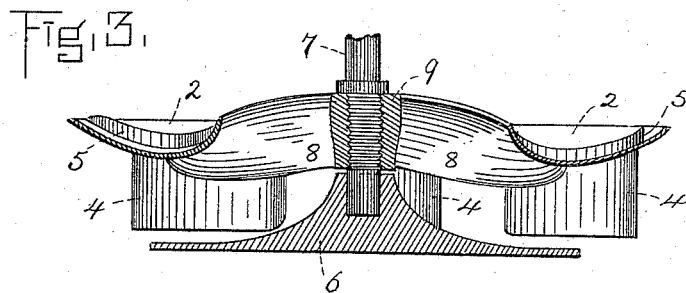
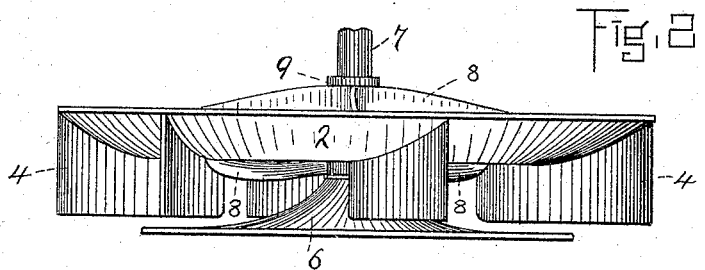
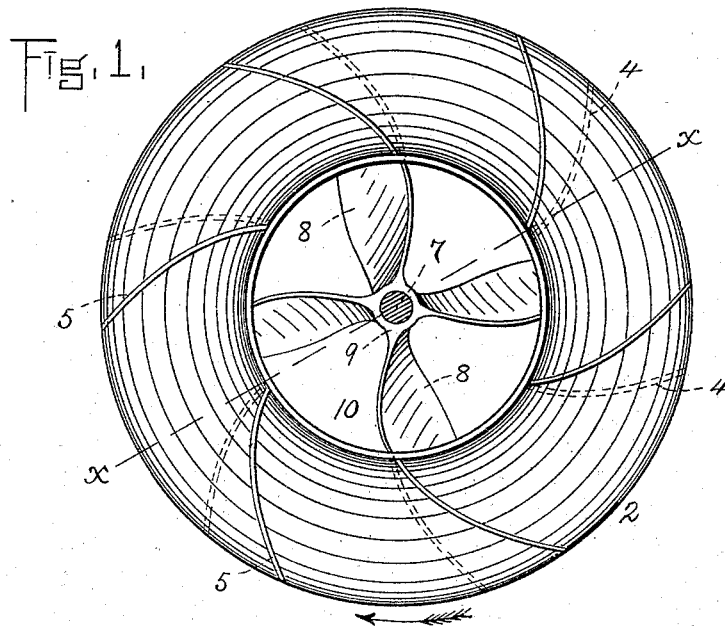


(No Model.)

R. SMITH.  
MIXING APPARATUS.

No. 492,475.

Patented Feb. 28, 1893.



Witnesses.

John A. Dougherty  
Francis C. Stanwood

Inventor.

Richard Smith,  
by H. C. Lodge, Atty.

# UNITED STATES PATENT OFFICE.

RICHARD SMITH, OF SHERBROOKE, CANADA.

## MIXING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 492,475, dated February 28, 1893.

Application filed February 18, 1892. Serial No. 421,980. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD SMITH, a citizen of the Dominion of Canada, residing at Sherbrooke, in the county of Sherbrooke and Province of Quebec, Canada, have invented certain new and useful Improvements in Mixing Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in agitators or mixing apparatus provided with a central feed and a circumferential discharge, whereby a thorough boiling motion can be produced to more effectually mix the particles in process and thereby make a homogeneous liquid as paints, pulp.

This invention may be considered as relating to and an improvement upon an apparatus described in United States Patent No. 473,530 issued April 26, 1892, in my name.

The drawings herewith presented show in Figure 1 a plan; Fig. 2 a side elevation and Fig. 3. a vertical section on line *xx* in Fig. 1. of a mixing apparatus embodying my invention.

As before premised this invention relates to that class of mixing apparatus in which a central feed is combined with a circumferential discharge, and my improvements relate to the peculiar construction, whereby the circulation or boiling action is increased and rendered more thorough. In the present instance I have shown at 2 a revoluble annular plate which is concave in cross-section and of varying curvature, this being the least at the circumference, and preferably increasing toward the inner portion in order to cause an outward flow of those particles which may rest upon its upper side. The under side is furnished with pendent vertical blades 4 tangentially disposed, see Fig. 1, and of considerable depth, while the upper side is equipped with similarly disposed ribs 5 of much less depth. Said plate is adapted to revolve about a conical casting or deflector 6, which is to be bolted down, wherever the apparatus is to be used

especially in vats employed in paper mills for the storage of paper or wood pulp, and where it is particularly desirable to prevent the particles composing it from settling, so as to maintain the whole as a homogeneous mass. Said deflector extends up within the rotary plate which fits over it and serves as a bearing for a driving shaft 7 which is stepped thereupon. To connect this annular plate 2 with the shaft I have provided arms 8. 8. preferably radially disposed and cast integral with or bolted to the plate at one extremity, and with a central hub 9 at the opposite extremity. These arms are positioned in the central opening 10, which serves as the feed orifice. In the present instance the hub is interiorly screw-threaded and engages the lower end of the shaft likewise screw-threaded. Moreover these arms or interconnecting webs are made as warped surfaces after the manner of propeller or screw-blades, and co-operate with the conical deflector before mentioned. Thus it is evident from the position of said arms during rotation of the apparatus that their function is to eject and crowd the liquid particles in contact therewith against the conical deflector, at the same time imparting radial movement outwardly, which motion is superinduced by the action of the blades on the under side of the plate 2. Furthermore such particles, as cannot pass through and into the central feed opening 12, but which rest upon the upper side of said annular plate are operated upon by the ribs 5, and the peculiar dished surface, of said plate. Thus every element in shape and function tends to force the liquid particles from the center outwardly. Whether said particles pass through the feed opening to be subsequently operated upon by the arms 8, 8, and blades 4, or whether they contact upon the upper side of the annular plate, there is a conjoint effect to impart to the particles a radial action with an upward motion.

What I claim is—

1. In an agitator the combination with a rotary shaft, and a series of helical surfaced arms affixed thereupon, of a single imperforate annular plate mounted upon the outer extremities of said arms, and a series of tangential blades secured to the under side of

said plate and extending from the inner edge of said plate outwardly, substantially as and for purposes specified.

2. In combination with a rotary shaft and  
5 a conical deflector as a step for said shaft, a concave annular plate, a series of blades attached to the under side, a series of ribs upon the upper sides thereof, and a series of arms composed of warped surfaces, which intercon-  
10 nect said plate with a central hub, substantially as explained.

3. In combination with a stationary conical

deflector, a revoluble shaft, and a series of helical arms attached thereto, a circumscribing annular plate of varying curvature in  
15 cross-section, and the tangential blades and ribs attached thereto which co-operate with the deflector, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD SMITH.

Witnesses:

H. E. LODGE,

FRANCIS C. STANWOOD.