Jan. 18, 1966 E. F. HILL 3,229,965

MIXING DEVICE

Filed Dec. 28, 1964

Fig. 1

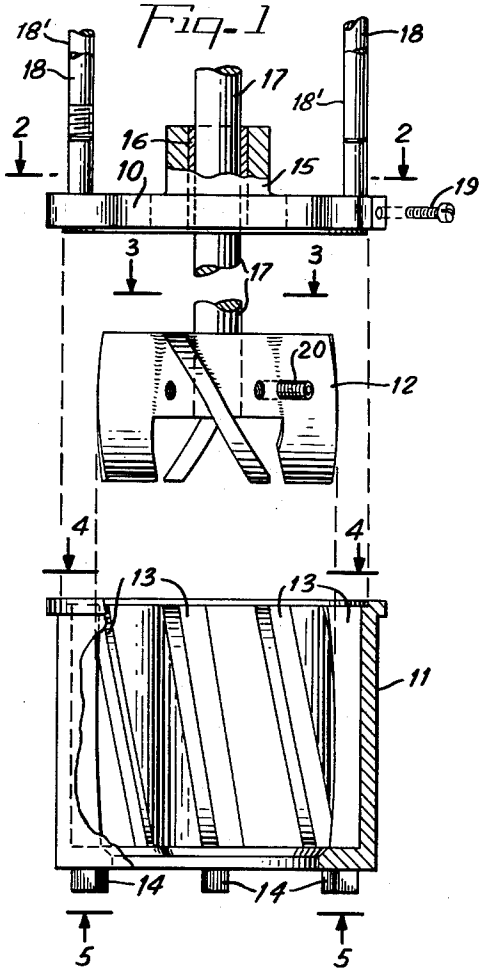


Fig. 2

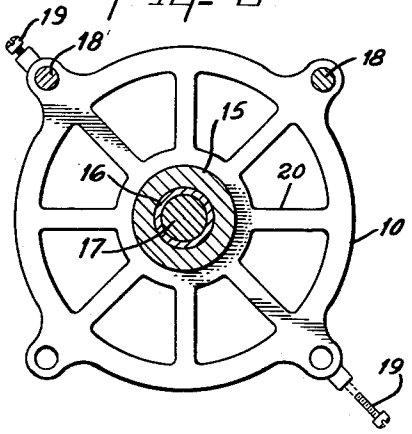


Fig. 3

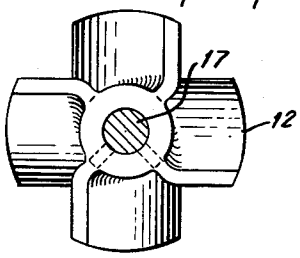


Fig. 4

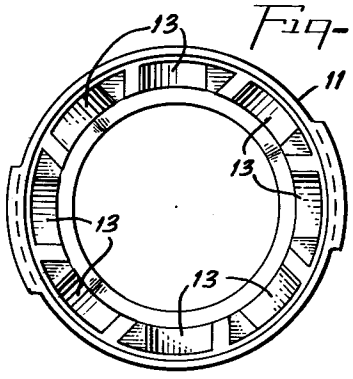
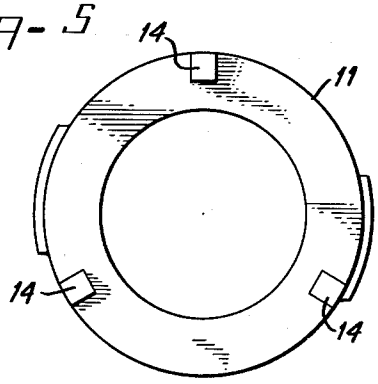


Fig. 5



INVENTOR.
EDWARD F. HILL

United States Patent Office

3,229,965

Patented Jan. 18, 1966

3,229,965

MIXING DEVICE

Edward F. Hill, 97 Winthrop Road, Hillsdale, N.J.

Filed Dec. 28, 1964, Ser. No. 421,548
4 Claims. (Cl. 259—95)

This application is a continuation-in-part of my application Serial No. 69,417, filed November 16, 1960, now U.S. Patent 3,197,181, and application Serial No. 330,902, filed December 16, 1963, now U.S. Patent 3,197,182.

My invention relates to a device for mixing, blending, and homogenizing fluid constituents in which a bladed rotor enclosed in a housing and cooperating with the housing is driven by any suitable means.

In application Serial No. 69,417, now Patent No. 3,197,181, I have disclosed a device for homogenizing fluid constituents employing a mixing head divided transversely in two portions, the upper portion of which is radially partitioned to form a plurality of sector-shaped passages which constitutes a stator through which the constituents flow in a plurality of streams, and a lower portion which houses a relatively flat bladed propeller which draws the mixture into the chamber and forces it through the sector-shaped passages of the stator against a movable deflector plate.

In application Serial No. 330,902, now Patent No. 3,197,182, I have disclosed an improved modification of the device disclosed in the earlier application in which the movable deflector plate is replaced by a similar mixing chamber positioned directly above the lower mixing chamber but is reversed with respect to the lower mixing chamber so that the streams emerging from the respective stators converge and produce more effective mixing action.

In accordance with the present invention, I have now found that if the portion of the mixing chamber in which the rotor or propeller is housed is provided with internal helical ribs or fins, and the edges of the propeller blades are bevelled to match the curvature of the ribs, more effective mixing action occurs due to greater shearing action between the propeller blades and the housing.

The invention will be described in greater detail with reference to the accompanying drawing in which:

FIG. 1 is an exploded view partially in section of a mixing head according to the invention;

FIG. 2 is a top plan view taken along the lines **2—2** of FIG. 1;

FIG. 3 is a plan view taken along the lines **3—3** of FIG. 1;

FIG. 4 is a plan view taken along the lines **4—4** of FIG. 1; and

FIG. 5 is a bottom view taken along the lines **5—5** in FIG. 1.

Referring to the drawing, the mixing chamber is divided into two portions, an upper portion **10**, which serves as a stator, and a lower portion **11**, which houses a rotor or propeller **12**. The lower portion is provided internally with helical ribs **13** and bosses **14** on its base. The end surfaces of the propeller blades, which may have a pitch up to about 45°, are tapered to match the ribs of the housing while, as disclosed in application Serial No. 69,417, now Patent No. 3,197,181, the upper edge of the rotor is closely spaced and parallel to the opposing edges of the radial partitions of the stator.

The upper portion is divided into a plurality of sectors by partitions **20** which extend between the outer casing and a central hub **15** in which a bronze bushing **16** is provided, a drive shaft **17** being journalled in the bushing for driving the propeller which is locked to the shaft by a locking set screw **20**.

Both portions of the mixing chamber are supported by threaded guide rods **18** which extend through tapped bores in the upper and lower portions of the mixing chamber and are secured by locking screws **19**. Since these guide rods can be easily removed, replacement of the propeller is facilitated.

Thus, when the mixing head is submerged in a fluid containing constituents which are to be homogenized, the propeller draws fluid into the lower portion of the chamber where, due to rotary action of the propeller in cooperation with the helical ribs of the housing, the fluid is sheared and forced through the sector-shaped passageways insuring thorough mixing action.

While I do not wish to be limited to the following examples, I have found that this improved mixing head can be used to mix paints, mayonnaise, emulsions of bituminous substances, and the like. The improved mixing head may be used with a movable deflector plate as disclosed in my earlier application, or it may be used in tandem as disclosed in my later application.

While I have described my invention in connection with a particular embodiment thereof and for specific application, I do not wish to be limited thereto as other modifications and applications thereof will be readily apparent to those skilled in the art without departing from the spirit and scope of the invention as it is defined in the appended claims.

What I claim is:

1. A mixing device comprising a tubular housing divided transversely into an upper and lower portion, said upper portion being divided into a plurality of sector-shaped passageways by a plurality of radial partitions, and a multi-bladed rotor disposed within the lower portion of said housing, said rotor having an upper edge closely spaced and parallel to the opposing edges of the radial partitions, the internal wall of said lower portion having a plurality of projecting helical ribs which cooperate with the blades of said rotor to produce shearing action on a fluid which is drawn into the chamber when said rotor is rotated, said lower portion being otherwise unobstructed.

2. A mixing device as claimed in claim **1**, in which the ends of the propeller blades are tapered to match the projecting ribs from the wall of the housing.

3. A mixing device as claimed in claim **2** in which the propeller blades have a pitch of up to about 45°.

4. A mixing device as claimed in claim **3** in which the upper and lower portions of the housing are separate and are secured together by removable guide rods to facilitate replacement of the rotor.

References Cited by the Examiner

FOREIGN PATENTS

777,271 6/1957 Great Britain.

WALTER A. SCHEEL, *Primary Examiner.*

ROBERT JENKINS, *Assistant Examiner.*