrete mixtures a certain quantity of water is present, and I take advantage of this condition and cause the water to wash out the accumulations mentioned. This washing action is possible in my invention, owing to the peculiar arrangement of the flanges and is illustrated diagrammatically in Fig. 5. In this diagrammatical view the arrow *d* indicates the direction of rotation of the drum and the relative positions of the plates or flanges are clearly shown. The water in flowing along the lines shown in Fig. 5, passes through the spaces 11 and flowing from these spaces engages the next following return flange 14, a part of the water passing through the orifices 14^b thereof and the remainder running down the return flange and discharging on the advancing flange from which the water is spilled over the inner edges thereof at the offset portions 10^b. The water also in passing down the inner side of the drum flows in part through the openings 10^e, the rest of the water which engages the advancing flanges at this point, running down along the flanges and meeting the stream delivered from the flanges 14. It therefore, clearly appears that the new construction which I have provided distributes the water completely over the various parts within the drum and causes this water to flow through the crevices or corners between the flanges and the walls of the drum, in which corners quantities of cement would otherwise be permitted to accumulate and in accumulating would tend to clog the machine. Also by giving the water a clear passage splashing is prevented.

Having thus specifically described the preferred embodiment of my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A rotary drum mixer, having advancing flanges in the drum extending substantially from end to end thereof, and return flanges engaging the inner walls of the drum between the advancing flanges and extending from the discharge end of the drum toward, but terminating short of the receiving end.

2. A rotary drum mixer, having interior advancing flanges in the drum extending substantially from end to end thereof, said flanges engaging the walls of the drum and interior return flanges engaging the walls of the drum between the advancing flanges and extending from the discharge end of the drum toward, but terminating short of the receiving end, the return flanges having greater width than the advancing flanges and tapering from the discharging toward the receiving end of the drum.

3. A rotary drum mixer, having advancing and return flanges, in the drum extending along the inner walls diagonally respectively from the end portions of the drum, towards the opposite ends thereof, the advancing flange clearing the inner end of the return flange and reaching beyond the same substantially to the opposite or discharge end of the drum.

4. A rotary drum mixer, having advancing and return flanges, in the drum extending along the inner walls diagonally respectively from the end portions of the drum towards the opposite ends thereof, the advancing flange clearing the inner end of the return flange and reaching beyond the same substantially to the opposite or discharge end of the drum and formed thereat with a lifting pocket.

5. A rotary drum mixer, having advancing and return flanges, both engaging the inner walls of the drum and extending diagonally from the respective end portions of the drum, towards the opposite ends thereof, the advancing flange clearing the inner end of the return flange and reaching beyond the same substantially to the opposite or discharge end of the drum and means for removably securing the flanges to the side walls of the drum.

6. A rotary drum mixer, having advancing and return flanges, both engaging the inner walls of the drum and extending diagonally from the respective end portions of the drum, towards the opposite ends thereof, the advancing flange clearing the inner end of the return flange and reaching beyond the same substantially to the opposite or discharge end of the drum, and provided thereat with an offset or bend extending toward the return flange and forming a lifting pocket.

7. A rotary drum mixer for concrete and similar wet plastic materials, having a relatively stationary mixing flange in the drum lying in a plane substantially radial of the same and forming a corner or crevice with an end wall of the same, the mixer having a passage at said corner or crevice allowing the circulation of water through said corner to prevent accumulations of concrete therein.

8. A rotary drum mixer for concrete and similar wet plastic materials, having a relatively stationary diagonal mixing flange in the drum in a radial plane thereof and with one end of the flange juxtaposed and secured to, but spaced from the corresponding end of the drum, to allow circulation of water past the said end of the flange and prevent accumulations of concrete between said end of the flange and the end of the drum.

9. A rotary drum mixer for concrete and similar wet plastic materials, having a diagonal mixing flange in the drum with one end juxtaposed to, but spaced from the corresponding end of the drum to allow circulation of water past the said end of the flange and prevent accumulations of concrete at this point, and a bracket spanning the space between said ends of the flange and drum and fastened to said ends of the flange and drum to hold the flange in place.

10. A rotary drum mixer for concrete and similar wet plastic materials, having a diagonal mixing flange in the drum with a lifting pocket at one end, said pocket being juxtaposed to, but spaced from the adjacent end of the drum to allow circulation of water between the pocket and the end of the drum and prevent accumulations of concrete at this point.

11. A rotary drum mixer for concrete and similar wet plastic materials having a mixing flange with its end juxtaposed to, but spaced from one end of the drum to allow circulation of water past the said end of the flange, and a second mixing flange projecting from said end of the drum and having a passage through it adjacent to said end.

12. A rotary drum mixer for concrete and similar wet plastic materials, having a mixing flange extending diagonally from one end of the drum to a point adjacent to the other end, the first end of the flange having a passage through it and the second end of the flange being formed with a lifting pocket spaced from the adjacent end of the drum to form a passage between it and the drum.

13. A rotary drum mixer for concrete and similar wet plastic materials, having a diagonal mixing flange, with a lifting pocket at one end, said pocket being juxtaposed to, but spaced from the adjacent end of the drum for the purpose specified, and a bracket spanning the space between the lifting pocket and the end of the drum and pocket and to the said end of the drum to hold the lifting pocket in place.

14. A rotary drum mixer, having advancing and return flanges, both engaging the inner walls of the drum and extending diagonally from the respective end portions of the drum, towards the opposite ends thereof, the advancing flange clearing the inner end of the return flange and reaching beyond the same substantially to the opposite or discharge end of the drum and formed thereat with a lifting pocket spaced from the adjacent end of the drum to provide a washing passage.

15. A rotary drum mixer, having advancing and return

flanges, both engaging the inner walls of the drum and extending diagonally from the respective end portions of the drum, towards the opposite ends thereof, the advancing flange clearing the inner end of the return flange and reaching beyond the same substantially to the opposite or discharge end of the drum and formed thereat with a lifting pocket spaced from the adjacent end of the drum to provide a washing passage, the return flange being perforated adjacent to the discharging end of the drum and the advancing flanges being perforated adjacent to the receiving end.

16. In a concrete mixer, a rotary drum having a flange secured to its inner wall and extending therefrom in substantially a radial direction, said flange having one end connected to an end wall of the drum and provided adjacent thereto with an opening for the passage of water.

17. A rotary drum mixer having a plurality of diagonal advancing flanges in the drum extending substantially parallel and substantially from end to end of the drum, each flange having at the discharge end of the drum a lateral offset forming a lifting pocket, all of such pockets facing alike the direction of rotation of the drum and diagonal return flanges engaging the inner walls of the drum between the lifting pockets, the return flange being disposed oppositely to the advancing flanges.

18. A rotary drum mixer for concrete and similar wet plastic materials having advancing and return flanges both engaging the inner walls of the drum and extending diagonally from the respective end portions of the drum toward the opposite ends thereof, the advancing flange clearing the inner end of the return flange and reaching beyond the same substantially to the opposite or discharge end of the drum, and the mixer having passages at the ends of the flanges adjacent to the ends or heads of the drum, such passages allowing the circulation of water substantially as described to prevent accumulations of concrete in the drum.

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

ARTHUR W. RANSOME.

Witnesses:
GENEVIEVE HANNIGAN,
O. T. WEDEMEYER.