

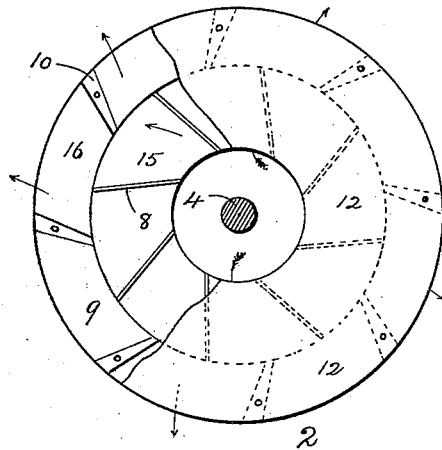
(No Model.)

R. SMITH & P. DILLON.  
MACHINE FOR AGITATING LIQUIDS.

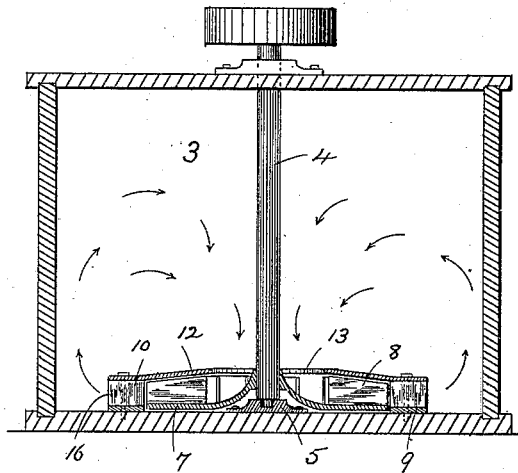
No. 423,285.

Patented Mar. 11, 1890.

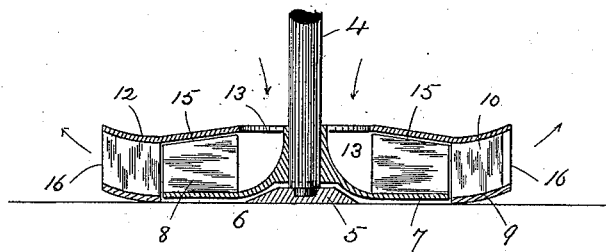
*Fig. 2.*



*Fig. 1.*



*Fig. 3.*



*Witnesses.*

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# UNITED STATES PATENT OFFICE.

RICHARD SMITH, OF SHERBROOKE, QUEBEC, CANADA, AND PETER DILLON,  
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## MACHINE FOR AGITATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 423,285, dated March 11, 1890.

Application filed September 30, 1889. Serial No. 325,582. (No model.)

*To all whom it may concern:*

Be it known that we, RICHARD SMITH, of Sherbrooke, county of Sherbrooke, and Province of Quebec, Canada, and PETER DILLON, of Lawrence, in the county of Essex and State of Massachusetts, United States of America, both citizens of the Dominion of Canada, have invented certain new and useful Improvements in Agitators; and we 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 apparatus for stirring or mixing liquids or liquid material of every description.

The object of our invention is to produce an agitator which is of simple construction, and yet one that will create a rapid, continuous, and thorough circulation of the liquids or liquid material in process.

This agitator consists, primarily, of a rotary head composed of an imperforate bottom or circular disk, upon the upper surface of which are fastened a number of vertical blades obliquely disposed and extending from the circumference inwardly a short distance. The disk is centrally affixed upon a shaft to be continuously rotated. The rotary head is located within a stationary circular casing provided with a series of deflectors likewise obliquely disposed, but oppositely of the blades on the head. Said head is further partially inclosed by an annular band of a width sufficient to cover both the blades and the deflectors, being attached to and resting on the upper edges of the latter. Thus the agitator is provided by such construction with a central feed or inlet opening upon its upper side and with discharge-orifices upon its circumference.

Further peculiarities of construction, as well as the mode of creating a circulation of the liquid material in which said agitator may be placed, will be hereinafter described.

The drawings represent in Figure 1 a sec-

tional elevation. Fig. 2 is a plan of an agitator embodying our invention. Fig. 3 is a diametrical section of the same, showing a slight modification in the form.

In the herewith-annexed drawings, 2 represents an agitator as an entirety located within a vat or other liquid-tight receptacle 3, in which the stirring or agitating process or operation is to take place. Said agitator is composed of a fixed casing and a rotary head. The latter is to revolve, preferably, in horizontal planes, and to such end a vertical shaft 4 is provided, which is to be continuously revolved by some prime motor. This shaft is to be properly stepped at 5 in the vat, and has securely fastened upon its lower end the rotary head 6. The latter is to be adjusted to revolve a slight distance above the bottom of the vat. Said agitator consists of a lower circular plate or disk 7, preferably horizontally placed. Upon the upper surface of said disk are disposed metallic blades 8, obliquely positioned, but set upon their edges and at right angles to the surface of the disk 7. Said blades extend from the circumference of the latter inwardly but a short distance, while the disk is curved or rounded at its junction with the shaft to facilitate the passage of the liquids.

Firmly bolted to the bottom of the vat is placed a ring or casting 9, the inner diameter of which is slightly greater than the outer diameter of the head. Upon this ring are cast or otherwise secured a series of vertical abutments or deflectors 10. Said deflectors are obliquely positioned and oppositely to the blades upon the head. Above said deflectors and resting on their uppermost edges is affixed a circular band 12, of a width sufficient not only to cover the deflectors, but to extend over and conceal the blades upon the head. Thus a portion of the agitator—that nearest the shaft—is left opened or uncovered, and thus this space may be varied as circumstances dictate.

Since this agitator is operated on the principle of the effects produced by rotary movement, it will be seen that the upper uncovered portion of the agitator serves, in connection with the oblique blades, as an inlet-

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aperture 13, while the covered portion formed by the bottom disk of the head, the blades thereupon, and the overlapping circular band 12, creates ducts 15, which discharge into the circular casing by passages between its deflectors, said passages being indicated at 16. In the operation of the agitator these stationary deflectors serve to co-operate with the revolving blades. Thus the tendency of the liquid particles to travel in horizontal planes is overcome and the liquid particles directed against the deflectors have their motion changed from rotary to straight-line movement. As a consequence the liquid particles are expelled outwardly and radially from the casing.

In Fig. 3 is shown a slight modification of the shape of the ring or casing 9 and the circular band 12 in cross-section. Both such elements are slightly dished or bent upwardly, as indicated. The object of such form is to induce an upward oblique movement to the liquid particles in motion as they emerge from the stationary casing by way of the discharge-apertures 16. In this manner, if desired, the efficiency of the agitator can be increased, as it aids in maintaining the circular movement of the liquids or liquid material in vertical planes and prevents such liquid from being expelled directly toward the walls of the receptacle or from moving in horizontal circular planes.

From the above arrangement it will be readily seen that when the agitator is continuously rotated liquid particles in the vat will at once be influenced, since owing to the centrifugal action produced thereby said particles will be directed outwardly by the oblique blades and forcibly expelled through the ducts or discharge-apertures formed by the bottom 7 of the head, blades 8, and band 12. As such liquid particles are displaced from the center, others induced by gravity pass into the upper uncovered portion 13, termed the "inlet" or "feed" aperture, and at once have a rotary divergent motion imparted to them, such movement being constantly accelerated as they approach the circumference of the revoluble head. When such particles composing the liquid leave the head, they are forcibly expelled and directed against the deflectors with the resultant effect that their circular horizontal movement is changed to radial movement and with an upward tendency after leaving the casing, due to the flow of liquid particles toward the shaft 4. By

such revolution and action of the agitator a continuous stirring or mixing of the liquid or liquid material is created in vertical planes, and as indicated by the arrows in the drawings.

In the drawings we have shown the casing with a circular ring resting upon the vat; but this may be omitted without affecting the operation of the agitator, since the deflectors can be bolted directly to the vat-bottom, in which event the latter would serve the same purpose as the said ring 9.

What we desire to claim is—

1. The improvements in apparatus for stirring or mixing liquids or liquid material, consisting of a fixed circular casing with a series of blade-like deflectors, combined with a revoluble head partly inclosed by said casing, a series of straight obliquely-fixed blades upon said head, and a central feed and a circumferential discharge, substantially as and for purposes described and specified.

2. An agitator composed of a revoluble shaft, an imperforate disk or bottom secured thereto, a series of blades positioned edgewise on its upper surface, a circular casing furnished with upright deflectors co-operating with said blades, and a circular band which covers both deflectors and blades, substantially as herein stated.

3. A revoluble agitator having a fixed casing composed of a circular ring, a series of deflectors on its upper surface and a circular band which rests above and extends inwardly therebeyond, combined with a disk, a central shaft, the blades oppositely positioned to the deflectors, a central inlet 13 for vertical feed, and the passages 16 for horizontal outflow, substantially as set forth.

4. An agitator adapted to be rotated by a central shaft and provided with a central inlet 13, connecting with a series of ducts 15, created by an imperforate bottom disk, a series of blades thereupon, and a stationary circular band extending over said blades, combined with a circumferential discharge formed by a fixed circular casing, a series of deflectors, and a circular band which rests above the latter, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

RICHARD SMITH.  
PETER DILLON.

Witnesses:

H. E. LODGE,  
FRANCIS C. STANWOOD.