Nov. 8, 1966 E. A. DAUBMAN 3,283,909

CENTRIFUGAL SEPARATOR

Filed Dec. 20, 1963

Fig.2

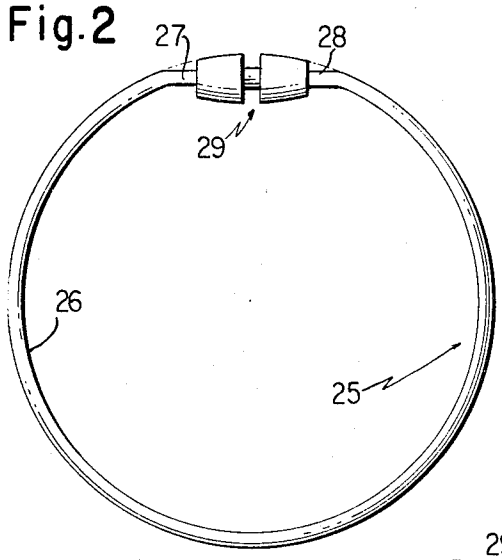
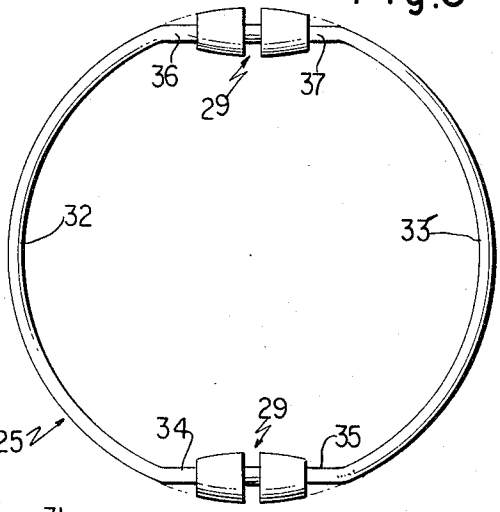


Fig.3



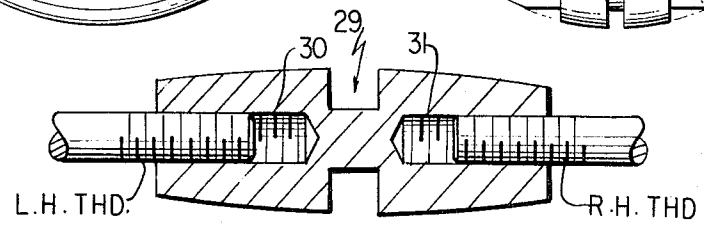


Fig. 4

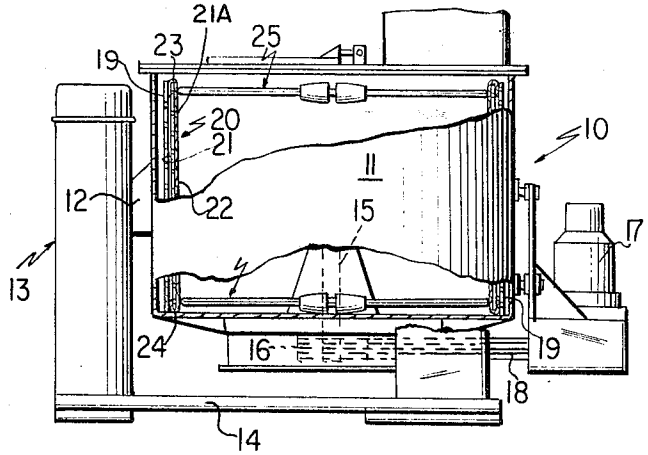


Fig.1

INVENTOR.
EDWARD A. DAUBMAN

BY
Robertson & Smythe
ATTORNEYS

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CENTRIFUGAL SEPARATOR

Edward A. Daubman, East Moline, Ill., assignor to Ametek, Inc., New York, N.Y., a corporation of Delaware

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This invention relates to centrifugal separators and particularly to an improved retaining means for maintaining a lining within the basket of the centrifugal separator and capable of being easily attached to and removed from said basket.

When fine solids are to be subjected to centrifugal force, they are retained on a suitable lining placed in the basket. Emphasis must be placed upon the careful choice and proper installation of this lining. Particle size of solids to be retained, and maximum strength to resist pressure and abrasion are the chief requirements of a lining. To promote drainage, a lining should always be separated from the perforated basket wall by a supporting backing screen. To minimize leakage of solids, sealing inside the basket at the top and bottom circumferences must be provided by folding back the top and bottom edges of the lining around the corresponding edges of the backing screen. Effective sealing is finally accomplished by the installation of expansion rings which, when tightened, force the top and bottom edges of the lining and screen tightly against the basket wall.

The principal object of this invention is to provide a perforated basket of a centrifugal separator with a readily attachable, expansible lining retaining means which will effectively force the top and bottom edges of the lining into sealing relation with a perforated basket.

Another object of the invention is to provide such a lining retaining means which will not interfere with the stationary housing within which the basket rotates.

Still another object of the invention is to provide such a basket and lining retaining means which will not impart any imbalance to the basket to which it is attached.

In one aspect of the invention, a centrifugal separator may comprise a housing that may be suspended from standards at spaced points about the housing so that the housing may be capable of limited oscillatable motion. A perforated basket may be mounted within the housing for rotation about a vertical axis. It may be connected to a vertical spindle that extends downwardly through the bottom of the housing and to which pulley means may be connected, said pulley means being belted to other pulley means on the output shaft of a driving motor.

In another aspect of the invention, a lining of filter media may be located on the interior surface of the perforated basket and it may be held from engagement with the basket wall by a screen. The top and bottom edges of the lining may be folded over the corresponding edges of the screen, between it and the inner surface of the basket.

In still another aspect of the invention, a perforated protecting plate may be made from relatively thin sheet metal, and when mounted within the basket, its peripheral wall may be placed against the filter media protecting it from damage during the unloading of collected solids.

In a still further aspect of the invention, one or more expansible lining retaining bands may be located within the basket and may be expanded into firm contact with the protecting plate, forcing the lining of filter media into firm sealing relation with the interior wall of the basket.

In still another aspect of the invention, the bands may be made of a single loop construction having turnbuckle means joining the free ends thereof so that the loop can be expanded or contracted by simply turning the turnbuckle means.

In a still further aspect of the invention, the band may be made of semicircular straps provided with diametrically

disposed turnbuckle means for facilitating expansion and contraction of the band.

The above, other objects and novel features of the invention will become apparent from the following specification and accompanying drawing which are merely exemplary.

In the drawing:

FIG. 1 is an elevational view of a centrifugal separator to which the principles of the invention have been applied;

FIG. 2 is a plan view of a band used in the basket of the separator of FIG. 1;

FIG. 3 is a modified form of the band of FIG. 2;

FIG. 4 is a sectional view of a turnbuckle means used with the bands of FIGS. 2 and 3.

Referring to the drawing, the principles of the invention are shown as applied to a centrifugal separator **10** including a housing **11** having flanges **12** at three equally spaced points about its periphery that extend into standards **13** on a base **14**. Only one of the standards **13** and flanges **12** is shown. The flanges **12** may be connected to a flexible suspension within its corresponding standard **13** so that the housing has the capability of slight oscillatory movement during operation.

The housing **11** may include a vertical spindle **15** therein that extends out through the bottom of the housing and has a pulley **16** fixed to its lower end. Pulley **16** may be connected to a pulley on the output shaft of a drive motor **17** by belts **18**.

A basket **19** may be mounted within the housing **11** and connected to the spindle **15** for rotation therewith. The basket **19** may be open at the top for the reception of material to be centrifuged, and it may be made of perforated sheet material which is relatively thin with respect to basket diameter.

In order to retain fine solids during a centrifugal operation, a lining **20** is located within the preforated basket **19**. Lining **20** may include a cylindrical screen **21** having a layer of fabric **22** or other solids collecting media covering the inner surface of the screen **21**. The upper and lower ends **23** and **24** of the layer **22** may be folded over the upper and lower edges of the screen **21** and may lie between the screen and the inner periphery of basket **19**. A protective sheet of perforated sheet metal **21A** may surround the inner periphery of the filter lining as to prevent damage to the lining during removal of solids from basket **19**. In order to hold lining **22**, screen **21** and protective sheet **21A** in sealing relation with the inner surface of basket **19**, band means **25** may be expanded into firm engagement with the inner periphery of the lining at a plurality of points along the depth of the basket **19**, and generally at the top and bottom of basket **19**.

Referring to FIG. 2, the hoop **25** may comprise a substantially circularly formed piece of rod **26** having end portions that are formed as a chord of the circular form. The opposite ends **27, 28** of the rod **26** lie in aligned relation and may be provided with righthand and lefthand threads. Referring to FIG. 4, a turnbuckle **29** may include aligned recesses **30, 31** that are provided with internal threads that mate with the threads on the ends **28** and **27**, respectively, of rod **26**. The outer surface of the turnbuckle **29** may include surfaces that generally conform to the circular form of the hoop **25** so that lying within the extent of the chord portions, they provide a continuation of the circular hoop **25** through this chord portion.

Referring to FIG. 3, the expansible hoop **25** may be made of two substantially semicircular rods **32** and **33**, the ends **34, 35** and **36, 37** of which are bent to lie parallel with each other, and when the semi-circular rods **32** and **33** are arranged as shown in FIG. 3, the ends **35, 37** and **34, 36** lie in aligned relation. Ends **35, 37** and **34,**

36 have righthand and lefthand threads, and a turnbuckle 29 connects ends 35, 37 and 34, 36.

From the foregoing it is evident that expansible hoop means have been provided that can be located at one or more locations within the basket 19 of a centrifugal separator and expanded into firm contact with a lining 20, screen 21 and sheet 21A, forcing the same into intimate contact with the inner wall of the basket 19 to retain fine solids within the slurry being centrifuged.

Although the various features of the combined centrifugal basket and lining retaining means have been shown and described in detail to fully disclose two embodiments of the invention, it will be evident that changes may be made in such details and certain features may be used without others without departing from the principles of the invention.

What is claimed is:

1. In a centrifugal separator, a housing; a spindle mounted in said housing; a basket made from a perforated sheet material connected to said spindle; a lining within said basket and including a cylindrical screen having its inner surface covered with a fabric lining; a protective sheet of perforated metal on the inner surface of said fabric lining; expansible and retractable hoop retaining means within and adjacent at least one end of said basket; said retaining means including two substantially semicircular elements, each end of one element and each end of the other element being arranged in an aligned pair, each aligned pair of ends being bent inwardly and extending along their length in a line defined by a plane passing through a chord of said hoop, turnbuckle means adjustably connecting the ends of each aligned pair to one another, said turnbuckle means having an outermost surface extending outwardly to substantially the outermost periphery of said hoop whereby said hoop and said turnbuckle means have coincident outer surfaces which engage the inner surface of said metal sheet; and means for rotating said spindle.

2. In a centrifugal separator according to claim 1, wherein said expansible hoop retaining means are located adjacent each of the ends of said basket, and the substantially semicircular elements are threaded; and wherein said turnbuckle means connect the threaded ends of one element to the ends of the other.

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REUBEN FRIEDMAN, *Primary Examiner.*

J. DE CESARE, *Assistant Examiner.*