Feb. 20, 1940. E. M. UNDERWOOD 2,190,896

REVOLVING CONE MIXER

Filed Jan. 24, 1938

Fig. 1.

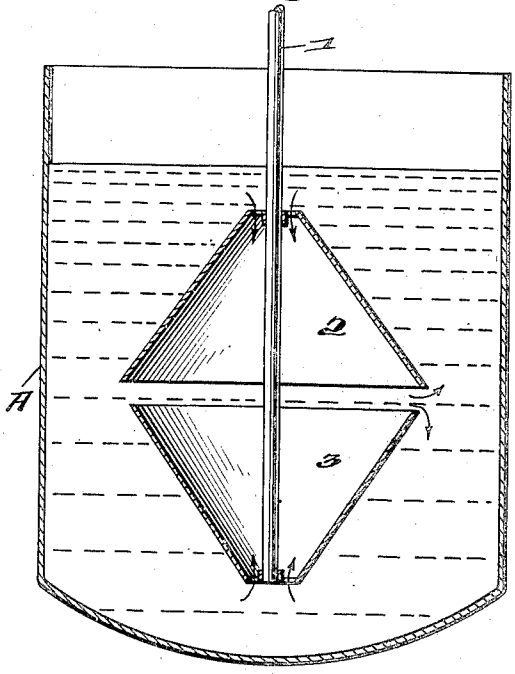


Fig. 3.

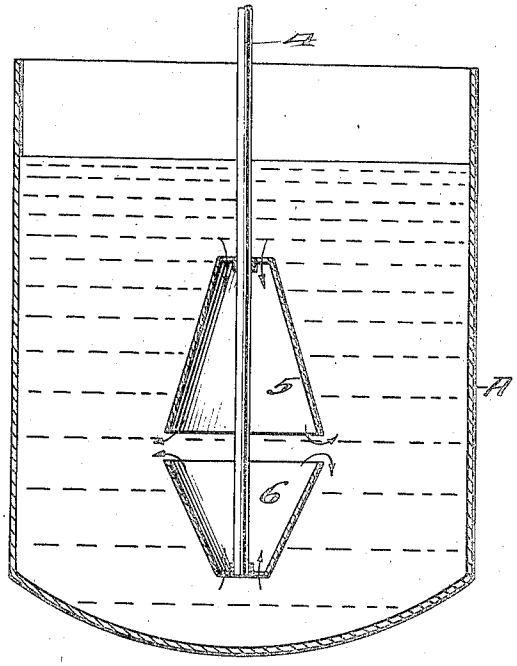


Fig. 2.

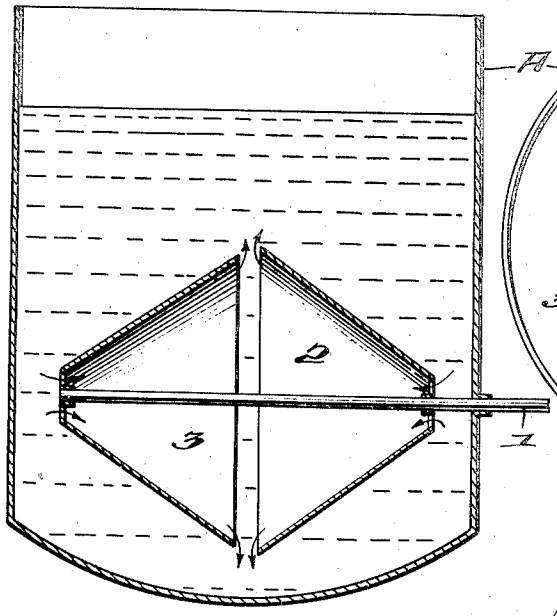
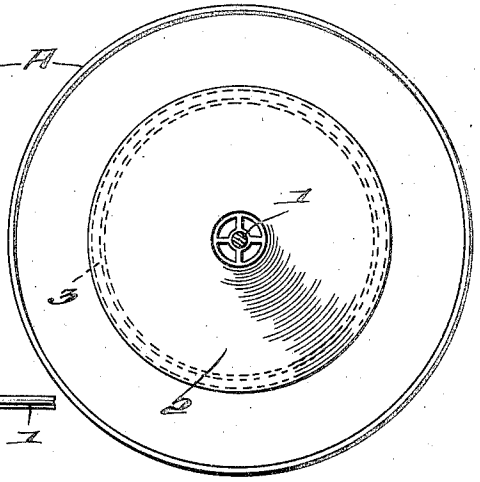


Fig. 4.



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REVOLVING CONE MIXER

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Application January 24, 1938, Serial No. 186,717

3 Claims. (Cl. 259—96)

My invention relates to an improvement in revolving cone mixers.

This invention is of the nature of the various forms of cones disclosed in my application, Serial No. 157,191, filed in the U. S. Patent Office, April 3, 1937, and embodies a development of the several forms of mixers disclosed in that application.

The primary object of the present invention is to provide complete and uniform mixing of various liquid and semi-liquid solutions by creating a differential in speeds of discharge of the liquid from the cones, with the result that the same material will not repeatedly meet at the discharge ends of the cones, but the discharging flow will constantly meet different materials, all of which is accomplished as has been fully demonstrated by experimentation in a very simple way by differential proportioning of the cones, and this might be accomplished by either a difference in diameters of cooperating cones, or a difference in length of these cones, the result of which is that the flow from one cone is at a greater speed than from the other.

In the accompanying drawing:

Fig. 1 is a vertical sectional view of a form of the invention;

Fig. 2 shows the same disposed horizontally;

Fig. 3 is a modification; and

Fig. 4 is a plan view of the form illustrated in Fig. 1.

Referring to Fig. 1, A represents the usual tank; the numeral 1, the rotary shaft; and 2 and 3 are the two cones secured to the shaft 1.

Cones 2 and 3 are shown opposed to each other, and the cone 2 is of greater diameter than the diameter of cone 3, thus providing a difference in pitch and consequently speed at the discharge end of the cone, with the result that the liquid issuing from the cone 2 exceeds the speed of the discharge from the cone 3, because of the faster travel of cone 2 at its periphery.

While this is illustrated in vertical form, the foregoing elements might be arranged horizontally or in any other position for that matter within the tank A.

Also, it is obvious that the relative difference in diameters of the discharge ends of the cones might be varied with respect to each other, so long as a suitable differential in pitch is preserved.

On the form shown in Fig. 3, the difference in pitch between the cones is taken care of by making one cone, namely cone 5 in this instance, of greater length than cone 6. Both are secured to the shaft 4.

It will be understood that the position of the cones 2 and 3, and 5 and 6, might be reversed by inverting the shafts 1 and 4, or in some other way.

While I have shown one pair of cones only in the drawing, these might be arranged in series on the same shaft.

By reason of the foregoing arrangement, the differential in relative speeds at the open or discharge ends creates a faster discharge and circulation from the cone of greater pitch, and in consequence a return of the material to meet the material discharging from the other cone at a different point or area in its flow, thereby accomplishing greatly improved mixing results as compared with former practices in which substantially the same material pumped through the cones repeatedly meets at the central discharge. In other words, if there is a difference in pitch between the two cones, the material will have a different pumping volume and speed of travel in the course of its repeated circuits, so that when the materials leave the cones on the way to the outer end and return, the material in one cone will revolve faster than in the other, and consequently the same materials will not return to a given place at the same time and come in contact again when the two discharging currents meet.

I claim:

1. A mixer including a tank, a rotary shaft, hollow cones secured on the shaft in pairs and discharging toward each other, one cone of greater diameter than the other.

2. A mixer including a tank, a rotary shaft, cones secured on the shaft in pairs and discharging toward each other, one cone of greater length than the other.

3. A mixer including a tank, a rotary shaft and cones of different pitch carried by the shaft, the cones having free interiors and discharging toward each other in opposite directions so that different particles of the contents constantly meet at the outlets of the cones.

ELVIN M. UNDERWOOD.