Oct. 8, 1946. W. R. DODGE 2,408,741

SELF-CLEANING STRAINING DEVICE

Filed Aug. 11, 1944 2 Sheets-Sheet 1

Fig. 1.

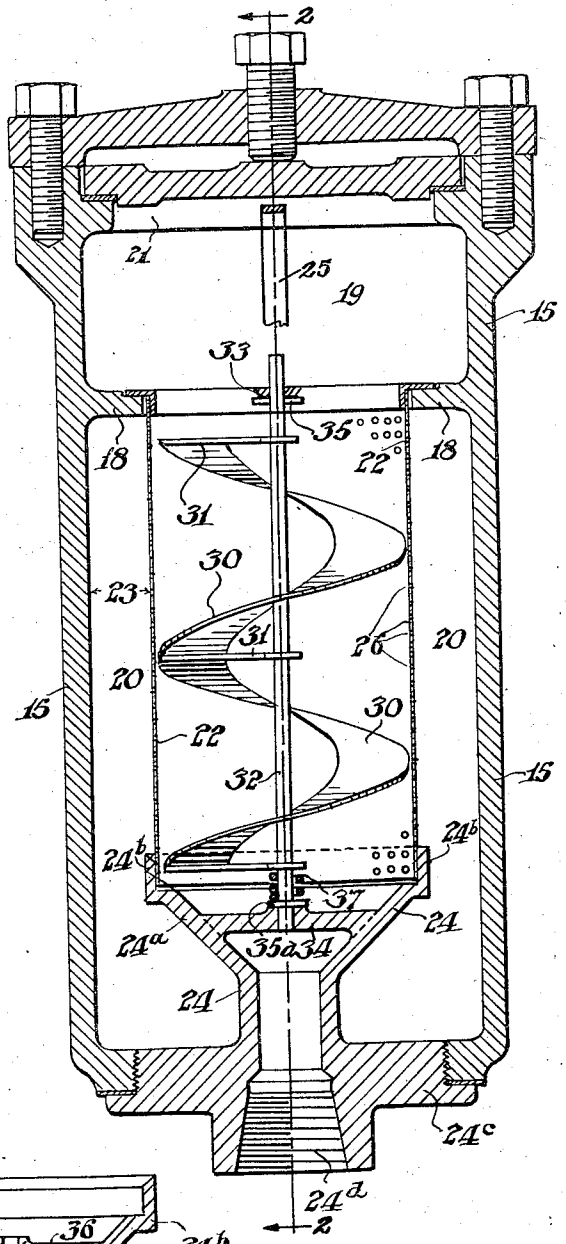
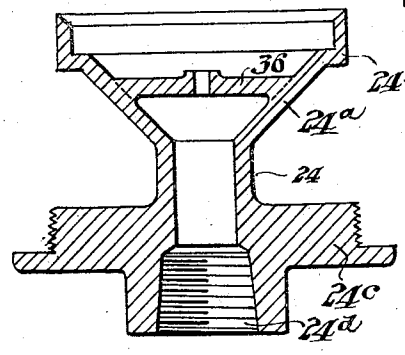


Fig. 3.



Inventor:
William R. Dodge,
By Ino Coosdale
Attorney.

Oct. 8, 1946. W. R. DODGE 2,408,741

SELF-CLEANING STRAINING DEVICE

Filed Aug. 11, 1944 2 Sheets-Sheet 2

Fig. 2.

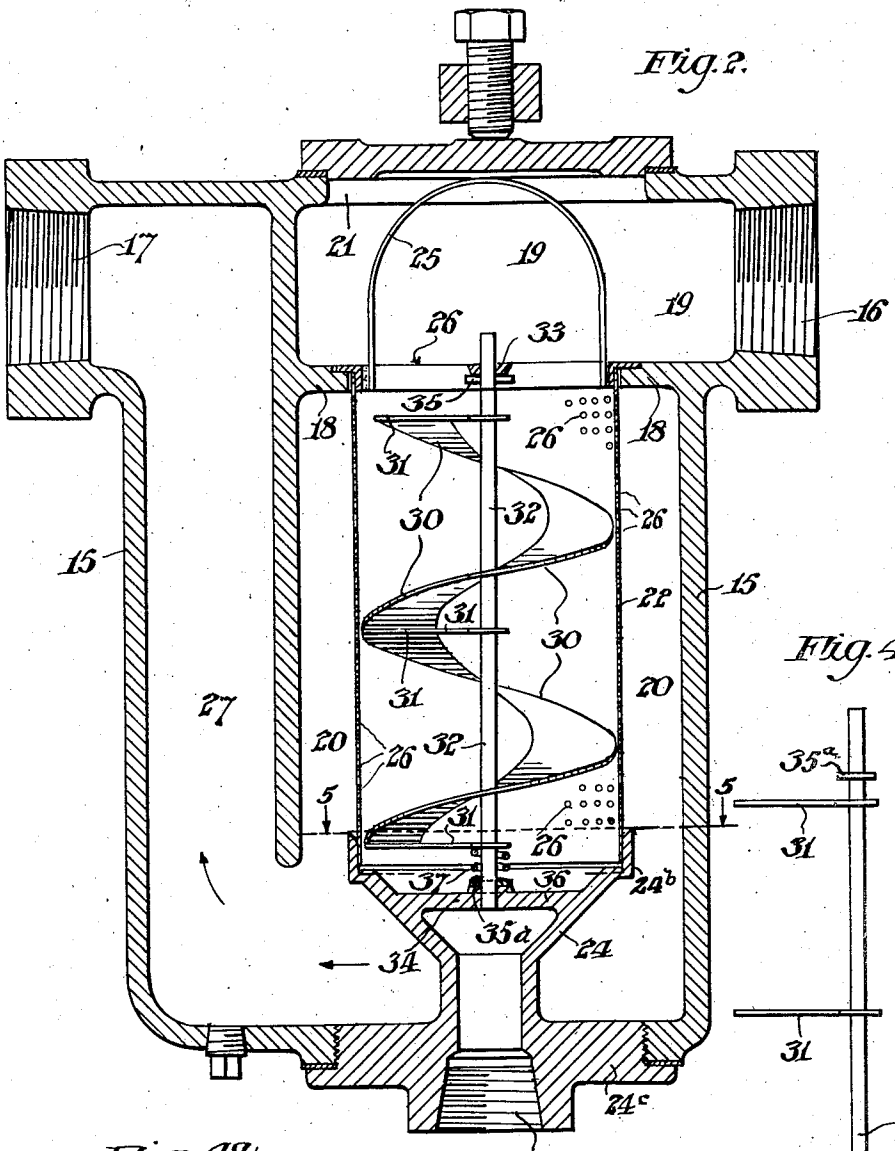
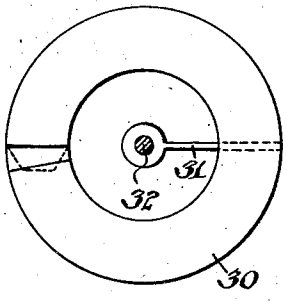


Fig. 4.

Fig. 4a



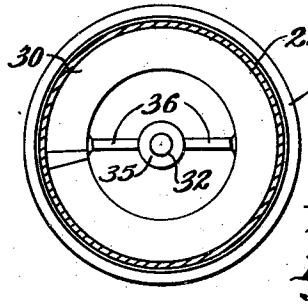


Fig. 5.

Inventor
William R. Dodge,
By Jno. Bowdle
Attorney.

Patented Oct. 8, 1946

2,408,741

UNITED STATES PATENT OFFICE

2,408,741

SELF-CLEANING STRAINING DEVICE

William R. Dodge, Aldan, Pa., assignor to Hajoca Corporation, a corporation of Delaware

Application August 11, 1944, Serial No. 548,988

1 Claim. (Cl. 210—167)

1

My invention relates to improved method and means for straining fluids and liquids.

The following are among my objects:

To improve the method of maintaining the strainer unit clean, while operating, thereby securing the maximum of efficiency.

To conserve a substantial bulk of foreign material which would ordinarily go to waste.

To utilize the pressure of the fluid passing from inlet to discharge to provide the power necessary for the cleaning operation.

To provide a shearing action upon the foreign material adhering to the strainer-unit in order to separate smaller parts of foreign matter from larger parts, in order to prevent unnecessary waste.

To provide improvements in construction, assembly and action in order to attain efficiency and economy as a whole.

Referring to the drawings, which illustrate merely by way of example, suitable means for effecting my invention—

Fig. 1 is a central vertical section.

Fig. 2 is a central vertical section on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary section on a larger scale.

Fig. 4 is a detail in elevation of the shaft for helix assembly.

Fig. 4ª is a top plan view of the helix.

Fig. 5 is a plan section on the line 5—5 of Fig. 2.

Similar numerals refer to similar parts throughout the several views.

The device herein described suitably effecting the invention, comprises the chambered body or housing 15 provided at the top with an inlet port 16 and a discharge port 17. This housing is provided with an inwardly projecting annular flange 18 near the top and cooperating in forming an intake space 19 for receiving the fluid entering at 16. A basket 22 has a foraminous wall, that is provided with perforations such as 26 in its wall. This basket is supported at the top by the flange 18. It is also supported at the bottom by a plug formation 24 threaded into the bottom of the housing.

The basket 22 is cylindrical in form, open at the top to the intake space 19, and spaced from the surrounding wall of the housing 15.

This space 20, surrounding the basket, receives the fluid delivered through the perforations 26 and delivers the same to the discharge 17.

The housing is adapted to be opened at the top and at the bottom. Suitable closure elements

2

are provided for said openings as shown. A handle or bail 25 is secured to the basket for convenience in handling.

The construction so far described is more or less similar to constructions found in the prior art.

In accordance with my invention a shearing blade in the form of a helix is mounted in the basket on bearings at either end. This shearing element is formed into a helix mounted upon a rotatable shaft, co-axial with the basket—the perimeter of the helix having a close movable fit with the inner wall of the basket.

The phrase "foreign material" as used in this case is intended to include any particles or substance in or of the liquid that will not normally pass through the perforations.

The plug formation 24 is threaded into the open lower end of the housing 15 and serves to close said lower end when in operation, or to open said lower end for cleaning (blow down) or the like.

More particularly the formation 24 is funnel-shaped as at 24ª provided with an annular flange 24ᵇ for receiving the lower end of the basket 22. Below the funnel-shaped formation is a closure disc 24ᶜ for gaining access to the housing, whereby the basket may be inserted or withdrawn from the housing. A plug controlled port 24ᵈ is provided in the closure disc 24ᶜ for further or supplemental control.

The top of the housing 15 may also be opened and closed by means of a cover-plate, cross-bar and set-screws, in which case a suitable bail 25 may be used. This bail 25 is an arch formation having its lower ends secured to the top of the basket 22 and furnishes convenient means for withdrawing the basket from the housing and for replacing said basket within said housing.

The device and operation, so far as above described, are largely in accordance with the common practice. Among the difficulties encountered in said practice, is the tendency of the straining basket to gather upon its surface, a coating of foreign material, that greatly impedes the straining operation and results in waste of time and material.

Such trouble arises differently in different types of material, and the object of the present invention is to overcome the said tendency, as effectively as possible.

In accordance with my invention I provide a rotating and shearing blade in the form of a helix 30, or turbine.

The perimeter of the helix is normally co-axial with that of the cylindrical basket.

The helix **30** is mounted upon a shaft **32**, also coaxial with the basket, by means of a number of radial arms **31** secured to the spindle or shaft **32**.

The shaft is mounted in bearings of cross bars **33** and **34** at the top, and bottom of the basket. These bearings are supported on suitable cross-pieces associated with the housing.

The radial arms **31** are all fixed upon the shaft **32**. A washer **35a** is slidably mounted on shaft **32** and adapted to rest upon the cross bar **34**. A spring **37** is positioned upon the shaft **32**, between the lowermost radial arm **31** and said bearing in cross bar **34**. By this arrangement, when the helix is pushed downwardly the spring is compressed; when however the spring is permitted to react, the helix is slightly elevated.

When the shaft **32** is spring-actuated upwardly, the washer **35** limits this spring-actuated upward movement of the shaft **32**.

The angle ring is shown in sections in Figs. 1 and 2, and comprises a strip of metal having parallel extensions in planes at right angles and cooperates with the flanges **18** in the support of the basket.

In the usual practice, the medium to be strained is introduced through inlet **16**, into inlet chamber **19** and thence into basket **22**. From basket **22** the bulk of the medium passes through the perforations in the wall of the basket **22** to the space **20** between the basket and the wall of the housing **15** and thence to the outlet or discharge port **17**.

If the medium contains particles of foreign material in appreciable quantity that will not immediately pass through the perforations in the basket wall, the said material is held in suspension in the fluid until a substantial part of same has passed through the perforations.

Such common practice has a number of objections. For example—the foreign material which is separated from the body of the medium has a tendency to adhere to the inner surface of the basket wall. This interferes with the straining operation. This trouble increases as the accumulation on the basket wall increases; thus requiring frequent cleaning of the basket which is expensive and wasteful.

The means and method in accordance with my invention serve to overcome the above cited objections.

The bearings in cross bars **33** and **34** are sufficiently loose to permit not only vertical and rotative movement but also slight rocking or sideway motion for the purpose to be described. In certain cases it may be desirable to provide ball bearings. The helix may be made of sheet metal or cast and may vary in gauge as circumstances require.

The operation employing the helix is as follows: The medium flowing into the top of the basket **22**, will directly encounter the helix blade **30** and, due to the differential pressure or flow from inlet **16** to outlet **17**, will cause the rotation of said helix. Meanwhile part of the medium will pass out through the perforations **26** into the space **20** within the housing.

In accordance with the method and means of the present invention, these objections are largely overcome. For example:

When a particle of foreign material is carried by the flowing medium into a perforation which will not permit passage therethrough, the perforation becomes closed, and the operation impaired. When a particle is carried into, but not entirely through, a perforation, the part that does not pass through the same, is sheared, by the rotating helix at or close to the inner surface of the basket wall, so that the remainder of the particle lodged within the perforation is released and carried clear of the basket wall into the housing space **20**. In this way material is saved and the time required in frequent cleaning also saved.

As the rotation of the helix is continuous it follows that there is no time for undesirable accumulation of particles.

When the part of the foreign material which projects into the basket is sheared from the part lodged in said perforation there is nothing to hold the balance of said foreign matter from passing into the filtered liquid passing through the housing.

When a particle of foreign material happens to be of such character as to render it difficult to dislodge from a perforation, the difficulty can be largely overcome by the mounting of the helix.

An important feature of the invention is that when the mass of medium projecting into the basket is sheared, the same goes into and becomes part of the unstrained medium in the basket, while the balance of said mass medium remaining in the perforation will go into the strained medium surrounding said basket.

This operation may be repeated from time to time, the said mass of unstrained medium may be reduced or even eliminated. This will result in saving of time and material. That is to say, the mass may be gradually worn away, or sufficiently reduced, to permit its passing through the perforation and become part of the strained medium.

It will also be noted that the rotation of the helical blade within the basket, will increase the agitation of the fluid passing therethrough which will facilitate the straining action.

What I claim is:

In a filtering device, the combination of a casing open at the top and bottom and provided at its upper portion with an annular, lateral, inwardly projecting flange, a hollow plug member closing the lower end of the casing and provided with an upwardly extending inverted conical portion and having an outlet for solids, a perforated open ended cylindrical basket arranged within the casing and spaced from the walls thereof and seated upon said conical portion having its upper end arranged within the annulus defined by said inwardly projecting flange, cross bars provided with bearings and located in said conical portion and in the top of the basket, a shaft journaled in said bearings, a helical blade mounted on said shaft in close proximity to said basket for rotation and for shearing material projecting from the interior of the basket wall, an inlet in line with the upper open end of the basket and an outlet located at the top of the casing and communicating with the space between the casing and the basket.

WILLIAM R. DODGE.